

TRIMBLE PERSPECTIVE™

USER GUIDE

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INTRODUCTION

Trimble Perspective is an infield software with an user-friendly interface that puts you in control. It is easy to use. It lets you intuitively:

- Collect and automatically register data in the field.
- Increase the field-to-office productivity with labels, annotations and measurement tools.
- Export to industry standard file formats.

OVERVIEW

As a new Trimble Perspective user, it is a good idea to familiarize yourself with the user interface, and all of its components.

- ▶ [System Specifications](#)
- ▶ [User Interface](#)
- ▶ [Application Settings](#)
- ▶ [Notifications](#)

System Specifications

TABLET: A Trimble T10 Tablet has the below specifications. If you use a commercial tablet instead, ensure it has to meet the minimum specifications of the T10 tablet:

- CPU: Four core processor running at 3.33 GHz
- OS: Windows® 10 IoT Enterprise
- RAM: 8GB
- Graphics: Support for OpenGL 4.4 or higher
- Storage: 256 GB

NOTE – *It is recommended updating the graphic card of your tablet with the most recent version of the driver. Please visit the manufacturer website to get most recent driver version.*

Throughout this user guide, a T10 tablet (or equivalent) will be referred to as a controller.

TRIMBLE PERSPECTIVE: Throughout this user guide, the Trimble Perspective software will be referred to as the software, or the application.

INSTRUMENT: A Trimble X7 instrument is a 3D laser system. Throughout this user guide, the Trimble X7 3D laser system will be referred to as the instrument, or the scanner.

NOTE – *It is recommended updating the instrument with the most recent version of the firmware. Use [Trimble Installation Manager](#) for Windows to update your instrument firmware. For more information, refer to the [Trimble X7 3D laser scanner's user guide](#).*

MEMORY CARD: Trimble recommends using SDHC memory cards (which are by default formatted in the FAT32 file system) with a minimum size of 32GB, a class 10 speed and a temperature ranging from -20°C to

85°C. If you choose to use an extended capacity SDXC memory card, it must meet the specifications given above and must be formatted in the FAT32 file system.

NOTE – Use the Storage management features of the Trimble Perspective software to ensure that the SDXC memory card is formatted in the FAT32 file system.

INSTALLATION: Install [Trimble Installation Manager](#) on your controller, and use it to install and update the Trimble Perspective software.

LICENSING: Every Trimble Perspective application must be licensed in order for you to install and operate the software.

User Interface

The Trimble Perspective software user interface looks typically as shown below. It is a good idea to familiarize yourself with it, and all of the components that are described hereafter.



A - MENU / PROJECT NAME AREA is where the current project name displays and where you can access the Menu panel.

B - INSTRUMENT STATUS AREA is where you can visually check the connection status of the instrument, the type of connection set between the scanner and the controller, and the battery level in the scanner. Click inside this area to open a window and access more detailed information such as the scanner name and the reference number, the space left in the memory card, the Wi-Fi settings, and the power level left in the scanner. From this new area, you can also access again to the **Connections** page (see [Connect to a Scanner, page 18](#)) or to the **Settings** (see [Application Settings, page 10](#)).

C - VIEW AREA is where the collected data displays. See [Views, page 7](#).

D - TOOLS AREA is where you can access the available tools.

- **D1 - STATIONS LIST** opens a panel from which you access the acquired data to view detailed information, run additional task(s). See [Stations List Panel](#).
- **D2 - ANNOTATION TOOL** enables to add and edit annotations. See [Annotate, page 51](#).
- **D3 - 2D MEASURE** enables to measure position(s), distance(s) and area(s) or a surface. See [Measure, page 54](#).
- **D4 - NOTIFICATIONS LIST** opens a panel from which you access the notifications popped-up during a site job. A notification can state a connection status of the instrument, a warning on the battery charge level in the instrument, one of the numerous steps the instrument executes, etc. See [Notifications Panel](#).
- **D5 - ELEVATION FILTER** delimits a display range in elevation by filtering the view upward and downward.

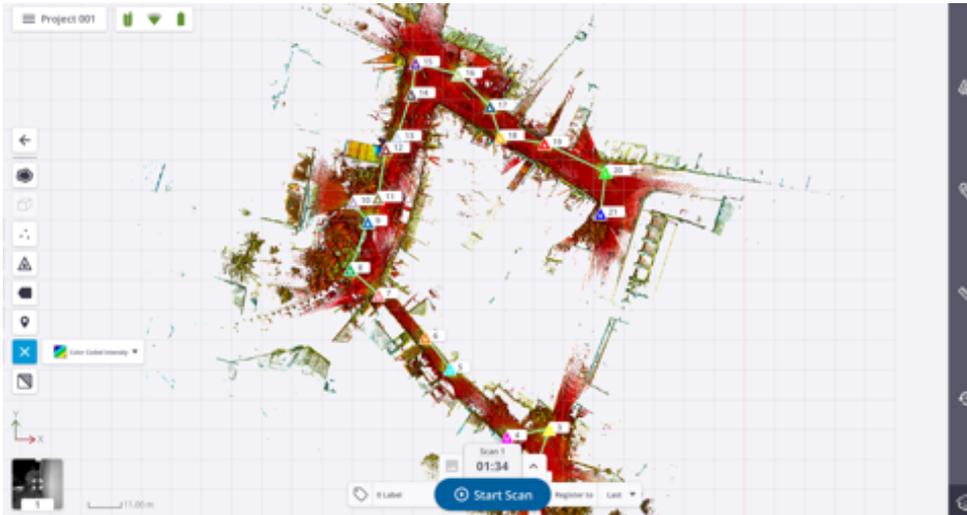
E - SCAN & IMAGE PARAMETERS AREA is where you access the acquisition parameters, launch a scan, and / or add labels. It is available at all times when the software opens and the controller connected to the instrument.

F - VIEW TOGGLE AREA is a shortcut to switch from the current view to another view.

G - DISPLAY SETTING S AREA is where you can access the display, rendering and navigation options. It is available at all times. The number of options varies depending on the view.

Views

MAP VIEW: This view is where the acquired scan data displays locked in 2D and from the **Top View**. For more information, see [Map View, page 29](#).



STATION VIEW: This view is where the acquired scan data displays as a 2D spherical luminance (or colored) image. For more information, see [Station View, page 31](#).

3 OVERVIEW

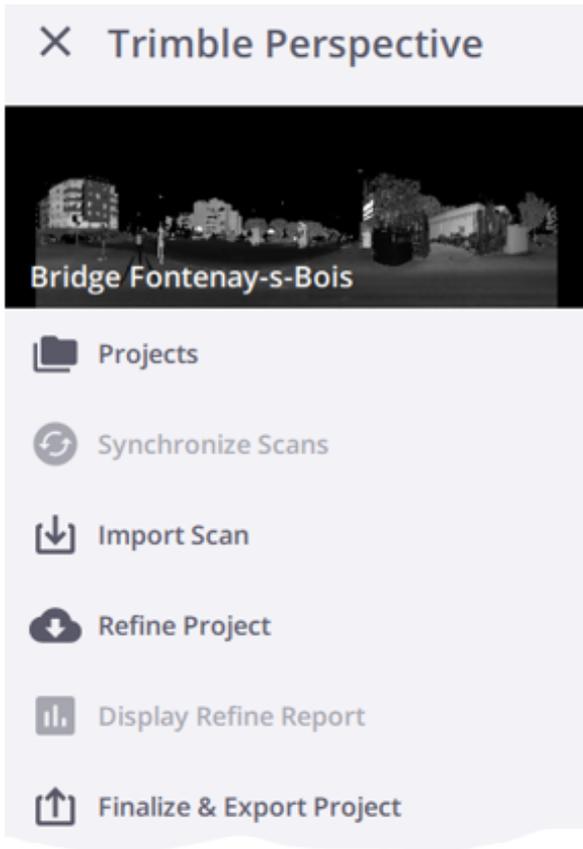


3D VIEW: This view is where the acquired scan data displays free of the 2D lock. For more information, see [3D View](#), page 34.

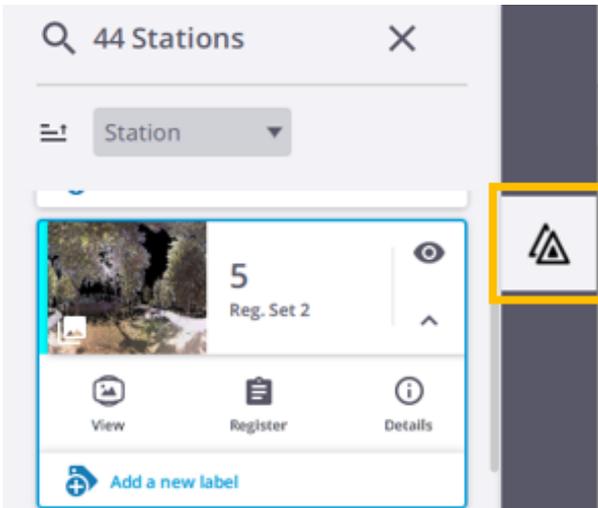


Panels

MENU PANEL: This panel populates the application options. Tap  to display the panel.

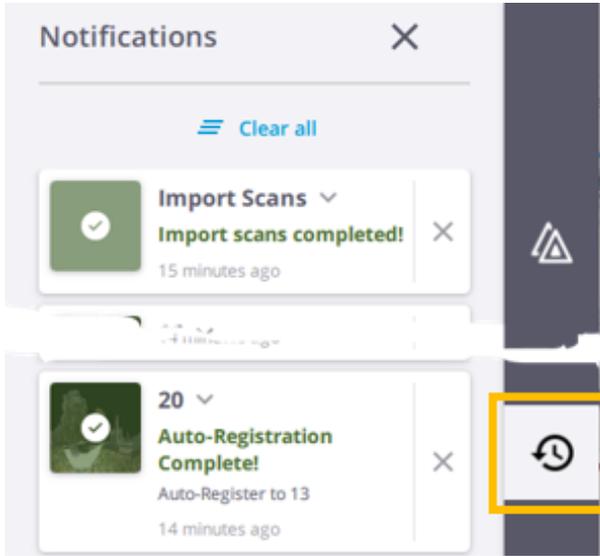


STATIONS LIST PANEL: All the data acquired during a site job are organized in this panel (see [Manage Stations](#), page 48). Tap  to display the panel.



NOTIFICATIONS PANEL: This panel displays a chronological top-down view of everything you do during your working session. Tap  to display the panel.

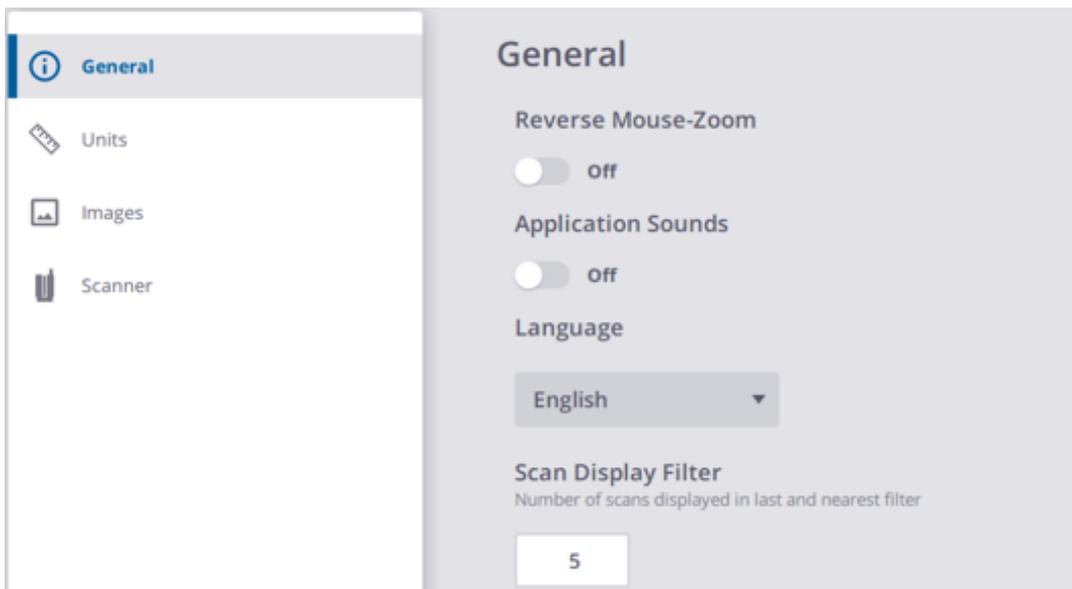
Every process you run in the application, like e.g. importing a scan, is recorded and referred to as a **Notification**, and each notification appears in the panel. Use this list of notifications to chronologically follow the flux of processes. The number above the **Notifications** icon indicates the number of unread notifications. This number drops to zero once the **Notifications Panel** is opened. For each notification, you can see how long the notification has appeared or expand the notification to view the details (see [Notifications, page 13](#)).



Application Settings

Access the application **Settings** by tapping **Menu**  / **Settings** .

General



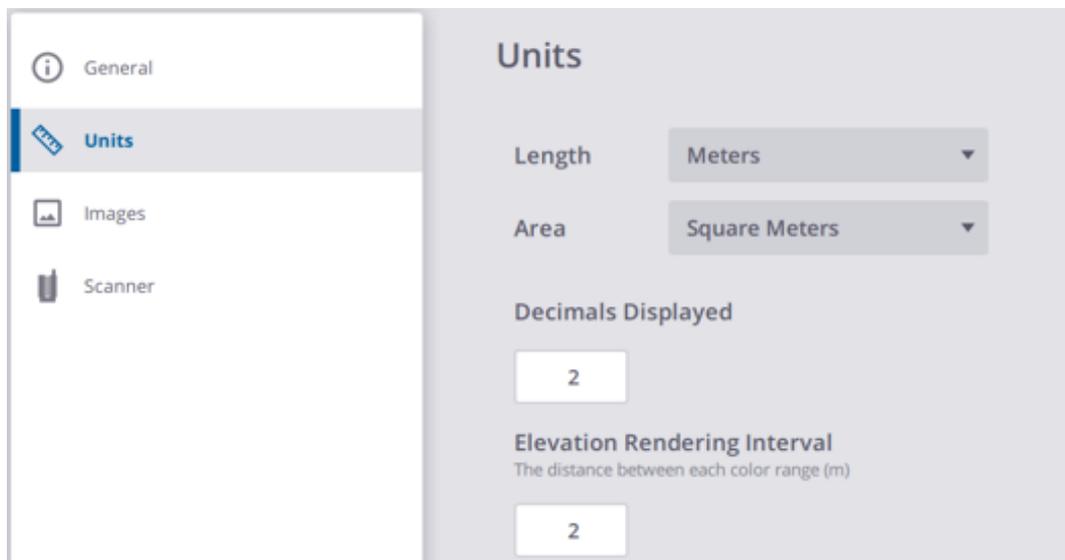
REVERSE MOUSE-ZOOM: Keep the default behavior **Off** (Roll forward to zoom in / Roll backward to zoom out) or change to **On** (Roll forward to zoom out / Roll backward to zoom in) when using a mouse wheel instead of the touchscreen.

APPLICATION SOUNDS: Turn the option to **On** to activate / to **Off** to deactivate the sound notifications.

LANGUAGE: This option enables to choose the language of the application. Close and reopen the application to see the change applied.

SCANS DISPLAY FILTER: This option enables to define the number of scans to display when using the **Display Last** and **Display Nearest** options. See [Visualize Scan Data / Map View, page 29](#).

Units



Use the **Units** settings to change project units, entry formats, and display formats for:

LENGTH: Select whether to work in Metric or Imperial units. If Feet, specify whether they are US Survey Feet or International Feet.

