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SHINING 3D®

EinScan SE/SP



User Manual

August 2020

SHINING 3D®
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1. SPECIFICATION AND SYSTEM REQUIREMEN

1.1. SYSTEM REQUIREMENTS

Preparing a suitable computer will improve your scanning experience.

One important notice for PC configuration is the **graphic card**. It has to be **Nvidia card** since certain function from Nvidia is needed for scanning. **GTX series card** is the best for scanning while Quadro series CAD card also works but you need a more expensive model comparing to the GTX series to get a good scan experience.

Handheld model	**EinScan SE/SP**	
	required	**recommended**
Operating System	Win10，64bit	
Graphics card	NVIDIA GeForce GTX 660	NVIDIA GTX1060
USB port	at last one USB2.0/3.0 port (At least one USB 3.0 port when using discovery pack)	
OS	win10 64bits	
Video memory	> 2G	> 4G
RAM	>16 GB	>32 GB
CPU	i5 3th Gen	i7-8700 or higher
Screen resolution	1920*1080 DPI: 100%; 125% 3840*2106 DPI: 100%; 200%	

➢ RECOMMENDED PC MODEL

Dell G3 laptops, Core i7-9750H, NVIDIA GeForce RTX 2060 6GB GDDR6, 2x8GB, DDR4, 2666MHz
Asus ZenBook Flip, Core i7, Nvidia MX250 with 2Gb memory, solid state hard rive, 16gb ram
Lenovo Y520 15IKBM i7-7700hq, 16GB, gtx1060
Acer Predator PH317 i7, GTX1060, 16G RAM
MSI – GS63VR 7RF stealth pro RAM 32G
Alien ALW15M-R2726R
ASUS ROG STRIX

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1.2. Hardware Installation

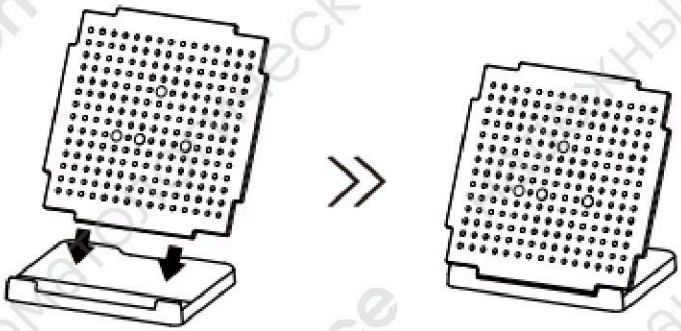
Unpack and set up your scanner and software before getting started with scanning.

1.2.1. Scanner Set-up

➢ Step 1. Place the scanner head onto the bracket.



➢ Step 2. Insert calibration board onto the board holder .
NOTE : Rotate the calibration board only while calibration.



➢ Step 3-1. Turntable and Scanner installation.

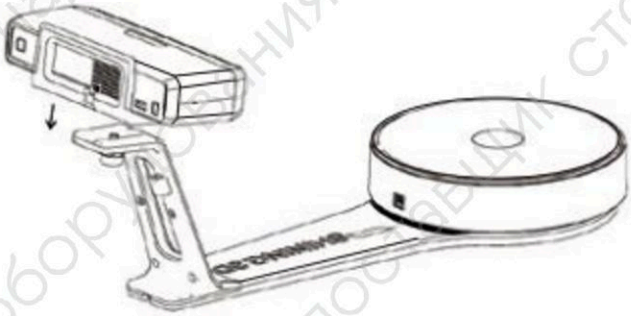
1) Place the turntable onto scanner stand



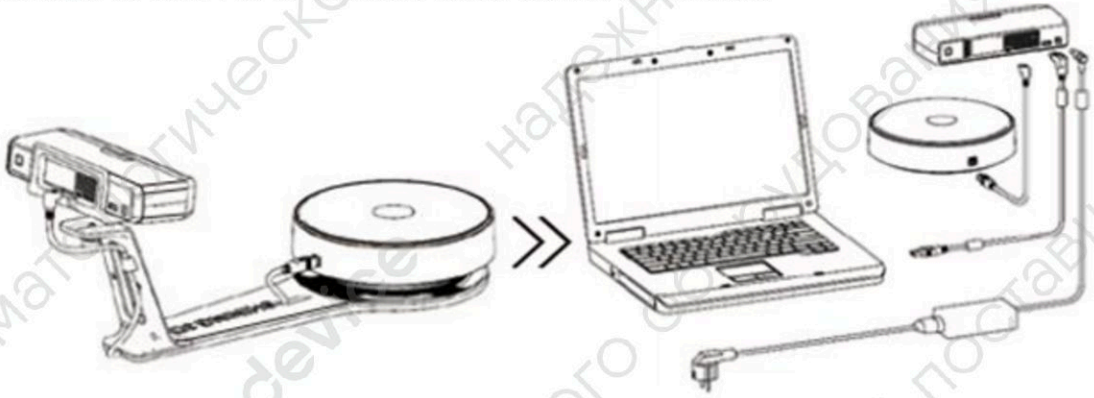
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2) Screw the scanner into the socket on the stand.

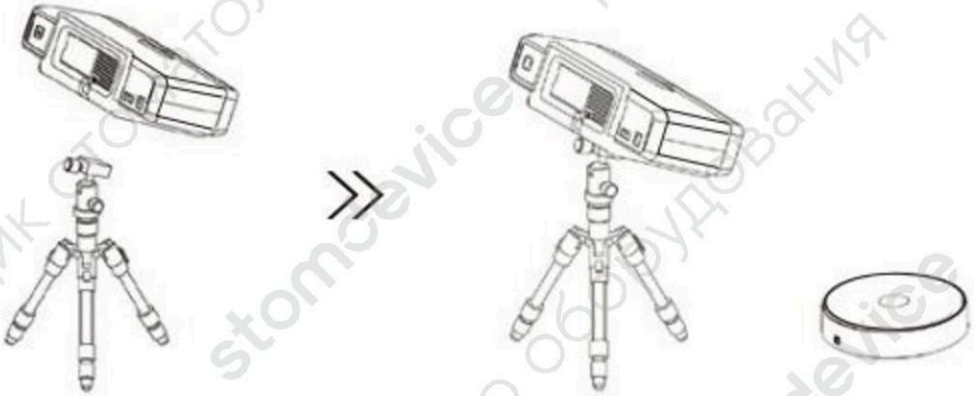


3) Plug power cord into outlet and the back of scanner; Plug USB cable into back of scanner and computer USB port; Plug USB cable into back of scanner, and turntable.



- Step3-2. Setting scanner on tripod for fixed scan, turntable coded targets and markers align mode.

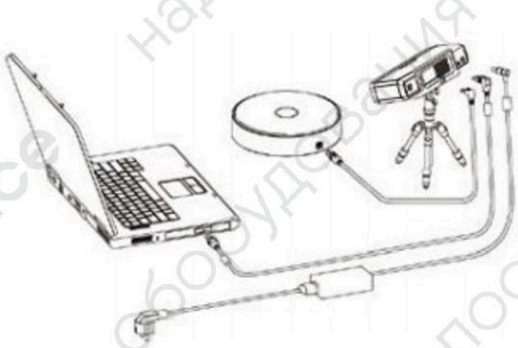
1) Screw the scanner head onto tripod.



2)Plug power cord into outlet and the back of scanner; Plug USB cable into back of scanner and computer USB port; Plug USB cable into back of scanner, and turntable.

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1.2.2. Scanner Turn-on/off

- Hold on the touch switch for about one second to turn the scanner on;
- Double-click on the touch switch and stay for one second each time to turn the scanner off.

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2. SOFTWARE SET UP

2.1. DOWNLOAD THE SOFTWARE

Step 1: Go to https://www.einscan.com/support/download/

Step 2: Select your scanner model

Step 3: download the software to your operating computer

Note: You are required to register before downloading.

2.2. INSTALL THE SOFTWARE

Note before installation: Administrator rights are required for the installation of the software only.

1. Double click installation package, accept the modification on your computer
2. Follow the instructions to complete the software installation.

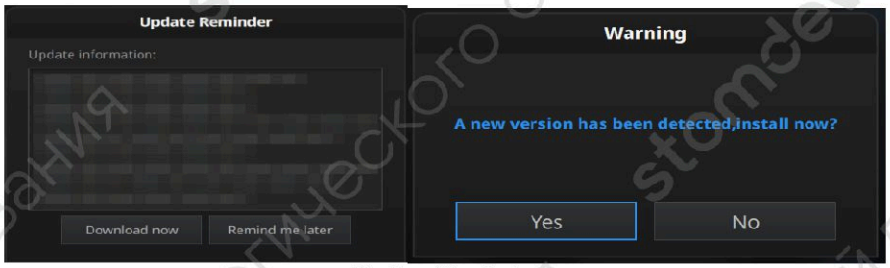


After the software is installed, a shortcut will be created on your desktop. Double click to open the software.

2.3. SOFTWARE UPDATE

When a new version is available, a pop-up will show when you start the software to remind you update your software to the latest version.

➢ Click **Yes** to update



Update Reminder

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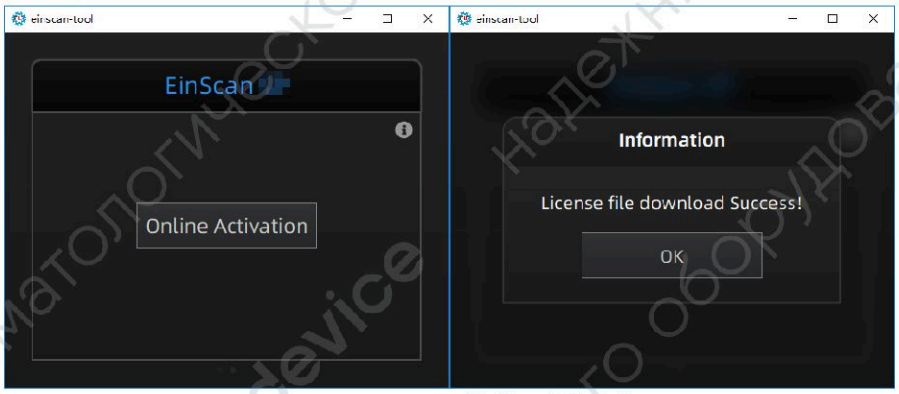
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2.4. DEVICE ACTIVATION

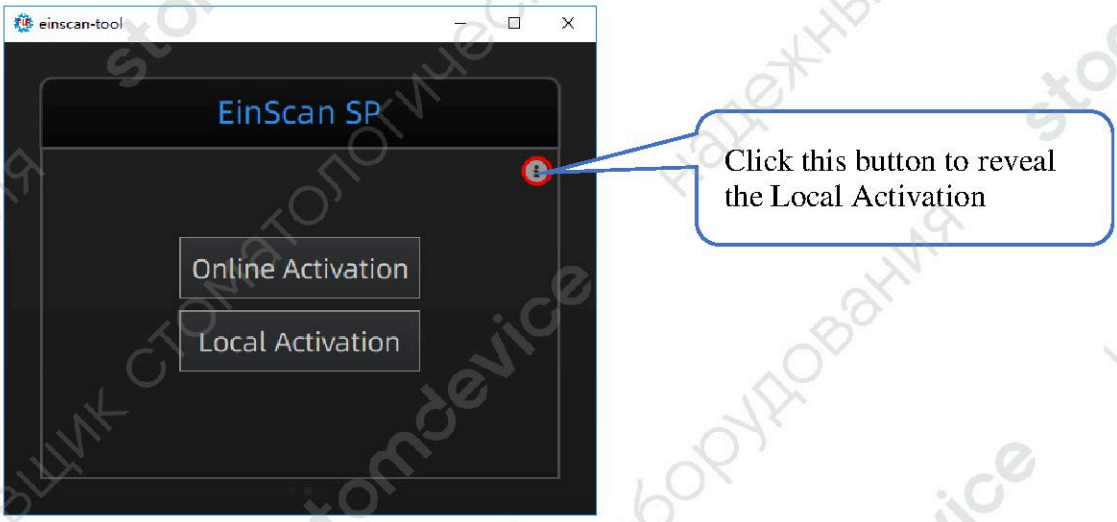
Device activation is required in your initial use. There are 2 ways:

1. **Online activation** is recommended if your computer is connected to the internet.
2. If there is an issue with network connection, choose **Local activation** to save the .ple license file on your computer, under the activation menu. (.ple file can be found in the USB drive.)

Note: If the activation fails, send a request for activation file to einscan_support@shining3d.com with your serial number.



