SHINING 3D®

EinScan HX

V.1.3.0

EinScan HX

Users Manual

Symbol Conventions

The symbols in this document are defined as follows.

Symbol	Description
Note	Provides additional information as the emphasis and supplement to the text.
Caution	Indicates a potential risk which, if not avoided, could result in property damage, data loss, lower performance, or unpredictable issues.
Danger	The safety instructions that you must precisely follow to avoid injury. Failure to observe can cause damages to your product, or result in personal injuries.

Content

1 Hardware

1.1 Introduction

EinScan HX scanner is a handheld laser 3D scanner developed independently by SHINING 3D, featuring the fast-scanning speed, complete data acquisition, light weight and convenient handheld operation.

EinScan HX is mainly applied in the industry such as automobile manufacturing, aerospace, and machinery manufacturing. It applies the LED structure light and laser, which enables repeating high-precision scanning to various kinds of industry materials.

All in all, EinScan HX is a cleverly designed tool covering various needs by balancing both quality and efficiency of scanning.

Figure 1-1 Scanner

1.2 Connect Cables

Connectors
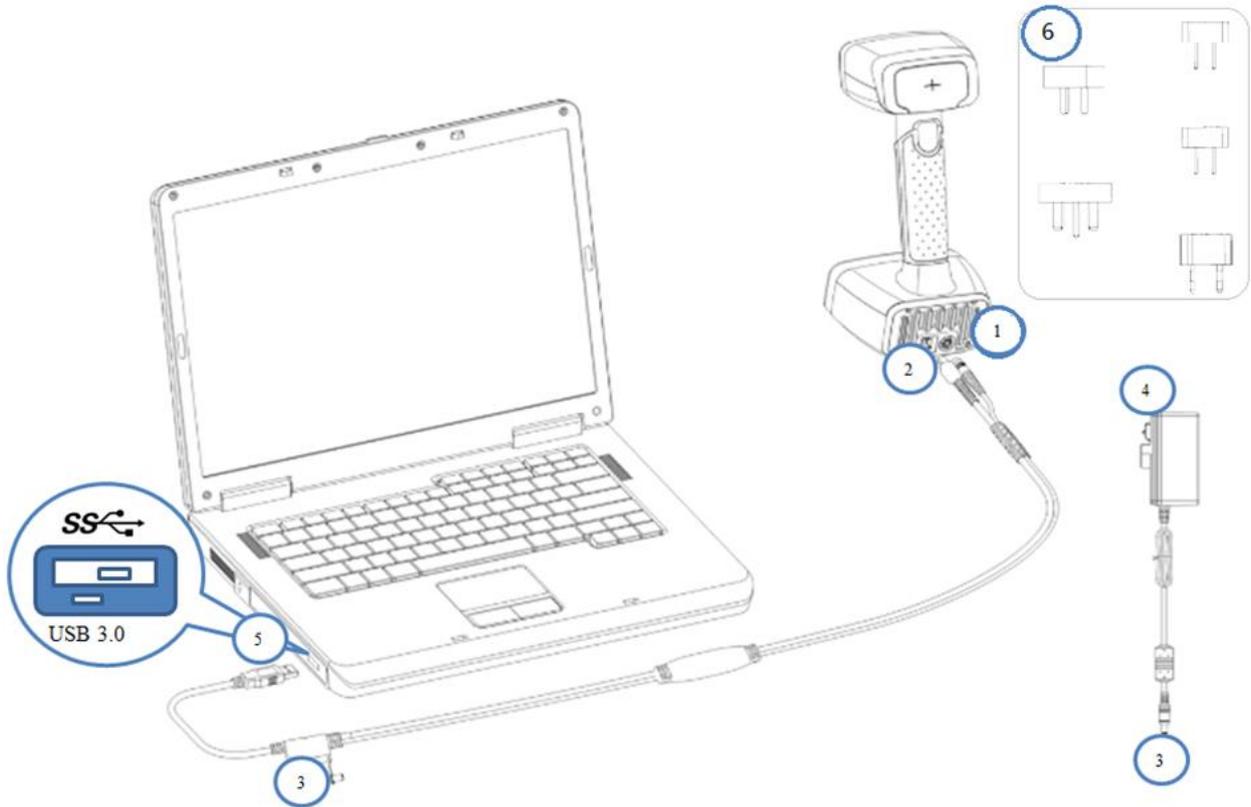
Figure 1-2 Assembly Diagram

① Electrical Plug (scanner)   ④ Electrical Plug (power adaptor)

② Connection Plug (scanner)   ⑤ USB Plug (aviation cable)

③ Electrical Connections   ⑥ Plug Adapters

Steps

1. Connect ① and ② with the scanner.

2. Connect ③.

3. Put ④ into the socket.

4. Connect ⑤ to PC USB 3.0 port.

⚠️**Danger**

Ensure that all the cables are not loose during the scanning operation. You are suggested to use fastening tools to prevent the device from being offline.

2 Software

2.1 Introduction

EXScan software supports HX scanners. With user-friendly software interface, full process scanning guidance, simplified software settings, you can operate the Scanner easily.

2.2 Operating Environment

Table 2-1 Operating Environment of EXScan

Operating System	Processor	Graphics Card	Memory	Video Memory
Windows 10 (64-bit)	I7-8700	NVIDIA GTX/RTX series cards; higher or equal to GTX 1080	≥32GB	≥4G

2.3 Install Software

Steps
1. Download the installation package.
2. Go to https://www.EinScan.com /support/download/ and select your scanner model or simply copy the installation package from the USB.
3. Double click the installation package, agree the modification to computer and terms, then follow the instructions to complete installation.
4. A shortcut will appear on desktop when the installation is done.

⚠ Caution

Do not install EXScan under ProgramFiles or ProgramFiles (x86) for there may be permission.

2.4 User Account

To keep the UpToDate information and software, register for a free account after software installation or from passport.shining3d.com.

Note

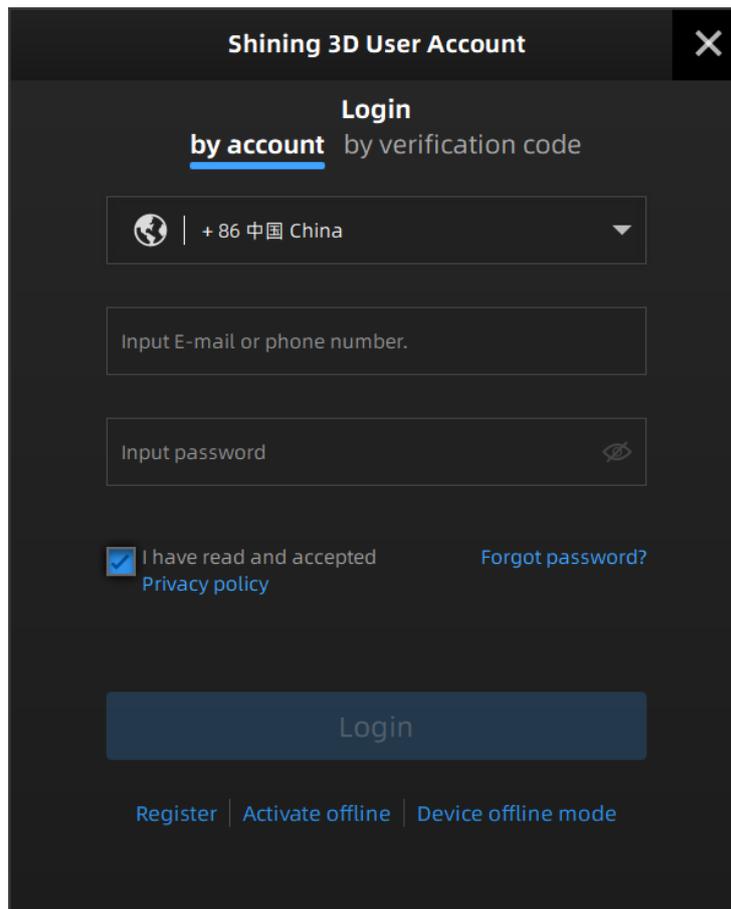Before getting shining pass, ensure that the device has been connected properly (refer to Connect Cables).
Registration is required to activate your scanner.

2.4.1 Register

Double-click to enter the software. Register for an account firstly if you do not have a Shining 3D user account.

1. Click or go to https://passport.shining3d.com/signup for register, there will be a pop-up.

Figure 2-1 Register or Login from Softeware

Figure 2-2 Sign-up Pop-up at https://passport.shining3d.com/signup

2. Follow the instructions and fill the blanks to create an account

2.4.2 Login to Activate Online

Double-click to operate the software.

If the computer with installed software has been networked, after registration, the activation will be processed automatically, and the operation interface will appear on the desktop as soon as finishing the online activation.

2.4.3 Offline Activation

If the computer on which the software is installed cannot be networked, you can use Activate Offline to complete activation.

To start offline activation, you need the following:
- Another computer connected to the internet
- USB disk or a portable hard disk to transfer files between the computer with software and the internet connected computer

Offline activation procedure:
1. Connect a USB disk or a portable hard disk (hereinafter referred to as "the disk") to the computer installed with EXScan before offline activation.
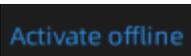
2. Click to enter offline activation interface.
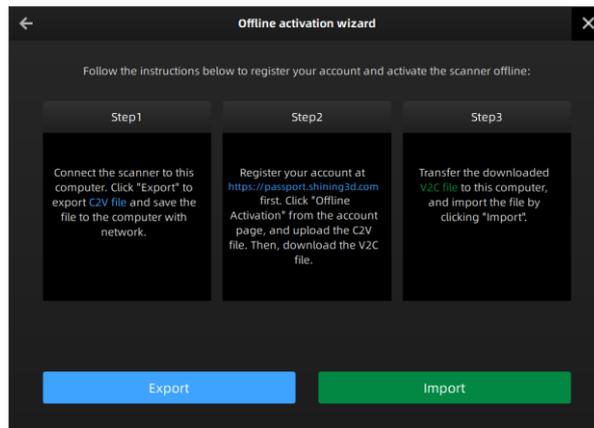
Figure 2-3 Offline Activation Wizard

3. Export C2V file: Click **Export** to save generated C2V file to the disk.
4. Login your user account at https://passport.shining3d.com/login using the internet connected computer.
5. Click **Offline Activation** after logging in successfully.
1) Import the saved C2V file in the disk.

2) Export V2C file: Export V2C file corresponding to the account to the disk.

6. Return to the computer on which the software is installed. Click Import to save V2C file from disk to the computer. Then the scanner is fully activated

Note

If the activation fails, just contact us through the mailbox (EinScan_support@shining3d.com). Send us the serial number of your device through mail and we will try the best to make the things right for you.

Figure 2-4 Serial Number

2.4.4 Device Offline Mode

Click or close button to enter the offline-mode operating interface.

Offline mode only supports importing and processing projects with scanned data, while it does not support calibrating and scanning operations.

To connect device under offline mode, click the reconnect button to re-enter the shining pass interface .

- Once log in successfully, your account's information will be saved for auto login.

- After login and entering the operating interface successfully, if the scanner is disconnected, EXScan system would enter the offline mode automatically.

2.5 Upgrade

2.5.1 Upgrade Hardware

For enjoying new functions and preventing the firmware from being incompatible, always make sure that the firmware in use is of the latest version. If not, a reminder prompting updates will pop up immediately after opening the software. Follow the instructions below to complete the upgrade.
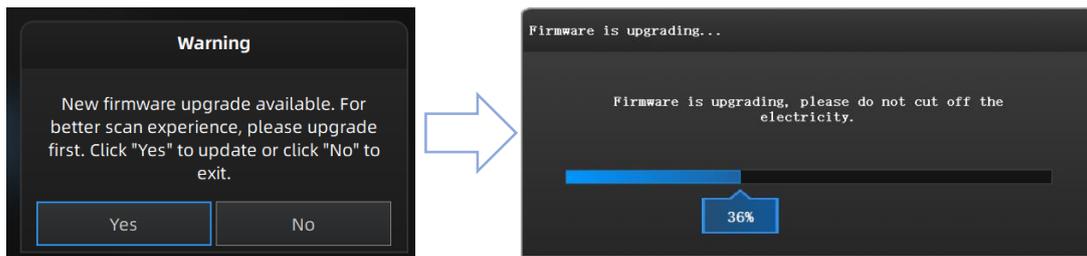
Figure 2-5 Update Warning

Preparations Before Upgrade
- Make sure that the device stay powered on during the whole process of upgrade.
- It is suggested to back up the original firmware in case of the upgrade failure or the coming version being unsatisfying.