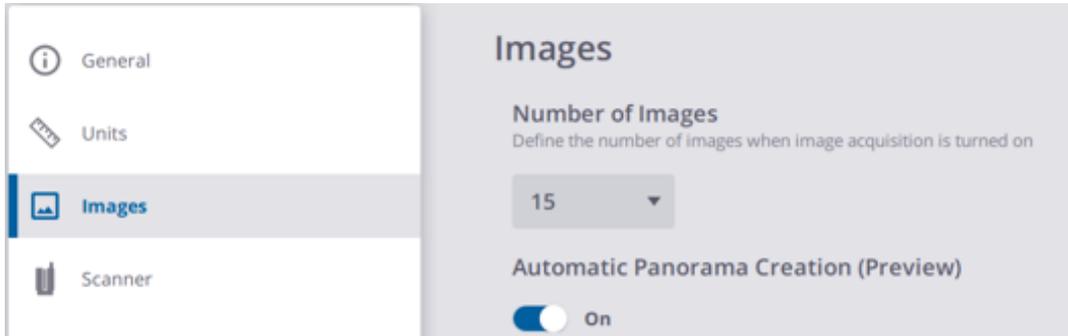
AREA: Select whether to work in Metric or Imperial units.

DECIMALS DISPLAYED: The number of decimal places used after the integer in a value. The higher number of decimal places used the higher the precision.

ELEVATION RENDERING INTERVAL: This number defines an interval in meters when applying the **Color Coded Elevation** rendering to the data displayed in the **Map View** (see [Visualize Scan Data / Map View, page 29](#)). The **Color Coded Elevation** renders the data with the height information encoded in the point color. This helps to visualize instantaneously the height of points in a scene. This rendering is useful to highlight e.g. in a building each floor separately, repeating the color bar at each level.

NOTE – You need to be in *Right* (or *Left*) view to see the *Color Coded Elevation* rendering applied.

Images

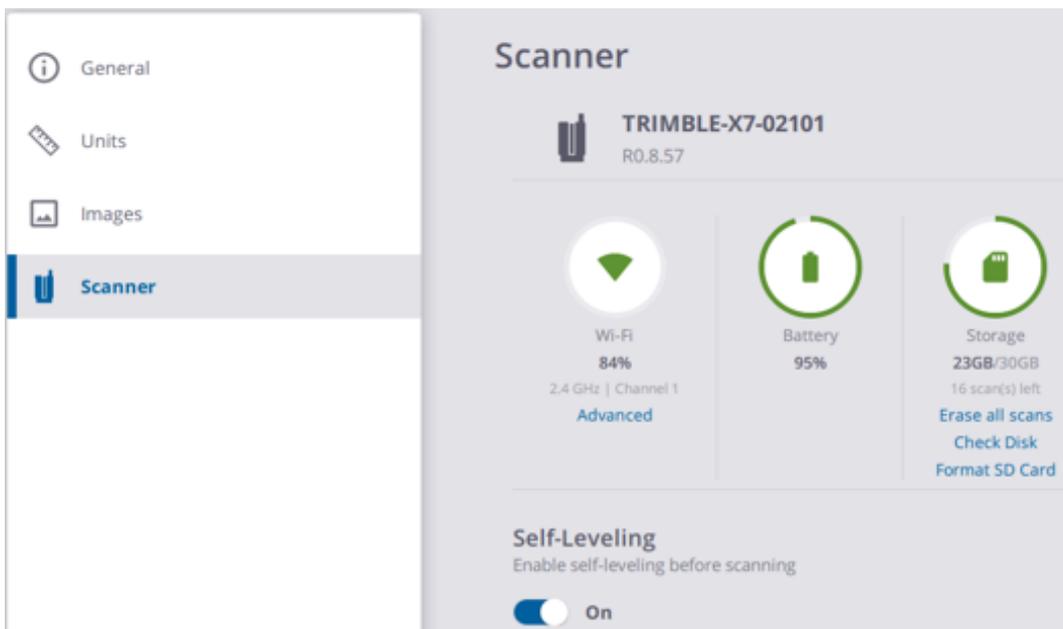


NUMBER OF IMAGES: This option enables to define the number of images when the **Images Mode** is On. See [Define Image Settings, page 23](#).

AUTOMATIC PANORAMA CREATION (PREVIEW): This option enables to create automatically a panorama in preview quality with the acquired images. See .

NOTE – First, set the **Images Mode** to On (see [Define Image Settings, page 23](#)).

Scanner



Wi-Fi: This panel displays the signal strength in percentage, the **Frequency Range** and the **Channel** in use in case of a wireless connection. Use the **Advanced** options to change the settings.

ADVANCED: This option lets you customize the **Frequency Range**, **Channel** and **Region Code** to use (see [Define Advanced Wi-Fi Settings, page 20](#)).

BATTERY: This panel displays the charge level of the battery in the instrument, in percentage and with color codes.

STORAGE: This panel displays the total capacity of the memory card in GB, the remaining storage capacity of the memory card in GB, and the number of allowable scans according to the current scan parameters. The **Storage** options are enabled only if a connection between the instrument and the controller has been set, and an SD card available in the instrument.

- **Erase All Scans:** This feature deletes all files under the **Scan Data** folder in the memory card.
- **Check Disk and Repair:** This feature scans through the entire memory card to find and fix problems.
- **Format SD Card:** This feature deletes all files in the memory card.

NOTE – When one of the three operations is being processing, the LEDs on the base of instrument blinks in orange.

NOTE – When you insert a brand new memory card into your scanner or after deleting the **Scan Data** folder, it is recreated automatically after you power on your instrument.

 **CAUTION** – You cannot undo any of the operations.

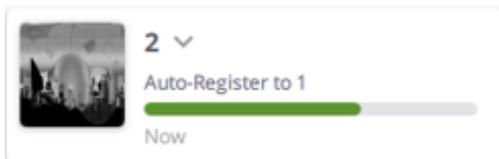
SELF-LEVELING: This feature consists of measuring the horizontality (or vertical) of the instrument.

NOTE – The settings in the **Scanner** panel are not available if you are not connected to a scanner.

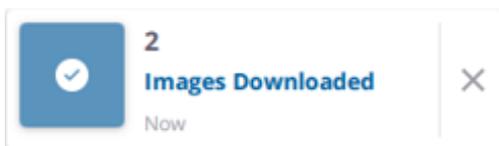
Notifications

When a process is running, a notification pops up to show the progression, or when it ends. A notification has the colors described below, and each color corresponds to a status:

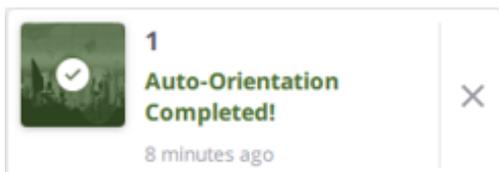
NO COLOR indicates an ongoing process.



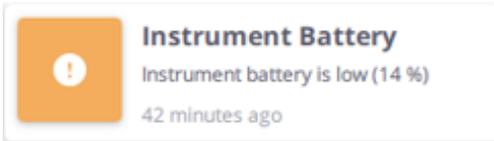
BLUE COLOR indicates a data download step that has been executed with success.



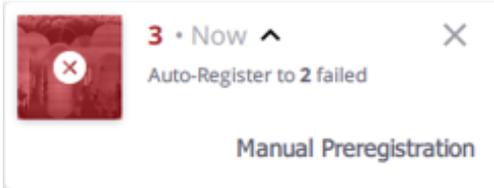
GREEN COLOR indicates that a process has been executed with success.



ORANGE COLOR indicates a warning.



RED COLOR indicates that a process has failed.



NOTE – Notifications do not remain displayed once popped-up except those in red, and orange. You have to hide them individually by tapping .

 **CAUTION** – Notifications are not saved at all. After closing the application, the notations panel empties.

MANAGE PROJECTS

After starting the software, create a new project, load and edit an existing one, or import one.

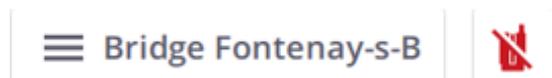
- ▶ [Create a Project](#)
- ▶ [Load a Project](#)
- ▶ [Import a Project or Scans](#)
- ▶ [Edit a Project](#)

Create a Project

To create a new project, tap **Create New** . A project has the following attributes:

- **NAME:** A default name is used if nothing is entered. The entered name cannot contain any of the following characters: \:*\?"<>|.
- **PICTURE:** To illustrate a project, take a picture with the controller () (see [Illustrate With a Picture](#), page 56) or choose an existing picture (.
- **PROJECT DESCRIPTION:** The default values for this field are the date, time and user name. You can see these values when editing a project (see [Edit a Project](#), page 17).

The **Map View** opens. The created project name displays next to the **Menu** icon. The **Scanner** icon in red means it is not yet connected (see [Connect to a Scanner](#), page 18).



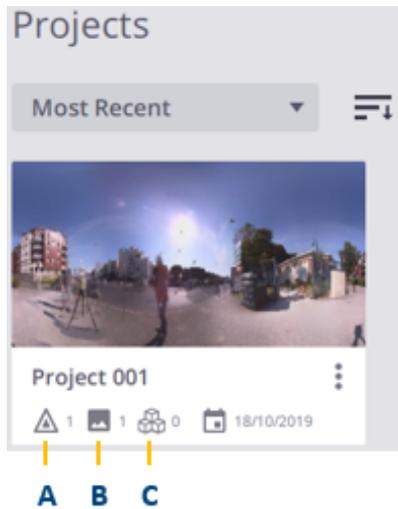
NOTE – The created project is saved under the **Scan Data** folder on the memory card of the scanner.

TIP – To add a new project, tap  from the **Menu** panel, and choose **Add / Create New** from the **Projects** page.

Load a Project

The software loads automatically the most recently opened project. To load another project, tap  from the **Menu** panel. From the opened the **Projects** page, tap a thumbnail.

NOTE – The **Projects** page displays all created projects, each as a thumbnail. Each contains the following information: Project name, Number of acquired scans (**A**), Number of acquired images (**B**), Number of Registration sets (**C**), and time-stamp.



Import a Project or Scans

IMPORT A PROJECT

Use the **Import Project** feature to import a project file in the **TDX** format (Trimble Data eXchange file format). Such a project contains data already processed (registered, colorized, etc.).

Do one of the following:

- Tap **Import Project**.
- Tap  from the **Menu** panel, and choose **Add / Import Project**.

TIP – The **TDX** format enables to share data already processed between users. Export first the project (see **Exporting Projects / TDX**) and import it.

IMPORT A SCAN

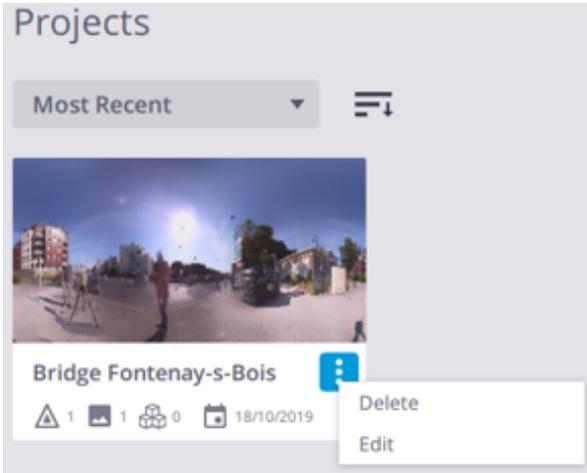
Use the **Import Scans** feature to import a scan file in the **TZF** format (Trimble scan file zipped format). Such a scan contains raw data. It is named using an **Index**. Choose the starting **Index** for the first scan. This allows differentiating an imported scan from an acquired one.

Tap  from the **Menu** panel and choose **Import Scans**.

NOTE – For each a new **TZF** format file imported, the software generates the displayed point cloud. This can take time if the number of imported scans is high.

Edit a Project

First, open the **Projects** page by tapping  from the **Menu** panel.



UPDATE A PROJECT

Tap **More** and **Edit** from a project thumbnail to change the attached picture, or modify the added comment.

NOTE – A project name cannot be changed.

DELETE A PROJECT

Tap **More** and **Delete** from a project thumbnail.

 **CAUTION** – When you delete a project from the application, the related project files are not deleted from the **Scan Data** folder in the memory card.

SORT PROJECTS

You can sort the projects by name (**Alphabetical**), by creation time (**Most Recent**), by number of acquired data (**Number of Stations** and **Number of Images**) (A), in **Ascending Order** (or **Descending Order**) (B).



5

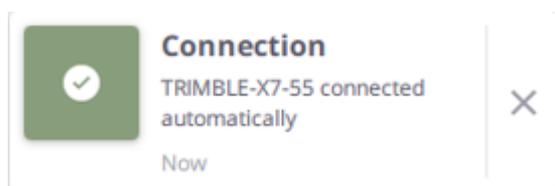
CONNECT, ACQUIRE & SYNCHRONIZE

After loading a project in the software, connect your controller to a scanner to start collecting data. Optionally, define the settings before or use the default ones.

- ▶ [Connect to an Instrument](#)
- ▶ [Define Advanced Wi-Fi Settings](#)
- ▶ [Define Scan Settings](#)
- ▶ [Define Image Settings](#)
- ▶ [Acquire Scans](#)
- ▶ [Acquire Images](#)
- ▶ [Synchronize Scan Data](#)

Connect to a Scanner

Connect to your scanner via **Wi-Fi** or through the provided **USB 2.0** cable. If you have previously connected to a scanner, the software reconnects automatically to it using the same setting.



Only one connection type can be used at a time. The USB cable is automatically selected as the primary connection type.

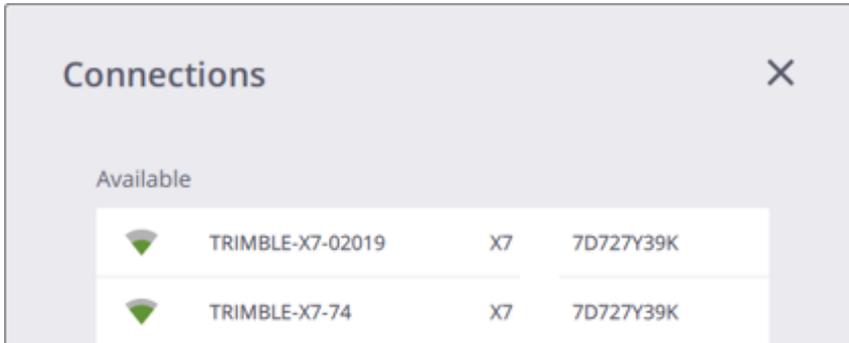
NOTE – After powering on the scanner, wait until the scanner is ready to be used. The five LEDs on the scanner base should blink in green. Refer to the Trimble X7 3D Laser Scanner user manual for more information.

CONNECT WITH Wi-Fi

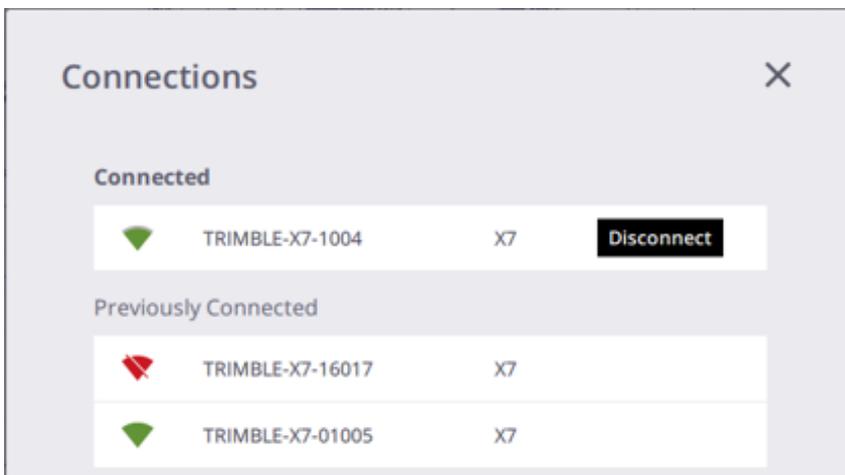
1. Tap the **Scanner**  icon to open the **Connections** panel.