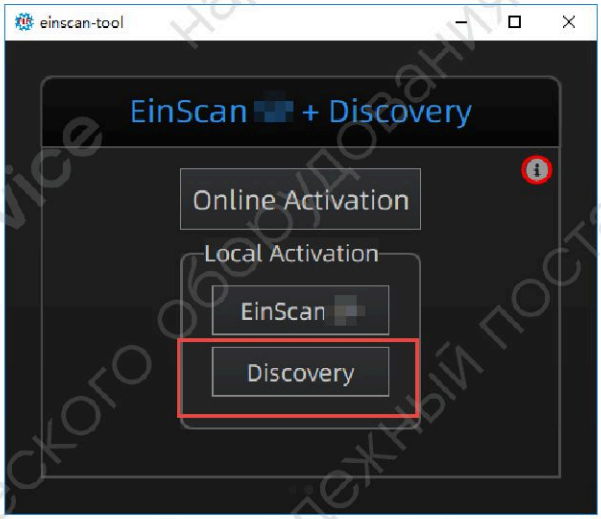
Online Activation



Local activation

When install Discovery Pack, you need to download the pack license, or import the file with .encode suffix in the USB disk.

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Discovery Pack license tool

2.5. Interface and Parameters

2.5.1. Navigate

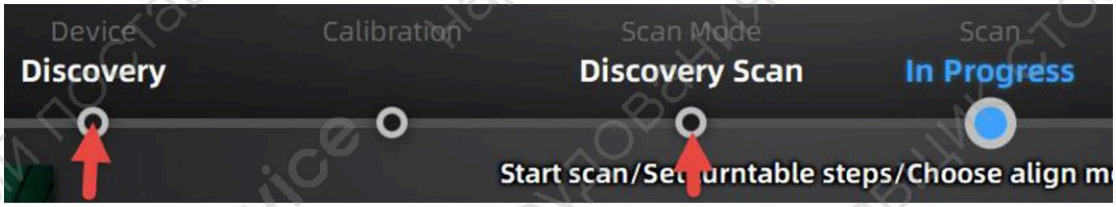


Interface navigation

Left mouse: rotate
Middle mouse: move the data
Scroll up and down: zoom in or out

Navigate between different menu by click on the circle. Choose different scan modes if Discovery Pack is connected.

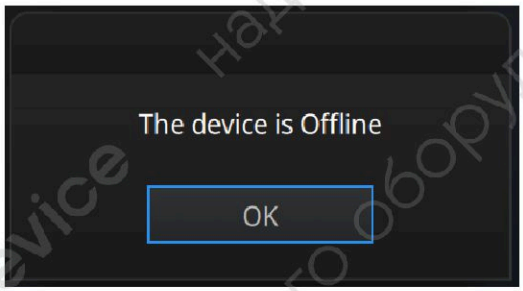
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Navigation bar

2.5.2. Device reconnect

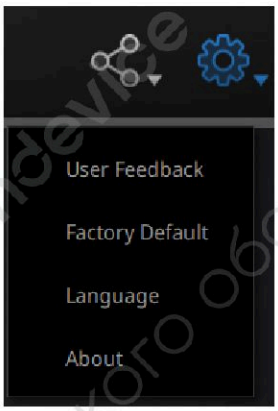
When the device is offline, meaning the scanner is not connected to PC, please check the connection and restart the software.



Device offline or connection loose

2.5.3. Settings

	Click the settings logo from the upper right to open the drop down menu.



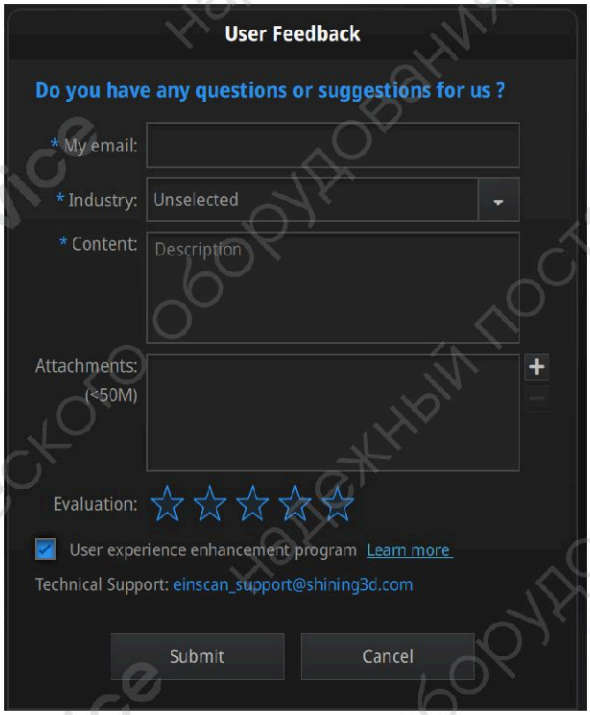
Drop down menu

Feedback

If you have any questions or suggestions, please share with us by clicking "Feedback". Please leave your email in "My E-mail".

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Feedback window

User Experience Enhancement Program

To help us improve the quality and user experience of EinScan, we hope to be allowed to collect usage experience information. This information will not contain your personal information or scanned data, and will not be accessible to any third party. This checkbox is selected by default, and we strongly recommend you keep it checked. As a reward, the User Experience Enhancement Program will continuously keep you informed with the newest software update information, to assure you get free software updates and enjoy the latest improvements based on your collective feedback. If you close the User Experience Enhancement Program, you might not be informed with software updates automatically.

Factory Default

All settings modifications will go back to the original settings.

Language

Select the language for the interface, click apply to change, restarting the software is not needed

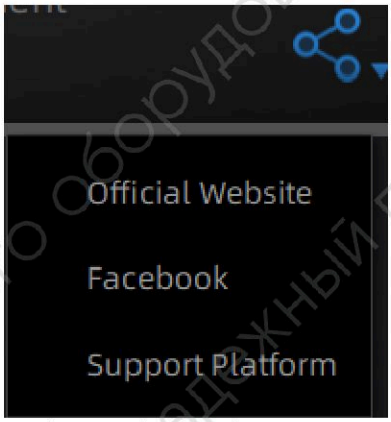
About

For version information and support, email einscan_support@shining3d.com

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2.5.4. EinScan community



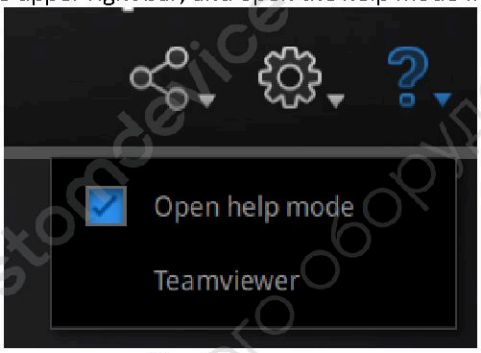
Community drop down menu

- **Official Website** (http://www.einscan.com/) refers to SHINING3D's official website for Einscan product and information.
- **Facebook** (EinScan) refers to facebook "EinScan Expert" for EinScan users to discuss and share the ideas, achievements and experience.
- **Support Platform** refers to the platform for EinScan users to validate the warranty and submit support ticket when necessary. Service live software updates, manual, video download can be accessed in support platform. Register your EinScan at support.shining3d.com.

2.5.5. Help Mode

Open Help Mode

Click the question mark in the upper right bar, and open the help mode from the drop-down menu.

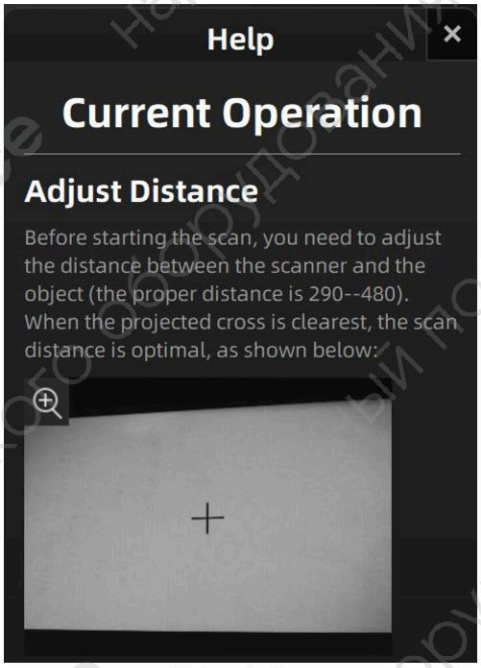


Drop down menu

Display the help tool related to the current interface.

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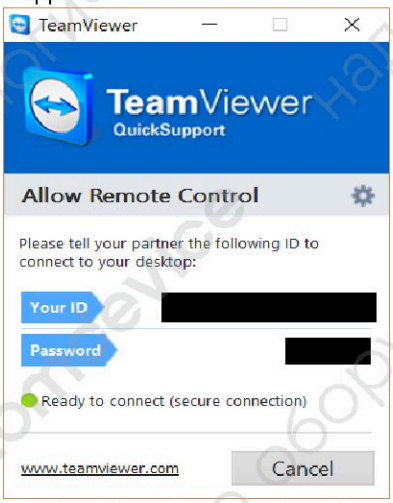
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Help window

Teamviewer

It opens S3D_teamviewer.exe, for online customer support access or display to other screen or portable screen. Share your ID and password to allow our technicians to remote control of your computer during online technical support



Share the Your ID and password to allow access

2.5.6. Alerts

A pop-up alert will notify the user of a hardware or configuration issue. Check and restart the software. If the error persists, please contact support by emailing einscan_support@shining3d.com.

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Fail to activate

For activation failure, make sure the scanner is well connected. Redo the activation.



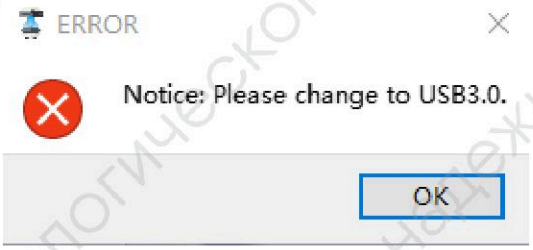
Device fails to activate

Incorrect configuration

try another USB port and update your graphics card drivers and restart the software.

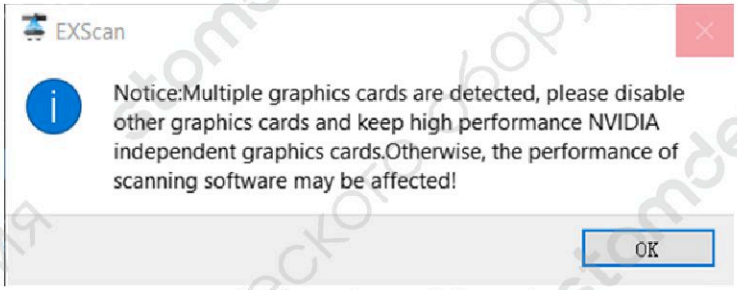


Graphics card incompatible



USB not 3.0

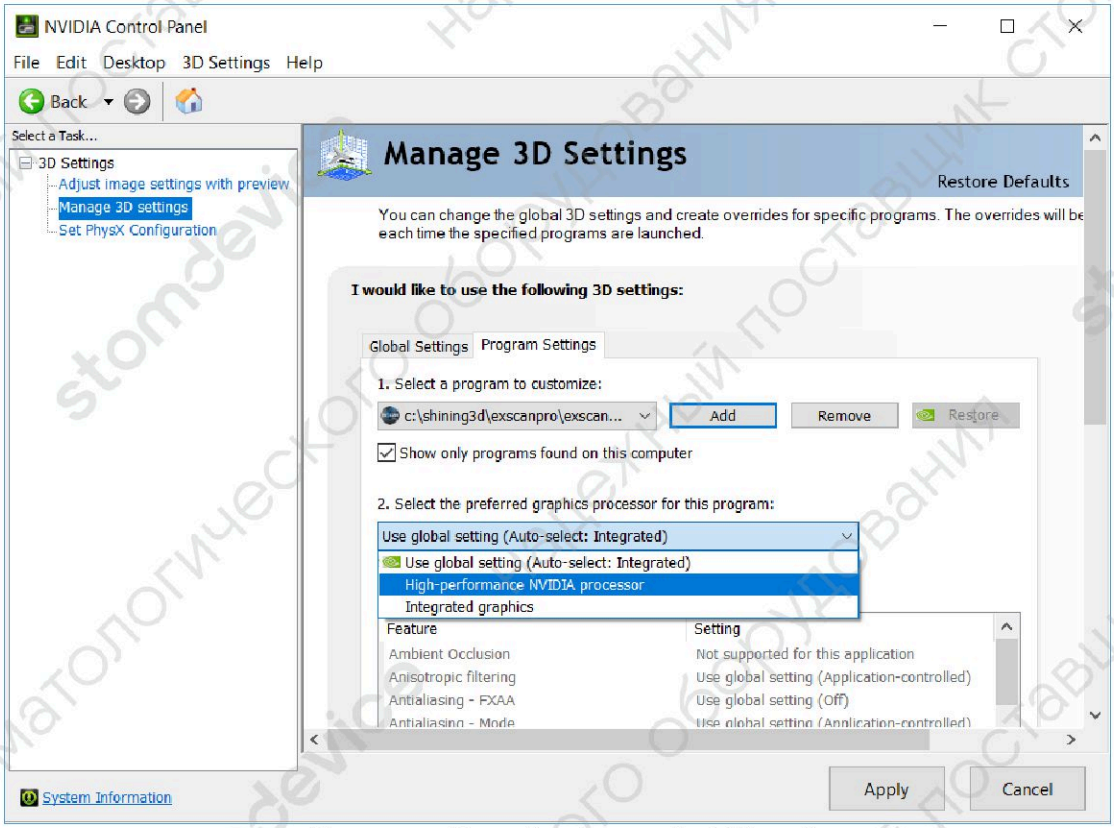
If the computer has multiple graphic card, access to the NVIDIA Control Panel (right click on the desktop). In Manage 3D Settings > Program Settings, Add EXScan S software. Then change the preferred graphic processor for this program. Select NVIDIA processor. Click Apply to save the settings.