Upgrading Process
- Firmware updating will take around 6 minutes.
- Power off the device and exit the software after upgrading successfully.
- Reconnect the device and reopen the software, the device is running under the latest firmware.

Note

If recovery fails, turn off the power of the scanner and reconnect the scanner to restart the software for upgrading again.

Caution

Do not disconnect the scanner, or unplug the power during the upgrade.

2.5.2 Upgrade Software

Users can get the patch through a normal software update. If the software in use is not of the latest version, a reminder prompting update will pop up immediately after opening the software.

Steps
1. Click **Yes** to update.
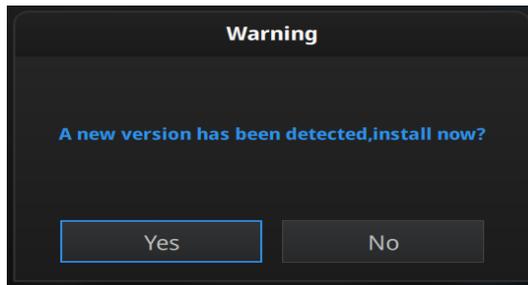
Figure 2-6 Update Warning

2. Click **Download Now** to download the installation package.
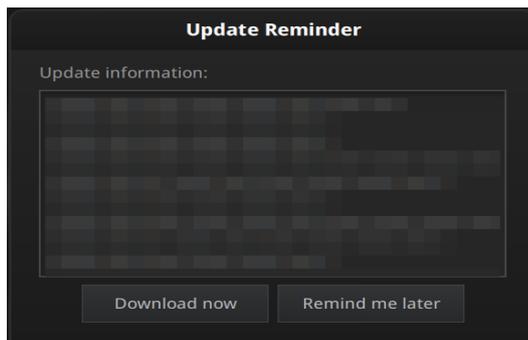
Figure 2-7 Update Reminder

3. When the download is completed, there will be a pop-up, click **Yes** to start installing.

⚠️ Caution

Do not close the software or unplug the power supply during download.

3 Operation

3.1 Calibration

Each set of EinScan comes with a calibration board and a position paper for calibration.

Calibration is a process of promoting device's performance while recalculating its parameters to ensure that both of its scanning accuracy and quality are over the VDI/VDE standards.

Follow the steps provided by the calibration wizard on the interface during the calibration.

- To ensure a better accuracy of the device, around 30 mins warm-up is suggested before calibration after clicking Calibration button. If no special request on the accuracy, just skip the heating step and go straight to the calibration operation. Do not move or vibrate calibration board during scanning.
- EinScan HX applies safe low-energy laser during laser scan mode, which causes no harm to human body such as eyes and skin under the normal operating situation. However, avoiding direct eye-contacts with the laser beam and keeping the scanner away from children are still commanded for your own safety.

3.1.1 Caution

EXScan system enters the calibration interface directly as being opened for the first time. Users can also click **Calibration** on the navigation bar for switching to the calibration interface manually.
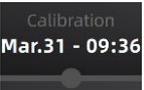
Situations Requires Calibration:
- Do the calibration when the scanner is connected for the first time.
- It is recommended to do the calibration twice a week.
- Do the calibration when the scanner having been keeping on idling for a long time.
- Do the calibration after the scanner going through a bumpy transportation.
- Do the calibration when there is a severe deterioration of accuracy or the misalignment occurs frequently during the scanning.
- Do the calibration when there are some errors in acquiring integrated high-quality data during the scanning.

The Maintenance to the Calibration Boards

- Make sure that there are no scratches or stains on the working side of the calibration board.
- Do not place loads or junk on the board as it may bring damage to the working side of the calibration board.
- Keep the calibration board away from the corrosive fluid, metals and sharp objects to avoid unexpected corrosion or damages.
- It is not recommended to wipe the calibration board. When cleaning the board becomes very necessary, gently wipe it with a piece of clean moisture cloth. Do not wipe the calibration board with chemicals or alcohols.
- After using the calibration board, put it in a flannel bag for nice protecting.
- Use the calibrating board matching to the device.

3.1.2 Standard Calibration

In the initial use, you will be guided to **Standard Calibration** directly.

Steps
1. Place the position paper on a horizontal flat surface.
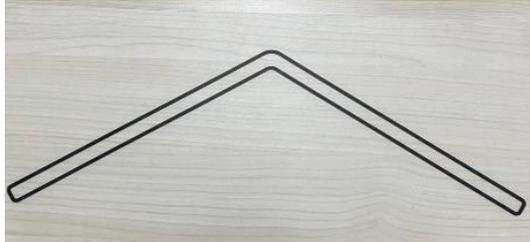
Figure 3-1 Position Paper

2. Open and then put the calibration board vertically aligning to the black line frame
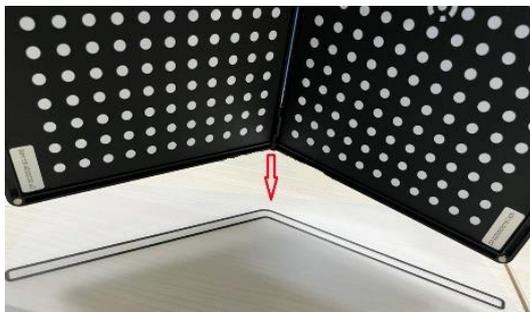
Figure 3-2 Calibration Board

3. Hold the scanner face to the center of board in upright position. Move the mark 🔲 into the white line frame.
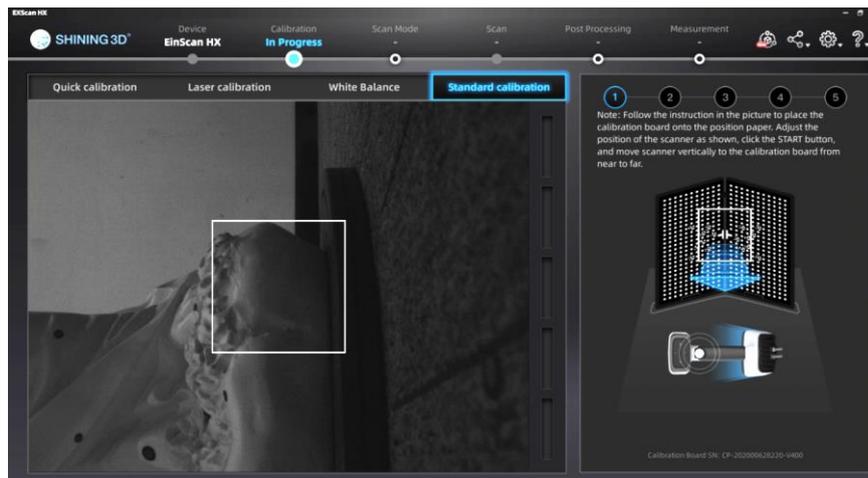
Figure 3-3 Preview of the Calibration Board

4. Press the play button on the scanner. Keep adjusting the distance between the scanner and the calibration board by moving the scanner horizontally from near to far slowly until all the color bars turn green, which means that all the required distances have been captured.

Figure 3-4 Color Bar

5. As the calibration for one angle is done, the software automatically joins in the calibration for the next angle. Follow the operation instructions on the interface to complete the calibration for the following 5 positions.

Table 3-1 Five Angles for Calibration

Position 1	Position 2	Position 3	Position 4	Position 5

6. After finishing the standard calibration, click **Next** on the following pop-up for entering the **LASER CALIBRATION**.
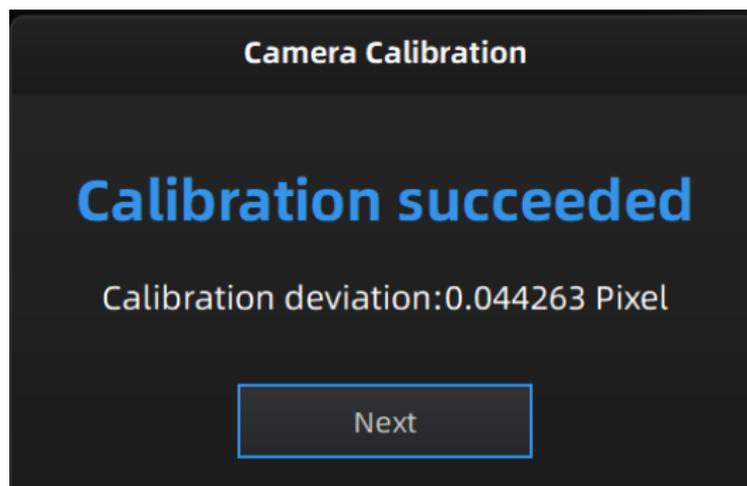
Figure 3-5 Calibration Succeeded

3.1.3 Quick Calibration

Quick Calibration is recommended when the scanning result remains not clear enough to meet the initial expectation after completing the standard calibration.
Quick calibration's operating process is like the standard calibration while it requires one position only.
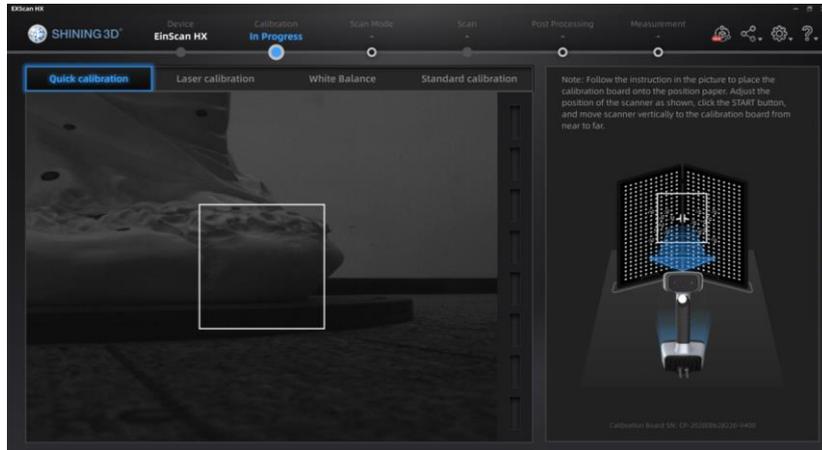
Figure 3-6 Preview of the Calibration Board

After finishing the quick calibration, click **Next** on the following pop-up for entering **the LASER CALIBRATION**.
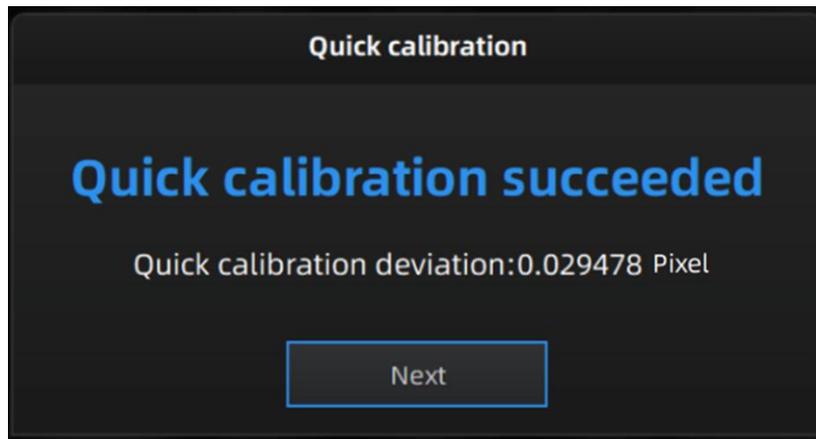
Figure 3-7 Quick Calibration Succeeded