All the scanners in the vicinity of the controller appear in the **Available** list. If you have previously

connected to an instrument, it is listed above in a separate list titled **Previously Connected**.



2. Tap a scanner name to connect to the scanner. The chosen scanner appears in the **Connected** list.



3. Optionally, tap **Disconnect** and choose another scanner to connect.

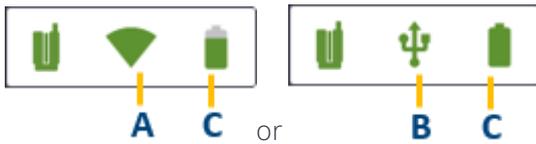
4. Tap **X**.

CONNECT THROUGH USB

Use the approved cable P/N 53099032 for connecting to the scanner. This Hirose 6P-PC to USB 2.0 cable has been designed to high speed data transfer. The scanner powers On automatically after the controller is switched on.

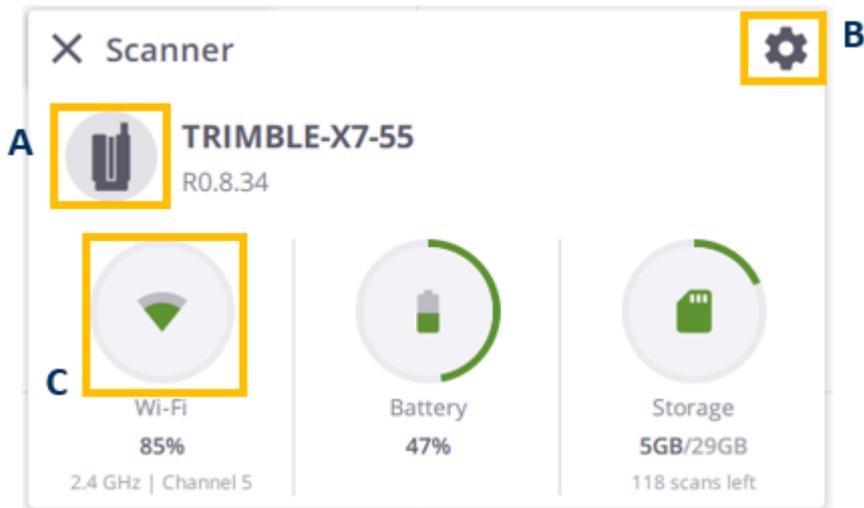
NOTE – When you are connected to a scanner through the USB cable, you cannot switch to the wireless connection with the same scanner. Disconnect first the USB cable from the scanner, and the software reconnects automatically to it in wireless.

Once connected, the **Scanner** icon switches from red to green and two other icons appear beside it: **Wireless Signal (A)** (wireless connection) (or **USB Connector (B)** (cable connection)) and **Instrument Battery (C)**.



Tap any icon to open the **Scanner** panel. It displays the following information:

- Scanner in use (name, reference number and firmware version).
- Scanner battery's charge level.
- Storage space left in the memory card.
- W-Fi settings (**Frequency Range**, **Channel** and **Signal Strength** in percentage).



In the **Scanner** panel, tap:

- A - The **Instrument** icon to open the **Connections** panel.
- B - The **Settings** icon to open the **Settings** panel (see [Application Settings / Scanner, page 12](#)).
- C - The **Wireless Signal** (or **USB Connector**) to open the **Wi-Fi Advanced Settings** panel (see [Define Advanced Wi-Fi Settings, page 20](#)).

The **Start Scan** button displays in the **Map View**. You can proceed to the scan and image parameter definition (see [Define Scan Settings, page 21](#) and [Define Image Settings, page 23](#)).

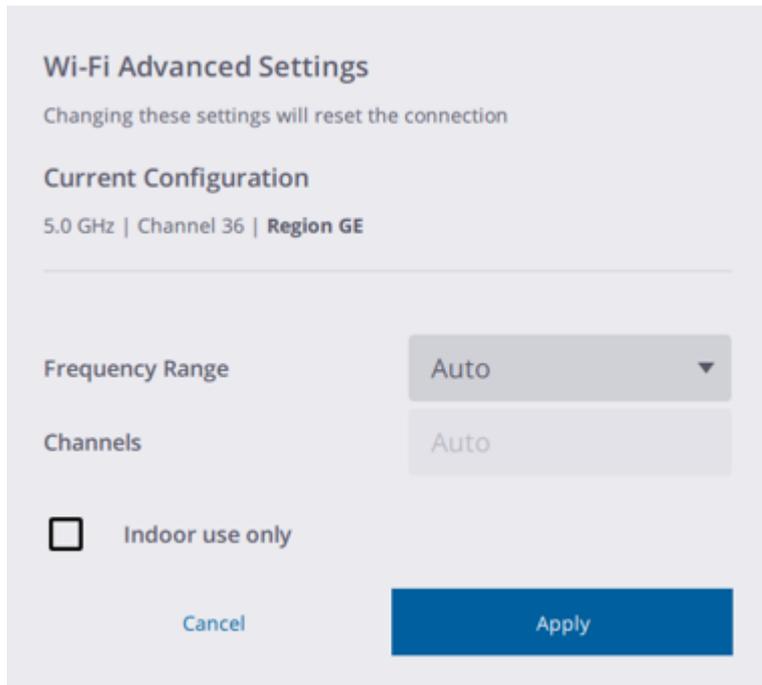
Define Advanced Wi-Fi Settings

The scanner has the wireless 802.11n technology. It supports the **2.4 GHz** and **5 GHz** frequency bands. For each new shipped scanner, the default factory values for the Wi-Fi settings are:

- **Auto** for the **Frequency Band**.
- **Auto** for the **Channel**.
- **Empty** for the **Region Code**.

At the first connection with a new scanner (or if connected to a different **Region Code** scanner), the software updates the scanner with the controller's **Region Code**, and keeps the **Frequency Band** and the **Channel** unchanged (**Auto**).

During the update process, the controller disconnects and reconnects to the scanner automatically. Based on the controller's **Region Code**, the scanner scans the Wi-Fi environment to select the good frequency and channel to use.



In addition to the **Auto** mode, you can switch between **5 GHz** and **2.4 GHz**. The **5 GHz** frequency provides a faster data exchange rate at a shorter distance while the **2.4 GHz** frequency offers coverage for further distances, but may perform at a slower speed in the data exchange. Both frequencies can be used with a multitude of channels including indoor use channels.

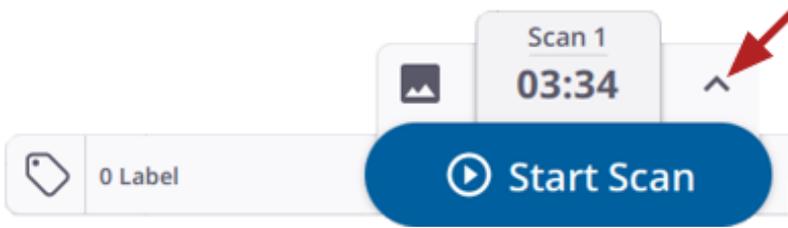
TIP – Press and release the **On/Off** button on the scanner for more than 10 seconds to reset the Wi-Fi settings to the default factory values.

NOTE – The **Wi-Fi Advance Settings** are enabled only if there is a wireless connection.

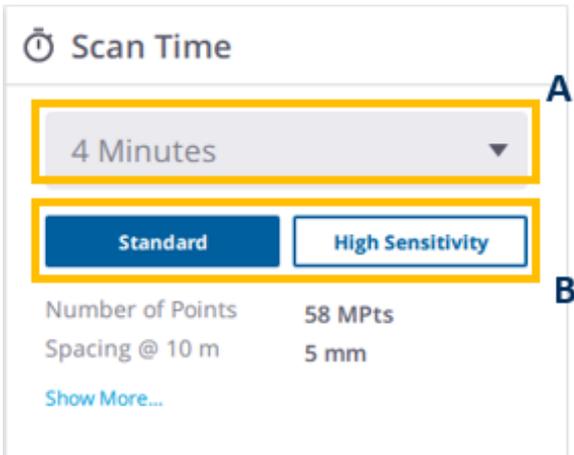
NOTE – You are disconnected and reconnected automatically to the scanner after changing the settings.

Define Scan Settings

To access the settings, tap the pull-down arrow above the **Start Scan** button.



The Scan Time & Images panel pops up showing scan settings:



- **A - SCAN DURATION.** It impacts the density (called **Spacing** referring to the distance between two consecutive points) and the number of points.
- **B - SCAN MODE.** It sets the speed and quality of a scan.
 - The **Standard** mode is for high speed (500 kHz), shorter range data acquisition.
 - The **High Sensitivity** mode has lower speed (166 kHz) for longer range and higher sensitivity to capture dark surfaces.

The table below shows the **Scan Mode(s)**, the **Spacing** at different distances and the number of points available for each **Scan Duration**.

NOTE – *Scan Duration includes Auto-Calibrations and one minute capture time.*

| Duration (Min) | Scan Mode | Spacing (mm) @10m | Spacing (mm) @35m | Spacing (mm) @ 50m | Spacing (mm) @ 80m | Number of Points (Mpts) |
|----------------|------------------|-------------------|-------------------|--------------------|--------------------|-------------------------|
| 2 | Standard | 11 | 40 | 57 | 91 | 12 |
| 4 | Standard | 5 | 18 | 26 | 41 | 58 |
| 7 | Standard | 4 | 12 | 18 | 28 | 125 |
| 4 | High Sensitivity | 9 | 33 | 47 | 75 | 17 |
| 7 | High Sensitivity | 6 | 21 | 30 | 48 | 42 |
| 15 | High Sensitivity | 4 | 13 | 19 | 30 | 109 |

First, select a **Scan Duration**. The **Scan Mode** is set automatically. If not, choose between the two modes.

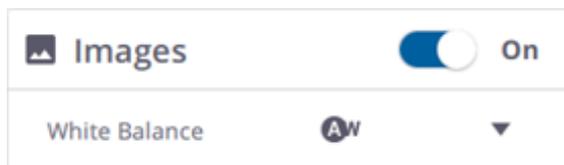
NOTE – After choosing a *Scan Duration* and a *Scan Mode*, the exact duration (in minutes and seconds) is updated. If the *Images* mode has been set to on, the duration is increased accordingly.

To structure your project, assign labels to data (see [Acquire Scans, page 23](#)). This step is optional and labels can also be assigned to individual scans after they have been collected (see [Assign & Edit Labels, page 45](#)).

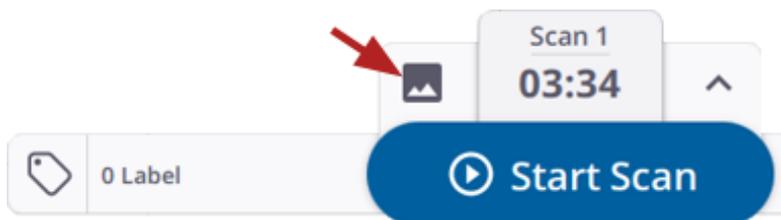
Optionally, activate the **Self-Leveling** feature before each scan acquisition (see [Self-Leveling the Instrument](#)).

Define Image Settings

Optionally, tap the pull-down arrow above the **Start Scan** button. Set the **Images Mode** to On to enable the images acquisition.



NOTE – The *Images* icon when is enabled means that the *Images* mode is On.



Keep the **White Balance** correction mode to **Auto** or select a preset for either indoor or outdoor shootings like **Cloudy**, **Sunny**, **Fluorescent** and **Incandescent**. See [White Balance](#).

TIP – You can change a preset during a scan, before the images are acquired.

In the **Settings / Images** panel, choose the **Number of Images** to acquire. Optionally, create automatically a panorama from the images following their acquisition (see [Application Settings / Images, page 12](#)).

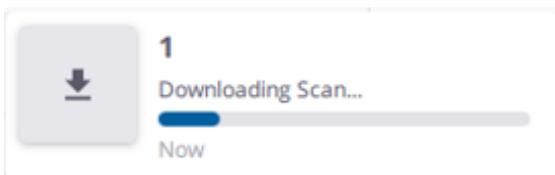
Acquire Scans

Tap **Start Scan**. If no parameters have been previously defined, the default values are used (2 minutes **Scan Duration**, **Standard Scan Mode**, and **Images Mode Off**). The name of the first scan displays above the **Start Scan**.



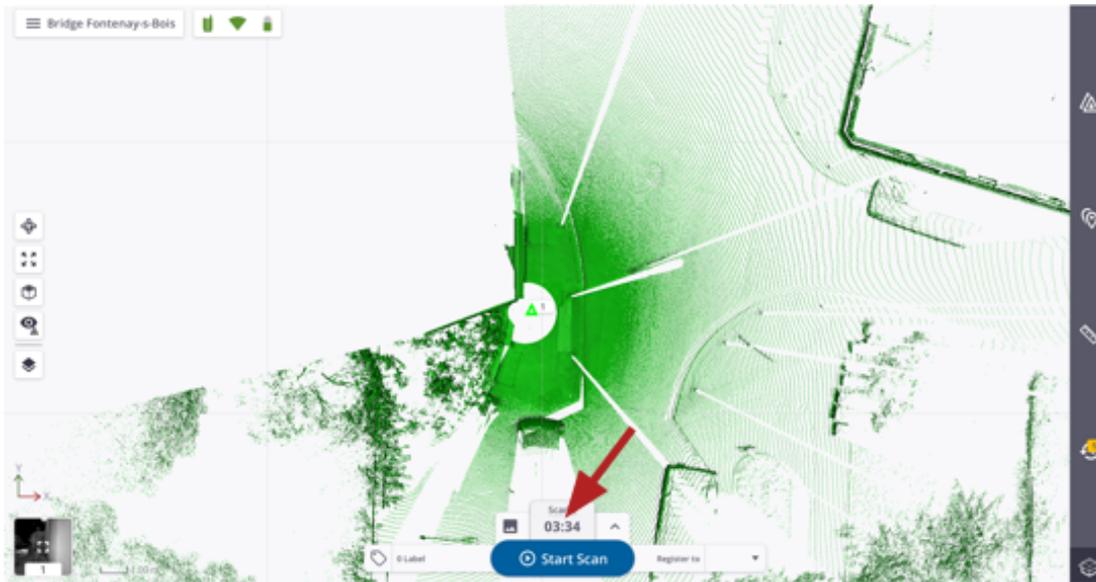
A scan acquisition is a sequence of the following steps:

- **INITIALIZATION:** This initial step consists of executing a **Tilt** measurement (see [Self-Leveling](#)) and / or an [Auto-Angular Calibration](#)). The scanner starts collecting data once this step is done.
To interrupt the step, tap **Stop**.
- **DATA COLLECTION:** The scanner rotates clockwise around its axis to acquire data. Once done, the scanner turns back counterclockwise to its initial position.
To pause and resume a scan in progress, tap **Pause** and **Resume**.
To completely interrupt a scan in progress, tap **Stop** and **Stop**.
NOTE – The scanner executes an [Auto-Distance Calibration](#) process before each scan.
- **DATA DOWNLOAD:** Once the scan has ended, the acquired data is saved on the memory card as a TZF format file under the **Scan Data** folder, and downloaded under the application database.