Multiple graphic card detected

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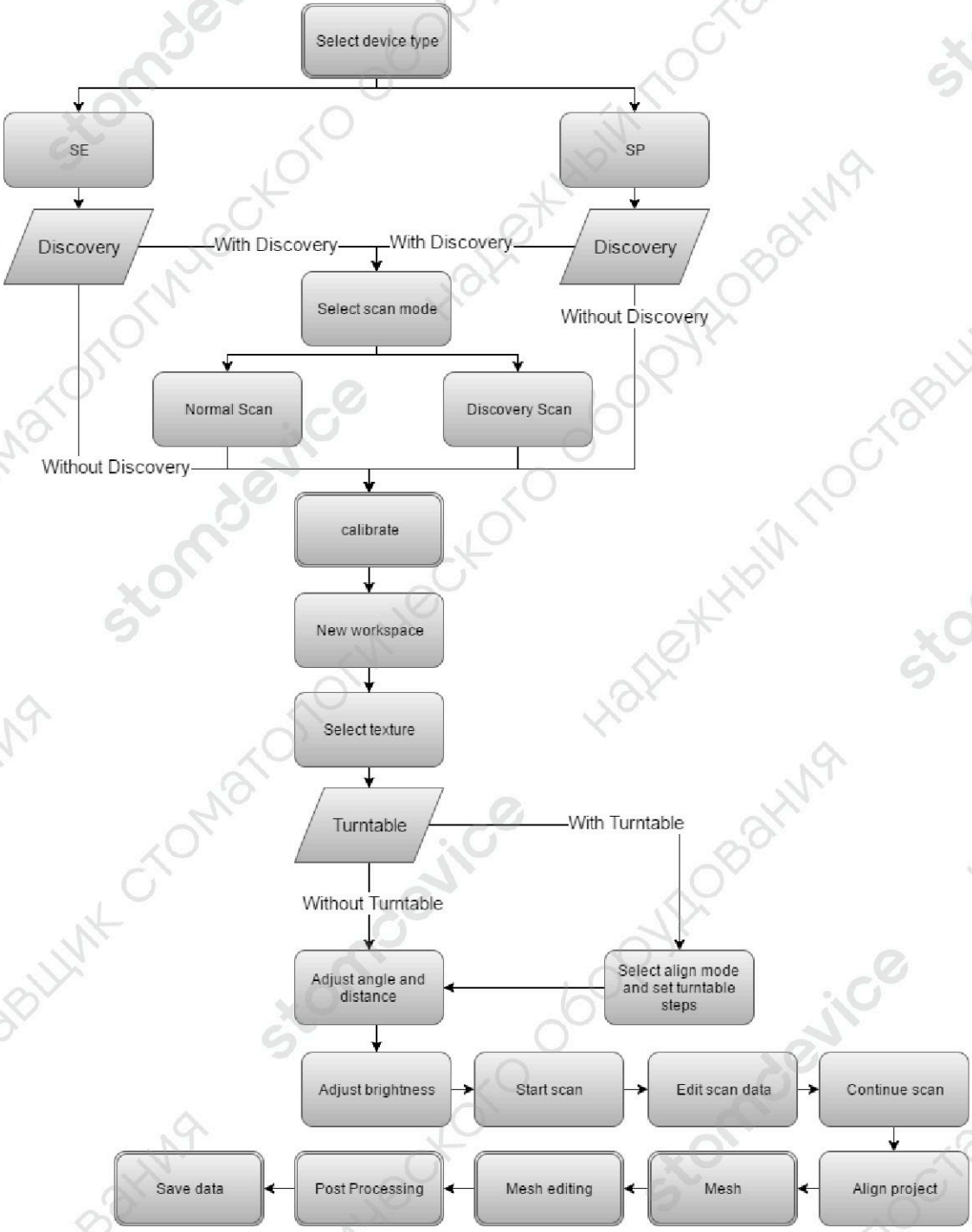


Change graphic card preferences for EXScan S

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3. SOFTWARE SCAN WORK FLOW



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4. CALIBRATION

4.1. Precautions and Use

Calibration is the process to ensure the device will scan with the optimal accuracy and scan quality. Each EinScan 3d scanner was factory-tested and achieved, at least, the listed accuracy from the technical specification according to VDI/VDE 2634 standards.

Besides factory tested guarantee of accuracy, to assure high scanning accuracy, each EinScan is also coming with a calibration board for customer calibration. This customer calibration is not required daily often. Only when the first time after scanner and software are installed. Or, when you are in the following situations, you should calibrate the device:

- When the scanner is used for the first time or after long time without using.
- When there is strong vibration during the transportation.
- When alignment mistake or failure frequent appear during the scanning.
- When scanning data is incomplete and quality is much worse during the scanning.

Note:

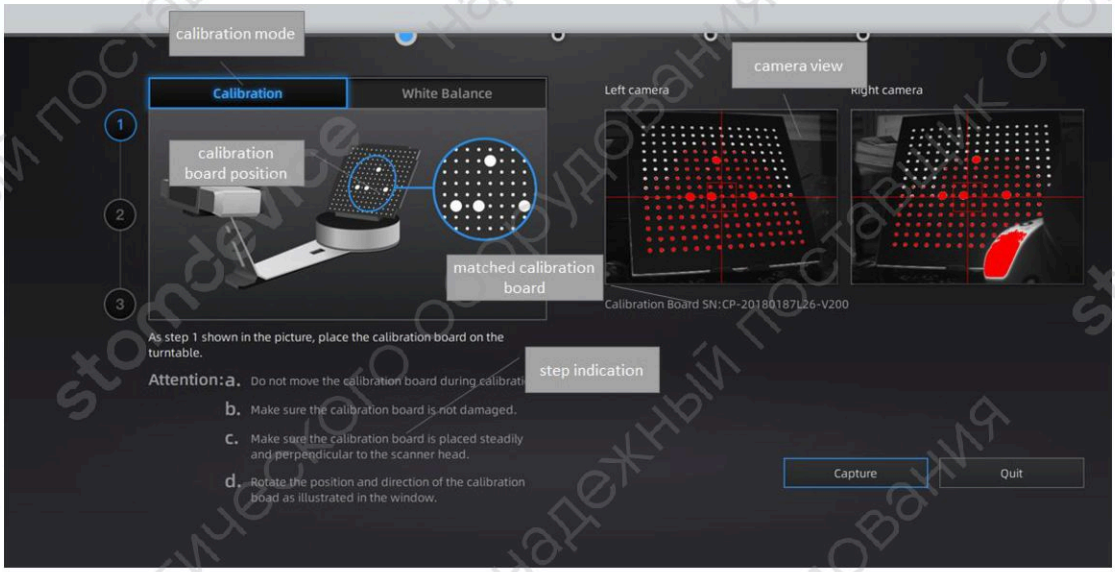
1. Customer calibration is recommended to do twice a week for daily use.
2. Make sure to protect the calibration board and keep it clean, no scratches or stains on the black surface with white circles.
3. The Calibration board is matched to the Device with same Serial Number. Doing the calibration with an incorrect calibration board will fail to generate good scan data or optimum accuracy.
4. Clean with clear water only, do not use alcohol or chemical liquid to clean the calibration board

4.2. Operation

After installation, when you open the software for the first time, choose device type and it will enter the calibration interface automatically. You can also choose Calibration on the navigation bar to enter calibration process later. If there is no calibration data, click “quit”, the software will prompt “No calibration data, please calibrate”.

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Calibration interface

4.2.1. Camera Calibration

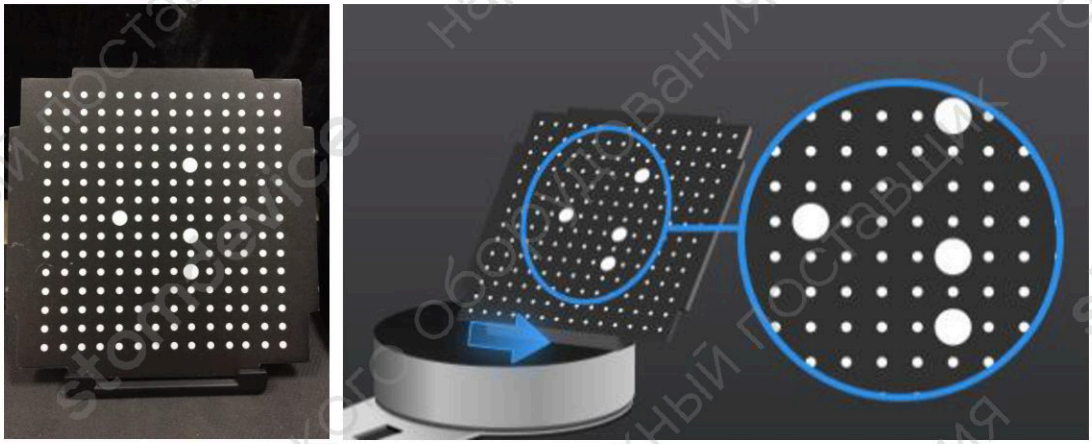
Calibrating your scanner is important in order to get accurate scan results. The following describes the three steps required to successfully calibrate your device.
Follow the software operation guide, adjust the distance between the projector and calibration board, and the cross from scanner should target at the calibration board n clearly. Place the calibration support and board in the center of the turntable as shown in Figure A. Check that the calibration board is located at the center of the turntable with the Figure A pattern facing the scanner and click “Capture”. Do not interfere or touch the calibration board during the calibration sequence.



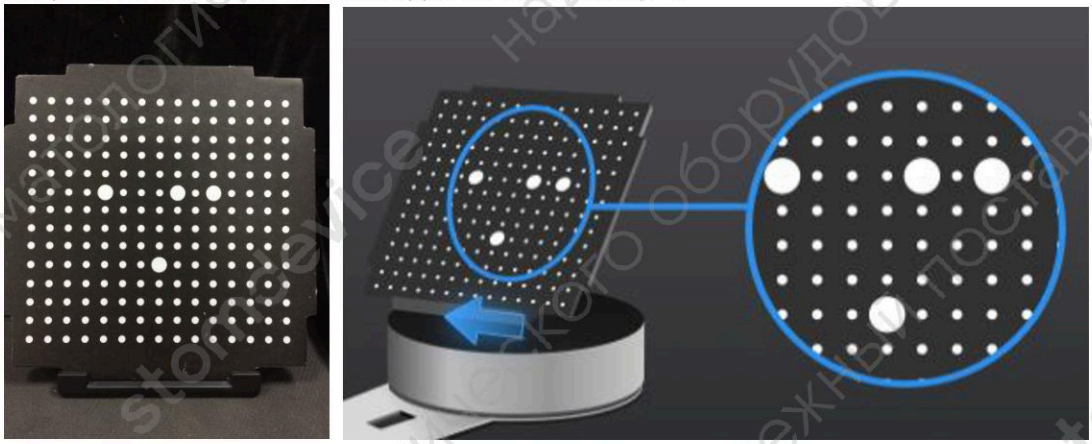
On-screen instruction during calibration step 1

After the 1st calibration sequence, the turntable will stop and the display will show what is in FigureB. Being careful not to move the support, remove the calibration board, rotate it 90° counterclockwise and place the board back onto the support as shown in step 2.

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Being careful not to move the support, remove the calibration board, rotate it 90° counterclockwise and place the board back onto the support as shown in step 3.