3.1.4 Laser Calibration

Steps

1. Open and place the calibration board on a horizontal flat surface with its back site lying towards up.
2. Hold the scanner face to the center of board in upright position.
3. Keep moving the scanner up and down slowly until all the color bars turn green, which means that all the required distances have been captured.
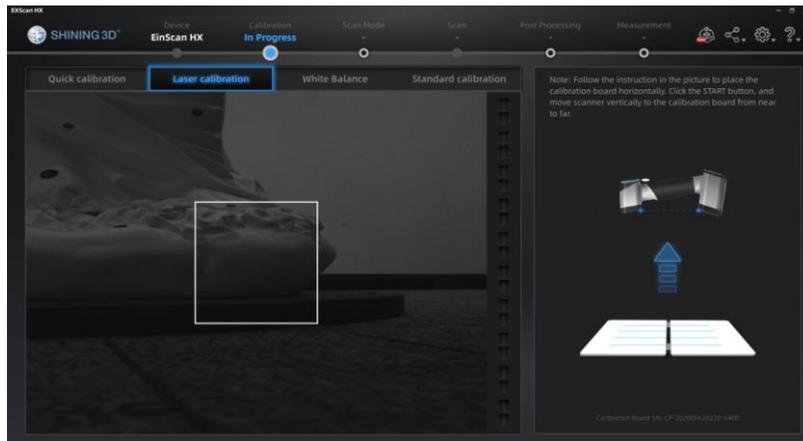
Figure 3-8 Laser Calibration

4. After finishing the laser calibration, click Next on the following pop-up for entering the white balance.
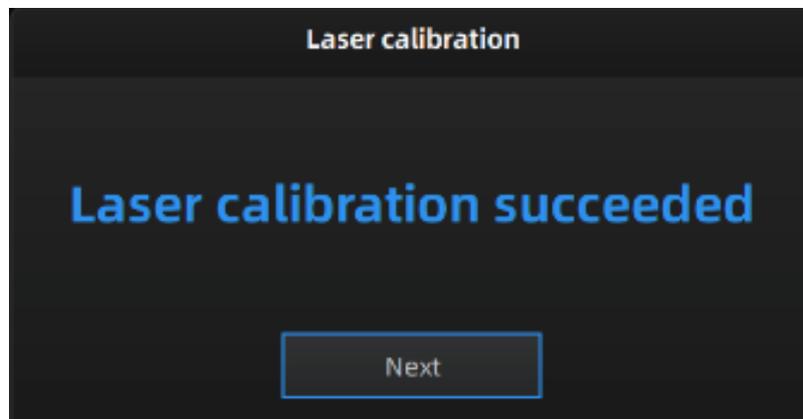
Figure 3-9 Laser Calibration Succeeded

3.1.5 White Balance

1. Open and place the calibration board on a horizontal flat surface with its back site lying towards up.
2. Hold the scanner face to the center of board in upright position.
3. Keep moving the scanner up and down slowly until the scanner takes a photo automatically, which indicates that the distance is just being optimal.
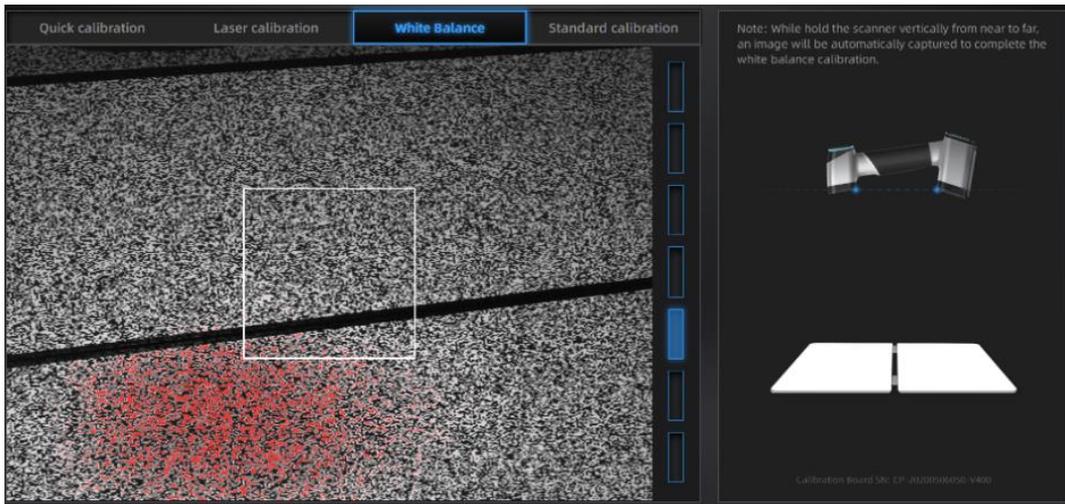
Figure 3-10 White Balance Interface

4. After finishing the white balance calibration, click **Next** on the following pop-up for entering **the scan mode**.
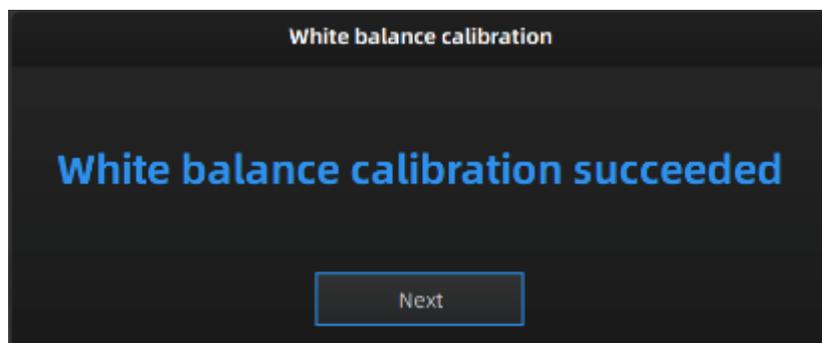
Figure 3-11 White Balance Succeeded

3.2 Preparation

3.2.1 Scanned Objects

Requirements
- The size of the objects to be scanned ranges from 300mm^3 to 4m^3.
- The objects owning plenty of geometrical or texture features tend to be scanned quickly and easily with excellent scanning result.
- 3D scanning may fail to function when scanning soft-material objects or lattice-structured objects with lots of small deep holes.

Preparation
Doing more preparations before scanning and taking notes during scanning may help if it is necessary to scan those items:

Table 3-2 Preparations for Scanning Specific Objects

	Preparation	Recommended Alignment
Black, transparent, shiny or reflective surfaces	Mist the surface with washable scanning spray. (under rapid scan mode)	The choose of alignment mode depends.
Surfaces with repetitive features	Add features on the surface manually by drawing markers.	Texture alignment.
Surfaces with few features	Stick markers on the surface and within its edge.	Global marker alignment.

⚠️ **Caution**

Here are some basic rules for sticking markers. Read them carefully before operating:
- Markers should be stocked randomly but evenly. Avoid sticking in regular.
- The number of markers stocked on the aligning common area should be 4 exactly.
- Ensure that there are at least 4 markers to be observed when the scanner working at a normal distance.
- The size of markers sticking on the frames or tiny area should be 3mm.
- Keep markers flattering. Do not stick them on the surface of high curvature.
- Do not use incomplete, damaged or stained markers.
- As the scanned object is of small size and can be scanned within one scanning field of view completely, the markers can be pasted on the surroundings.
- Use the markers coming with your device, or the scanner could not figure out those added features and eventually results in low accuracy.

Figure 3-12 Different Ways of Sticking Markers

3.2.2 Operating Buttons

Operating Buttons on the Scanner
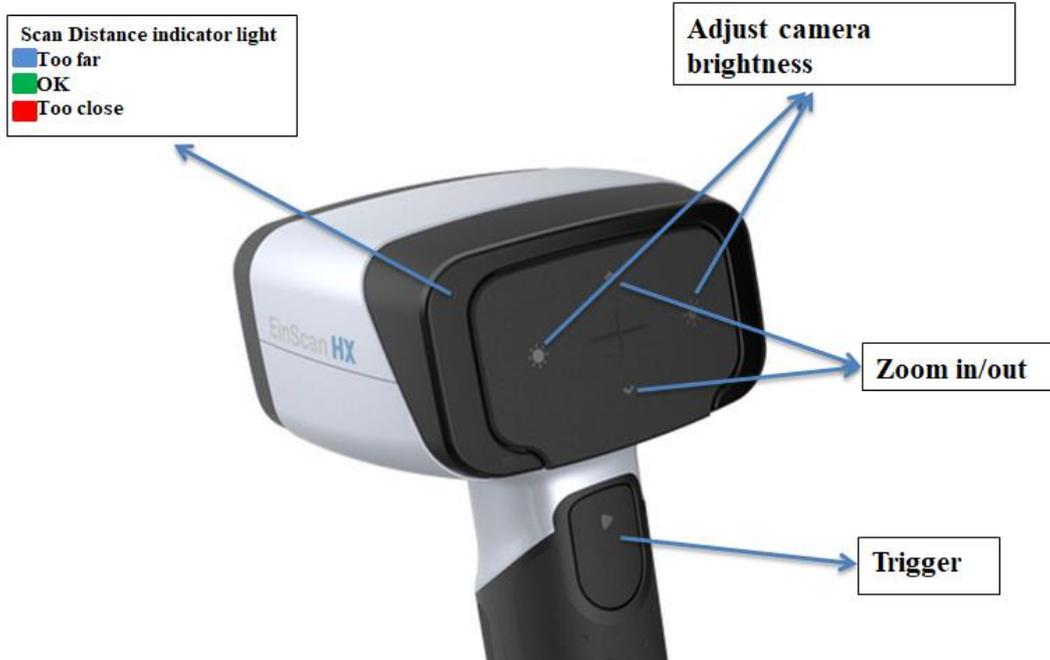
Figure 3-12 Scanner

