

## Release notes

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From: Product Manager Amberg Tunnel Surveying

To: Amberg Tunnel Surveying distribution partners / customers

**Amberg Tunnel 2.6.0.0**  
**Amberg Navigator 1.4.0**  
**Amberg ScanControl 1.0.1**

Dear Amberg Tunnel users,

We would like to inform you that new versions of the Amberg Tunnel Surveying software products were released. Please find details about new features, changes and their benefits below.

Customers can download the latest software release from  
<http://www.ambergtechnologies.ch/downloads/>.

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# 1. Amberg Tunnel – General

## 1.1. New task: Blast round scan & Line scan

With the Amberg Tunnel release 2.6.0.0 it is now also possible to generate Amberg Navigator tasks which also works with laser scanner and Leica MultiStation. These two tasks works in tunnel heading and for the Blast round scan with Leica MultiStation you can also use it in a shaft heading. To learn more about the new task see also chapter 3.2 and 3.3.

## 1.2. ASCII-Export from transverse slope editor

To export the transverse slope definition of the current construction stage to an ASCII file, use the Export to file function from the toolbar.

## 1.3. Benefits

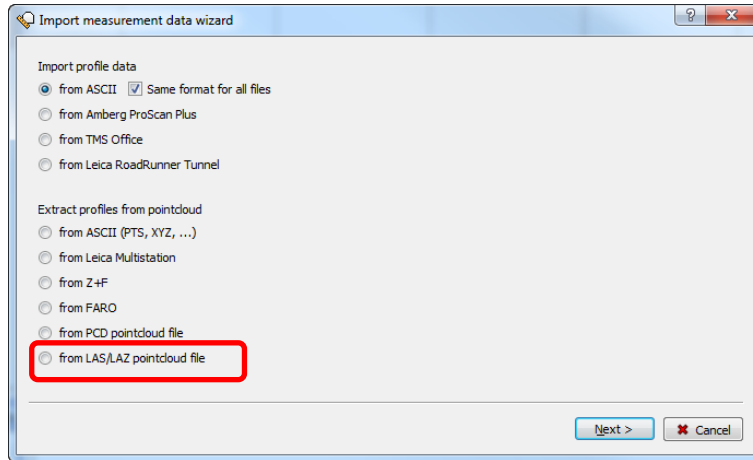
With the new features, you can:

- control with one Amberg Navigator Tablet a Total Station and a Laser Scanner or a Leica MultiStation.
- georeferenced and process you point cloud direct in the tunnel a save up to 80% of your time for post processing scan data.

## 2. Amberg Tunnel – Control module

### 2.1. Import pointclouds from LAS/LAZ to measured profiles

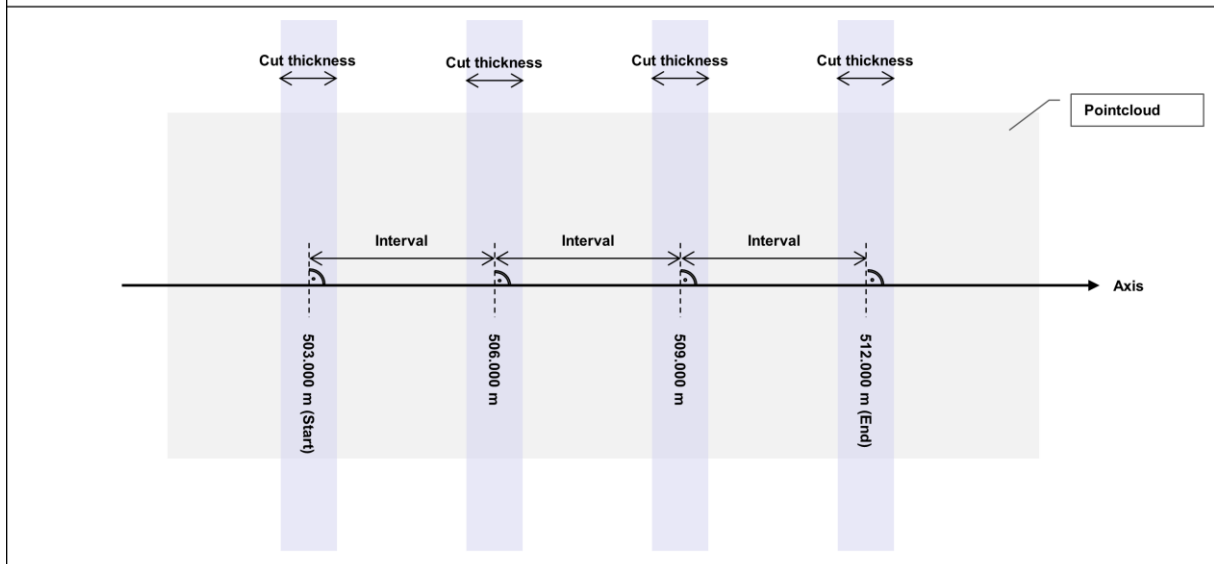
The Import measurement data wizard supports extraction of profiles from a pointcloud. Profiles are extracted from the point cloud at stationing values along the axis, vertical / tilting with longitudinal slope according to the settings of the construction stage.