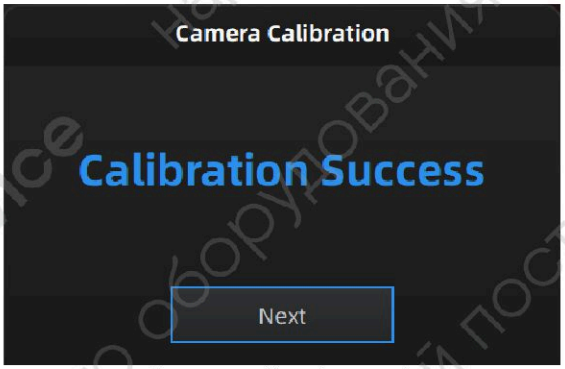


Upon completion of the 3rd calibration sequence, the software will automatically calculate and archive the current conditions. This calculation may take several seconds but once complete, you are ready to start automatic turntable scanning.



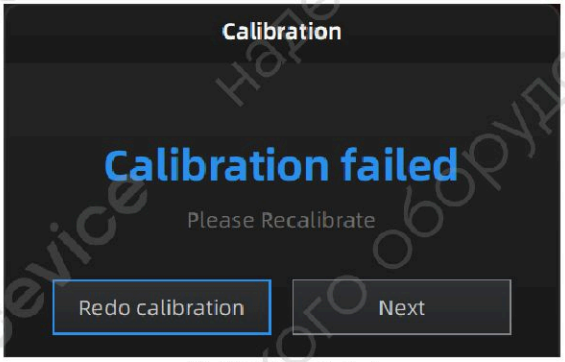
You will see the result as below. Calibration will take longer or fail if you did not follow all instructions properly. When calibration succeeds, click “Next” to move on to the White Balance as the software indicates.

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Camera calibration result

If calibration fails, click “Redo calibration” to start the same calibration again from the beginning.



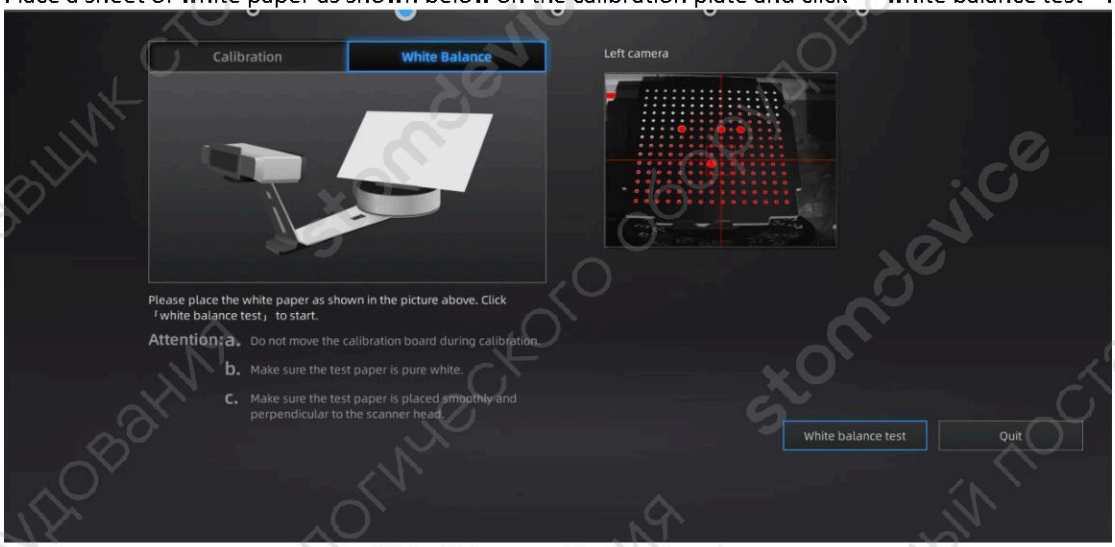
Calibration failed

Click “Next” to perform white balance as the software indicates.

4.2.2. White Balance

To capture an accurate color texture, White Balance calibration should be done every time when the lighting environment is changed.

Place a sheet of white paper as shown below on the calibration plate and click “white balance test”.



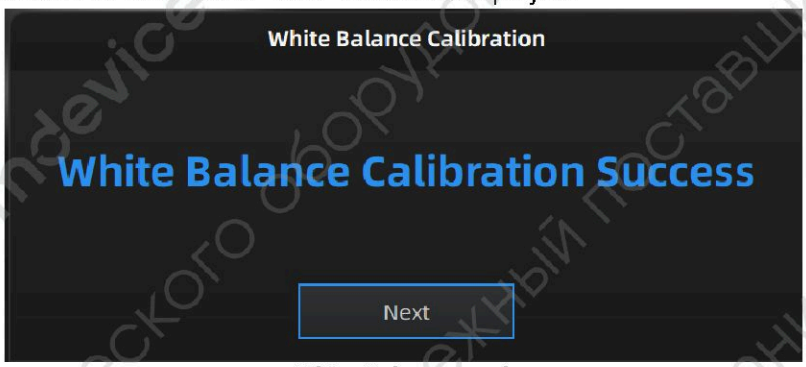
White Balance calibration interface

To guarantee a good texture, the white paper must be kept clean.

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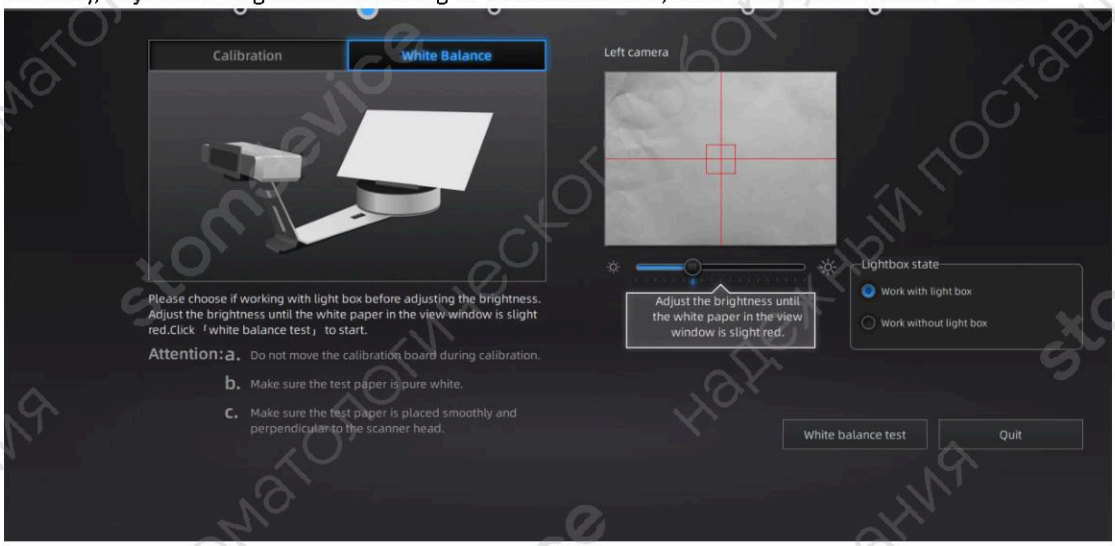
If the texture doesn't give you satisfaction, please optimize the lighting environment and redo White balance.

You will see the result as below. Click "Next" to new a scan project.



White Balance result

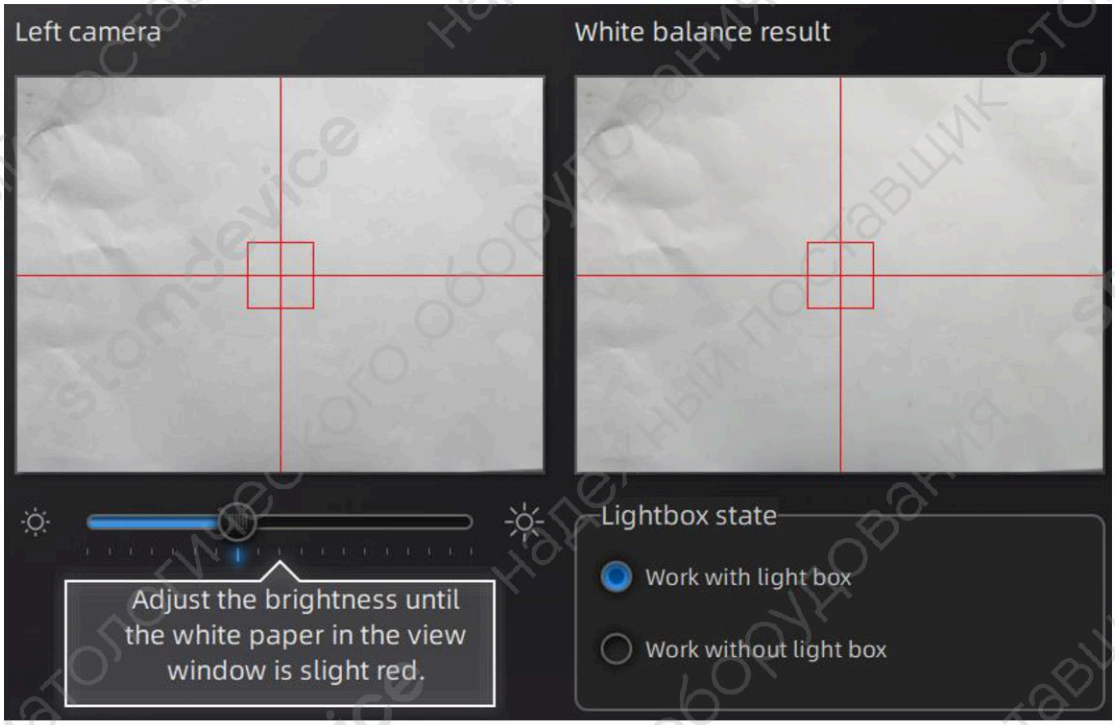
If you use with Discovery pack, choose work with or without light box based on the real situation when you are doing white balance calibration. Place a white paper at a proper distance(290mm - 480mm), adjust the brightness according to the camera view, click "white balance test" to start.



After white balance, check the color of object in the camera view is the same as the real object. If not, adjust the brightness again and re-calibrate; If yes, click "Quit" to exit calibration interface.

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5. BEFORE SCAN

5.1. Object

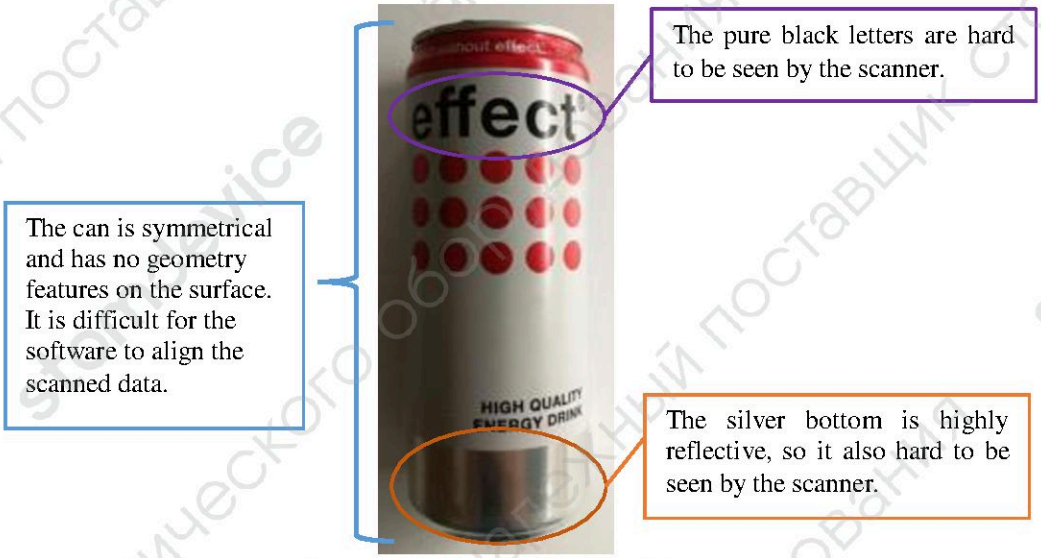
EXScan S can scan objects from 30*30*30mm ^3 to 200*200*200mm ^3 with turntable or scan objects from 30*30*30mm ^3 to 700*700*700mm ^3 without turntable.
We do not recommend scanning:

- moving or vibrating objects, which cause the shape of object changed during scanning process.
- Soft material object
- lattice structures with many small deep holes

During scanning the shape of the object needs to be maintained without any changes (human bodies must be held still, for example).

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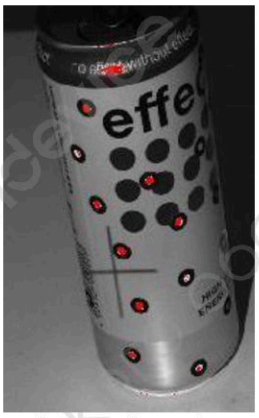
Example of object that is difficult to scan

5.2. PREPARATION

To align data if geometry features are not sufficient, you need to stick markers or pieces of clay on the surface of scanned objects to create extra "features".