Operating Buttons within the EXScan

: Preview   : Pause

: Play

3.2.3 Workflow

```
                    ┌──────────────┐
                    │ Calibration  │
                    └──────┬───────┘
                           ↓
                  ┌──────────────────┐
                  │ Select scan mode │
                  └────────┬─────────┘
              ┌────────────┴────────────┐
              ↓                         ↓
      ┌──────────────┐          ┌──────────────┐
      │  Rapid scan  │          │  Laser scan  │
      └──────┬───────┘          └──────┬───────┘
             ↓                         ↓
      ┌──────────────┐          ┌──────────────┐
      │  Create a    │          │  Create a    │
      │  project     │          │  project     │
      └──────┬───────┘          └──────┬───────┘
             ↓                         ↓
   ┌────────────────────┐      ┌──────────────┐
   │ Select alignment&  │      │   Select     │
   │ texture& resolution│      │  resolution  │
   └──────────┬─────────┘      └──────┬───────┘
              └────────────┬──────────┘
                           ↓
                    ┌──────────────┐ ←┐
                    │   Preview    │  │
                    └──────┬───────┘  │
                           ↓          │
                    ┌──────────────┐  │
                    │     Scan     │  │
                    └──────┬───────┘  │
                           ↓          │
                    ┌──────────────┐ ─┘
                    │  Edit data   │
                    └──────┬───────┘
                           ↓
                    ┌──────────────┐ ─┐
                    │ Finish scan  │  │
                    └──────┬───────┘  │
                           ↓          │
                  ┌──────────────┐    │
                  │ Create/ open │    │
                  │ a new project│    │
                  └──────┬───────┘    │
                         ↓            │
                  ┌──────────────┐ ←──┘
                  │Align projects│
                  └──────┬───────┘
          ┌──────────────┼──────────────┬──────────────┐
          ↓              ↓               ↓              ↓
   ┌──────────┐  ┌──────────────┐ ┌──────────────┐ ┌──────────┐
   │   Mesh   │→ │     Post     │→│ Measurement  │→│ Save the │
   │          │  │  processing  │ │              │ │ project  │
   └──────────┘  └──────────────┘ └──────────────┘ └──────────┘
```
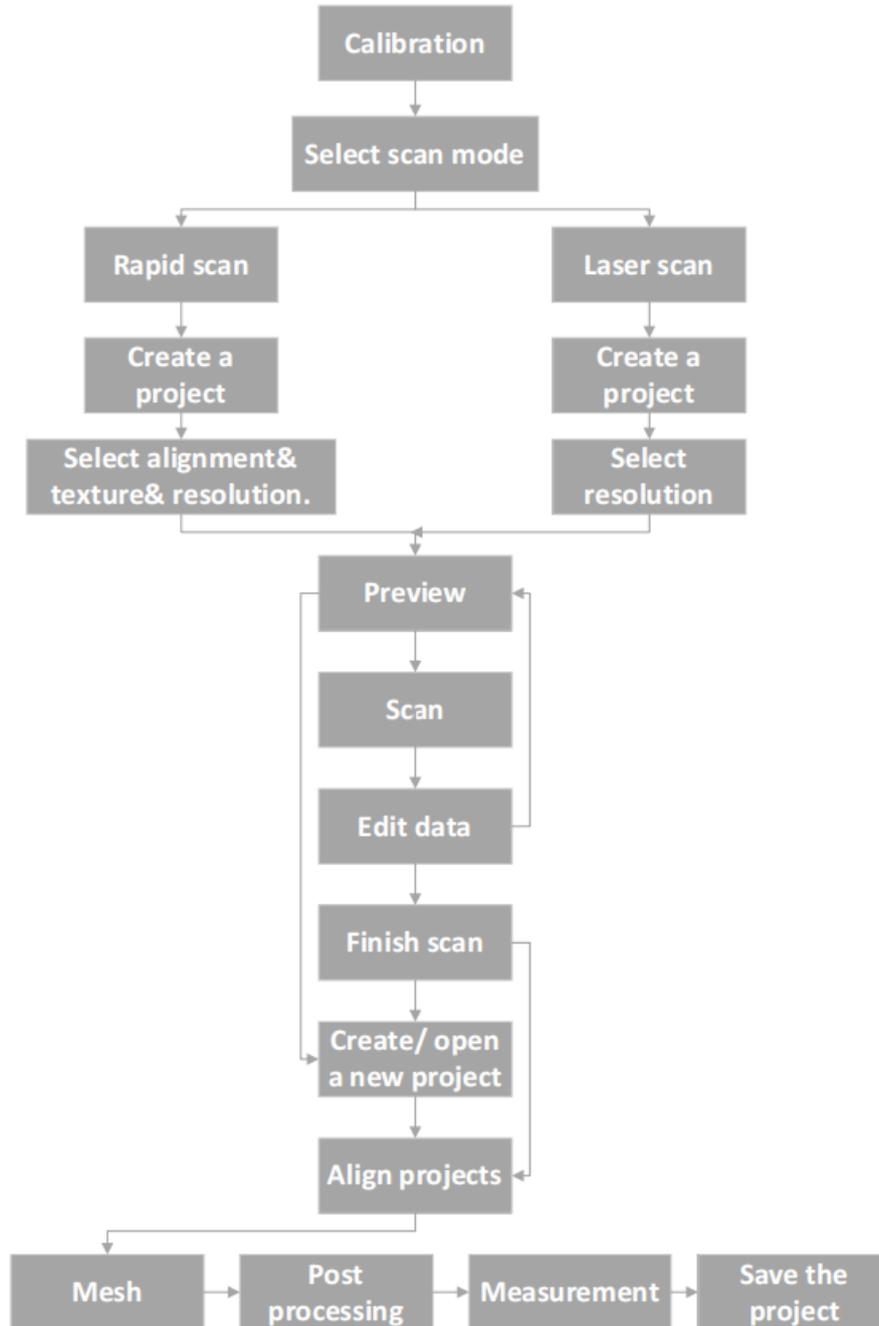
3.3 Select Scan Mode

You can choose a mode to start scan after a full preparation.

The following diagram and form comparing the differences between rapid scan and laser scan are for your reference:

Figure 3-13 Icons of Rapid Scan and Laser Scan

Table 3-3 Differences Between Rapid Scan and Laser Scan

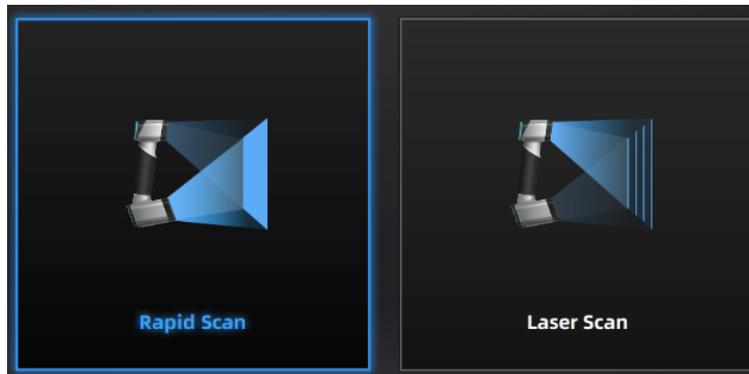|	Rapid Scan	Laser Scan
Light source	LED	Laser
Accuracy	0.05mm	0.04mm
Resolution	0.25~ 3.0mm	0.05mm~ 3.0mm
Alignment	Markers/ features/ hybrid/ texture	Markers
Scanning speed	20FPS	55FPS
Texture Scan	Available	Non-Available
Scanning objects	Ordinary objects	Industry products

Advanced Mode

- 1. Advanced mode is unchecked by default.
- 2. The advanced mode can be turned on / off only after the scan mode being selected.
- 3. The point distance adjusting function in advanced mode is only applicable to laser scan mode.
- 4. When advanced mode is unchecked, the point distance range is 0.1 ~ 3.0. when advanced mode is turned on, the point distance range is adjusted to 0.05mm ~ 3.0mm.
- The option of advanced mode is only alterable on the interface of selecting scan mode. Once entering the other interfaces, the state of which is no longer changeable.
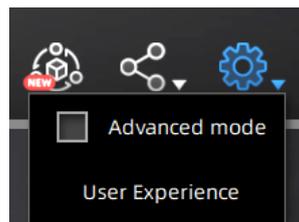
Figure 3-14 Advanced Mode

3.3.1 Rapid Scan

Rapid scan mode is faster than laser scan while it has a lower resolution. The size of the objects to be scanned ranges from 300mm^3 to 4m^3.

Different aligning methods are available under rapid scan mode, such as features aligning, markers aligning, global markers aligning and hybrid aligning. And the texture feature of the scanned surface can be captured when scanning under this mode.

Hybrid alignment mode allows sticking markers on the surface without extinguish feature, so that there is no need to stick markers all over the object, which saves lots of time compared to laser Scan.

Figure 3-15 Example

Create a Project

Creating a project before scanning can provide a specific saving path, so that users are able to process existed data conveniently.

Steps
1. Click **New Project Group** or **Open Project Group**.
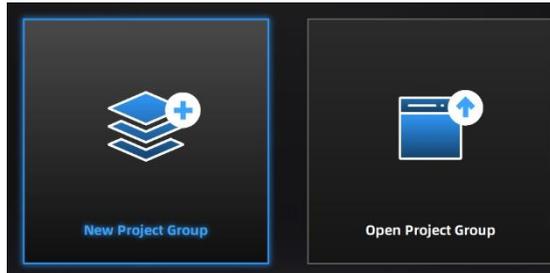
Figure 3-16 Create or Open a Project

2. Enter a name and storage location for the project file.
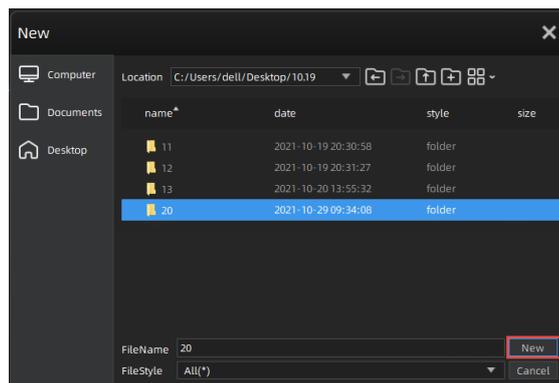
Figure 3-17 Select Project Storage Location

3. Select a mode and set parameters before scanning.

    Select Texture
    Texture scan requires colorful texture surface for adding color information to the scanning data and is only available in rapid scan mode after completing the white balance calibration.
    As it takes longer time for data processing when meshing, notice that move the scanner slowly and steady during collecting texture information.
    Non-texture scan and texture scan function the same way.

Figure 3-18 The Effect of Texture Scan

Select Mode of Alignment

RAPID SCAN allows aligning by markers, features, hybrid and texture. LASER SCAN only supports marker alignment.

Markers Alignment

This mode aligns scanning result by recognizing markers. Which is suitable for non-feature regions like flat, spherical surface or objects with repetitive features. Preparation required for markers is listed in detail in **Scanned Objects**. Read it carefully before scanning.

Note

Markers alignment mode is not suitable for scanning objects with dark-colored surface.

Feature Alignment

This mode aligns the data automatically by analyzing the geometric features of the object during scanning. Rich features on the object are required for this mode. "Track lost" may happen if there is not enough common area captured in neighboring scans or the scanned area has few geometric features.

Texture Alignment

This mode aligns the scanning results by analyzing the texture on the surface. Texture Scan is required to be done before entering texture alignment.

 Hybrid Alignment

This mode is suitable for objects with region having less geometrical features. The software is to switch between features alignment and markers alignment automatically depends on whether there are greater than or equal to 4 markers being collected at a time or not.
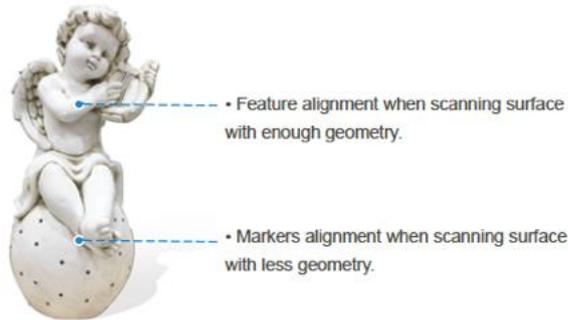
Figure 3-19 Example

Select Resolution

Select a resolution for the project. The higher the resolution, the better the details. However, higher resolution may lead to larger files and longer processing times.

Click **High Detail**, **Medium Detail** or **Low Detail** for choosing presetting resolution parameters, or drag the cursor for adjusting the point-distance, which suggests the distance between points of clouds.

Noted that higher resolution is required for scanning delicate objects such as gears.

Table 3-4 Resolution of Laser Scan and Rapid Scan

Resolution	Laser Scan	Laser Scan (under advanced mode)	Rapid Scan
Scope	0.1mm~3.0mm	0.05mm~3.0mm	0.25mm~3.0mm
High Detail	0.2mm		0.7mm
Medium Detail	0.5mm		1.0mm
Low Detail	1.0mm		1.5mm

Note

- The maximum size of scanned objects = point distance*8192/mm in theory. However, the upper limit to the size of the scanned object depends on computer configuration in reality, such as the capacity of the graphics card, GPU and RAM.
- When importing an existed project, its previous resolution and alignment mode are to be imported at the same time automatically.

Preview

Hold the scanner to face the object with enough markers or geometry features on surface, click

Preview or the **Trigger** to run into the preview mode, through which the operator could preview

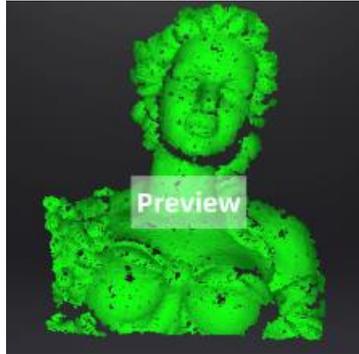the final performance and adjust parameters to an optimal level accordingly.