The wizard guides you through the following steps:

1. Select the data source type that fits your data.
2. Select the file that you want to import.
3. Specify the file format.
4. Specify the content of data columns.
5. Specify the parameters that are used to extract the profiles from the point cloud.
  - a. **Start stationing:** Start of profile extraction section
  - b. **End stationing:** End of profile extraction section
  - c. **Interval:** Interval between the extracted profiles (along the axis)
  - d. **Profile cut thickness:** Total bandwidth value, used to find the points to be assigned to the extracted profile

### Profile characteristics



Use **Filters** to generate profiles with fixed point spacing. There are two options:

**Fixed number of points:** Select how many points you want have in each extracted profile.

**Fixed point interspace:** Select the interspace (along the theoretical profile) of the points in the extracted profile.

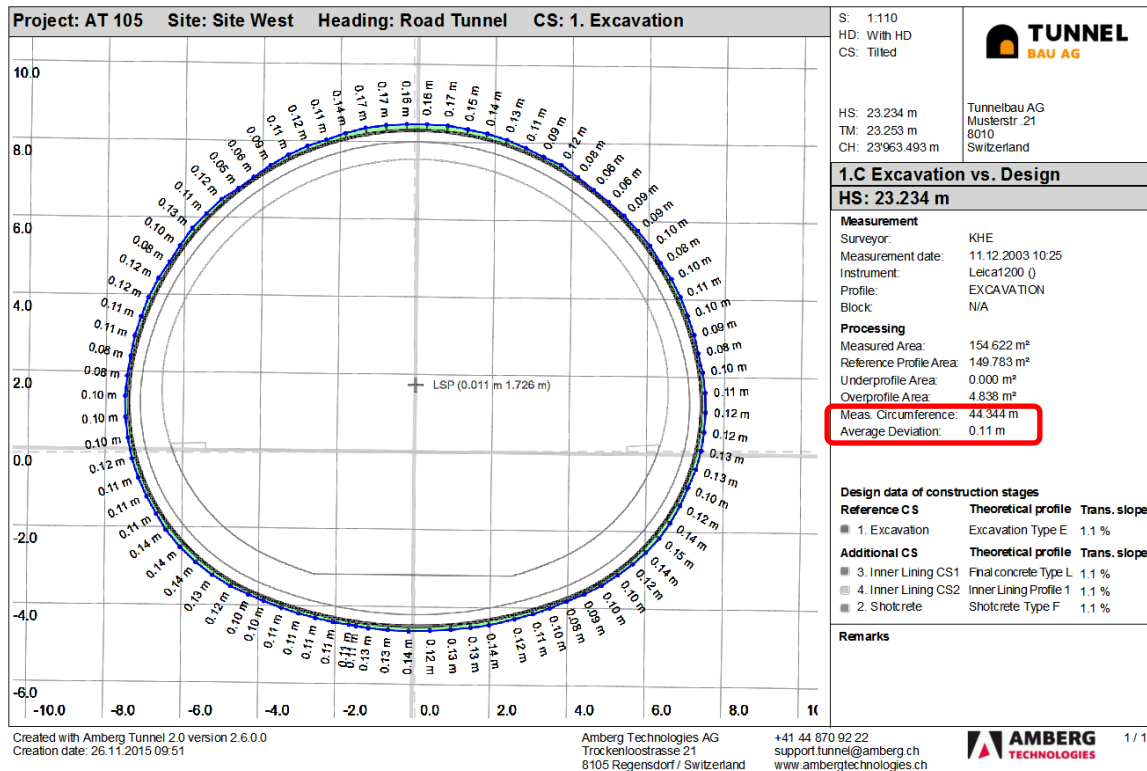
6. Specify the attributes that will be set for all extracted profiles.

**Important note:**

Extracted profiles must have maximum 250 points. Profiles containing more than 250 points will be reduced automatically.

## 2.2. Additional values are exported to the \*.csv export

The values Measured circumference and average deviation values can be now also exported to the \*.csv file for additional analysis.



## 2.3. Additional improvements

- Point reduction filter for scan data import
- Feet values for PTS import supported

## 2.4. Benefits

With the new features, you can:

- efficiently exchange laser scanning data from third party products to Amberg Tunnel with the LAS/LAZ Import.

### 3. Amberg Navigator Tablet

#### 3.1. General – Tablet requirements 64-bit for Scanning task

With the Amberg Navigator Release 1.4.0 we also release a 64-bit version of Amberg Navigator Tablet Software. For the use of the new laser scanning tasks (which are explained in the next chapters) there is the requirement that you have to use a 64-bit tablet.