When you stick markers on the surface of the object, you need to follow the following rules:

- Make sure sticking at least 4 markers in each frame (one scanning field of view). Control the number of markers seen on the camera view.
- Stick markers in a random, non-linear pattern (see example below).
- Markers should be stuck on the flat surface area and keep the marker surface flat.
- Use the markers provided with the device only. Other markers can result bad accuracy or not to be seen.



Object with markers

Before scanning transparent, highly reflective and black objects, you should spray white powder on the surface (see example above).

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6. SCAN

6.1. Before Scan

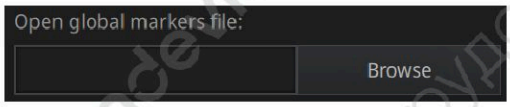
6.1.1. Create a Work

Enter the interface of New Work and Open Work. The initial default work save location is on the desktop unless the user opts to change this. Click "New Work", enter the work name, then click 'Save' to enter the scan parameters window. Texture scan is only active when the texture camera (Color Pack) is attached to the scanner.



Create a work

In the new project interface with SP, you have the option to click browse to import a Global Marker File (GMF) as .ASC, .TCT or .P3. Global Marker File is normally captured by a Photogrammetry System to achieve a high accuracy Markers Frame for large object, in which you can scan the object in detail and match the global accuracy of Markers Frame.



Browse to load a GMF

Note: When using the global markers file, new markers cannot be scanned. Global markers points can be deleted.



Click the work button to create or load a new work

When a project is open, click the **work button** to create or load a new work.

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6.1.2. Working Distance

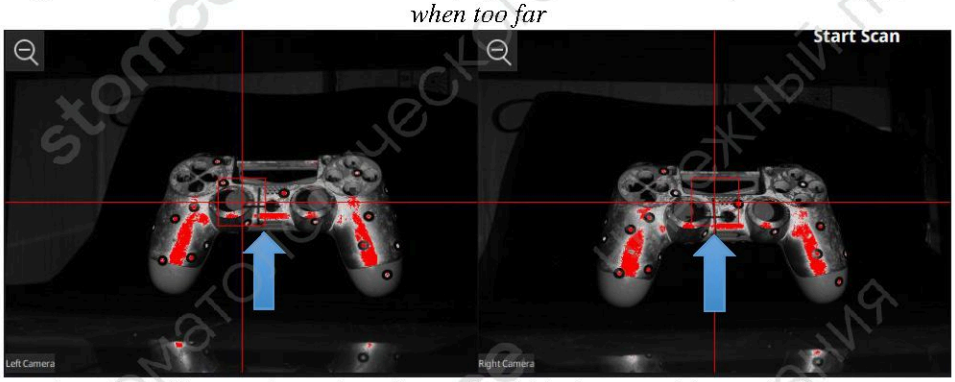
Adjust the distance between the object and device, until the cross is clearly to be seen on the object. Make sure the scanner will not move during the scanning.

suitable working distance is 290 ~ 480mm

Check the projected cross on the on the preview windows. Adjust the working distance until the cross is inside the central box. At the proper working distance, the cross should be seen clearly with a sharp contour on the surface.



On the Right camera, at a too close distance the projected cross will be shifted to the left , to the right when too far



At optimal distance the projected cross is within the central box on both cameras

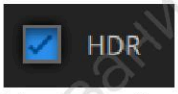
6.1.3. Adjust Brightness

Click and drag the button to adjust the brightness. The correct brightness setting will depend on the lighting in the environment and the texture of the object.



Drag to adjust the brightness setting

To scan an object with high contrasting texture, such as something white and black, use HDR. Each single scan will take longer to capture.



Turn HDR ON to scan contrasting textures

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6.2. Turntable

6.2.1. With/Without Turntable

Create or Import a fixed scan project.
On the top right, Check the box to use the turntable, or Uncheck to not use the turntable.



Fixed scan with turntable

6.2.2. Turntable Steps

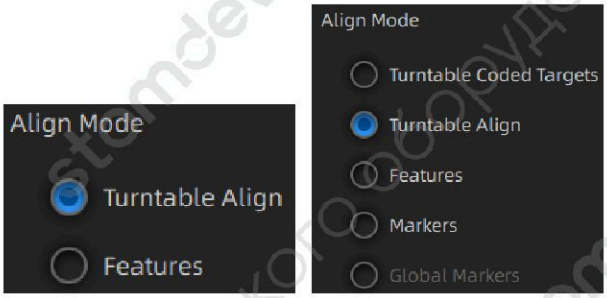


Turntable step input

Before scanning, set the turntable steps between 8 and 180. The number shows the times of steps that the turntable will stop and data will be captured during the 360° full rotation. The default setting, 8 steps, is recommended. You can change the number of steps according to the features of the objects.

Note: Using more turntable steps will help scan more complete data in some angles, but NOT more accurate.

6.2.3. Alignment Condition



SE/SP Alignment mode selection with the turntable

Select an alignment mode condition for the turntable scan.

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Turntable Align

If you do not want to stick marker points on the object you want to scan, and it is too big and covers the coded targets on the turntable, you could choose turntable align.
Working Principle: Align the data with the assistance of turntable.

Note: Need to keep the distance between turntable and scanner the same as it is during calibration; Objects in regular shapes such as sphere and square are not suitable for this mode.

Turntable Coded Target Alignment

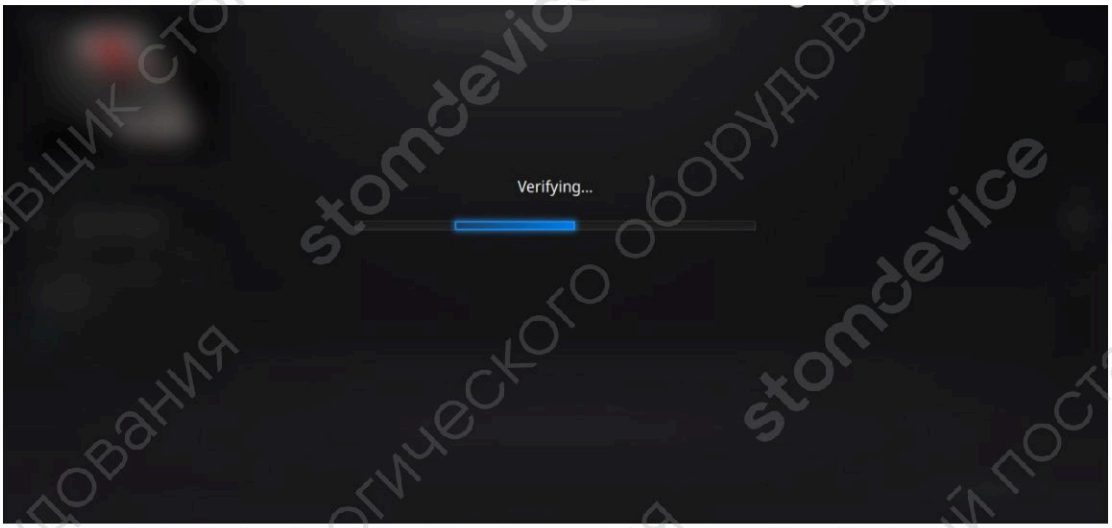
The turntable coded target alignment works as follows: on every step of the turntable, the scanner recognizes common coded targets on the turntable to calculate the new position of the object. At least 4 common targets need to be recognized between 2 neighboring scans.

Note: The object needs to be small without covering the coded targets, put the object on the middle of the turntable, and make sure the object will not move during scanning; If you choose turntable coded target alignment, the scanner head is requested to fix on the tripod to scan.

Feature Alignment

When the distance between turntable and scanner is inconsistent with it is during calibration, feature alignment will be helpful.
Working principle: With feature alignment, after starting scanning, software will capture four data to calibrate. The scans are matched by knowing the center and angle of rotation between successive captures.

Note: Objects in regular shapes such as sphere and square are not suitable for this mode. With feature align, need to make sure the object will not move when turntable rotates. And the objects needs to have enough features for the software to recognize.



During the "verifying" steps, the software calculates the position of the turntable

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Markers Alignment and Global Markers Alignment

Markers alignment is used when the scanner cannot see enough coded targets on the turntable for auto alignment. Markers alignment works in a similar way as turntable coded target alignment; the software matches 2 neighboring scans by recognizing at least 4 common markers.

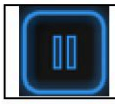
Global Markers is accessible if a Global Marker File has been loaded during the project creation.

6.3. Scan

6.3.1. Start Scan

	Click the button or press **space bar** to start scanning
	Click the pause button, and the scanning will pause; Click again to resume scanning.

When the scan is completed the data is automatically saved in the project file. Make sure the relative position does not change during the scan.

	When auto scan mode is scanning, you can click the button to stop the current scan. The current data will be deleted directly.



Scan interface

Note: Right Click on the camera preview to display the Right camera in the window. You will see the parts shown in the window from right camera. The parts which can be seen by both cameras will be captured.

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6.3.2. Edit Scan

After the single scan is completed you can edit the data.

SHIFT + **Left mouse**: Select unwanted points, the selected points will turn red, as shown below.
Ctrl + **Left mouse**: Deselect selected data.



	**Delete selected data** Click the button or the "DELETE" key on the keyboard to delete selected data.
	**Undo** You can only undo the most recent deleted data.
	**Show/Hide Stripes** (for data with color texture only) Click the button to switch the texture option between display and hide.

	Press the **space bar** on the keyboard to save data and exit the single-scan editing. The edited data is saved in the project file
	Cancel editions on the data

If you are not satisfied with current scanning data, or there is not enough overlapping regions or markers between neighboring scans for registration.

	**Delete data** click the button to delete current data

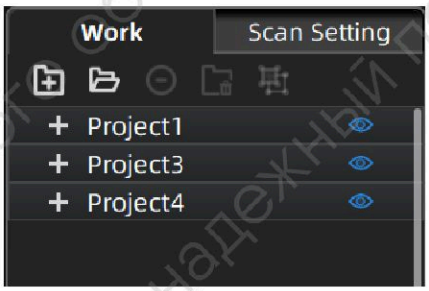
Then change the position of the scanner or the object to scan again.

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7. PROJECT GROUP

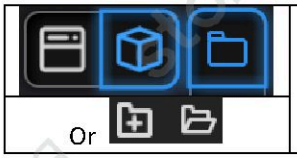
You are able to edit, manually align, rename, or save the scan project in the project group list.



Project tree

7.1. CREATE/IMPORT PROJECTS

When the scan data is saved, you can create new projects with more scans, or import the saved projects and manage all projects on the project tree.

 Or	Click the project button to create or load a new data

Click on the project tree or on the **project button** create a new project or import a project into the work.

Imported data will be copied in the work folder and appear on the project tree
New project will create a new entry in the project tree and a new project file in the work folder

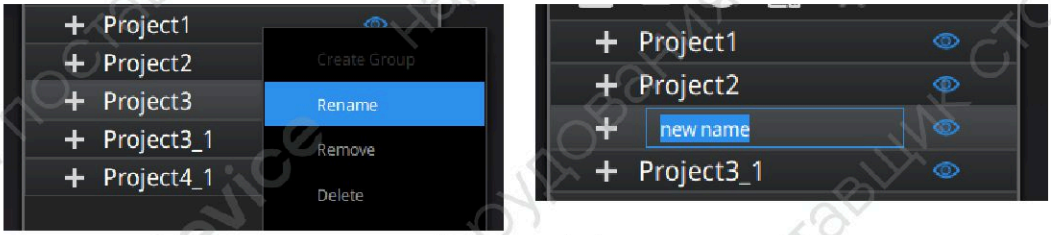
7.2. Current project

The last loaded project is the Current project, new data will be added and align with the current project. The current project is the last listed on the project tree.
Reopen a previous project to make it as the current project.

7.3. Rename project

Right click on the project on the tree to rename it. The new name will be updated in the work folder.

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Rename projects

In case of name interference in the work folder when load a project, the loaded project will be automatically renamed: "Name" → "Name_1".