Once the download step is completed, the acquired data displays as a point cloud in the **Map View** (see [Visualize Data / Map View, page 29](#)) and as a station in the **Stations List** panel, and the next scan name

displays above the **Start Scan** button.



- **AUTO-ORIENTATION:** This step consists of finding the correct orientation of the acquired data. It is always applied to the first acquired scan.

To interrupt the step, tap **×** from the **Stations List** panel.

TIP – Press and release the **On/Off** button on the scanner less than 1 second to acquire data without using a controller. The acquired data is stored on the SD card and downloaded to the controller once the scanner is connected (see [Synchronize Data](#), page 27) or plug the SD card to the controller and use the **Import Scans** feature (see [Import a Project or Scans](#), page 16).

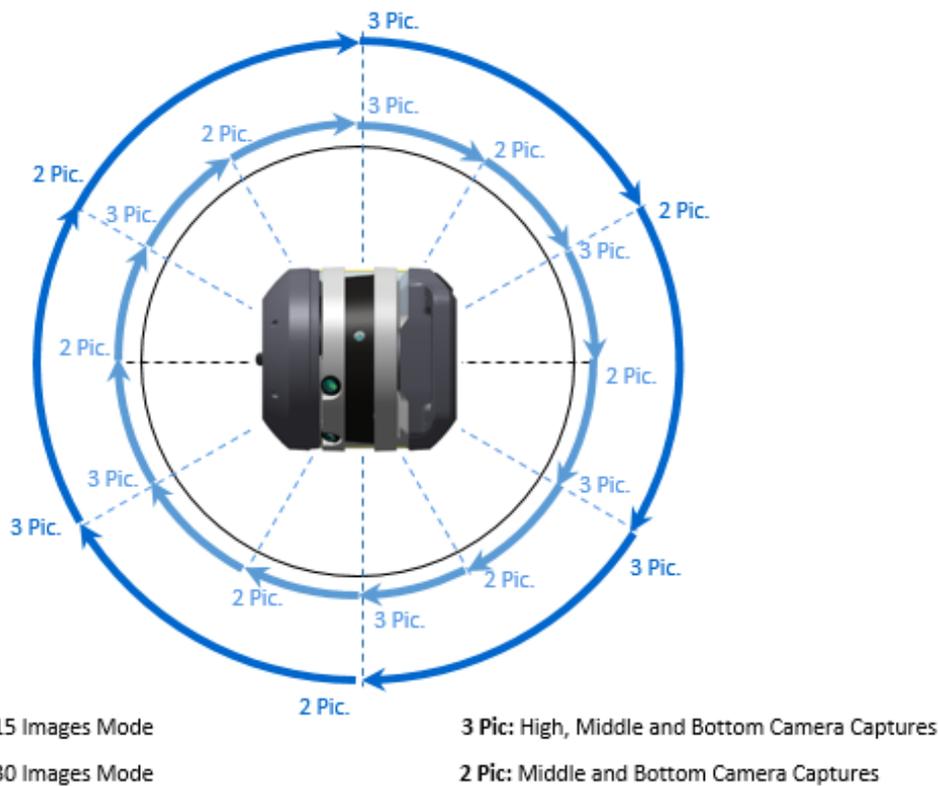
TIP – The settings for the scanner's push button are the last used ones or the default ones (if using the scanner for the first time). Any change on the settings in the application is not immediately taken into account for the next. Scan first with the scanner being connected (by tapping **Start Scan**) to apply the change to the next scan.

NOTE – The Multi-color LEDs on the scanner blink in blue during the whole acquisition step.

NOTE – A **TZF** format file is created even if a scan has been interrupted.

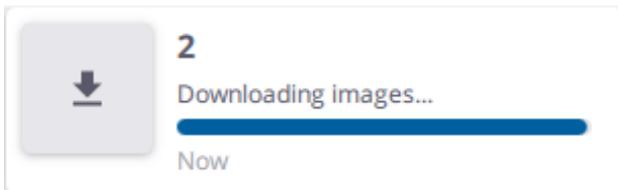
Acquire Images

Images are used to colorize scans, and optionally create panoramas. The scanner takes either fifteen images or thirty images as illustrated below. Each image has a resolution of 3840 x 2748 pixels, and the exposure automatically adjusted.



An image acquisition follows the steps below:

- **DATA COLLECTION:** The scanner captures a set of images every 60° (or 30°).
To pause and resume the step, tap **Pause** and **Resume**.
To interrupt the step completely, tap **Stop** and **Stop**.
- **DATA DOWNLOAD:** Once the acquisition has completed, the images are saved on the memory card as a TCF format file under the **ScanData** folder and downloaded to the software database.



- **WHITE BALANCE AUTO-CORRECTION:** This step applies a **White Balance** correction in the **Auto** mode or with a chosen preset.

Only the **Auto** mode can be interrupted. Tap **✕** from the **Stations List** panel.

- **PANORAMA CREATION:** The step is optional. It creates automatically a preview quality panorama based on the acquired images. See [Create Panoramas / Preview Quality](#).

NOTE – To interrupt the step, tap **✕** from the **Stations List** panel.

NOTE – No **TCF** format file is created if you stop acquiring images.

Synchronize Data

Use the **Synchronize Scans** feature to synchronize data between a scanner and a controller in the situations where the data has been collected using the scan push button on the scanner (no controller). Such situations may occur:

- When the Wi-Fi connection is lost.
- When the controller turns off because the battery level is low.

The prerequisite is to have the scanner connected first and collect at least one scan. After reconnecting to the scanner, a message pops up and notifies the number of scans to synchronize.



Tap  from the **Menu** bar. All the data (scans and images) are automatically downloaded and the scans get registered together.

Tap **Stop** to interrupt the synchronization.

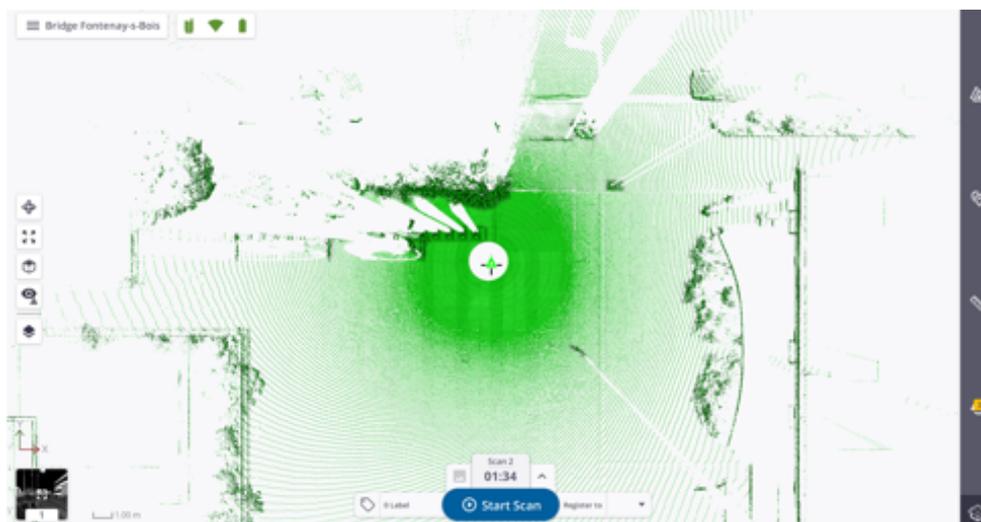
VISUALIZE & REGISTER

After acquiring the first scan, you can visualize the result in different viewers. Once two scans are acquired, both are registered automatically together. Optionally, use the manual methods to refine the registration or to correct it if it fails.

- ▶ Visualize Scan Data
- ▶ Register Two Stations Automatically
- ▶ Register Two Stations Manually
- ▶ Edit & Register Registration Sets
- ▶ Edit Registration Links

Visualize Scan Data

Each scan define a station, identified by a number, a marked position (triangle) and a color. All the acquired scans display by default in the **Map View** (see [Map View, page 29](#)), but you can switch to the **Station View** display (see [Station View, page 31](#)) or to the **3D View** display (see [3D View, page 34](#)).



Map View

The **Map View** enables to visualize the whole data from the **Top View** (default view) and locked in 2D.



In this view, a station has a point cloud representation, with a marker (triangle) and a name (**Label**). You can:

- Zoom in (or zoom out) all the displayed stations by stretching or pinching with two fingers.
- Pan by sliding with one finger.
- Zoom on a displayed station (or an empty area) by double tapping the station (or an empty area), with a factor of 1.75.

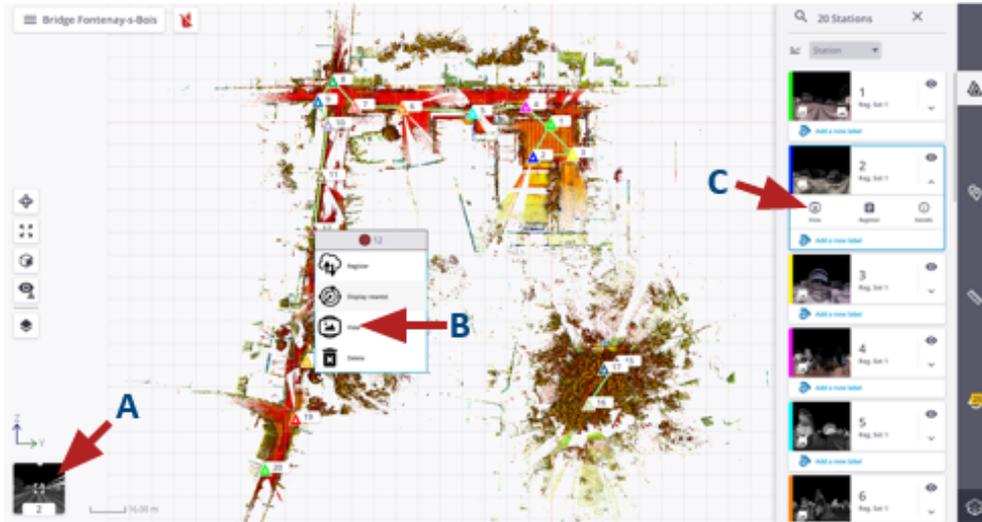
Or tap:

- **A - 3D View** to switch from the current view (2D locked view) to an unlocked view. See [3D View, page 34](#).
- **B - Zoom Extends** to fit the scanning result(s) to the center of the view.
- **C - Views** to display the scanning results from **Top View**, **Right View** and **Left View**.
- **D - Display** to expand the options. Tap one of the following:
 -  to display all hidden stations.
 -  to hide all displayed stations. Hiding all displayed stations hides all station positions, labels, registration links and all created annotations (see [Annotate, page 51](#)).
 -  to display the most recent station(s). The number of most recent stations needs to be defined in the [Settings / General, page 10](#).

TIP – You can also tap a station position in the view and choose **Display Nearest** from the dropped-down list.

-  to display stations near the selected one. The number of nearest stations has to be defined in the Settings / [General, page 10](#).
 - E - Options to access the options below. Tap:
 -  to hide all the points whose normal faces the screen (towards or backwards).
 -  to display points of the scan data without any visibility filtering.
 -  to change the display point size.
 -  to hide all station markers, and labels (if displayed), and registration links (if existed).
 -  to display all station markers, and labels (if displayed), and registration links (if existed).
 -  to hide all station labels. Display first all station positions.
 -  to display all station labels.
 -  to render the displayed points with one color per scan.
 -  to render the displayed points with color-coded intensity.
 -  to render the displayed points using the gray scale defined by their intensity.
 -  to render the displayed points using their color (real color).
 -  to render based on the height information found in the points in **Left Side** (or **Right Side**) view.
 -  to render the displayed points with one color per group (registration set).
 -  to hide a **2D Grid** over the scan data.
- NOTE** – This **Cross** defines the origin of the project (0,0,0 as coordinates in the XYZ coordinate system). It is replaced by a **2D Grid** when hidden.
-  to display a **2D Grid** over the scan data in **Top View**.
 -  to change the background color of the **Map View** to black.
 -  to change the background color of the **Map View** to white.
 -  to display all annotations (**Pins** and **Labels**).
 -  to hide all annotations (**Pin** and **Label**).
 -  to display all annotation of a chosen station.

- To display the current station in the **Station View** (see [Station View, page 31](#)) :
 - The thumbnail at the bottom left corner (A).
 - A station position to select **Station View** from the dropped-down list (B).
 - **Station View** of a station card in the **Stations List** panel (C):



Station View

The **Station View** enables a full-dome visualization of the whole scan data from the current station position. In this view, the scans from the current station are displayed.

To load a station, do one of the following:

- Tap **>** (or **<**) to load the next station (or the previous station) (A).
- Choose a station from the drop-down list (B).

- Tap a station marker (C).



- Tap  to open the Stations List panel, and choose a station card as illustrated below.



In this view, you can:

- Zoom in (or zoom out) from the station position by stretching or pinching with two fingers, or rotate around the station position by sliding with one finger.
- Use the following options:
 -  to hide all station markers, labels (if displayed), and registration links (if existed).
 -  to display all station markers, labels (if displayed), and registration links (if existed).
 -  to hide all station labels. Display first all station positions.

-  to display all station labels.
-  to display all annotations (**Pins** and **Labels**).
-  to hide all annotations (**Pins** and **Labels**).
-  to display all annotation of a chosen station.
-  to render the displayed points using the gray scale defined by their intensity.
-  to render to the displayed points using their color.

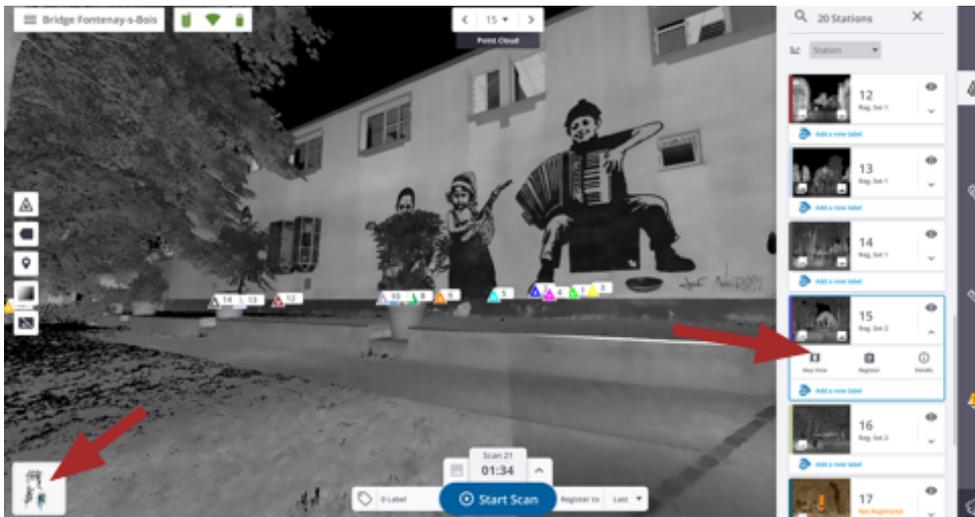
NOTE – In case of an outdoor scan, the sky is rendered in black.

-  to increase the color range in order to enhance the perception.
-  to color in red the areas where there is no point.

- Tap **Point Cloud**  to display the current station as 2D spherical luminance image.
- Tap **Panorama**  to display the current station as a 2D spherical luminance image with a panorama in overlay.