#### 3.2. New task: Blast round scan

This task allows to determine the position of a pointcloud with a Leica MS or with the Amberg Positioning Method (APM) and provides on-site evaluation. For the APM, prisms at two positions of the laser scanner and the sphere prism are measured. The measured absolute coordinates of the prisms are stored for positioning the scan. The blasting round task generally consists of five steps: setting the scan directory, theodolite measurement of the prisms, laser scanner measurement, sphere detection and on-site evaluation.

- Note:**
- This task of Amberg Navigator Tablet is optimized for scanners **equipped with two prisms**
  - In **shaft headings**, this task can be used only with **Leica MS instruments**
  - The Leica MultiStation must also have a **GeoCom Scanning** license additionally to the GeoCom Robotics license

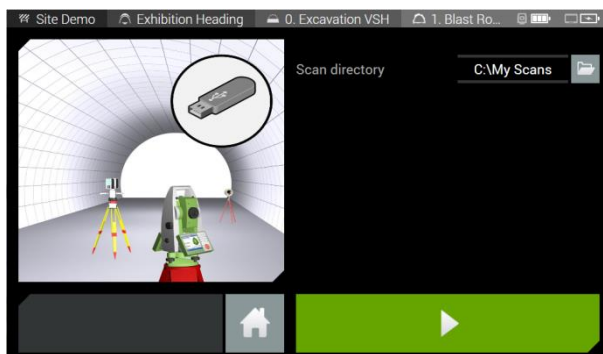


The workflow of this task depends on the selected scanner type.

FARO / Z+F	Leica MS
Select scan directory	Select scan directory
Theodolite measurements (automatic)	
Scanner measurement	Scanner measurement
Sphere detection	
Evaluation	Evaluation

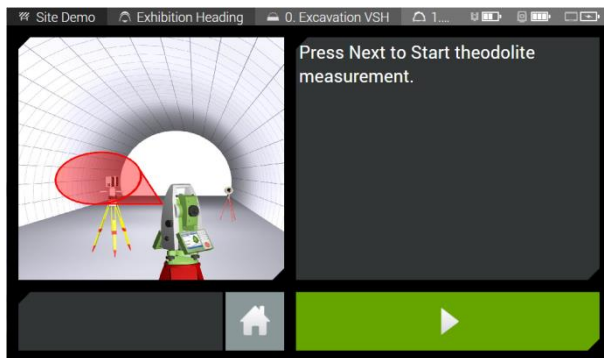
##### 3.2.1. Scan directory

Select a scan directory. The measurement data of the theodolite and the laser scanner will be stored to this directory. Make sure to pick a folder on a drive that provides enough disk space and is permanently available during the measurement.



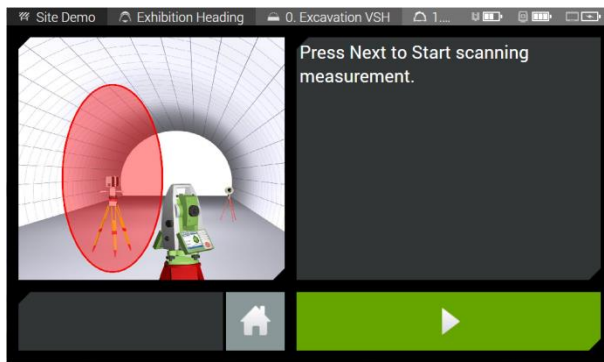
### 3.2.2. Theodolite measurements

Depending on the task settings, measure the three APM prisms automatically with PowerSearch.



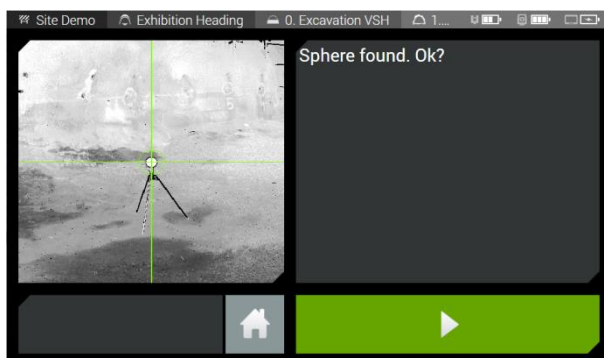
### 3.2.3. Laser scanner measurements

After the theodolite measurements are done, press Next to trigger the laser scanner measurement.



### 3.2.4. Sphere detection

For an optimal workflow, the sphere target (TMS ScanTarget TPR100) is positioned between the laser scanner and the theodolite, at a **maximal distance of about 6 meters** from the scanner. This ensures the sphere to be recognizable in the pointcloud. The sphere is being detected automatically in the pointcloud. Press Next to confirm the sphere position. If the sphere can't be detected, please position the sphere according to our recommendations and execute the task again.