7.4. Remove/Delete

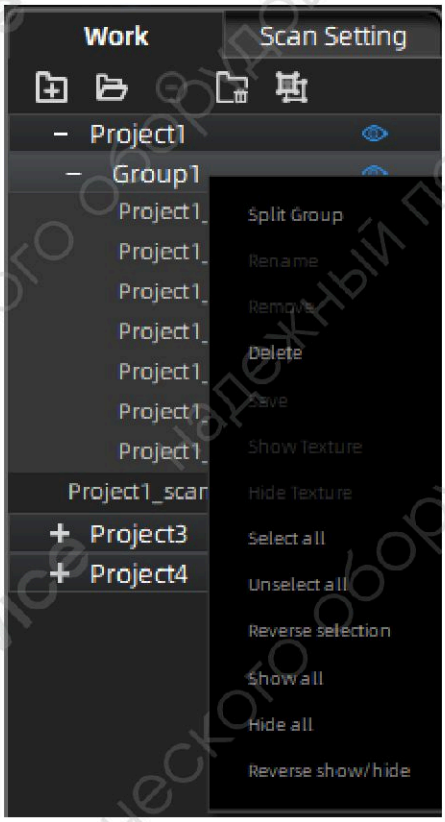
	Remove the project
	Delete the selected data, group(s) or project(s)

Select one or many projects Click **remove** to remove the project(s) from the project tree, but not from the work folder.
Click **Delete** or right click and delete to delete the selected data, group(s) or project(s) from the project tree and the work folder.
If you remove or delete the current project the last project will reload and become the new current project.

Note: Delete only affects the data in the work. If the project is imported from other work, only the created copy is deleted.

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7.5. Create/Split group



Left mouse: Select data in the data list or on the scanned model.
Shift/Ctrl + **Left mouse**: MultiSelect in the data list.

	Create or split group
	Delete the selected data
	Hide or display data

After creating the group, all the selected data belong to it. Right-click the group or data to view drop-down menu.

Note:
The data captured by turntable scan mode will belong to one group by default. Groups could be manually aligned after being deleted or split. You could left-click the scan model to select data after hiding texture.

7.6. Edit data

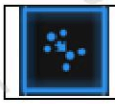
Double click on a project, group or a scan, to enter the edition mode. The edition are applied to the selected data only. Modifications will not affect the rest of the data.
Shift + **left mouse**: select data on the 3d view, and enter the edition mode. the edition are applied on the visible data only.

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See [6.3.2] for the edition functions.

7.7. Alignment

Within a project, If you use markers, the data of a project will automatically align with the marker positions. If not, an automatic alignment will be calculated with a best-fit of the single scan to the previous scans of the project according to the geometric features. If the object is not with enough geometric features, you can use manual alignment.

	Click the button to open the Manual Alignment interface



Drag and drop single scan, group or project to the float and fixed window

Single scan, group or project can be dropped into both windows. Scans in the group or are not allowed, split the group first.

Manual alignment can be used between projects, load the full projects on the float and fixed window. A single data can not be aligned with another project

	click to remove the scan, group or project from fixed or float window
	Texture visible or invisible (color pack only)

➢ **Manual Align**

SHIFT + click left mouse button to select at least 3 non-collinear corresponding points in the 3D preview windows for Manual Alignment, as shown below.

Ctrl+Z: cancel last point picked

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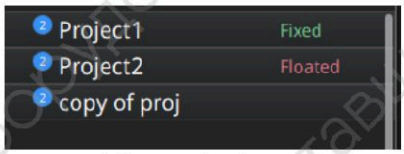
Select 3 points to align the data

How it works: The software calculates the best fit alignment from the picked points, and refine the alignment by best fit of all the points of the floating to the points of the fixed.

➢ **Auto-alignment**

After dragging the data into fixed and floated windows, click the feature alignment button on the left, then the data will be automatically aligned according to features.

After data are aligned the blue number represent the alignment reference.
The floated data is transferred to the reference of the fixed.
it is recommended to keep data with the same reference into a same group.



Alignment reference

Click **Complete** to validate and leave the Alignment interface
Click **Reset** to cancel all alignments done in this session
Click **Next** to validate the alignment and continue to use the Alignment interface

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8. MESHING

8.1. CREATE MESH(watertight/unwatertight)

When scanning and editing are completed, click  to create mesh. 2 types of mesh are available: Watertight and Unwatertight.

- If there are non-texture projects, there will be a data optimization option. After clicking it, the amount of triangles will be optimized in less than 2,500,000 triangles.
- If the projects are all with texture, the data optimization option will be unavailable. The software will simply the data by default.



Mesh Mode

Watertight	Unwatertight
	
All holes will be filled automatically. The data can directly be 3D printed.	Unclosed model stays the way it is scanned. Processing time is quicker than Watertight.

TEXTURE WATERTIGHT

The texture capture is separate from the 3d data capture. If the texture has been captured, it will still be displayed on areas where holes are filled in the mesh processing. If the texture is missing, the corresponding mesh data will be in black.

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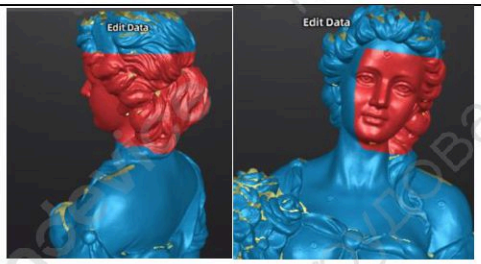


8.2. MESH EDITING

The mesh can be edited: Select/delete, Hole filling, Sharpen, Smooth, Simplification, Multiview.

MESH SELECT/DELETE

Press **Shift** + **Left mouse** to select data and enter the selection menu
CTRL+ Left mouse: Deselect an selected region

	**Edit buttons:** ①**Deselect** ②**Revert** ③**Delete** ④**Undo** ⑤**Select Trough** ⑥**Select Visible** ⑦**Hide/Show color**	 Select **Visible** to select data on the front view only Select **Through** to select data all though

	Click **End** button to return to the Post-processing menu
	Click **Revoke**, to cancel and return to the Post processing menu

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8.3. HOLE FILLING

When selecting meshing in unwatertight, the 3d model will keep the missing scanned regions as holes.

You can click  use the hole filling tools.

Click  for **Manual hole filling**. The hole edges are displayed green, and get red after picking. Click the edge of the hole to fill it

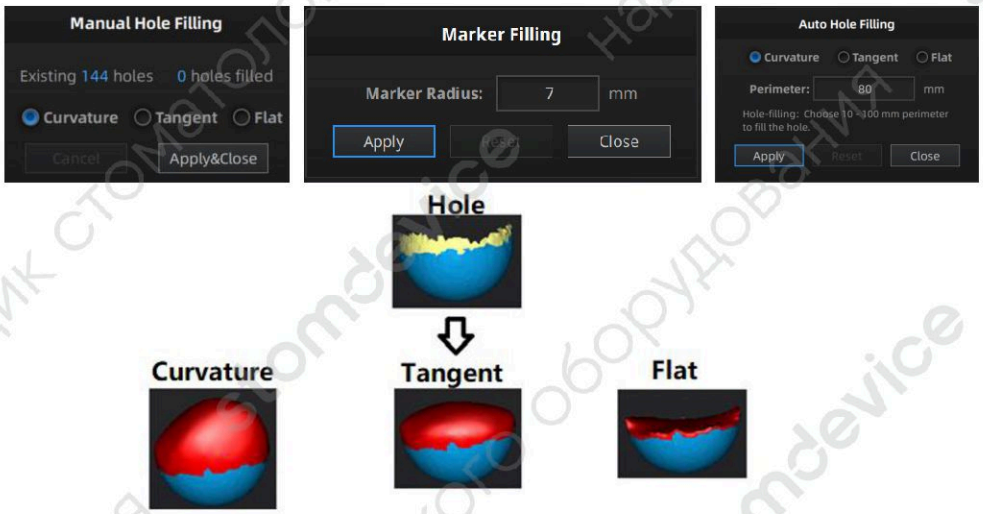
Click  for **Marker filling.** Input the radius of the marker used, all holes generated by markers will be automatically filled. This function is only applicable to the meshed scan data with markers, while it is not available for imported data.

Click  for **Auto filling**. Input the perimeter of the biggest hole to be filled. Less than 100mm is recommended. This function will fill every hole with a smaller perimeter than the number input.

The hole edges are displayed green.

Choose **Curvature, Tangent or Flat** before picking a hole

- **FLAT** calculates the solution for the hole filling considering the point position on the boundary
- **TANGENT** calculates the solution considering the point position and the normal of the last row of triangles forming the boundary
- **CURVATURE** calculates the solution considering the point position and the normal of the 2 last rows of triangles forming the boundary



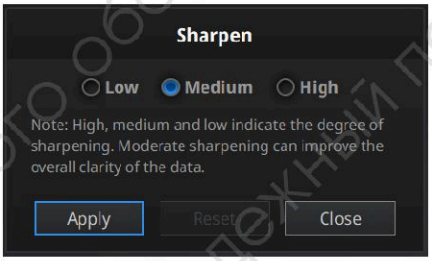
Effect of Curvature, Tangent or Flat

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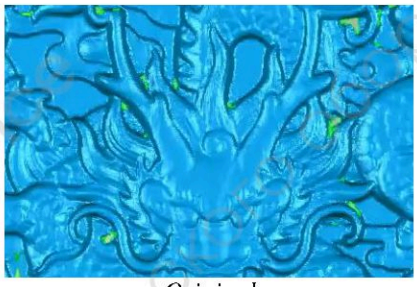
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8.4. SHARPEN

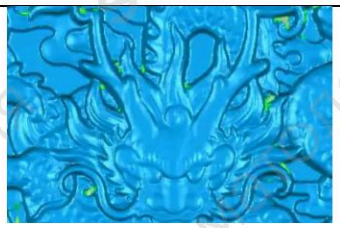
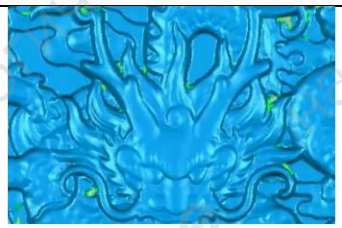
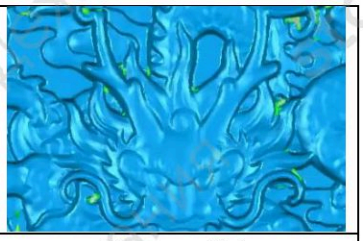
Click  Smooth button to display the sharpen menu, click again to close the menu.



Sharpen men



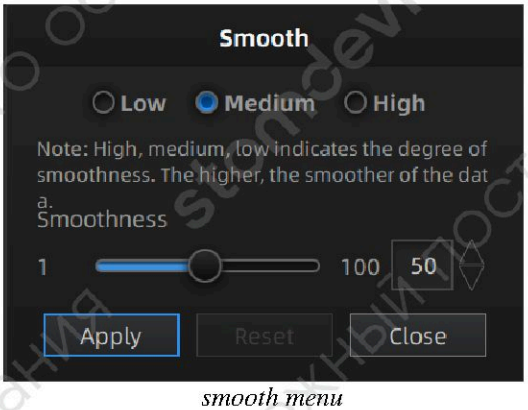
Original

		
Sharpen-Low	Sharpen-Medium	Sharpen- high

8.5. SMOOTH

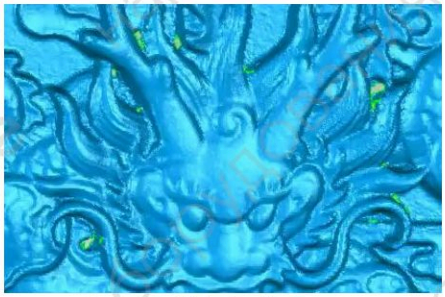
Click Smooth button to display the smooth menu, click again to close the menu.

Smooth the possible noise on the surface of the scan data. It might remove some small details or smooth some sharp edges at the same time. The example of before and after smoothing is shown below. Run 2 times, data will be smoothed twice.

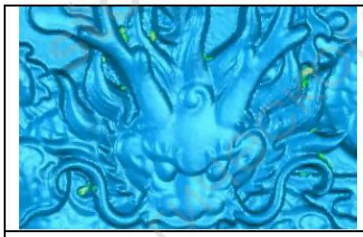
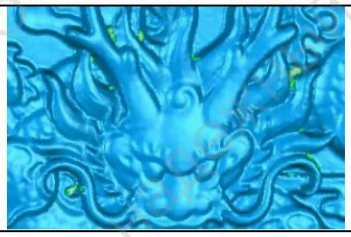
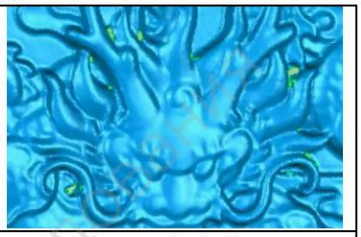


smooth menu

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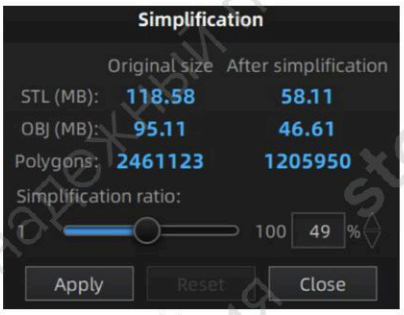
Original

		
Smooth-Low	Smooth-Medium	Smooth- high

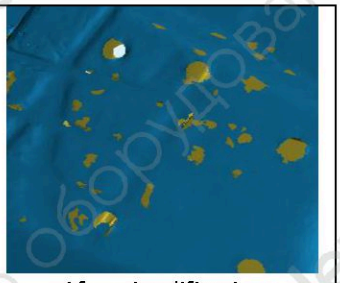
8.6. SIMPLIFICATION

Click  Data simplification button to display the simplification menu.