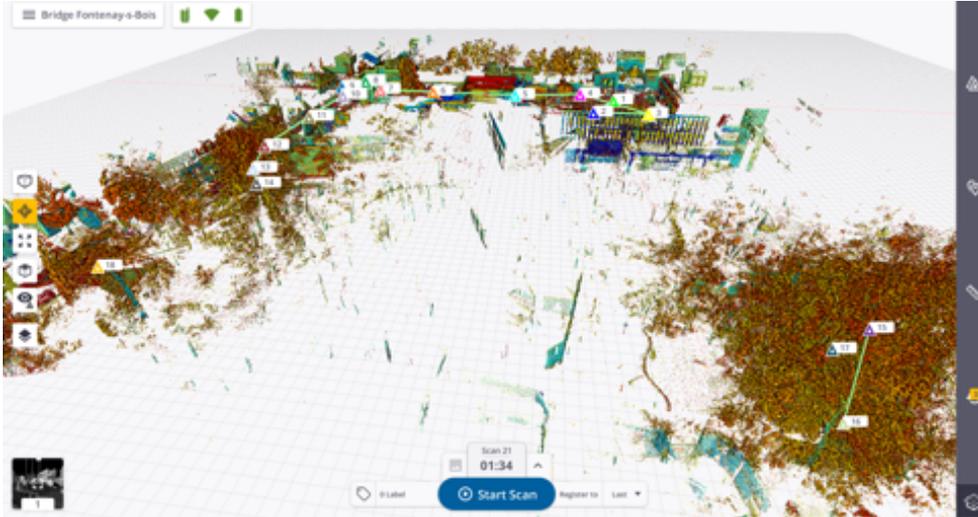
NOTE – In the **Panorama** mode, you can view the other station positions and station labels only if these stations have a panorama created.

- Switch back to the **Map View** display by tapping:
 - The thumbnail located at the bottom left corner.
 - **Map View** from a station card in the **Stations List** panel.



3D View

The **3D View** enables to visualize the whole scan data in free navigation. In this view, each station has a point cloud representation, with a marker (triangle) and a name (Label).

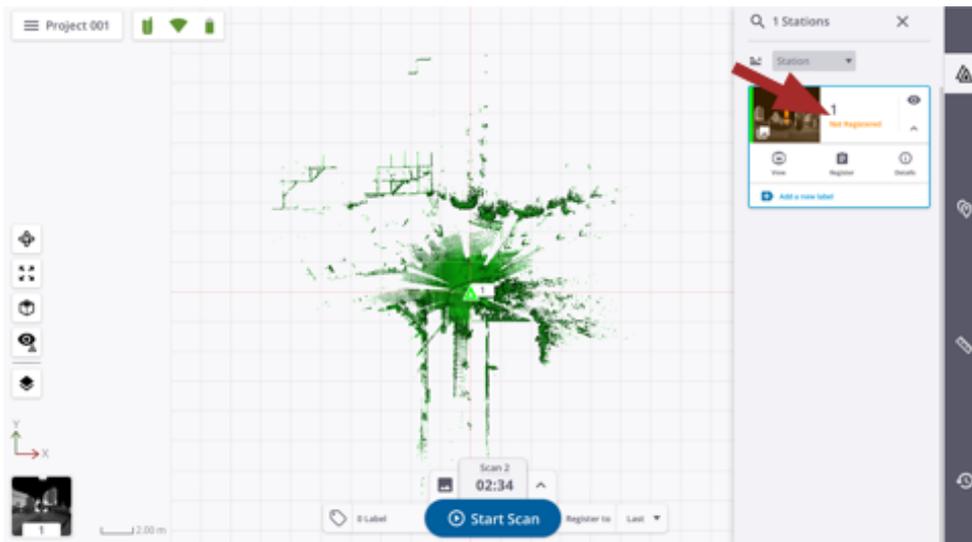


In the view, you can:

- Zoom in (or zoom out) the whole scan data by stretching or pinching with two fingers.
- Rotate around a tapped position by sliding with one finger.
- Pan by sliding with two fingers.
- Display the scanning result(s) in the **Parallel** projection mode  or in the **Perspective** projection mode .
- Use the same options than in the **Map View** (see [Map View, page 29](#)).

Register Two Stations Automatically

The first scan is not registered, and has the "Not Registered" label in the **Stations List** panel. It is automatically with the next acquired scan (see [Automatic Registration](#)).



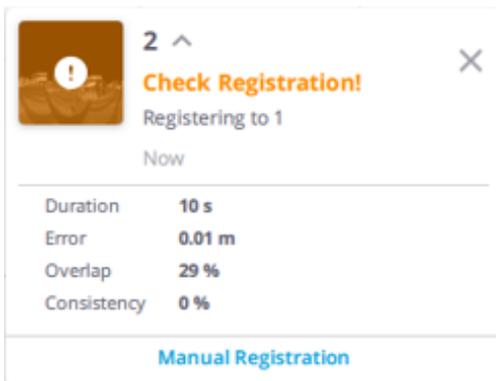
Once the registration done, a notification pops up and states the following status:

- **REGISTRATION COMPLETE:** The registration succeeds. A green notification pops up and a **Registration Link** is created between the two stations (see [Edit Registration Links, page 42](#)). Both stations are added into a common **Registration Set**, and the "Not Registered" label is removed from the first station.



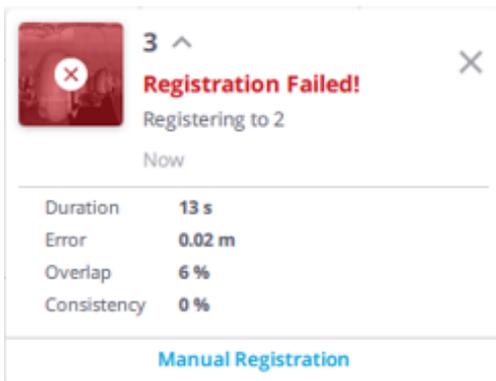
Each new station added to the project is automatically registered with the previous one, unless you choose a station from the **Register to** list. Stations that have been successfully registered per pair are put under the **Registration Set** (see [Edit & Register Registration Sets, page 41](#)).

- **CHECK REGISTRATION:** The registration needs to be checked. An orange notification pops up. It does not mean that the result is wrong. It indicates that the result may require a closer analysis.

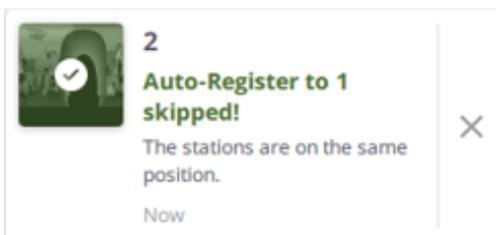


From that point:

- If nothing is done, no **Registration Link** is created, and the second station starts a new **Registration Set**.
- If the result looks good, tap **Manual Registration** from the notification card and create a **Registration Link** between the two stations by tapping .
- If the result looks bad, tap **Manual Registration** from the notification card and register the two stations manually (see [Register Two Stations Manually, page 37](#)).
- **REGISTRATION FAILED:** The registration fails. A red notification pops up and no **Registration Link** is created between the first and second stations. In this case, tap **Manual Registration** from the notification card to register them manually (see [Register Two Stations Manually, page 37](#)).



NOTE – When acquiring a second scan from the exact same position, the registration will be skipped. The scans will be considered as belonging to two separated stations but with the same initial position and orientation.

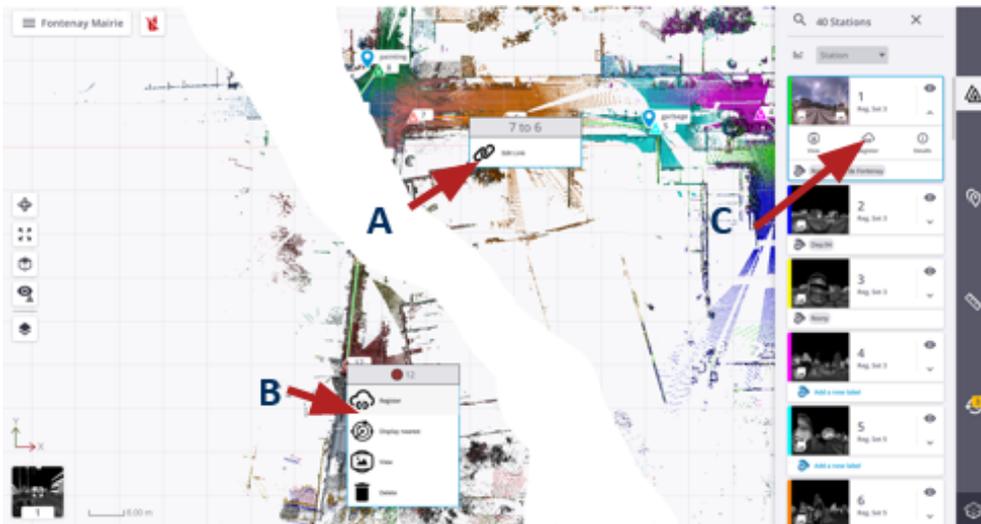


NOTE – All the acquired stations are stacked by order of acquisition in the **Stations List** panel (see [Stations List Panel](#)) and the **Register to** list next to the **Start Scan** button

Register Two Stations Manually

The registration of two stations, whether it succeeded or failed, can be refined or re-registered manually. To open the **Manual Registration** toolbar, do one of following:

- A - Tap a **Registration Link** in the **Map View** and choose **Edit Link** (see [Edit Registration Links, page 42](#)).
- B - Tap a station marker in the **Map View** and choose **Register**.
- C - Tap a station card in the **Stations List** panel and select **Register**.



REGISTER TWO STATIONS BY MANUAL POSITIONING

In the **Manual Registration** toolbar, the selected station and the previous station display respectively in the **Moving Stations** list (Blue list) and in the **Reference Stations** list (Gray list).



A ring manipulator appears over the moving station and the station positions of both are displayed bigger than the others. Here 5 and 4 are bigger than the rest.

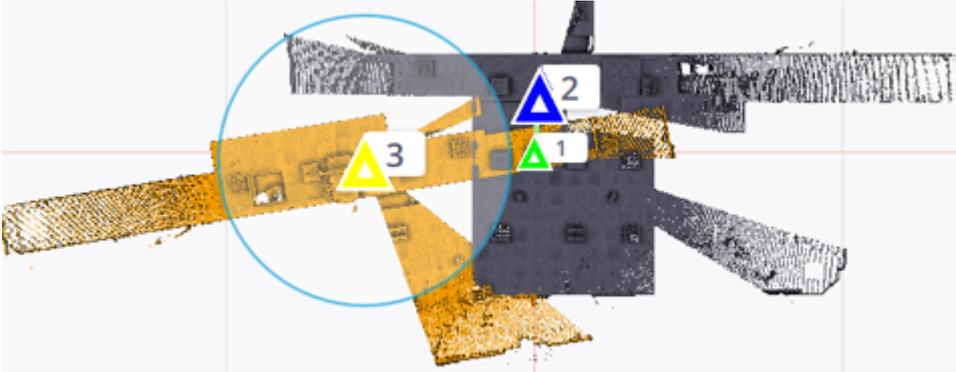
To change either the moving station or the reference station, tap the pull-down arrow and choose a new one from the list.

- Optionally, tap  to filter the displayed point clouds from top and bottom. The two sliders separate visually invalid points from valid points. Invalid points are trees, bushes and the like, they are no essential and helpful for the registration. Valid points are ground, walls, etc. They are useful.

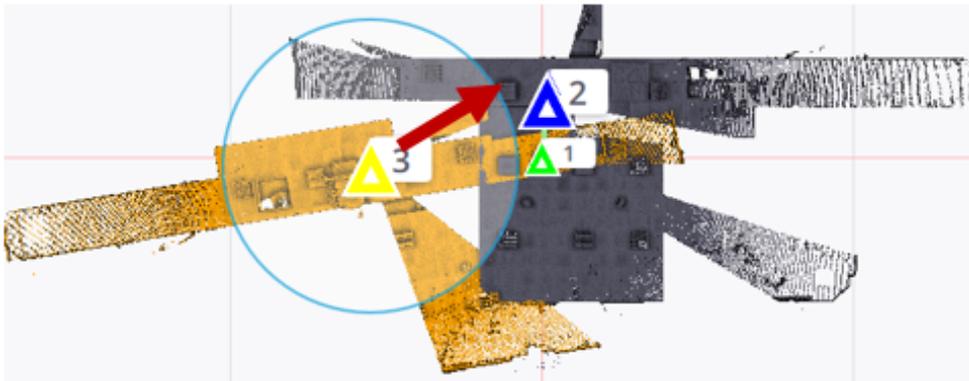


- The displayed value is an average distance of the higher and lower points in the project.
-  enables to move only one slider at a time.
-  enables to move the two sliders at the same time.

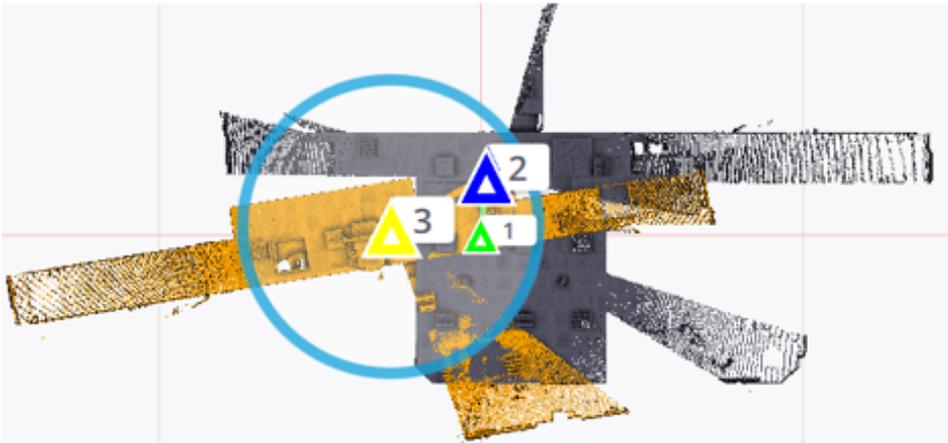
- In case of a huge amount of stations, use:
 -  to center the moving station in the middle of the **Map View**.
 -  to hide all the stations except the two selected ones.
- If the moving station is far from the reference station, adjust its distance to the reference as follows:
 - Pick the moving station marker. Its color turns orange.



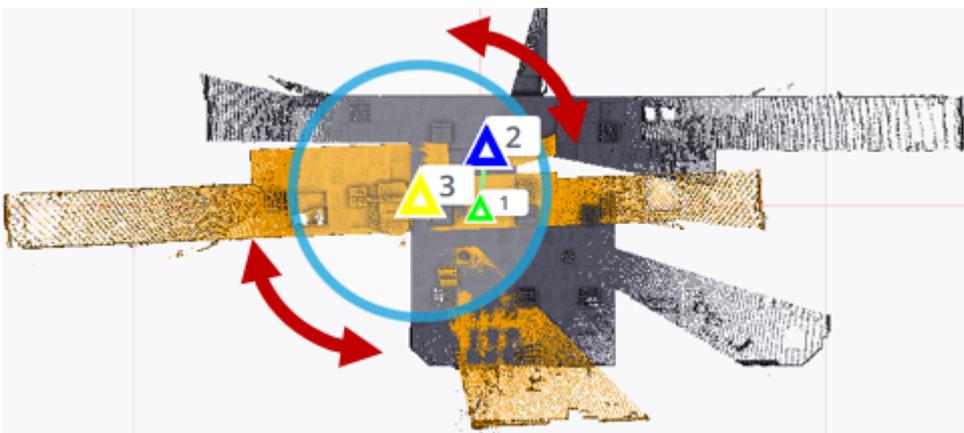
- Drag the moving station's marker close to the reference station's marker.