### 3.2.5. Evaluation

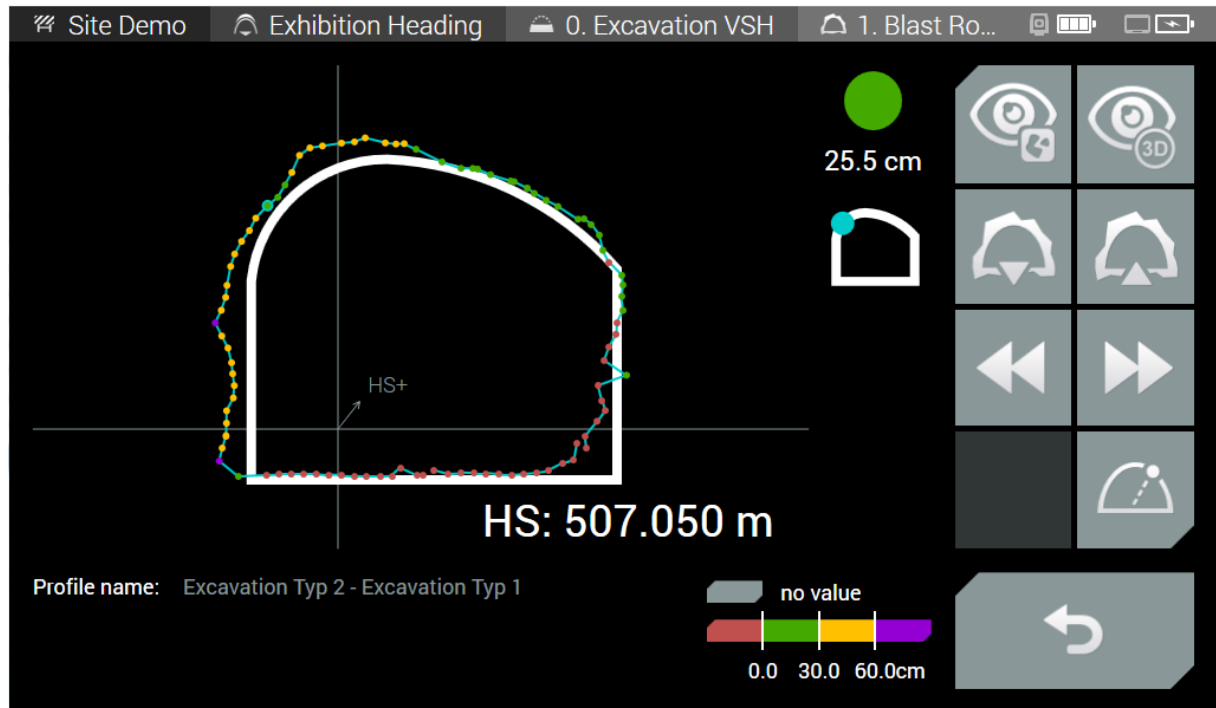
The theodolite and the laser scanner measurement data are stored to the scan directory. The pointcloud is positioned by Amberg Navigator Tablet and can be evaluated on-site. For the evaluation, the pointcloud around the laser scanner position is downsampled (according to the task settings) and calculated against the design.

The following evaluation modes and functions are available. To toggle between the 2D modes, use the according view button top left. To switch to the 3D mode or back to the 2D mode, use the according view button top right.

## 2D mode – profile view

The pointcloud around the laser scanner position is cut to profiles according to the task settings. Each profile point is calculated against the design and colored according to the color key bottom right.

To move between measured profiles, use the **Next profile** and **Previous profile** buttons. To select a measured point within the currently displayed measured profile, use the **Next point** or **Previous point** button or press on it in the profile view. The under- or overprofile value of the currently selected point is displayed top right of the graphics area. To highlight the current selection on the tunnel wall with the red laser of the theodolite, press the **Highlight point** button.



This evaluation page contains the following buttons:

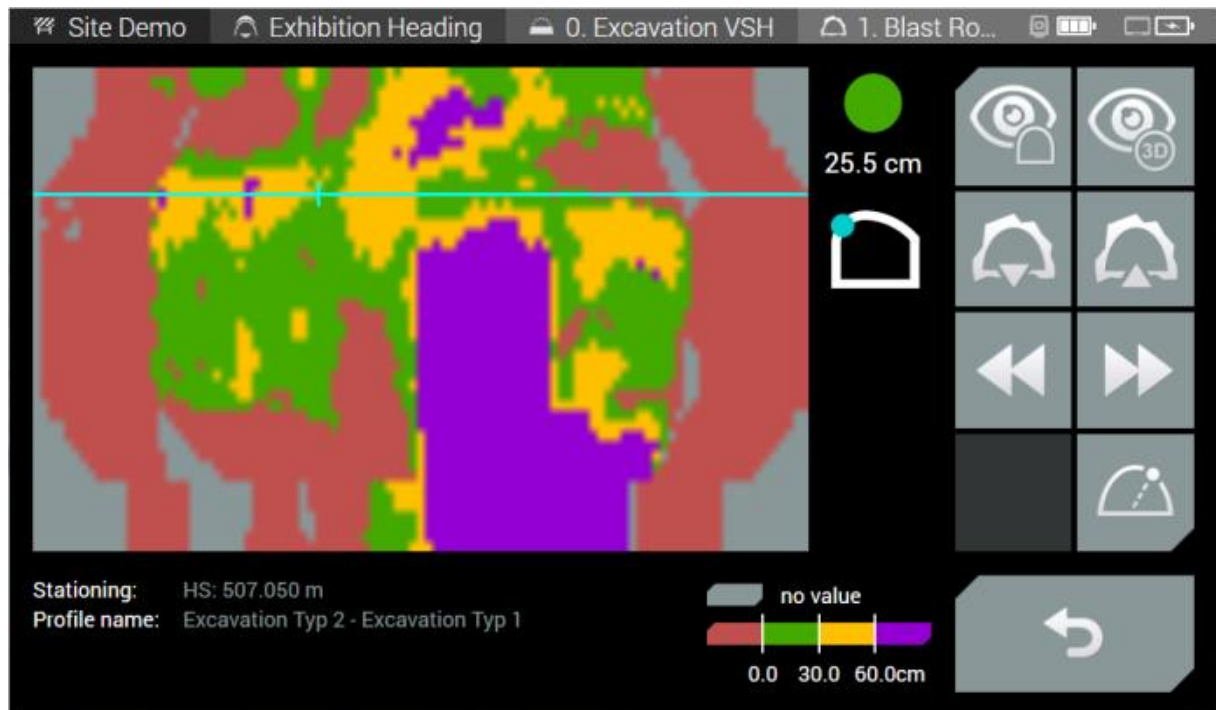
- |                             |   |
|-----------------------------|---|
| <b>Toggle 2D view mode:</b> | Change from the 2D profile view to the 2D map view.   |
| <b>Switch to 3D mode:</b>   | Switch from the 2D mode to the 3D mode.   |
| <b>Previous profile:</b>    | Displays the previously measured profile it in the graphics area.   |
| <b>Next profile:</b>        | Displays the next measured profile it in the graphics area.   |
| <b>Previous point:</b>      | Selects the previous point of the currently displayed profile and displays its under- or overprofile value. |
| <b>Next point:</b>          | Selects the next point of the currently displayed profile and displays its under- or overprofile value.     |
| <b>Highlight point:</b>     | Highlight the selected point at the tunnel wall with the instrument.  |
| <b>Back:</b>                | Finishes the evaluation and returns to the range selection.   |



## 2D mode –map view

The pointcloud around the laser scanner position is cut to profiles according to the task settings. Each profile point is calculated against the design and colored according to the color key bottom right. In the map view, all profiles are aligned and displayed as a map.

To move between measured profiles, use the **Next profile** and **Previous profile** buttons. To select a measured point within the currently displayed measured profile, use the **Next point** or **Previous point** button or press on it in the profile view. The under- or overprofile value of the currently selected point is displayed top right of the graphics area. To highlight the current selection on the tunnel wall with the red laser of the theodolite, press the **Highlight point** button.



This evaluation page contains the following buttons:

**Toggle 2D view mode:** Change from the 2D map view to the 2D profile view.

**Switch to 3D mode:** Switch from the 2D mode to the 3D mode.

**Previous profile:** Displays the previously measured profile it in the graphics area.

**Next profile:** Displays the next measured profile it in the graphics area.

**Previous point:** Selects the previous point of the currently displayed profile and displays its under- or overprofile value.