After simplification, the polygon numbers, file size and level of detail of data will be reduced accordingly. Set the ratio from 1 to 100, the default is 100%.
The comparison of detail between before simplification and after simplification (at 30% simplify proportion).



simplification menu

	
Before simplification	After simplification

8.7. TEXTURE REMAPPING

Click Texture Remapping to display the Texture menu

Mesh edition of simplification, hole filling on texture scanned data will affect the texture render. By doing the texture remapping, the texture information will be reapplied on the mesh.

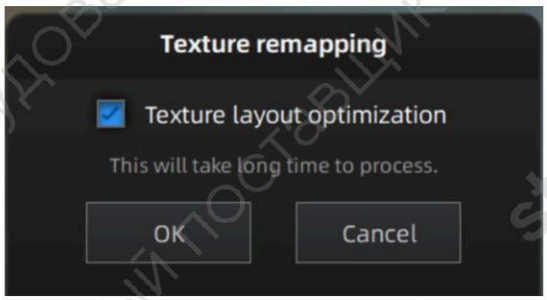
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Texture remapping is accessible before saving the data.

Choose "**Texture Layout Optimization**" (TLO) to create an optimized arrangement for the texture file. It will make the texture manual editing much more convenient if you are going to process the texture in a 3rd party software.

This option has no effect on the texture itself.



Texture Layout Optimization

	
No Texture layout optimization	**Texture layout optimization**

Notes:

1. TLO requires a longer time to compute
2. TLO is used only with OBJ output
3. TLO result is more convenient for texture manual editing

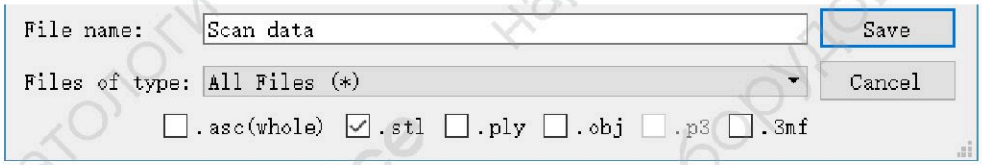
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9. Export Data

9.1. DATA FORMATS

Click  to export the data. Navigate to choose a save folder. And input the file name. Select one of the formats below. By default, the saving path is the project folder, the file name is "Scan data", and the format is .stl.



save folder

Format	Texture	Data type	Saves as	Recommended for
ASC (separated) (scan mode only)	No	Separated point-clouds, with calculated alignment	scan_0.asc scan_1.asc scan_2.asc etc...	◆ Inspection ◆ Fast export (no post-processing needed) ◆ Complex data to post process in another software
ASC (whole)	No	optimized point-cloud	scan.asc	◆ Inspection ◆ Fast export (no post-processing needed in hand-held mode) ◆ Large data to post process in another software ◆ Complex data to post process in another software
STL	No	Mesh	scan.stl	◆ 3D printing (watertight mesh data) ◆ Reverse Engineering ◆ Compatibility with most mesh editing software
OBJ	Yes (separated)	Mesh, Texture & Matching file	scan.obj scan.jpg scan.mtl	◆ Artistic applications ◆ 3D rendering ◆ Compatibility with most mesh editing software
PLY	Yes	Mesh	scan.ply	◆ Low storage ◆ Easy texture editing
3MF	Yes	Mesh	scan.3mf	◆ Low storage ◆ Compatibility with Microsoft paint3d
P3	No	Marker position	scan.p3	◆ Global Marker File in EXScan S software ◆ Measurement of the marker position

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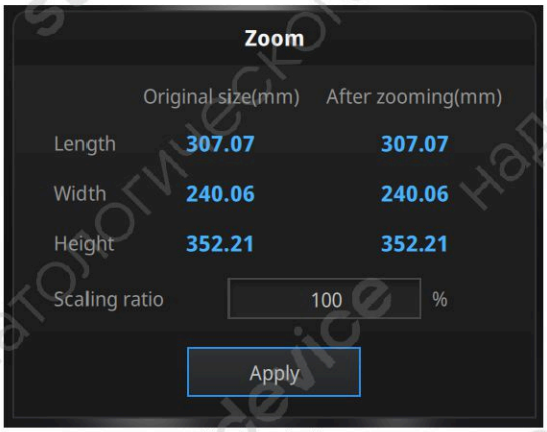
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9.2. SCALE DATA

Scaling the volume of scanned data, while the number of triangles, the level of detail of the scan and size of data will not be actually changed.

By default, the scale is 100% and will be exported with millimeters for reference.

The value display represents the dimensions of the smallest box containing the data oriented to the reference axis.



Scale window



Scale result

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9.3. MEASUREMENT

After meshing, the Measurement menu will be available on the top. Or click Measurement on the navigation bar, and import a data.

	Go to Measurement

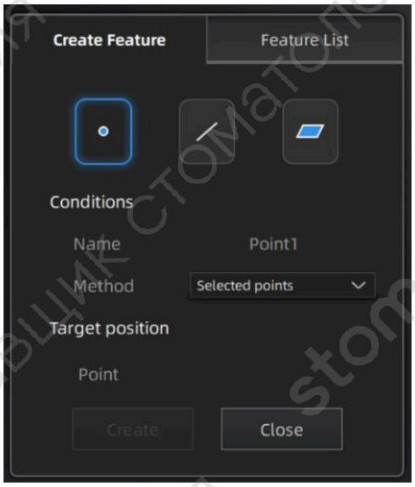
	Open file

Click **Open file**, a STL or OBJ file can be import to edit.

9.3.1. CREATE FEATURE

	Enter/Exit the Feature menu

Click the Feature button to display the menu, click again to close the menu



Feature menu



Display of Features

Click on the corresponding icon to create points, lines, planes.
Then select the creation method and follow the instructions, click “Create” to generate, or “Close” to cancel and close the window

The features created displaying in gray, the selected feature are in Red. In the feature list, click “delete button” to remove (Delete action cannot undo).

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Feature	Creation method	Requirement	Description
Point 	Selected Points		● Click on the data to select a point ● Click create to create a point
	Line-Plane Interface	Line and Plane should be created in advanced	● Click on the created line, or select it on the dropdown ● Click on the created plane, or select it on the dropdown The point generated is the intersection between the non-parallel line and plane **Feature creation failed! Error code 9**: the line is parallel to the plane
Line 	Point-Point		● Pick 2 points. ● Click on the data to select a point or click on a feature point previously created In the Choice list select one of the point to redo it The line generated is define as point From to point to point
	Plane-Plane Intersection	2 Planes should be created in advanced	● Click on the plane previously created, or select it on the dropdown, repeat for the second plane. ● The created line is the intersection between the 2 non-parallel planes **Feature creation failed! Error code 1**: the planes are parallel
Plane 	3 Points Fit		● The plane is generated by 3 points not co-linear. ● Click on the data to select one point or click on a previous created feature point; ● In the Choice list select one of the point to reselect it **Feature creation failed! Error code 6=** the points selected are co-linear
	Point-Line Fit	Line should be created in advanced	● The plane generated includes the point and the line (The line should be created in advanced) ● Click on the line previously created, or select it from the drop-down ● Click on the data to select a point or click on a feature point previously created ● In the Choice list select one of the element to reselect it **Feature creation failed! Error code 6=** the point selected belongs to the line
	Best Fit		● Press Shift+ LMB to select an area, press ctrl+ LMB to unselect ● The plane generated is the position with the smallest deviation from the selected area **Recommend method to create plane**

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9.3.2. MOVEMENT

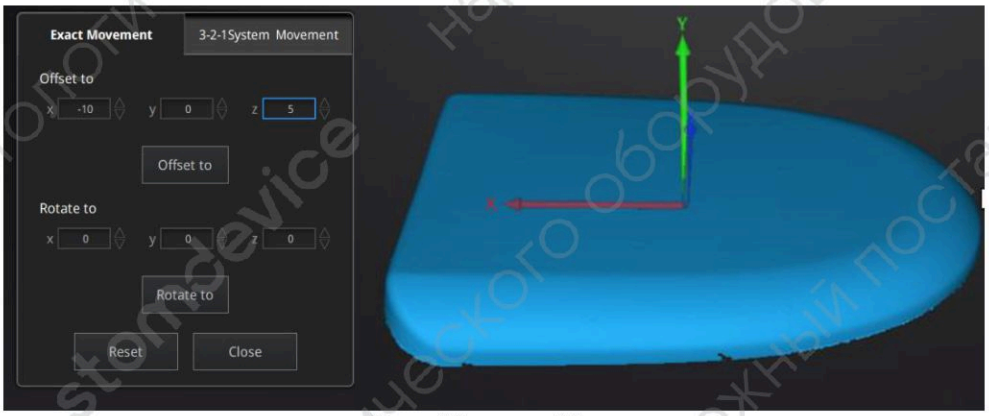
Use this mode to modify the alignment of the data to the global coordinate. This action is useful for post processing or reverse engineering.

The transformations do not affect the shape and size.

	Enter/Exit the Movement menu

Click the Movement button to display the menu, click again to close the menu

- **Exact movement**



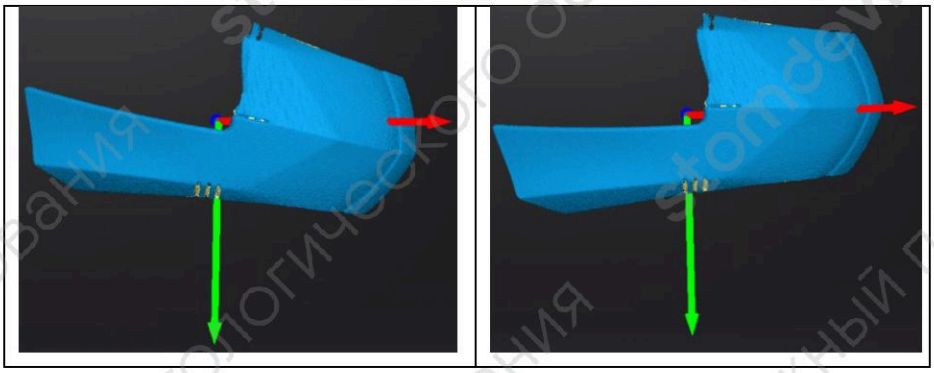
Exact Movement Menu

Enter the value in mm and degrees, click **Apply** to match the data origin to the input coordinate and orientation
The arrows represent the global coordinate system, Red=X+, Green=Y+, Blue=Z+

Click **Reset** to cancel the transformation to original position
Click **OK** to confirm the transformation

Tips:

- Start from data reposition (offset to 0,0,0)
- Edit rotations prior to transformation
- Change the view normal to a reference plane to change the corresponding angle



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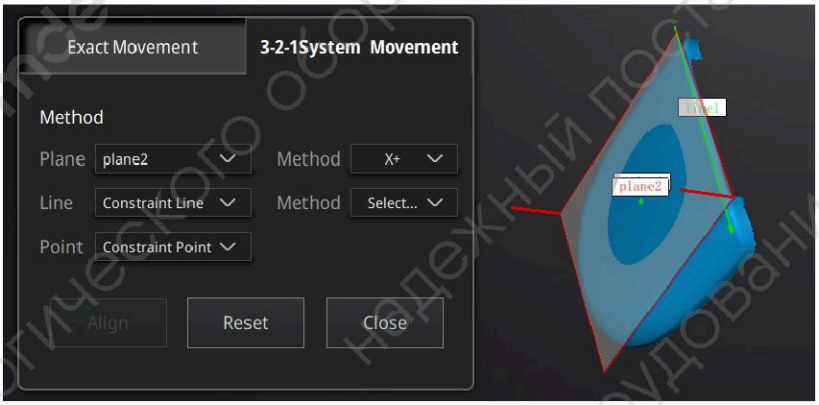
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3-2-1 Movement

Prior to 3-2-1 movement, the creation of a plane, line not normal to the plane and point are required.

3-2-1 movement (plane-line-point alignment) aligns the data by deletion of the Degrees of Freedom.