- If the moving station is not well orientated with the reference station, adjust its orientation relative to the reference station as follows:
 - Pick the ring manipulator, it becomes bigger and the moving station color changes to orange.

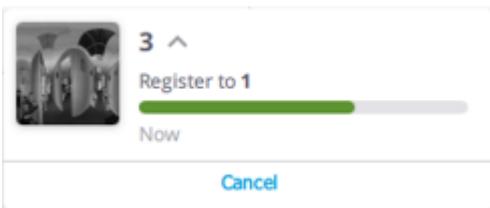


- Drag the ring manipulator to rotate the moving station. Once done, release the ring manipulator. Both the ring manipulator and the moving station resume their initial state.



- Once the moving station corrected positioned and orientated with the reference station, tap **Register** to register the two stations.

Optionally, tap **Cancel** from the popped-up notification (or **Undo**) to cancel (or undo) the registration.



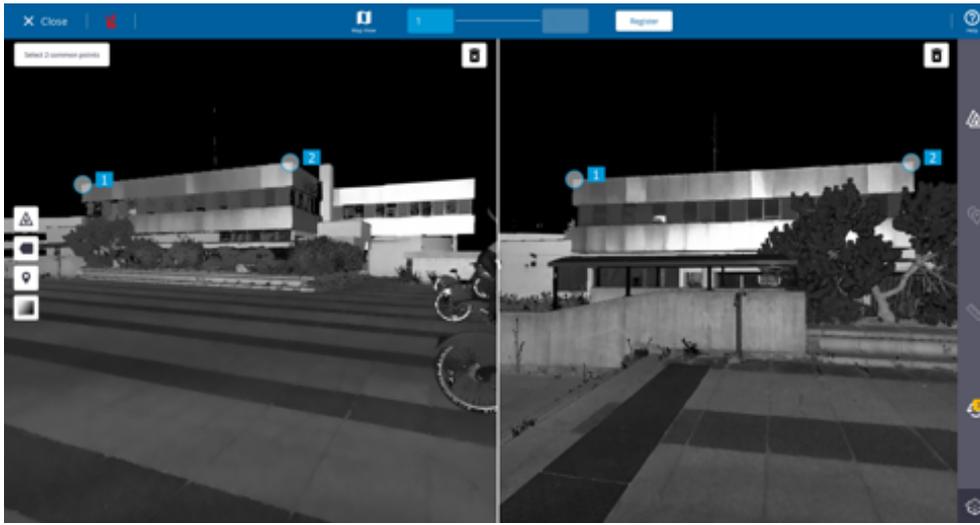
NOTE – Using **Create Link**  instead of **Register** does not register the two stations but only creates a link between them.

- Tap **X** to close the **Manual Registration** toolbar.

REGISTER TWO STATIONS BY PICKING TWO PAIRS OF CORRESPONDING POINTS

Select two unlinked stations from the **Manual Registration** toolbar, one from the **Moving Stations** list and the other from the **Reference Stations** list, and tap **Split View**. In the side-by-side views, tap:

- Two pairs of corresponding points.
- A point to select it and tap a new position (in option).
-  in both views to reset the two pairs of corresponding points (in option).
- **Register** to register the two selected stations.



-  to get back the **Map View** (in option).

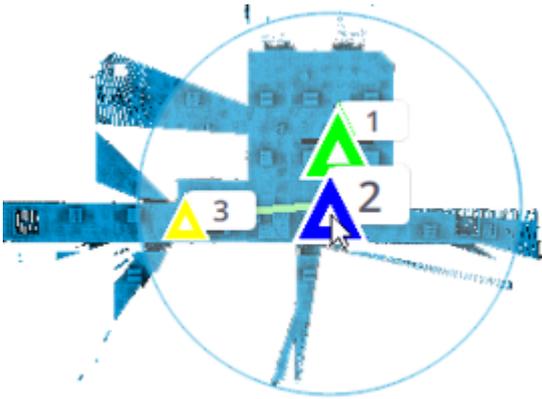
NOTE – If the two selected stations are linked, tap first **Break Link**.

Edit & Register Registration Sets

Two stations successfully registered together are linked by a **Registration Link** (see [Edit Registration Links, page 42](#)). A run of stations successfully registered two-by-two are put in a common **Registration Set**. If the registration has failed for a station of the run, a new **Registration Set** starts with the station inside. A **Registration Set** can be edited only within the **Manual Registration** tool.

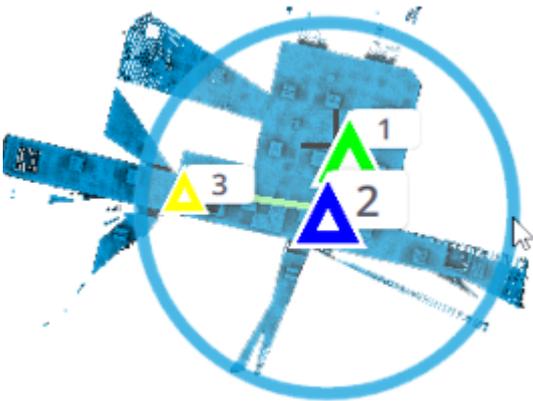
MODIFY THE POSITION OF A REGISTRATION SET

From the **Manual Registration** toolbar, select a station from a **Registration Set** and drag and drop the station to a new position. All the stations of the set are shifted as a whole to the new position (the **Registration Links** between the stations are preserved).



ROTATE A REGISTRATION SET

From the **Manual Registration** toolbar, select a station from a **Registration Set** and rotate the ring manipulator. All the stations of the set are rotated around the selected station as a whole (the **Registration Links** between the stations are preserved).



REGISTER TWO REGISTRATION SETS

In the **Manual Registration** toolbar, select two stations, one from each of the **Registration Sets** and proceed to either an automatic registration, or a manual registration.

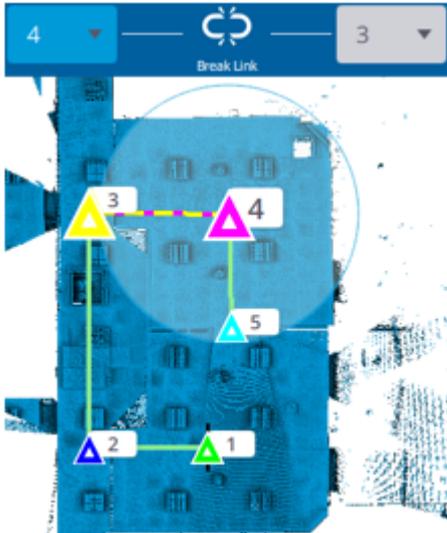
TIP – Use the **Registration Set Color**  option to render the points displayed in the **Map View** with one color per **Registration Set** (only outside the **Manual Registration** tool).

Edit Registration Links

Two stations that have been successfully registered together are linked by a **Registration Link** (from moving station to reference station). A **Registration Link** can be edited only within the **Manual Registration** tool.

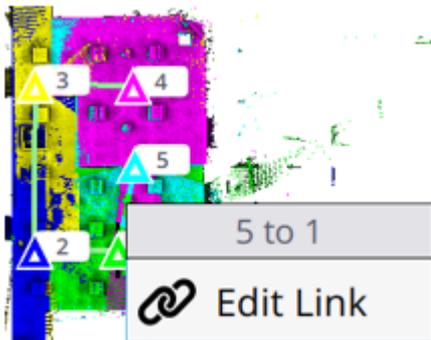
BREAK A REGISTRATION LINK WITHIN A SET

From the **Manual Registration** toolbar, select two stations from the same **Registration Set**, one from the **Moving Stations** list and the other from the **Reference Stations** list, and tap **Break Link**.



Or

In the **Map View**, tap a **Registration Link** and choose **Edit Link** from the pop-up menu. In the **Manual Registration** toolbar, the **Moving Stations** list and the **Reference Stations** list are updated to display the moving station and the reference station of the selected link. Tap **Break Link**.



LINK TWO STATIONS MANUALLY

From the **Manual Registration** toolbar, select two stations from two different **Registration Sets**, one from the **Moving Stations** list and the other from the **Reference Stations** list, and tap **Create Link**. The two stations are linked together, the moving station is put into the **Registration Set** of the reference station (if existed).

⚠ CAUTION – Two stations linked with a **Registration Link** does not mean that they are registered together but only put in the same set.

LINK TWO REGISTRATION SETS WITH A LINK

From the **Manual Registration** toolbar, select two stations from two different **Registration Sets**, one from the **Moving Stations** list and the other from the **Reference Stations** list, and tap **Create Link**. The two stations are linked together, and the two sets are merged into one (moving set into reference set).

ORGANIZE, ANNOTATE & MEASURE

To organize the data in your project, use labels. They are a quick and flexible way to flag the acquired data. Optionally, annotate the scan data and perform some measurements.

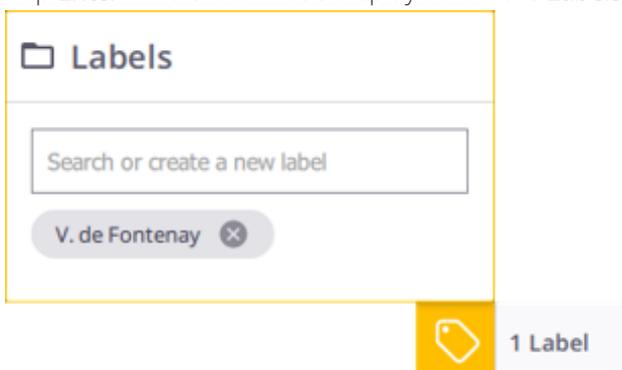
- ▶ [Add & Edit Labels](#)
- ▶ [Manage Stations](#)
- ▶ [Annotate](#)
- ▶ [Measure](#)

Assign & Edit Labels

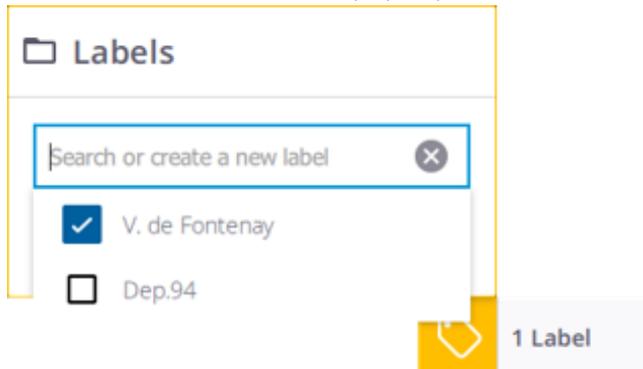
You can create (or select) and assign a label to a station, delete one, sort the stations to only display those having the same label. A label once created is added to those related to the instrument status: "Leveled", or "Not Leveled", "Imported", etc.

ASSIGN LABELS BEFORE SCANNING

1. Tap the **Labels** icon. The **Labels** panel pops up.
2. Tap in the **Labels** field.
3. If there is no label, enter a name in the **Labels** field.
4. Tap **Enter**. All created labels display below the **Labels** field.



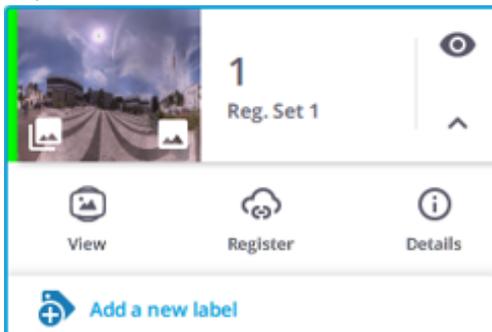
5. If there are some labels, a list pops up.



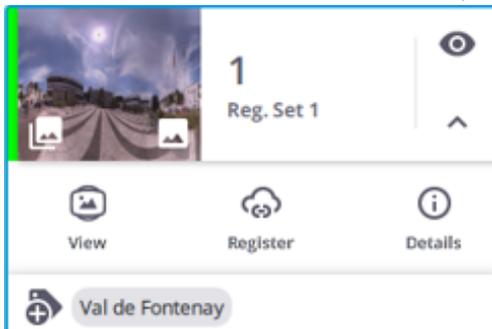
6. Choose a label from the list. The check box when is:
 - **Checked** means "Assigned", tap to unassign.
 - **Unchecked** means "Not Assigned", tap to assign.
7. Tap  inside the **Labels** field to close the list.

ASSIGN LABELS AFTER SCANNING

1. In the side panel, tap the **Stations List** icon. The **Stations List** panel displays.
2. Tap **Add New Label** from a station card.

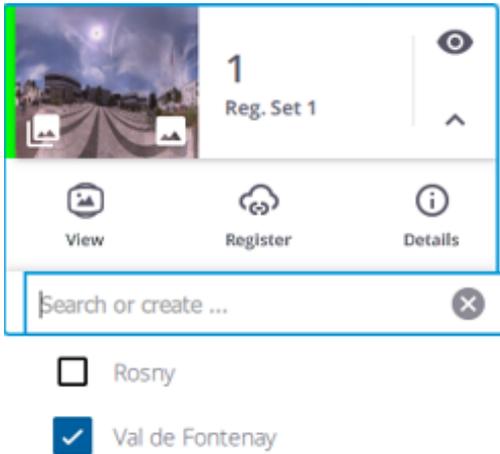


3. Enter a name in the **Labels** field, and tap **Enter** to create a new label.

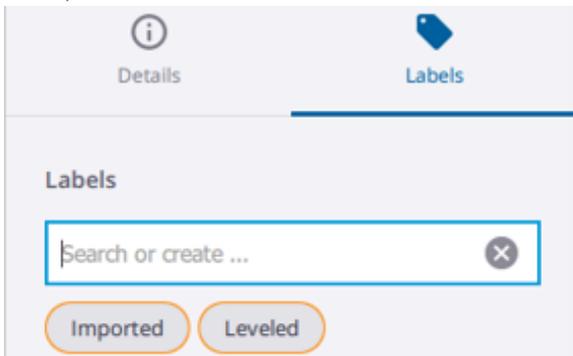


4. Or choose a label from the drop-down list (if there are some). A check box when is:
 - **Checked** means "Assigned", tap to unassign.

- Unchecked means "Not Assigned", tap to assign.



5. Or tap **Details / Labels** and create a new label or select one from the list.

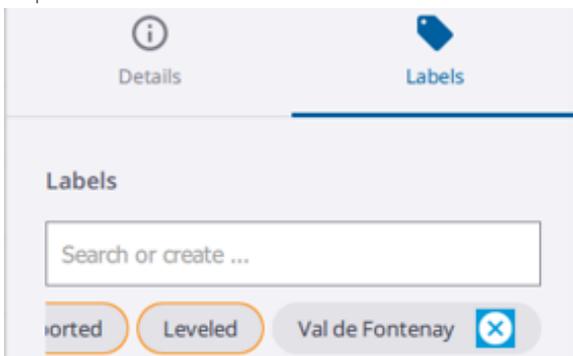


NOTE – Tap  inside the **Labels** field to close the list.

DELETE LABELS

Tap the **Stations List** icon to open the **Stations List** panel. Do one of the following:

- Unassign a label until it is no longer assigned to any station.
- Tap **Details / Labels** and  beside a label.



SORT STATIONS BY LABEL(S)

1. In the side panel, tap the **Stations List** icon. The **Stations List** panel displays.
2. Tap a label name (or a set of label names) in a station card. Stations out of the filtering range are hidden in the **Stations List** panel and in the **Map View**.
3. To reload the hidden stations, tap the X icon beside the name of the label to remove from the filtering.