**Next point:** Selects the next point of the currently displayed profile and displays its under- or overprofile value.

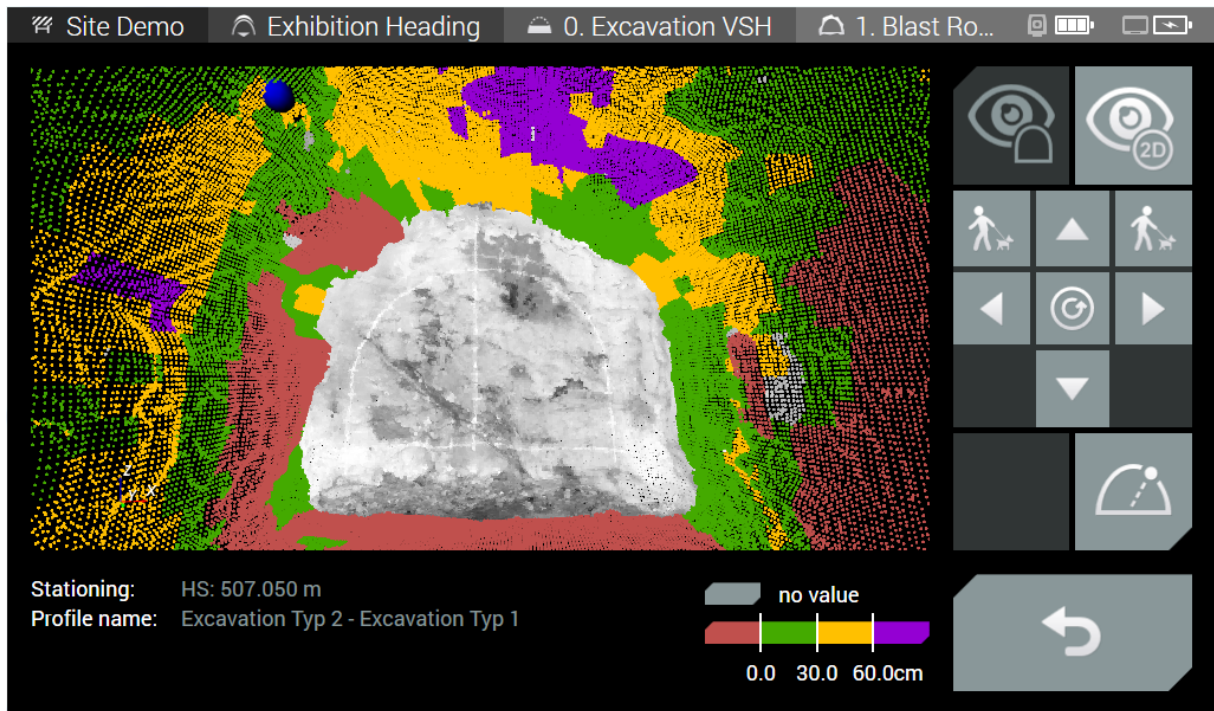
**Highlight point:** Highlight the selected point at the tunnel wall with the instrument.

**Back:** Finishes the evaluation and returns to the range selection.

### 3D mode

The pointcloud around the laser scanner position is downsampled, calculated against the design and colored according to the color key bottom right.

To select a measured point from the pointcloud, press on it in the 3D view. The currently selected point is marked with a blue ball. To highlight the current selection on the tunnel wall with the red laser of the theodolite, press the **Highlight point** button.



This evaluation page contains the following buttons:

**Switch to 2D mode:** Switch from the 3D mode to the 2D mode.

**Rotate up/down/left/right:** The arrow keys allow turning the 3D view to all four directions.

**Walk forward/backward:** The "dog keys" allow walking forward (with the dog) or backward (against the dog) in the 3D view.

**Reset view:** Resets the 3D view to the initial position, viewing in ascending heading direction.

**Highlight point:** Highlight the selected point at the tunnel wall with the instrument.

**Back:** Finishes the evaluation and returns to the range selection.

### 3.3. New task: Line scan

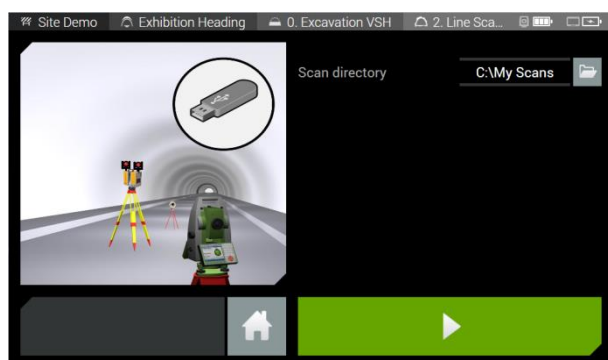
This task allows to determine the position of a pointcloud with the Amberg Positioning Method (APM), and efficiently acquire many scans in a row. For this purpose, prisms at two positions of the laser scanner and the sphere prism are measured. The measured absolute coordinates of the prisms are stored for positioning the scan. The Line scan task generally consists of six steps: setting the scan directory, selecting the scan number, theodolite measurement of the prisms, laser scanner measurement, sphere detection and preview.

**Note:**

- This task of Amberg Navigator Tablet is optimized for scanners **equipped with two prisms**.
- This task can only be used with the APM method, requiring a total station and a laser scanner. It is **not possible to use a Leica MS instrument** for this task.

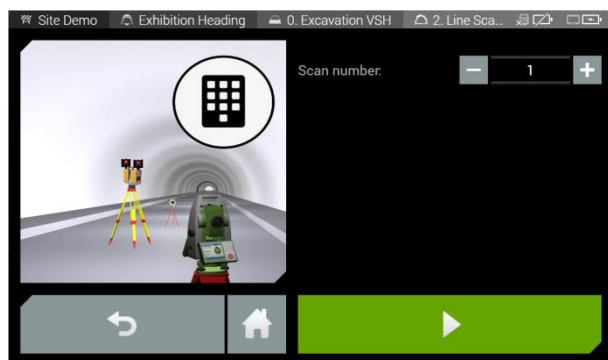
#### 3.3.1. Scan directory

Select a scan directory. The measurement data of the theodolite and the laser scanner will be stored to this directory. Make sure to pick a folder on a drive that provides enough disk space and is permanently available during the measurement.