Figure 3-20 Preview

 Note

- Data is not to be record during **Preview**.
- The software enters preview mode every time a new project being built, an existed project being imported, or restart scanning after a pause.
- Click **Start** in software or press the Play button on scanner to exit the preview mode and start scanning.
- If there is a pop-up of **Tracking Lost** on the interface, just face the scanner to those currently captured regions (the green colored ones or the regions with red spots shown in pictures below), so that the scanning process is to resume.
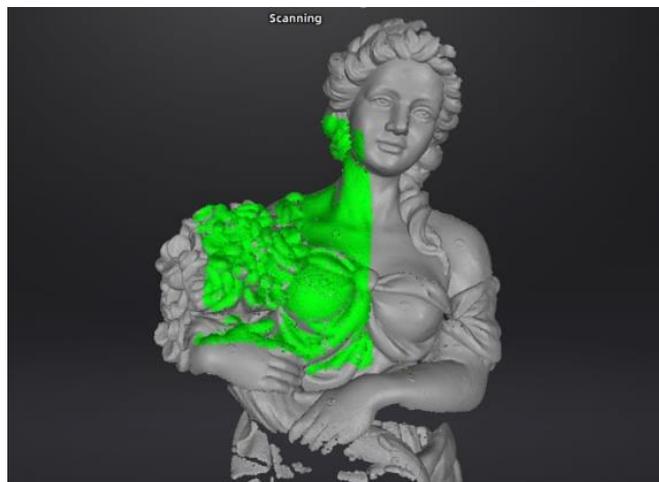

Figure 3-21 Currently Captured Regions

Find proper distance and brightness during the preview.

Click **Pause** [■■] on the interface or the **Trigger** to pause scanning. The data will be automatically saved in the project file.

Check Scanning Distance
The colored LED on the scanner and the rangefinder on the left side both reveal the distance between the scanner and the object.
The light turns green under optimal distance while it turns red or blue as the distance being too close or too far.

Table 3-5 Distance Color

	Too close	Optimal	Too Far
Distance color bar			
Distance color on the scanner			

Check Brightness

Adjust the brightness by clicking "☼" or "☼" on the scanner or dragging the brightness bar

[☼ ━━━○━ ☼] on the preview window to the left (-) or right (+).

Note

An overexposed scan will capture less data.

Table 3-6 Preview

Too bright (X)	Good (√)

Rapid Scan Setting

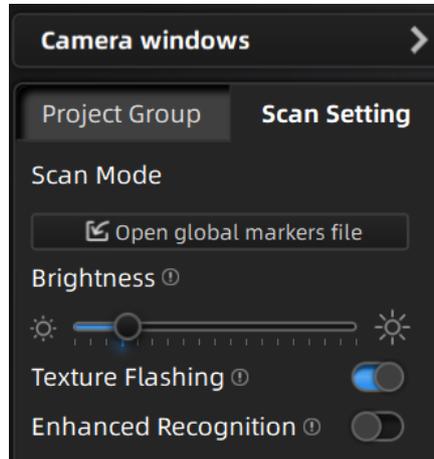Users can set parameters during preview mode.

Figure 3-22 Rapid Scan Setting

Scan Mode：

Open global markers file: Open existed makers-scanning project and import global markers.

Brightness:
Adjust the brightness manually by dragging the bar.

Plane Detection :
- Check Plane Detection :
This function is only available under features alignment mode or hybrid alignment mode. The system will reduce the possibility of misalignment intelligently and there will be a reminder of Not Enough Features to Align when there is less geometry.
- Not Check Plane Detection:
Turning off plane detection enables scanner to scan flat surface while misalignment may happen.

Texture Flashing:
Texture flashing is only available under texture scan mode and is designed for improving the uniformity of the texture in scanning result with continuous Led flashing. It is highly recommended to turn on this function or you need to make sure there is ample evenly distributed light during scanning.

Enhanced Recognition:
Marker Recognition Enhancement is only available under markers alignment and hybrid alignment. It features a more sensitive markers recognition and a lower scan accuracy, which is recommended for detecting markers on dark surfaces.

Scanning Operation

1. Hold the scanner to face the object with enough markers or geometry features on surface, click
    Preview ⬛ or the **Trigger** to run into the preview mode.

2. Click the **Trigger** again or click **Play** ⬛ to exit the preview mode and start the scan. Find proper
    distance and brightness according to the environment as well as object itself during scanning.

3. Click **Pause** ⬛ on the interface or the **Trigger** to pause scanning. The data will be automatically
    saved in the project file.

3.3.2 Laser Scan

Laser scan mode is capable of acquiring high-accuracy detailed data. The size of the objects to be scanned ranges from 300mm^3 to 4m^3.

Laser scan allows marks alignment only, so it is necessary to stick markers properly previous

operation. And the laser line is not to be projected when markers are not recognized. Check

Preparation for more information of laser scan preparation.
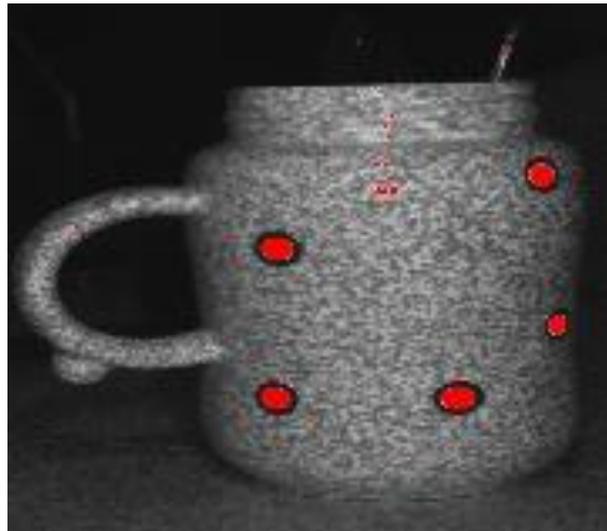

Figure 3-23 Marks on the Object

Create a Project

Create a project before scanning, which provides a specific saving path, and so that users are able to process existing data conveniently.

Steps
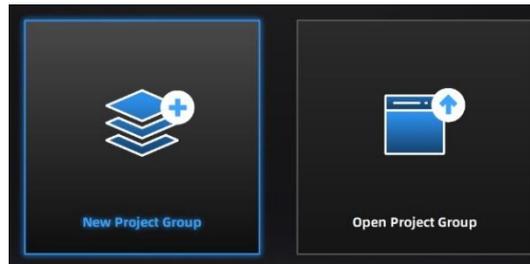1.   Click **New Project Group** or **Open Project Group**.

Figure 3-24 Create or Open a Project

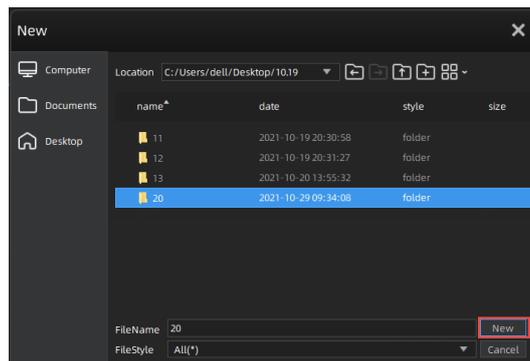2.   Enter a name and storage location for the project file.

Figure 3-25 Select Project Storage Location

3.   Select Resolution
The higher the resolution, the better the details. However, higher resolution may lead to larger files and longer processing times. Higher resolution is required as scanning delicate objects such as gears. Click **High Detail**, **Medium Detail** or **Low Detail** for choosing presetting resolution parameters, or drag the cursor for adjusting the point-distance, which suggests the distance between points of clouds.

- The maximum size of scanned objects = point distance*8192/mm in theory. However, the upper limit to the size of the scanned object depends on computer configuration in reality, such as the capacity of the graphics card, GPU and RAM.

- When importing an existed project, its previous resolution and alignment mode are to be imported at the same time automatically.

Preview

Hold the scanner to face the object with enough markers on surface, click **Preview** or the

Trigger to run into the preview mode, through which the operator could preview the final performance and adjust parameters to an optimal level accordingly.

Figure 3-26 Preview

Note

- Data is not to be record during **Preview**.
- The software enters preview mode every time a new project being built, an existed project being imported, or restart scanning after a pause.
- Click **Start** in software or press the Play button on scanner to exit the preview mode and start scanning.
- If there is a pop-up of **Tracking Lost** on the interface, just face the scanner to those currently captured regions (the regions with red spots shown in pictures below), so that the scanning process is to resume.
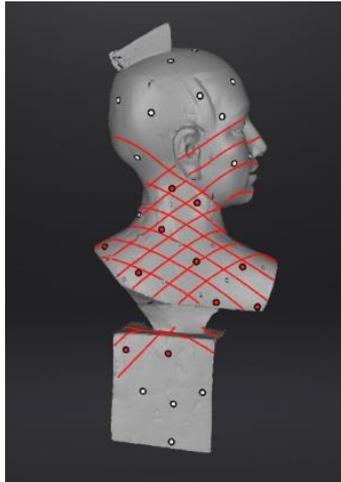
Figure 3-27

Find proper distance and brightness during the preview.

Click **Pause** on the interface or the **Trigger** to pause scanning. The data will be automatically saved in the project file.

Check Scanning Distance
The colored LED on the scanner and the rangefinder on the left side both reveal the distance between the scanner and the object.
The light turns green under optimal distance while it turns red or blue as the distance being too close or too far.

Table 3-8 Distance Color

	Too close	Optimal	Too Far
Distance color bar			
Distance color on the scanner			

Check Brightness

Adjust the brightness by clicking "" or "" on the scanner, or dragging the brightness bar

 on the preview window to the left (-) or right (+).

Note

An overexposed scan will capture less data.

Table 3-9 Preview

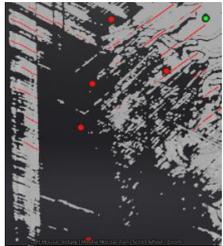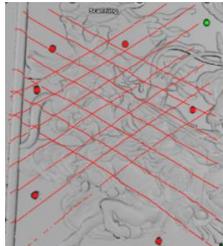| Too bright (X)	Good (√)

Laser Scan Setting

Users can set parameters during preview mode.
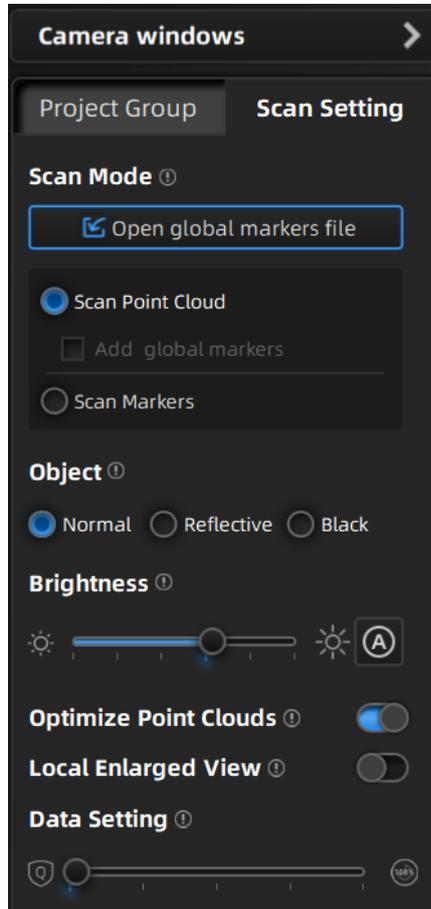
Figure 3-28 Laser Scan Setting

Scan mode:
Scan Point Cloud: Acquires data in form of point cloud. This mode is usually applied after scanning markers or importing global markers files.
Add Global Markers: To add newly scanned global markers to the original global markers, switch to Scan Point Cloud mode and click Add Global Markers.
Scan Global Markers: Scan markers is usually applied for completing existed global markers data. as only scanning the markers, the scanner is able to capture the data swiftly without projecting laser line.