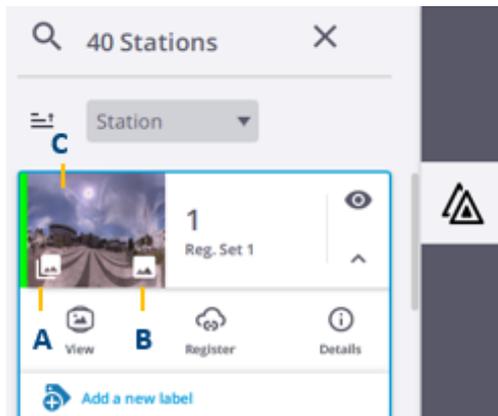


Manage Stations

DISPLAY STATION PROPERTIES

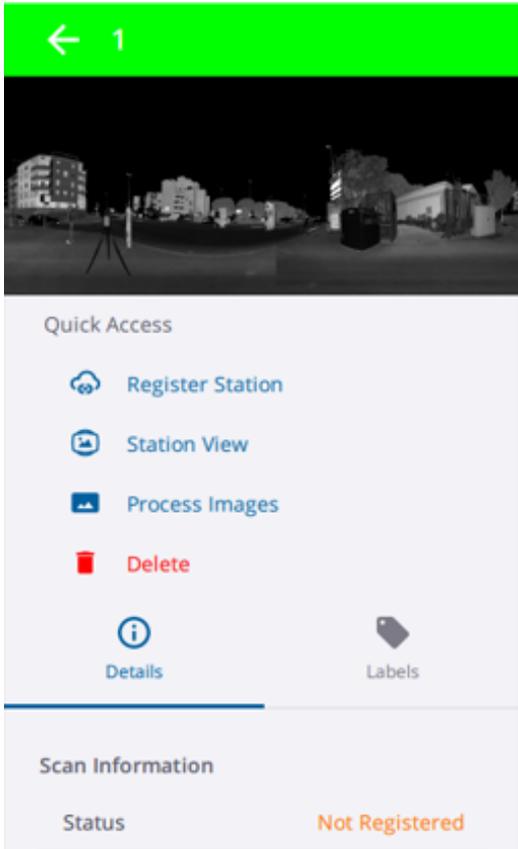
For each station, there are two levels of properties:

- **SUMMARIZED PROPERTIES:** From the **Stations List** panel, tap a station card to select the station. For each station card, the most relevant information is displayed: station name, registration set name, label(s) (if added), images (A) (if acquired), panorama (B) (if created), and colorization (C) (if applied to the resulting scan).



- **DETAILED PROPERTIES:** From the **Stations List** panel, tap  to expand a station card and  to display detailed properties (registration status, leveling status, etc.) and additional features (**Delete**, **Process**

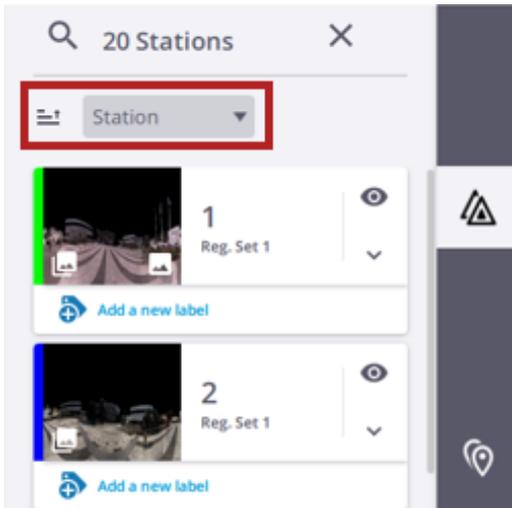
Images and Label creation and edition).



FILTER STATIONS

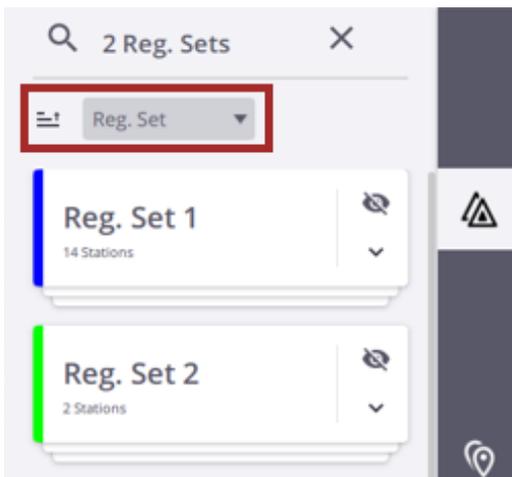
From the **Stations List** panel, tap the pull-down arrow and choose:

- **Stations** to filter the stations per station name, in ascending (or descending) order.



NOTE – When you hide (or display) a station from this panel, you hide (or display) all the contents: scan, markers (position and label), registration link and create annotation(s).

- **Reg. Set** to filter the stations per registration set, in ascending (or descending) order. Expand a registration set to can see all the stations in the set.



NOTE – When you hide (or display) a registration set from this panel, you also hide (or display) all the contents of the set (scans, station markers (positions and labels), registration links and created annotations) in the **Map View** and **3D View** and all markers (positions and labels) and created annotations of the set in the **Station View**.

DELETE STATIONS

When you delete a station from a project, the related file(s) (TZF, and/or TCF) are not removed from the **Scan Data** folder on the memory card, but only from the application's database.

In a project, stations are named following a sequence, starting at zero for the first station and incrementing in one digit for the second station, etc. When you delete **Station N**, the sequence is not disrupted, meaning that the next station is **Station N+1**.

Do one of the following:

- In the **Map View**, tap a station position and choose .
- From the **Stations List** panel, display the properties of a station by tapping , and tap **Delete**.

 **CAUTION** – When you delete station from a project, you delete its related scan, markers (position and label), registration link and created annotation from any view.

COLORIZE SCANS

To colorize the scanning result, tap  from the **Stations List** panel. (see [Colorize Scans, page 59](#)).

CREATE PANORAMAS

To create a high quality panorama, tap  from the **Stations List** panel. (see [Create Panoramas, page 61](#)).

Annotate

An annotation is a note and /or an image attached to a location which has to pick on the displayed data. Once created, an annotation can be edited.

NOTE – No connection to the scanner is required to use the **Annotate** tool.

ADD AN ANNOTATION

Tap **Annotate**  from the right side panel. With the **Annotations** panel popped-up, tap **Create New**:

- If not displayed, the **Station View** displays. Tap a point and if required, drag and drop the tapped point to a new location.
- The **Annotation** panel pops-up. From this panel:
 - Input a name in the **Name** field.
 - Optionally, input a comment in the **Description** field.
 - Optionally, take a picture with your controller to illustrate the annotation to create (see [Illustrate With a Picture, page 56](#)) or choose an existing picture.
 - Once satisfied, tap **Create Annotation**.
- Once created, an annotation displays as:
 - A pin with a label in the **Station View**.

- An annotation card in the **Annotations** panel.



DISPLAY AND HIDE AN ANNOTATION

To display (or hide) an annotation from all views (**Map View**, **Station View** and **3D View**), select it from any view (or from the **Annotations** panel):

- In the current view, the selected annotation is displayed bigger than the others, and a panel pops up showing the name, the thumbnail of the attached picture and the **View Details** command.
- In the **Annotations** panel, the selected annotation is surrounded by a blue frame, and its card expands showing hidden commands.

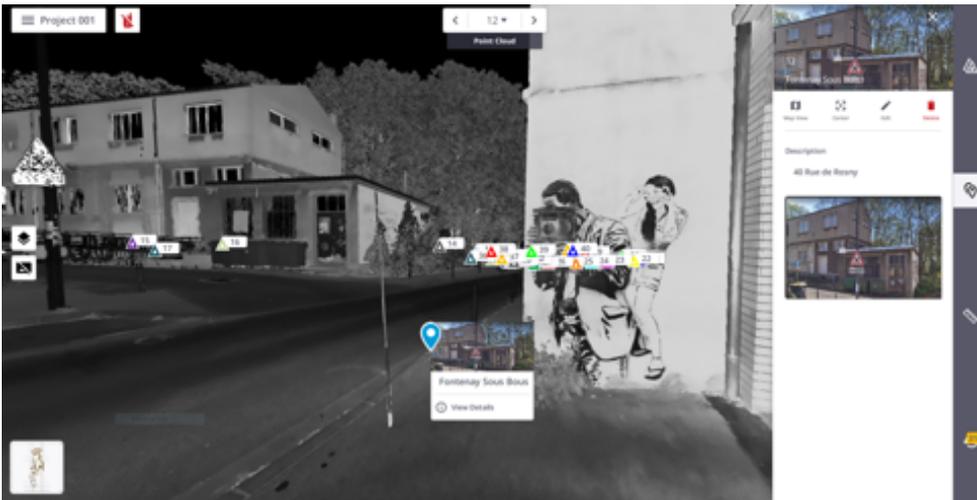


- Tap one of the following:
 -  to hide the selected annotation from all views.
 -  to display the selected annotation in all views.

-  to center the selected annotation in the current view.
-  to switch from the **Station View** display to the **Map View** (or **3D View**) display.
-  to switch from the **Map View** (or **3D View**) display to the **Station View** display

EDIT AN ANNOTATION

To edit an annotation, select it from any view (or from the **Annotations** panel) and tap **Details** (or **View Details**) to display its properties.



Tap **Edit** to open the **Edit Annotation** panel. From this panel, you can:

- Change the selected annotation's name.
- Change the description.
- Replace the attached picture by a new one. First, remove the previous picture by tapping **Remove Image** and then attach a new one.
- Not modify the position.

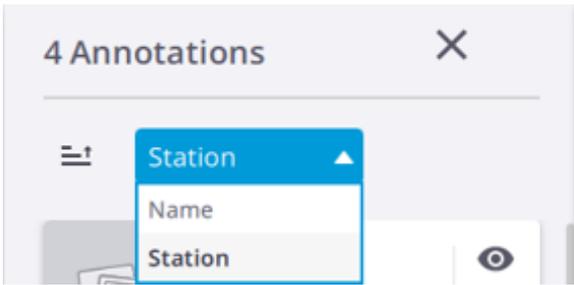
Once done, tap **Save**.

DELETE AN ANNOTATION

To delete an annotation from all views, select it from any view (or from the **Annotations** panel) and tap **Details** (or **View Details**) to display its properties. Once opened, tap **Delete**.

SORT ANNOTATIONS

Created annotations can be sorted by **Annotation Name** or **Station Name** in **Ascending Order** (or **Descending Order**).



Measure

The **2D Measure**  lets you measure the 3D position of a point, a distance between two points, or an area and perimeter drawn by several points. These points need to be picked on the scan data in any view (**Map View**, **Station View** and **3D View**).

MEASURE A 3D POSITION

The **Single Point**  lets you measure the 3D position of a point on the scan data. This point can be tapped in any view.

MEASURE A 2D DISTANCE

The **Distance**  lets you measure a distance by tapping two points in any view.

MEASURE A 2D DISTANCE IN THE XY PLANE

The **Horizontal Distance - XY Axis**  lets you measure a 2D distance in the XY plane by tapping two points in the **Station View**.



The measurement is performed between the first point and the projection of the second point in the XY plane.

MEASURE A 2D DISTANCE ALONG THE Z AXIS

The **Vertical Distance - Z Axis**  lets you measure a 2D distance along the Z axis by tapping two points in the **Station View**.

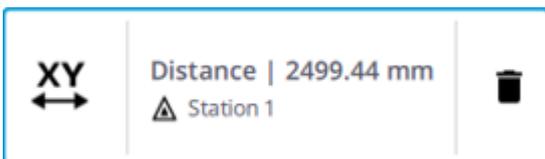


The measurement is performed between the first point and the projection of the second point along the Z axis.

MEASURE AN AREA AND A PERIMETER

The **Area**  lets measure an area and a perimeter by tapping at least three points in the **Map View**.

The results display in any view and are stacked by measuring order in the **Measurements** panel. If you have done a measurement in the **Station View**, the station inside which the measurement has been done is displayed below the result.



If you have done a measurement in the **Map View**, the view from which the measurement has been performed is displayed below the result, except for the **Single Point** measurement.



DELETE A MEASUREMENT

Select a measurement in a view. The selected measurement displays in red in the view, and is surrounded by a blue frame in the **Measurements** panel. Tap **Delete**  besides the selected measurement.

EDIT A MEASUREMENT

Select a measurement in a view. The selected measurement displays in red in the view, and is surrounded by a blue frame in the **Measurements** panel. Drag and drop a point in the **Map View** (or **Station View**). The selected measurement is updated in the **Map View** (or **Station View**), as well as in the **Measurements** panel.

Illustrate With a Picture

Tap  to take a picture with your controller to illustrate a project (see [Create a Project, page 15](#)) or an annotation (see [Annotate, page 51](#)). The preview screen displays. A framing grid is a set of lines, it helps to position and frame a picture.

- Tap  to activate the framing grid.
- Tap  to deactivate the framing grid.



Tap the **Photo** button to take a picture. Optionally, tap  to rotate the picture 90° counterclockwise. If you are satisfied with the result tap **Save**, or tap **Discard** to cancel and come back to the shooting position.

Once done, tap  :

- **PROJECT**: The taken picture displays as a thumbnail in the **Menu** bar and in the **Projects** page. If no picture has been attached, the first acquired scan is used instead.



- ANNOTATION: The taken picture is attached to a created annotation in two places.



FINALIZE & EXPORT

After registering all the stations together, you can refine the registration to increase the accuracy, export the refined project to industry standard format files, or run a report if needed. For tasks not run following the data acquisition such as colorization and panoramas creation, you can run them all in batch mode.

- ▶ [Refine a Project](#)
- ▶ [Run a Refinement Report](#)
- ▶ [Finalize a Project](#)
- ▶ [Export a Project](#)

Refine a Project

The **Refine Project** feature enhances the accuracy of the registration. It refines the position and orientation of all the stations using the scan data. The stations need to be previously registered for this feature to work successfully.

For every station, the application looks at all the possible links to all the other stations, and examines their overlaps. It computes a threshold on the overlap on every station, and keeps all the links whose overlap is larger than the threshold.

Tap **Refine Project**  from the **Menu** panel. If required, tap **Cancel** to interrupt the process. A report displays at the end (see [Run a Refinement Report, page 58](#)).

Run a Refinement Report

After refining the registration of the all stations, run a report by tapping **Menu / Display Refine Report**.

EDIT

With the report opened, tap **Edit**. From the opened **Edit Report Details** panel, add the information about your company (Logo, Name and Website), the information about you (name and title), and additional images. If required:

- Change the **Threshold** value for the **RMS**. It refers to the root mean square of the point-to-point distances on the overlapping areas.
- Reset to the **RMS** value to default (6).

SAVE

Save the report in a **PDF** or **HTML** format file.

Finalize a Project

To finalize a project, refine the registration on the whole project, colorize uncolorized scans, and create missing **High Quality** panoramas. Optionally, export the refined project.

Tap  from the **Menu** panel to open the **Finalize & Export Project** dialog.

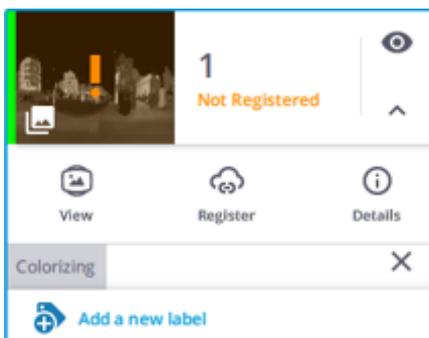
Refine Scans

The **Refine Scans** feature enables to enhance the accuracy of the registration. It refines the position and orientation of all the stations using the scan data.