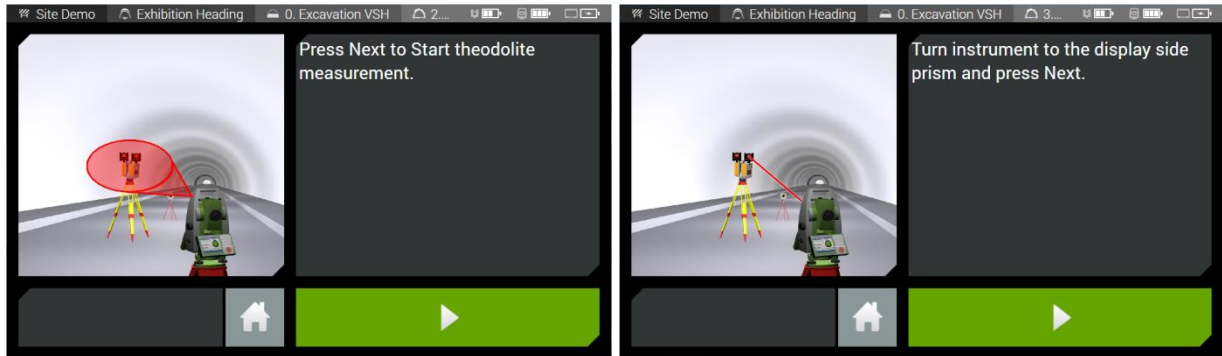
#### 3.3.2. Scan number

Select a scan number. It must be unique for the selected scan directory and will be used for linking the scan data with the total station measurements in the dedicated evaluation software.



### 3.3.3. Theodolite measurements

Depending on the task settings, measure the three APM prisms automatically with PowerSearch or measure them manually in three separate steps.

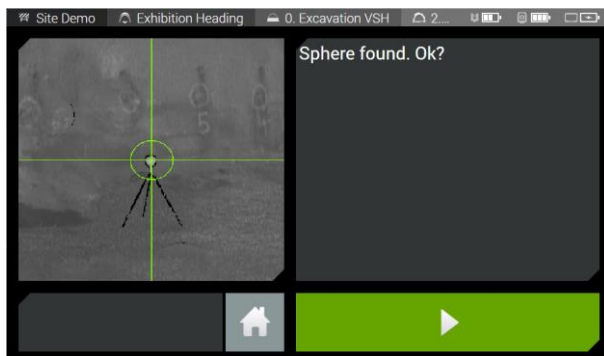


### 3.3.4. Laser scanner measurements

After the theodolite measurements are done, press Next to trigger the laser scanner measurement.