⚠️ **Caution**

Switching to scanning markers or importing global markers files after scanning point cloud will clear the current data. It is allowed to switch between 2 modes freely after generating point cloud.

Scanning Object:
Choose the object surface material accordingly: Reflective, Normal, Black.

Brightness:
- **Manual Adjustment:** Adjust the brightness by dragging the bar.

- **Automatic Adjustment:** Turn on the auto exposure by clicking the icon on the right side, then the system will adjust the brightness automatically.

1) Auto exposure is available only under laser scan mode.
2) It is not allowed to turn on or turn off the auto exposure during the process of preview or scan.
3) When auto exposure is turned on, the system will process the exposure with an advance countdown during the preview and remember the parameter for adjusting the brightness accordingly. Noted that find a proper distance before auto exposure, or the system may fail to record the parameter.

Optimize Point Clouds
Check this option, so that the system will optimize the point clouds data automatically.

Local Enlarged View
Check this option to enter the 3D enlarged view. by checking the detailed scanning data, users can find the missing part and complete the its data in time.

- Entering the preview mode or scan mode with Local Enlarged View on, the scanned data would be presented within a rather intimate view. The enlarging effect ends as soon as exiting preview mode or scan mode.
- When the point distance is bigger than 0.5mm, Local Enlarged View is turned off by default; When the point distance is less than 0.5mm, Local Enlarged View is enabled by default.

Data Setting

- Drag the bar to the quality side **:** The scanning result tends to be of high quality with less noise.

- Drag the bar to the integrity side **:** The scanning result tends to be integrated but rich of noise (this setting is suitable for scanning black/ reflective surface, or those surfaces being hard for scanning).

Scanning Operation

1. Hold the scanner to face the object enough markers on surface, click **Preview** or the **Trigger** to run into the preview mode.
2. Click the **Trigger** again or click **Play** to exit the preview mode and start the scan. Find proper distance and brightness according to the environment as well as object itself during scanning.

3. Click **Pause** on the interface or the **Trigger** to pause scanning. The data will be automatically saved in the project file.

3.4 Edit Data

During the scanning process, the scanner may vibrate slightly, the scanned surface or the

environment may be too dark for operation. Those uncertain factors upon can bring noise.

In this regard, the function of editing is developed. It supports switching the perspective and editing

the model manually in the custom selection region.

![Note icon]Note

- Under the feature alignment mode, after clearing all the data by the function of edit, the data

  will recover once re-scanning.

- When editing one or more projects, it is needed to select those projects from the project list.

  The data of project turns blue once being selected.

3.4.1 Generate Point Clouds

Click ![icon] to generate point clouds.

The point clouds is a collection of the point data describing the surface of scanned object in 3D
coordinate system, and the effect of generating point cloud is shown in the following figure.
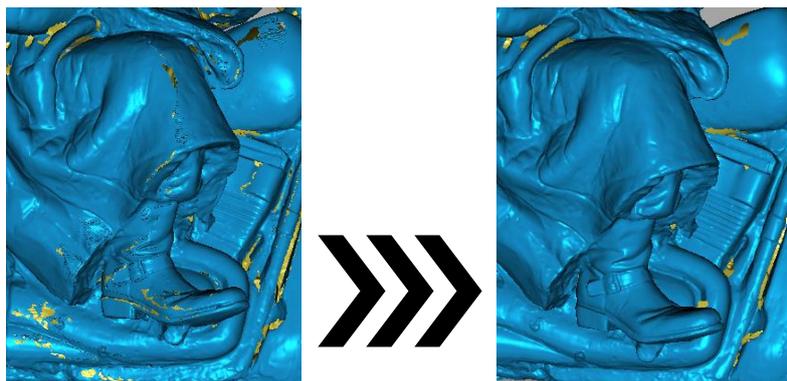
Figure 3-29 Generate Point Cloud

Those large-amount point clouds data is benefit for the further editing to the model.

3.4.2 Create a Cutting Plane

The plane can be rotated, zoom or move.
Taking the model below as a reference, after setting the cutting plane, the cutting plane above the direction of the arrow is valid (displayed in blue). The user can choose whether to save the data in the reverse direction (displayed in red) or delete it. Although the data in the reverse direction of the arrow can also be saved, the newly scanned data cannot be added to it.
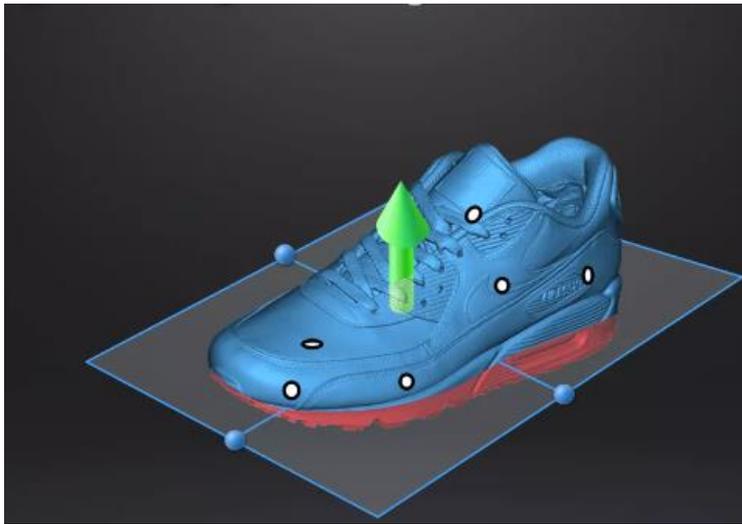

Figure 3-30 Example

Steps

1. Click to enter cutting-plane interface.

2. Choose a create method

   Create a cutting plane by fitting point cloud
   Press down Shift and Left mouse button to select point cloud data, those selected data is to form a cutting plane.

   Create cutting plane by straight line

   Press down Shift and Left mouse button and then click to draw a straight line on the

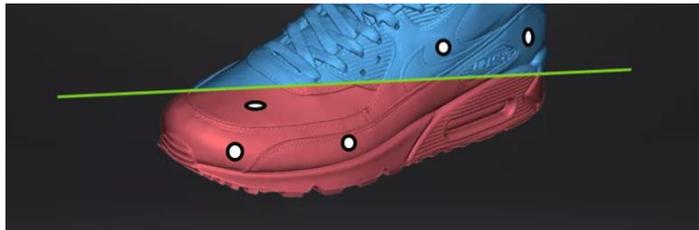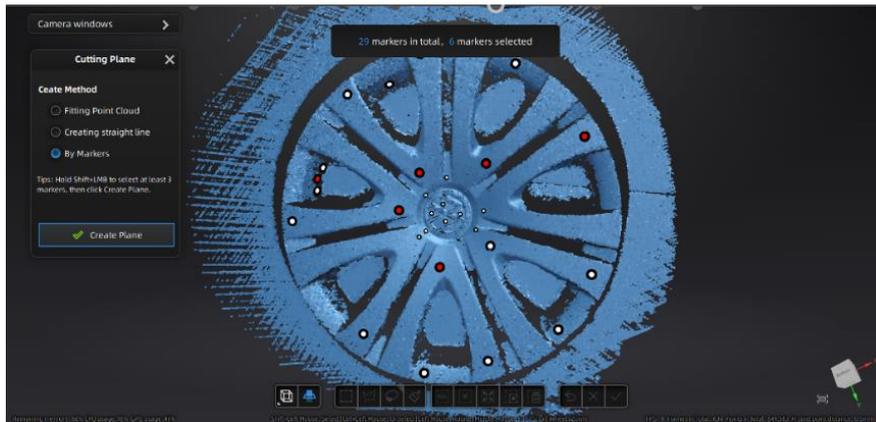   scanned object, a cutting plane generates from the line is created manually at the same time.

Figure 3-31 Straight Line Cutting Plane

⚠ **Caution**

Do not move the scan data view during the process, or the system may generate a new cutting plane.

Create a cutting plane by markers

Press down Shift and Left mouse button to select at least 3 not lined-up markers.

Figure 3-32 Markers Cutting Plane

3. Click **Create Plane** and a cutting plane will be generated.

   1) Press the ball on the edge of the plane 🔵 for adjusting the angle of the plane, and press

      the arrow 🔵 for moving the plane.

   2) Dragging 4 cursors or entering certain numbers to adjust the angle and position of cutting plane precisely.

   3) Check **Delete Selected Data**, then the red regions will be deleted.

   4) Click **Invert** to select opposite regions.

   5) Click **Delete Plane** to delete the current cutting plane.

4. Click right mouse button for hiding cutting plane or canceling the hiding; double click **Cutting Plane** for reentering the edit interface of cutting plane after quitting.

5. Click **Apply** for quitting edit cutting plane. Noted that the red region will be deleted meanwhile.

3.4.3 Edit Model

Buttons

Figure 3-33 Buttons for Edition

1. Orthographic/
   Perspective projection
2. Multi view
3. Create cutting plane
4. Rectangular
5. Polygon

6. Lasso
7. Straight line
8. Paint Brush
9. Select all
10. Cancel selection
11. Connected domain

12. Revert selection
13. Delete selection
14. Undo the last step
15. Cancel edit
16. Apply edit

Orthographic/ Perspective projection
- **Orthographic projection:** the edge of the object is big when near and small when far.
- **Perspective projection:** The distance to each edge of the object is equal.

Connected Domain: Select all of connected data to edit. To delete the redundant data and noise, select one part of them, click **Connected Domain** button to select all of connected garbage data and then delete.

⚠ **Caution**

The initial data will be cleared once the processing is confirmed.

Shortcut Keys

Table 3-10 Instruction for Shortcut Keys

Shortcut keys	Instruction
Hold down the left mouse button and move the cursor	Rotate the model
Hold down the middle mouse button and move the cursor	Pan the model
Roll the mouse wheel up and down	Zoom in and zoom out the model
Space bar	Confirm editing
Delete	Delete selected data or the red regions

3.4.4 Edit Projects

Manage projects on the project group when the scanned data is saved.

Icons

Figure 3-34 Icons for Editing

⊞ Create a new project.   ☑ Import the saved projects.

🗗 Remove the project.   ⊠&🗑 Delete the selected project (s).

🖿 Pop up the project tree.   🖫 Save data in .asc or .p3 format manually

🖻 Enter Manual Alignment.

Note

- Click the right mouse button on the project in the project tree for various operations.
- The current project is the last one listed on the project tree and is always the one to be added newly scanned data. Reopening a previous project can turn it the current one.

3.5 Alignment

Iterative scanning is required when the point cloud data of the entire model cannot be obtained at one time. When scanning, ensure that there is enough common scanning area of data scanned. Therefore, alignment is done to obtain identical surface features based on the repeatedly scanned areas, connecting such point cloud data obtained through iterative scans into one complete set of data. Through alignment, multiple scan data are combined into a whole set of point cloud data, thereby effectively solving the problem of incomplete data collection.

When more than two project files are present in the project tree, and scanned point cloud data is in those project files, the project can be aligned.