Colorize Scans

You can colorize a single scan or a set of scans in batch mode.

- **SINGLE COLORIZATION:** From the **Stations List** panel, select **Details** / **Process Images** / **Colorize Point Cloud** to colorize a scan (the resulting **TZF** format file) with the color and /or exposure information found in the images (the resulting **TCF** format file). To cancel the step, tap .



A notification pops-up and summarizes the state of the step (succeeded (**Green**) or failed (**Red**), as well as

the duration.



- **BATCH COLORIZATION:** From Menu panel, select **Finalize & Export Project** to open the dialog, and check the **Colorize Point Clouds** option to colorize all scans in batch.



Below is a thumbnail of a colored station:



Below is a thumbnail of an uncolored station:



 **CAUTION** – A scan can be colorized only once. After colorizing, the **Colorize Point Clouds** option becomes dimmed in the **Process Images** (or **Finalize & Export Project**) dialog.

TIP – Select the **True Color** rendering from the **Options**  in the **Map View** to view the colorization applied to the scan data.

Create Panoramas

A panorama results from the stitching of the acquired images at a given position (station position). It may have two resolutions.

- **PREVIEW QUALITY:** This resolution uses a fixed distance, i.e. 20 meters, and does not apply any **Blending** and **Occlusion** corrections. It is fast and requires less computer resources. It is recommended for preview purposes.

- **Blending** smooths discontinuities between images.

- **Occlusion** avoids the duplication of objects.

Do one of the following:

- To create a panorama automatically for each station after acquiring the images, set the **Automatic Panorama Creation (Preview)** option to on (see **Application Settings / Images**, page 12).

- To create a panorama manually for a given station, select **Details / Process Images / Create Preview Panorama** from the **Stations List** panel.

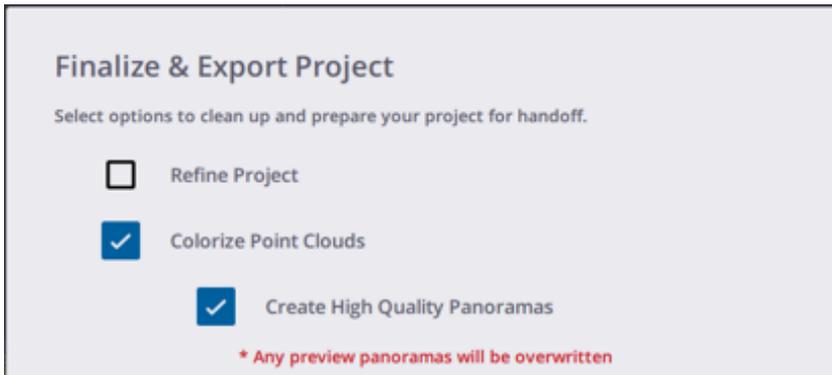
NOTE – The **Create Preview Panorama** option is dimmed if the automatic method has been initially used.

- **HIGH QUALITY:** This resolution mode uses the point cloud to define a distance, and does apply a **Blending** and an **Occlusion** corrections to a panorama to create. It is slower and requires more computer resources, but gives a better panorama result.

Do one of the following:

- To create a single panorama, select **Details / Process Images / Colorize Point Cloud / Create High Quality Panorama** from the **Stations List** panel.

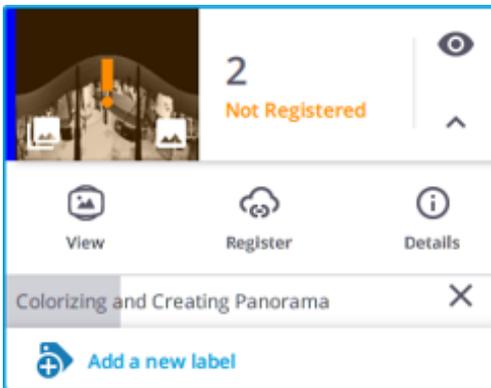
- To create all panoramas in batch mode, check the **Colorize Point Clouds / Create High Quality Panoramas** option in the **Finalize & Export Project** dialog.



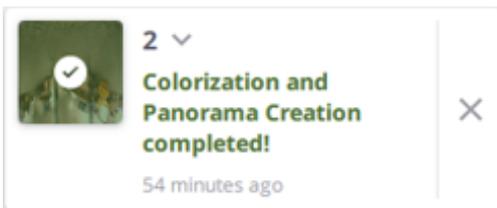
NOTE – A high quality panorama once created overrides the preview quality panorama (if initially created).

NOTE – A high quality panorama (if created) is used to colorize a scan, meaning that you cannot one without colorizing.

For all methods except the batch mode, tap **X** to cancel the step.



At the end of the step, a notification pops-up and summarizes the state of the step (succeeded (**Green**) or failed (**Red**)), as well as the duration.



NOTE – The *Process Images* options are not available after colorizing, and creating panoramas (preview quality and high quality).

NOTE – The *Panorama*  option is available only if a panorama has been created.

Export a Project

To export the current project to a file format, tap  from the **Menu** panel. In the **Finalize & Export Project** dialog, check the **Export Project** option and choose the appropriate format by tapping  :



- **TZF:** This format is a Trimble scan files in a zipped format. The software exports the current project as a folder with:
 - One **TZF** format file per station.
 - One **TCF** format file per station if the station has been acquired with images (see [Acquire Images, page 25](#)).
- **E57:** This format is a file format specified by the ASTM (American Society for Testing and Materials), an international standards organization. The E57 format supports two types of data: Gridded Data and Non-Gridded Data. Gridded data is a data which is aligned in regular arrays.
 - **E57 GRIDDED FILES:** The software exports the current project as a set of LAS 1.2 format files, one per station.
 - **E57 NON-GRIDDED FILES:** The software exports the current project as one LAS 1.2 format file.
- **PTX:** This format is an ASCII based for scan file format. The software exports the current project as one LAS 1.2 format file.
- **LAS, Non-Gridded:** This format is a public file format for interchanging 3-dimensional point cloud data between data users. It is binary-based and has several versions: 1.0, 1.1, 1.2, 1.3 and 1.4. The application exports the current project as one LAS 1.2 format file.
- **POD, Non-Gridded:** The POD (Point Database) file format is a Bentley Pointools' native point cloud format. The software exports the current project as one POD format file. Points, color, intensity and normal (if available) information are exported.
- **RCP:** This format file is a project file for Recap from AutoDesk. The software exports the current project as one RCP format file.
- **TDX:** TDX is a Trimble Data eXchange file format, commonly used in some Trimble software applications like TBC (Trimble Business Center) or RealWorks. The software exports the information listed below:
 - Stations with registration sets,
 - Created panorama(s)
 - Measured points,
 - Leveling information,

8 FINALIZE & EXPORT

- Registration transformation information,
- Created labels.

As a result, the following is created:

- A folder named according the project name followed with the TDX suffix.
- A project file named according to the project name with the TDX extension and a TDF (Trimble Data Files) folder with a set of TZF format files, one per station and a set of TPF format files, one per station if a panorama has been created from the acquired images (see [Create Panoramas, page 61](#)).

NOTE – *You can cancel an export in progress by tapping **Cancel**.*

RESOURCES

In this chapter, you can find additional resources like FAQs, Tips and tricks and Contact.

- ▶ [Contact & Support](#)
- ▶ [FAQs](#)
- ▶ [Tips & Tricks](#)
- ▶ [Glossary](#)
- ▶ [List of Notifications](#)

Contact & Support

Geospatial Division

10368 Westmoor Drive

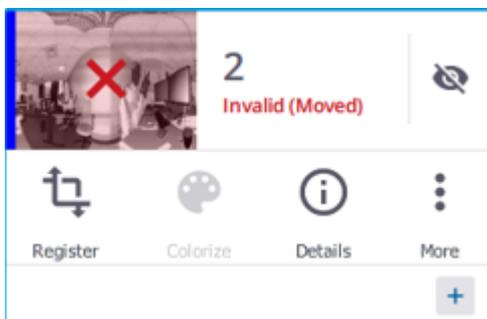
Westminster CO 80021 - USA

www.trimble.com

FAQs

INVALID STATION

The software performs a Tilt measurement before and at the end of a scan and compares the results. If the gap is over than 1 milliradian, the acquired station is flagged as **Invalid**.



As a consequence, the automatic registration (or manual registration) cannot be applied to the station.

CONNECTION TO THE SCANNER LOST WHILE SCANNING

An acquisition in progress terminates even if the controller has been disconnected from the scanner for one of the following reasons: Wi-Fi signal lost, or USB 2.0 connection issue, or the application closed by accident, etc..

Tips and Tricks

Below are listed some tips and tricks that can help you in your daily duties.

ONE SCAN BUTTON SETTINGS

The settings for the **One Scan** button feature are the last used ones or the default ones (if using the scanner for the first time). Any change on the settings in the application is not immediately taken into account for the next. Scan first with the scanner being connected (by tapping **Start Scan**) to apply the change to the next scan.

CREATE A SECTOR SCAN

When you interrupt an acquisition in progress, the acquired data is not discarded. It is saved on the memory card and downloaded under the software database. This data can be considered as a **Sector Scan** compared to a complete dataset we qualify as to a **Full Scan**.

DATA ACQUISITION TERMINATES EVEN IF THE CONNECTION TO THE INSTRUMENT IS LOST

If the connection to the scanner has been interrupted (Wi-Fi signal lost, or USB connection issue, or the application closes, etc.) when the scanner is collecting the data.

The instrument continue collecting the data till the end.

The acquired scan data, first saved on the SD card in the instrument, is automatically loaded to the application database if:

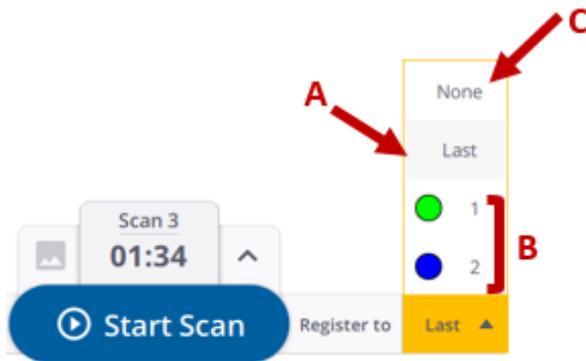
- The controller has been reconnected to the same instrument.
- The instrument has been turned first off and then on, and reconnected to the same instrument.

The acquired scan data is not loaded to the application database if:

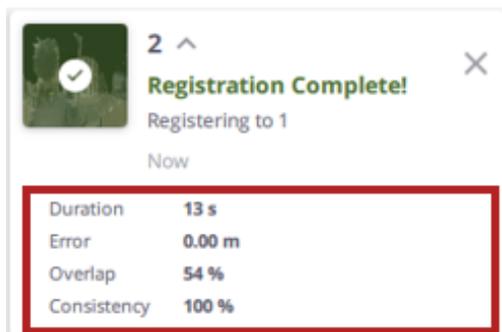
- The controller has been connected to a different instrument.
- A new project has been created or a previous project loaded in Trimble Perspective, and the controller reconnected to the same instrument.

Glossary

- **AUTO-ANGULAR CALIBRATION:** The **Auto-Angular Calibration** is performed by the scanner. It applies a correction to the collimation error, i.e., the deviation of the **Horizontal Axis (HA)**, or **Vertical Axis (VA)**, or **Sight Axis (SA)**.
- **AUTO-DISTANCE CALIBRATION:** The **Auto-Distance Calibration** is performed by the scanner. It applies a distance correction in the albedo measurement and the distance measurement.
- **AUTOMATIC ORIENTATION OF THE FIRST SCAN:** This step is always applied to the first acquired scan. It consists of finding the correct orientation of the acquired data. At the end of the step, a notification pops up and summarizes the state of the step (succeeded (**Green**) or failed (**Red**)).
- **AUTOMATIC REGISTRATION:** The **Automatic Registration** is always enabled and works with pairwise scans or pairwise registration sets. When the **Automatic registration** is launched, it computes a transformation to fit the current scan with the previous one (default mode) (A), or with a chosen one (B) as perfect as it can. It can also compute no transformation (C).

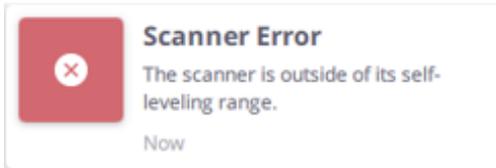


After each **Automatic registration**, some statistics are computed. The computed statistics and the resulting notifications are here to help you inspecting the transformation but do not replace a human control.



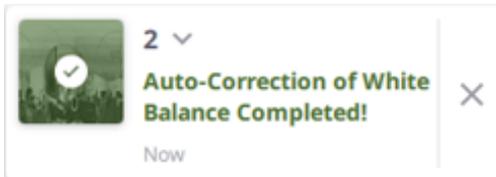
- **REGISTRATION:** A **Registration** consists of applying a transformation to the current scan so that it fits as much as possible to the previous station or to a chosen station, whatever the method (automatic or manual). The goal is to have your project completely registered from the first scan to the last one, meaning that all stations resides in a unique registration set.
- **SELF-LEVELING:** This option is by default on. It consists of measuring the horizontality and verticality of the

scanner. If the scanner is within a range of $+5^\circ$ and -5° from either side of its vertical axis, the acquired stations are **Leveled**. If the scanner is within the following ranges, from $+5^\circ$ to $+45^\circ$ and from -5° to -45° , from either side of its vertical axis, the acquired stations are **Not leveled**. If the scanner is out of the operating ranges, i.e., greater to $+45^\circ$ and -45° from either side of its vertical axis, the software displays an error and then prevents you from collecting the data.



- **WHITE BALANCE:** This is a process that a camera uses to remove color casts produced by the different color temperatures, so that white objects appear white in the pictures.

In the **Auto** mode, the white balance correction is disabled in the scanner. The images are acquired with no correction. The correction is applied to the images in the software once they are downloaded (a notification popped-up once the correction is applied).



With the other modes, the images are directly corrected once acquired by the scanner (no notification popped-up by the software).

List of Notifications

Below are listed some notifications.

Controller Battery Charge Level

When the charge level of the battery in the controller reaches one of the two thresholds:

- **30 %** is considered low. A warning notification (in orange) pops up. You can still work with the instrument for collecting data.
- **10%** is considered critical. A critical notification (in red) first pops up. The software prevents you from collecting data by displaying a warning message (if tap the **Start Scan** button). The instrument will continue acquiring data till the end and the scan data should be retrieved later once the battery will be enough charged and the controller reconnected to the instrument.

NOTE – Trimble Perspective monitors the battery in the controller every 10 minutes if its charge level is above 30%, every 5 minutes if it is between 30% and 10% and every minute if it is below 10%.

Instrument Battery Charge Level

When the charge level of the battery in the instrument reaches one of the two thresholds:

- **25 %** is considered low. A warning notification (in orange) pops up. You can still work with the instrument for collecting data.
- **10%** is considered critical. A critical notification (in red) first pops up. The application prevents you from collecting data by displaying a warning message (if tap the **Start Scan** button). This avoids getting corrupted (or incomplete) scan data.

NOTE – *The charge level of the battery can be checked by tapping the **Scanner** icon next to the **Menu** icon.*

Memory Card Space Left

When the space left on the memory card in the instrument reaches the following threshold:

- **850 MB** is considered low. A warning notification (in orange) pops up. You can still work with the instrument for collecting data.
- Not enough space to save the current scan, a critical notification (in red) first pops up. The application prevents you from collecting data by displaying a warning message (if tap the **Start Scan** button).