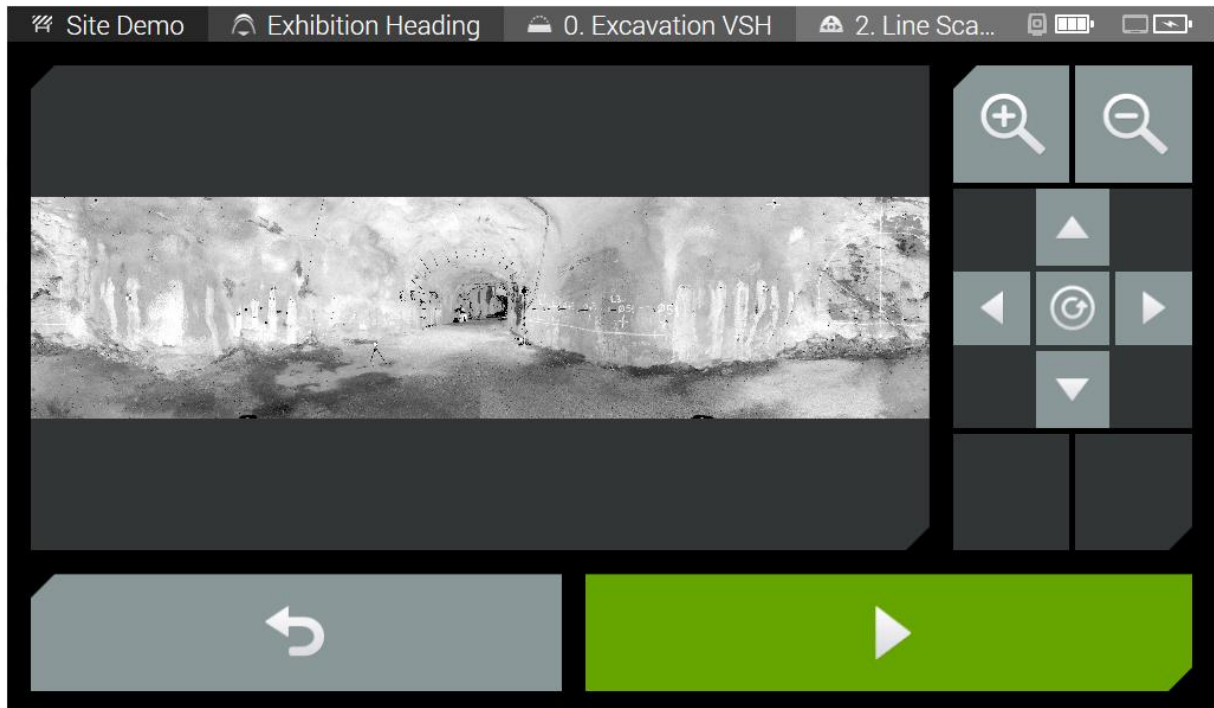
### 3.3.5. Sphere detection

For an optimal workflow, the sphere target (TMS ScanTarget TPR100) is positioned between the laser scanner and the theodolite, at a **maximal distance of about 6 meters** from the scanner. This ensures the sphere to be recognizable in the pointcloud. The sphere is being detected automatically in the pointcloud. Press Next to confirm the sphere position. If the sphere can't be detected, please position the sphere according to our recommendations and execute the task again.



### 3.3.6. Preview

The theodolite and the laser scanner measurement data are stored to the scan directory. An intensity image is established and displayed. Carefully check your data for integrity and repeat the measurement if required.



This preview page contains the following buttons:

- |                                  |   |
|----------------------------------|---|
| <b>Zoom in:</b>                  | Zoom in and magnify the preview image.                                  |
| <b>Zoom out:</b>                 | Zoom out and scale down the preview image.                              |
| <b>Shift up/down/left/right:</b> | The arrow keys allow shifting the preview image to all four directions. |
| <b>Reset view:</b>               | Resets the preview image to the initial position.                       |
| <b>Back:</b>                     | Finishes the evaluation and returns to the range selection.             |
| <b>Next:</b>                     | Restarts the task and automatically increments the scannumber.          |

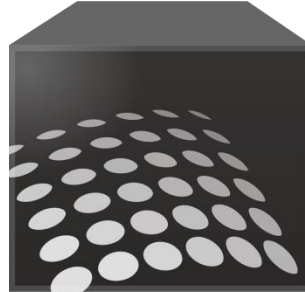
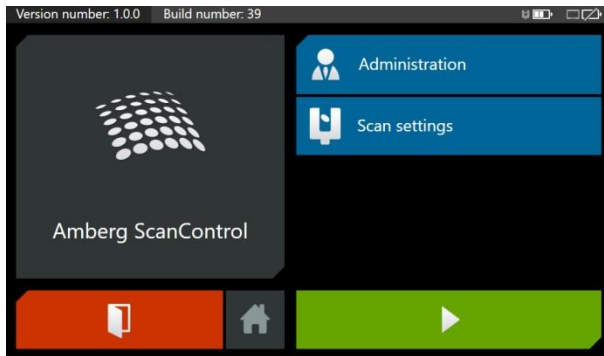
### 3.4. Benefits

With the new features, you can:

- optimise your scanning time which you need on your tunnel site.
- georeference and process your scan data direct in the tunnel and save up to 80% of time.
- stake out of critical areas direct after scanning in the tunnel.
- use the total station functions of the Leica MS for a high accurate setup and use the scanning functions for a fast collection of the relevant information on the tunnel wall.
- only one instrument is used (Leica MultiStation)

## 4. Amberg ScanControl (Reminder)

Amberg ScanControl contains the tools to record a pointcloud of a tunnel or any other location by means of a laser scanner. The software controls the instrument, displays a preview of the pointcloud and stores the data in the optimal format to evaluate it in dedicated Amberg software. Note that Amberg ScanControl does not provide any evaluation functionality itself.



Supported laser scanner types:

- FARO Focus<sup>3D</sup> X 30
- FARO Focus<sup>3D</sup> X 130
- FARO Focus<sup>3D</sup> X 330
- Z+F Imager 5006 / Amberg Profiler 5003 / Leica HDS6200
- Z+F Imager 5010 / Amberg Profiler 5033 / Leica HDS7000

The new software Amberg ScanControl, which replaces TMS ScanControl, is now available and can be downloaded free of charge from our website.

### 4.1. Phase-out of TMS ScanControl

With the release of Amberg ScanControl on 15<sup>th</sup> September 2015, we are officially announcing the phase out of TMS ScanControl.

Yours sincerely,

Oliver Schneider  
Product Manager  
Tunnel Surveying Systems