Click ![icon] on the right side of the interface to enter the project alignment interface.
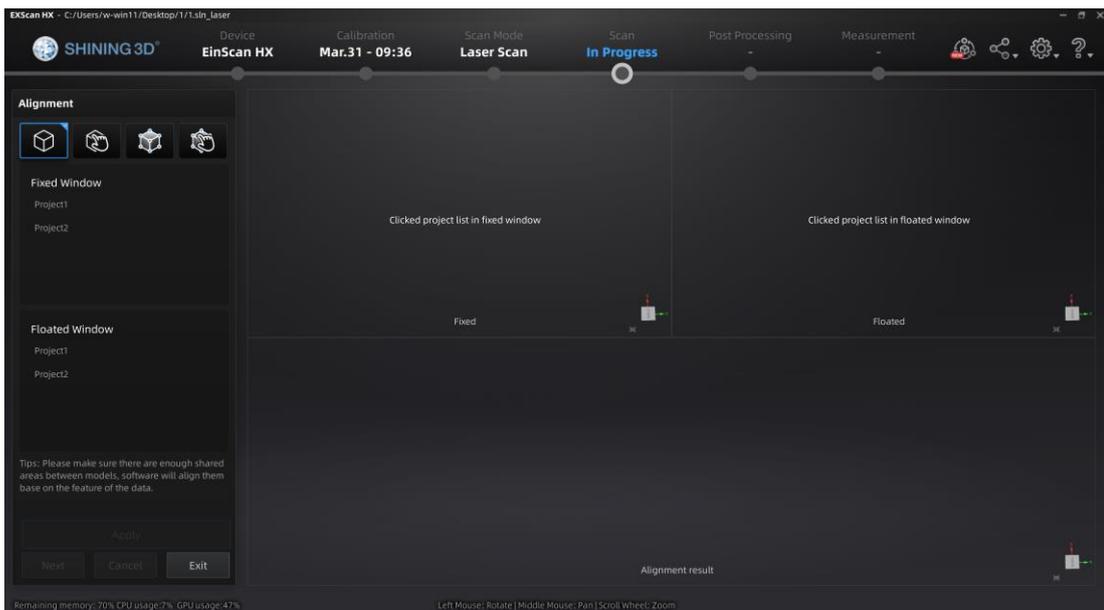

Figure 3-35 Alignment

![Note icon] **Note**

If the project has not been generated into the point cloud, click **Align** and then click **Continue** to generate the point cloud and align them; click **Cancel** to entry the alignment interface without displaying the project that has not been generated point cloud.
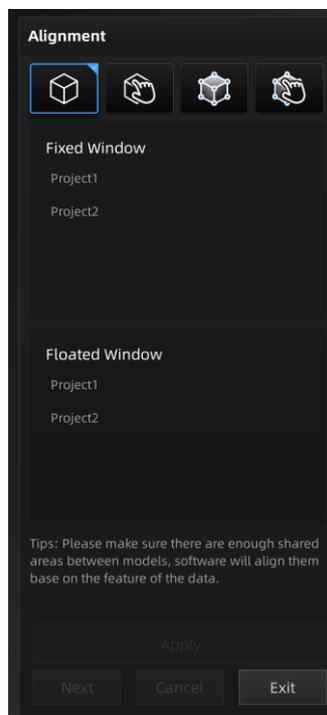
3.5.1 Feature Alignment

Feature alignment can be chosen when the scanned point cloud files share common features.

⚠ Caution

Regular shaped objects (circular objects and square objects included) or small sized objects are not suitable for this mode.

Choose **Feature Alignment** and click **Apply**, alignment will be performed automatically.

Figure 3-36 Feature Alignment
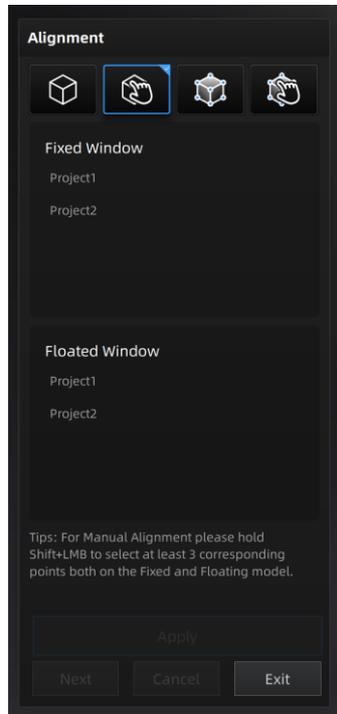
3.5.2 Manual Alignment

As it is difficult to obtain the integrated data at one time, repeating multi-angle scanning is necessary. Aiming at combining all those point cloud data into one, manual alignment captures the overlapping area through recognizing the similar features and then aligning the point cloud data intelligently.

Manual alignment is a supplement to feature alignment, which can solve the problem of feature alignment failures such as some areas with few common areas or extremely similar areas. The data is aligned by the best fit of all points of the data in the floated viewport and the fixed viewport.

Step

1. Press down **SHIFT** and left mouse button.
2. Choose at least 3 common points which are not in one line in the fixed window and flotant window.
3. Click **Apply** to align.
4. Press down **Ctrl + Z** or **ESC** to cancel the selection points one by one.

Figure 3-37 Manual Alignment

3.5.3 Marker Alignment

If the currently selected project is a marker point project, the marker point alignment can be performed. It is necessary to ensure that the two projects have no less than 3 common marker points each other, otherwise the alignment will fail. The software will automatically align according to the mark points.

⚠️ Caution

Please spray powder on the surface of the black object before scanning in the marker alignment mode. (Rapid Scan mode)
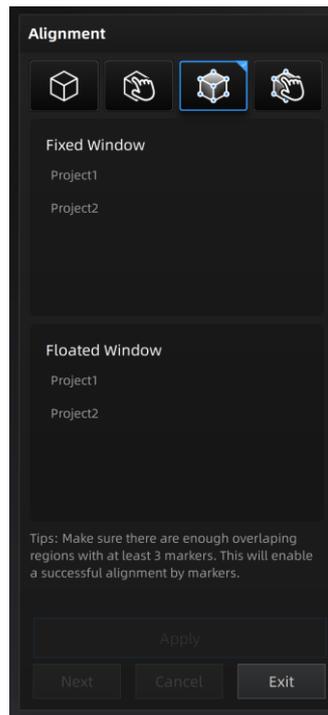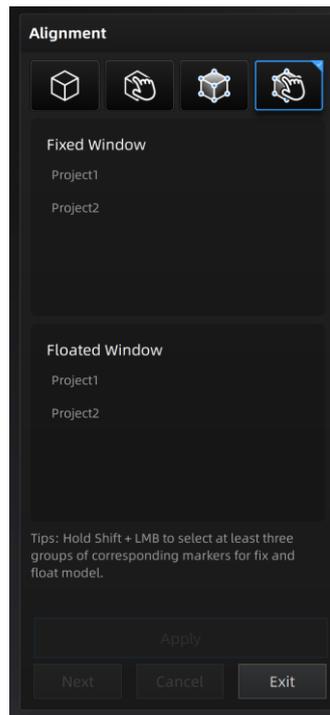
Figure 3-38 Marker Alignment

Table 3-11 Button Names

Button names	Description
Apply	Perform the alignment operation.
Next	The aligned projects will be merged into a group, which can be further aligned.
Cancel	Undo the completed alignment.
Exit	Exit the alignment interface.

3.5.4 Manual Marker Alignment

Select two project files and manually select multiple (≥3) marker points for alignment. The selected

marker points will be cleared after aligning.
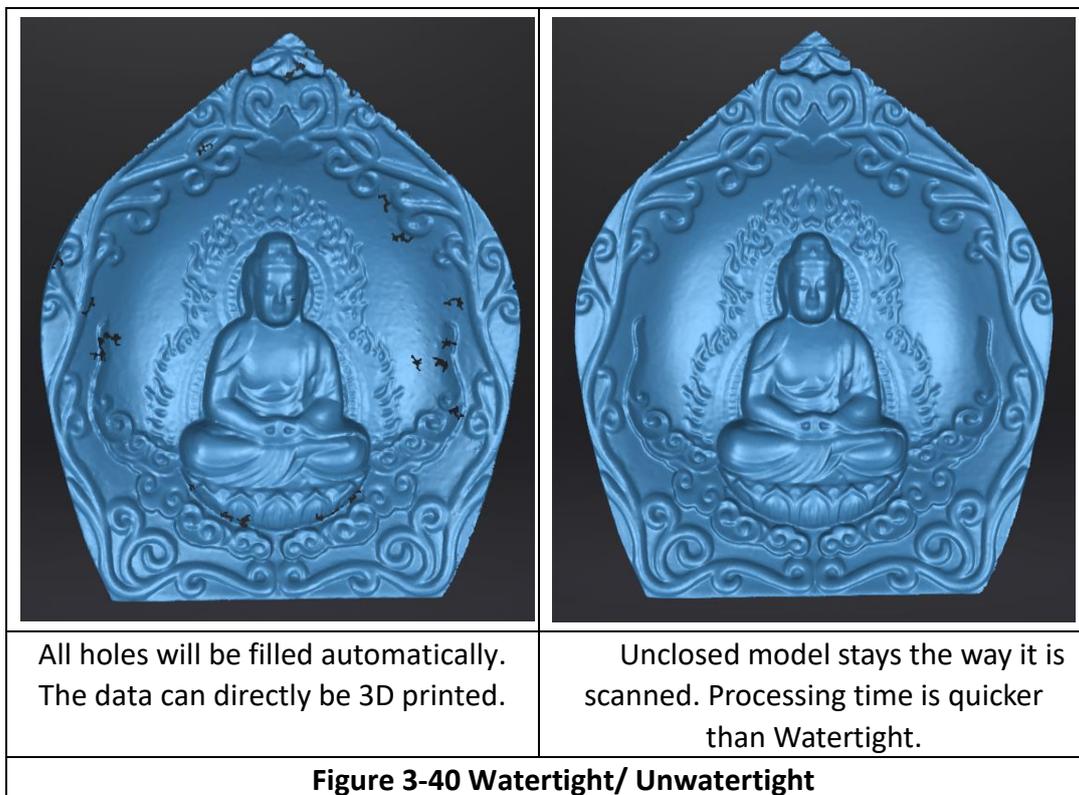Press **Ctrl+Z** to cancel the selected marker points one by one.

Figure 3-39 Manual Marker Alignment

3.6 Mesh

Meshing is to convert the point cloud into a triangular mesh surface. After meshing, the model can be enlarged, and any triangle surface can be manually selected for observation. The meshed data can be directly used for rendering or measurement.

Steps

1. When scanning and editing are completed, click to create mesh.
2. Choose the type of mesh: Watertight or 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.

Figure 3-40 Watertight/ Unwatertight

Through the toolbar on the left, you can simplify, optimize, remove small floating parts, remove spike and fill marker hole.
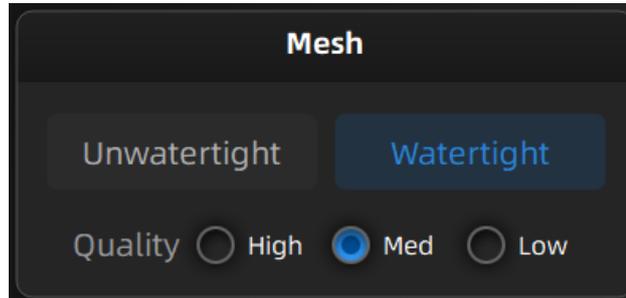

⚠ **Caution**

If there is no connection between the scanned data, only larger data will be retained after meshing.

---

3. Use recommended parameters:

Quality：choose quality under the watertight mode.

Figure 3-41 Mesh Menu

Filter: Optimize the data and improve the clarity of the data. The higher the level, the less the small details.

Table 3-12

Level	Description
None	No optimization
Low	Optimizes data slightly and preserves data characteristics
Med	Reduce the noise on the surface of the scan data
High	Reduce the noise on the surface of the scan data and sharpen it powerfully.

Smooth: Further adjust and optimize the data at the filter level (Low, Med, and High).

Remove small floating parts: Remove small floating parts on the model.

Max triangles: Set max. plate number to get mesh model's triangle plate number is within configured plate number.

Fill small hole: For objects with tiny holes (larger than 10 mm), use the function to fill tiny hole to make the scanned image look better. For objects with holes (smaller than 10 mm), you are not recommended to use the function, or you can set the function parameter value to a smaller one.

Remove spikes: Remove spike-like data on the image edge.

Marker hole filling: Fill in the surface of the object that is not scanned to the pasting mark point.

4. Click **Apply** to mesh.

3.7 Post Processing

When the model data is meshed, it switches to the post-processing interface. Alternatively, you can directly click [icon] on the navigation bar to enter the post-processing interface and import data. Post-processing can then be performed on the data, including simplifying, mesh optimization, smoothening, removal of isolated faces, automatic hole mending and manual hole mending.

Click [icon] to select the file for post-processing; or directly drag the file in STL, OBJ, PLY into the measurement interface.