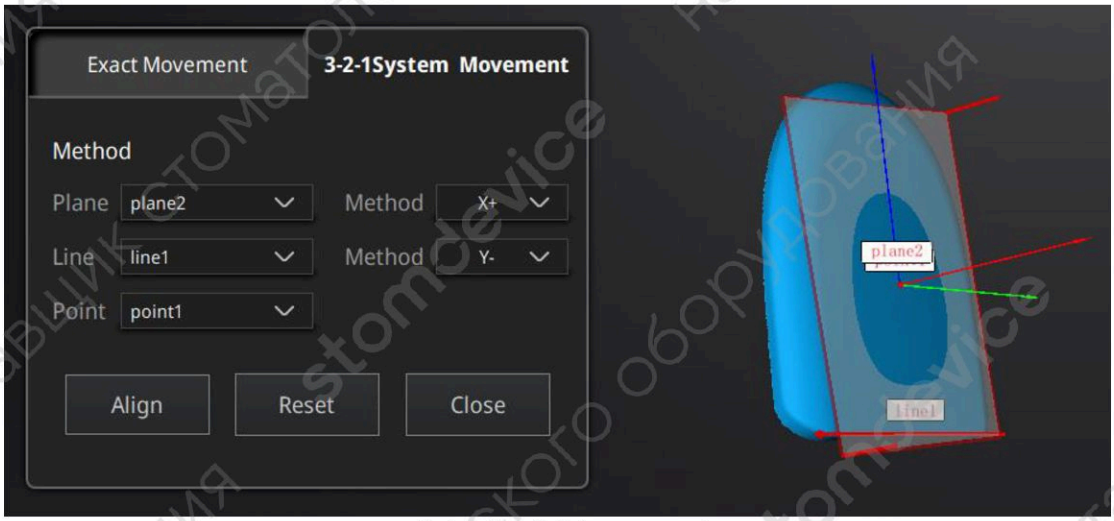
The arrows represent the global coordinate system, Red=X+, Green=Y+, Blue=Z+



3-2-1 Movement menu

- Select a Plane in the drop-down menu, match it to the first axis in the Method drop-down. The arrows on the corners of the plane represent the plane positive direction. The normal vector of the plane will match the axis direction.
- Select a Line in the drop-down menu, match it to the first axis in the Method drop-down. Beware the direction of the line to match it to the + or - axis. The projection of the line to the first plane will be parallel to the corresponding axis
- Select a Point in the drop-down menu. The data will be translated to match the point with the origin point (coordinate 0,0,0)

Click **Align** to perform the transformation



Data after 3-2-1 movement

Click **Reset** to cancel
Click **Apply** to confirm the transformation.

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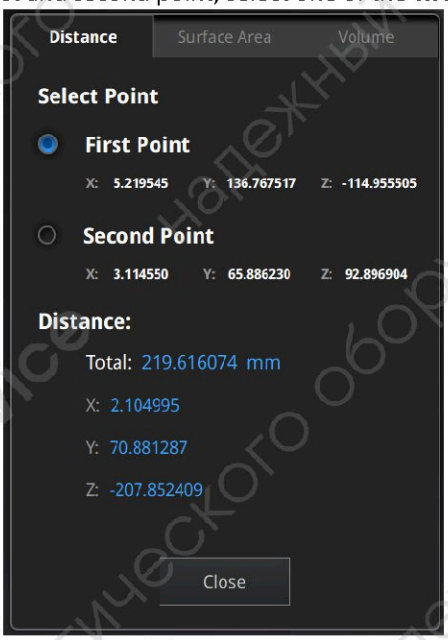
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9.3.3. MEASURING

Click  Measurement button to display the menu, click again to close the menu

DISTANCE

This tool calculates the distance between two points belonging to the surface of the data
Click on the data to pick the first and second point, select one of the two points to redo it.



Distance menu

Total is the 3D distance, X, Y and Z are the projection of the segment to the respective planes.

SURFACE AREA

Press **Shift+ LMB** to select an area, press **ctrl+LMB** to unselect.
Ctrl+A to select all.
Click **Calculate** to display the Area value of the selected data in mm^2
Redo the selection and click calculate again to update



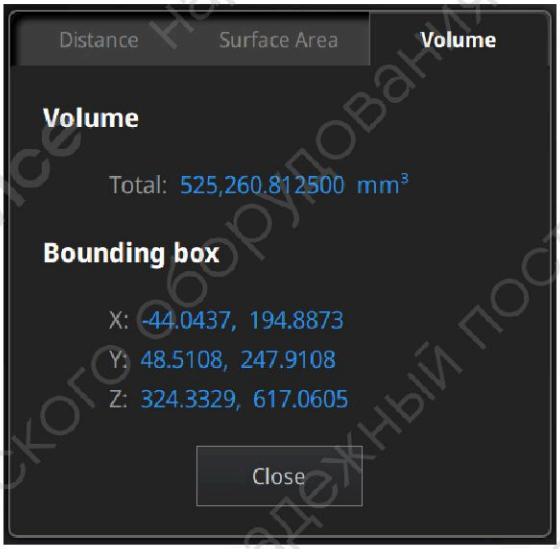
Surface Area menu

VOLUME

This tool calculates the volume contains in a watertight mesh.
It returns the volume in mm^3 and the coordinates of the smallest box, parallel to the global coordinates, containing all the data.

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Volume menu

Prior to the calculation make sure the file is watertight (no holes).

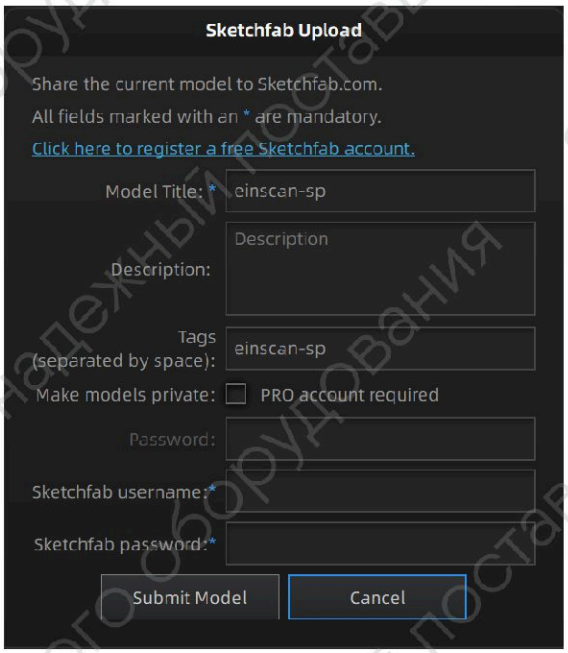


File not watertight alert

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10. SHARE DATA

Click  after mesh to share data to Sketchfab, it will show the dialog as below. A model title, username and user password are required. Register and view the shared model at http://sketchfab.com.



Notes:

1. Sketchfab basic plan accounts can only upload data less than 50M, while Pro plan account can share with a maximum of 200M.
2. Data is saved as .STL does NOT contain texture

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11. Third-party Software

Click  after mesh to import the mesh to a third-party software.


GEOMAGIC ESSENTIALS and  **SOLID EDGE SHINING 3D EDITION** can be started.

Notes:
1. The third party software should be installed and activated in advanced.
2. Solid Edge Shining 3D Edition is included in the scanner.
3. Geomagic Essentials is not included in the scanner. Please contact us if you are interested to buy.
4. Both software needs to obtain the license for an online activation.

GEOMAGIC ESSENTIALS is the essential bridge between 3d scanning and design. Once 3d scan is finished in EinScan 3d scanning software-Exscan Pro, take the 3d scan data to Geomagic essentials, extract the feature you want, and create solid models and complex profiles to your CAD design environment.

Solid Edge is a design tool from SIEMENS PLM Software. Partnered with SIEMENS PLM Software, EinScan users is able to use Solid Edge SHINING 3D Edition, which includes reverse engineering, generative design (optional modular), and simulation (optional modular) with CAD functions in one platform.

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12. MODEL PREVIEW

Double click the short-cut 

on the desktop. Drag files into the window for preview. Manipulate the data with the same control as EXScan software.



Model Preview

STL, OBJ, PLY, ASC, or 3MF can be loaded, files from 3rd party software might fail to be loaded. In this case we recommend Meshlab, a free mesh software editor, or upload to sketchfab.

Notes:
To load a OBJ textured file make sure to have the MTL and JPG files with the same name and in the same folder than the OBJ

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13. Others

13.1. FAQ

1. What if no scan data when the turntable has rotated one circle?
Solution: Please make sure that the object won't block the mark points on the turntable. Or, there will be no fringe pattern, while turntable will be still rotating. If the align mode is mark point, please make sure that the marks on the turntable are covered, so as not to affect the scanning. Make sure that in each single scan area has at least 4 points.

2. What if the merging fails without mark points when the turntable has rotated several circles or when it is under f ixed scan mode?
Solution: Try to make sure there are at least 1/3 overlap between the current scan area and the previous scan area and the object surface should be featured. For objects which are symmetric and without rich features, using mark points or manual merger is recommended.

3. How to scan objects in transparent, semi-transparent or black?
Solution: Scan before spraying on the surface.

4. Under auto scan mode, if the turntable is not moving, but with a humming sound, how to solve?
Solution: Disconnect power line and connect again in few seconds.

13.2. Safety Precautions

- Keep well-ventilation. Environment temperature shall below 40 Celsius degree, and do not use the device under an environment with flammable or corrosive gases or another similar environment.
- Please grab and place gently in the proper position, and do not squeeze it. Prepare precautions like sunscreen, rain-proof, shock-proof and etc. No matter on sunny or rainy days.
- If the device could not function correctly, fixing the device by opening it by yourself is not allowed. The device shall be repaired by professional technicians or under their instruction.
- You should send the device to facilities with qualification for recycling it instead of dropping into the household garbage when it is scrapped.

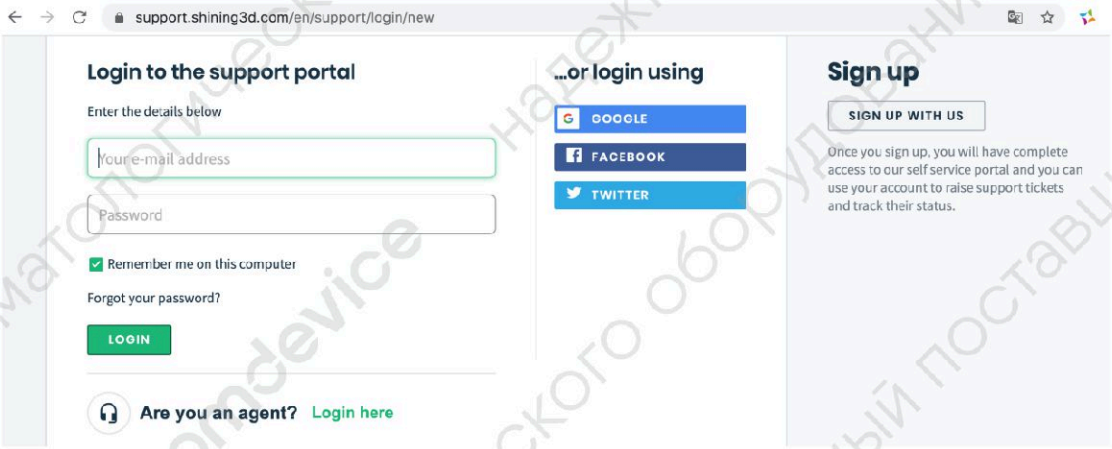
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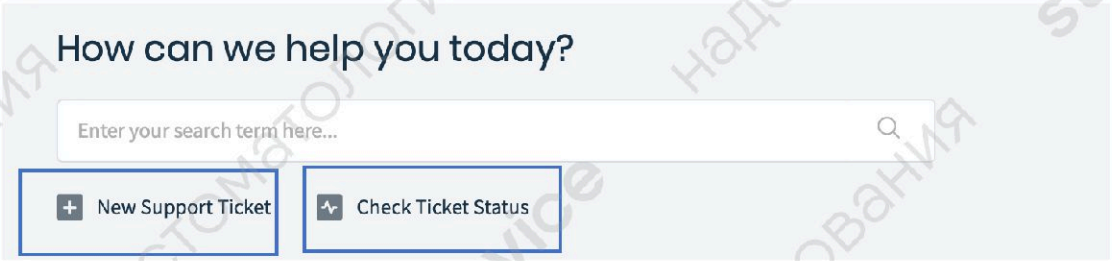
14. SUPPORT AND CONTACT

14.1. Submit a Ticket

Sign up in Shining 3D Support Platform support.shining3d.com
Or send email directly to einscan_support@shining3d.com



Log in with your account. Click New Ticket on the tab bar to submit a ticket and check the status



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14.2. Contact Us

By email
einscan_support@shining3d.com
sales@shining3d.com

Skype: Einscan_support

Facebook Group: EinScanexpert

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