Shift+ LMB (left mouse button): Select unwanted data, and the selected data will be displayed in red.

Ctrl+ LMB (left mouse button): Deselect a selected region.

Table 3-13 Icons on Post Processing

Icon	Name	Description
[icon]	Select Visible	To select data on the front view only.
[icon]	Select Through	To select data all though
[icon]	Texture Remapping	Refer to **Texture Remapping.**
[icon]	Show/Hide Texture	To show or hide the texture.

3.7.1 Simplification

After simplification, the polygon numbers, file size and level of detail of data will be reduced universally. High level may cause detail loss. Set the ratio from 1 to 100, the default is 0.
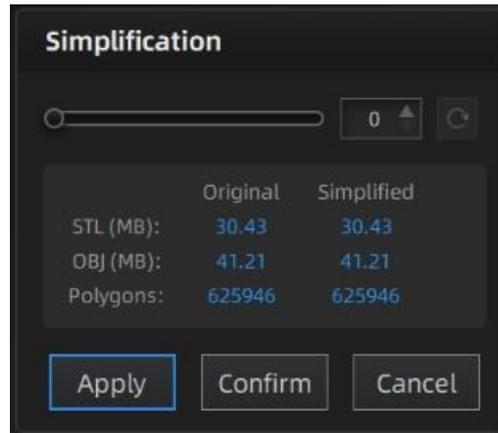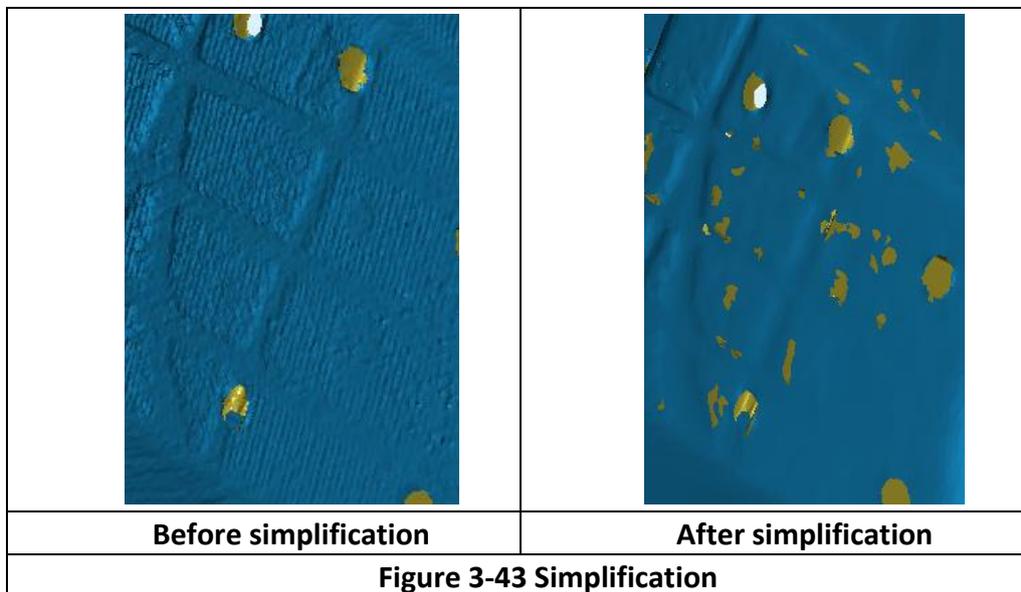
Figure 3-42 Simplification menu

Click **Apply** to simplify data, preview the result of current setting.

Click **Confirm** to apply the "Simplification" setting.

Click **Cancel** to quit and go back to the original data.

⚠️ **Caution**

Multiple operations on Simplification, the result will not be added. It will always operate on the original data.

The comparison of detail between before simplification and after simplification (at 70% simplify proportion).

Before simplification	After simplification
Figure 3-43 Simplification	

3.7.2 Mesh Optimization

Mesh optimization can optimize the quality of the data by adding more triangles to curvature regions.

There are 3 ratio options of mesh optimization. Processing time will be different.

Below shows the result of different ratios.

| Original | Mesh optimization 10 | Mesh optimization 50 | Mesh optimization 100 |
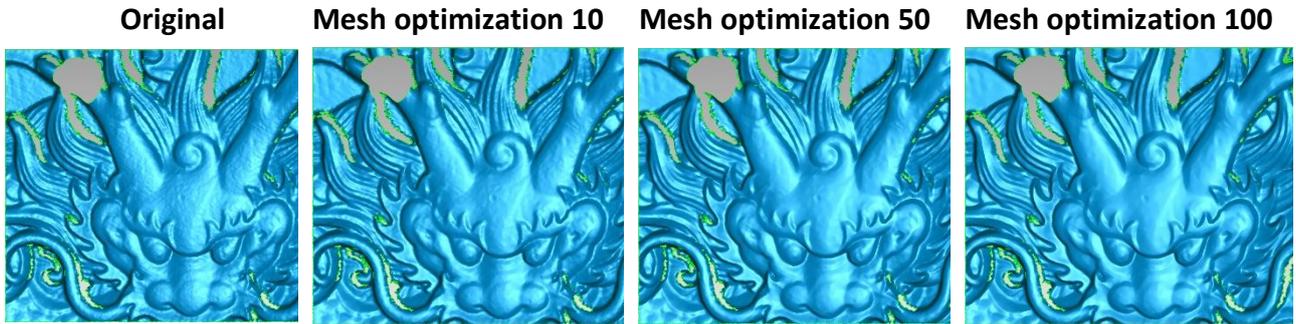
Figure 3-44 Mesh Optimization

Click **Apply** to optimize data, preview the result of current setting.
Click **Confirm** to apply.
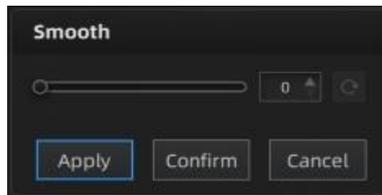Click **Cancel** to quit and go back to the original data.

⚠ Caution

Multiple operations on Mesh Optimization, the result will not be added. It will always operate on the original data.
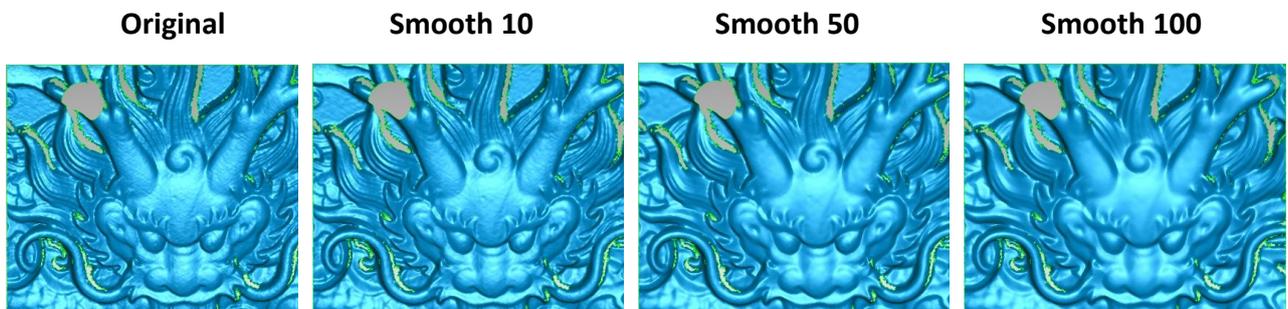
3.7.3 Smooth

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. Set the ratio from 1 to 100, the default is 0.

Figure 3-45 Smooth Menu

The example of before and after smoothing is shown below. Run 2 times, data will be smoothed twice.

| Original | Smooth 10 | Smooth 50 | Smooth 100 |

Figure 3-46 Smooth

Click **Apply** to smooth data, preview the result of current setting.

Click **Confirm** to apply the "Smooth" setting.
Click **Cancel** to quit and go back to the original data.

⚠ **Caution**

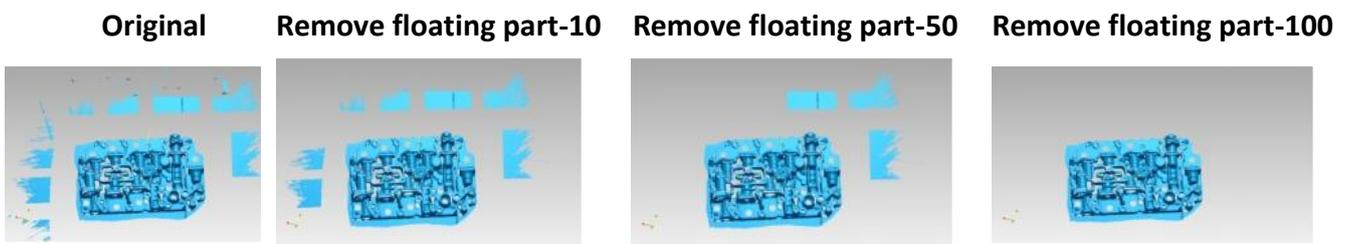Multiple operations on "Smooth", the result will not be added. It will always operate on the original data.

3.7.4 Remove Small Floating Parts

Remove small floating parts in the scan data.
From 0 to 100% where 100% is the size of the largest mesh island. Smaller islands will be removed.
0 means no operation, 100 is the maximum. The maximum value is the square of the diagonal length of the floating part/10, MAX=$(L/10)^2$.
Diagram of removing floating parts shows as below:

Original	Remove floating part-10	Remove floating part-50	Remove floating part-100

Figure 3-47 Remove Small Floating Parts

Click **Apply** to remove floating part, preview the result of current settings.
Click **Confirm** to remove floating part.
Click **Cancel** to quit and go back to the original data.

⚠ **Caution**

Multiple operations on "Remove floating part", the result will not be added. It will always operate on the original data.

3.7.5 Fill Holes

Due to the loss of point cloud data in some areas, holes may occur after the 3D scanned model is meshed, resulting in incomplete models. Holes can be filled through the hole mending operation: Auto Hole Filling and Manual Hole Filling.
Each mode realizes the hole mending according to the curvature of the area around the hole. Types of tangent and plane are also available to be chosen for hole filling. When there are multiple holes to be mended, automatic hole mending method is recommended.

Auto Hole 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.
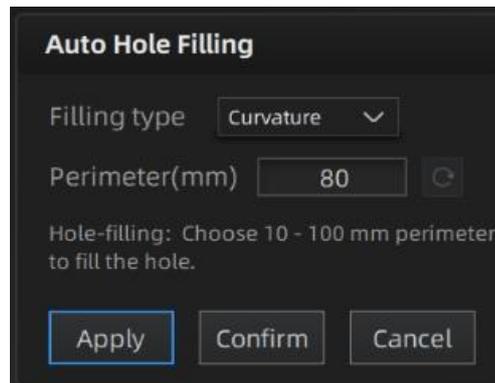

Figure 3-48 Auto hole filling

Choose Curvature, Tangent or Flat before filling 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.
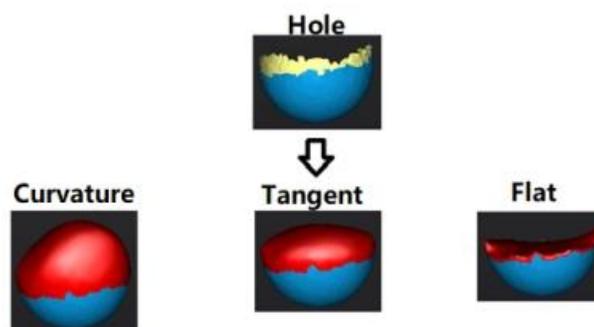

Figure 3-49 Effect of Curvature, Tangent or Flat

Click **Apply** to auto fill hole, preview the result of current setting.

Click **Confirm** to apply.

Click **Cancel** to quit and go back to the original data.

Manual Hole Filling

The hole edges are displayed green and get red after picking. The number of the holes and the number of holes filled will be displayed on the interface. Choose Curvature, Tangent or Flat before picking a hole.
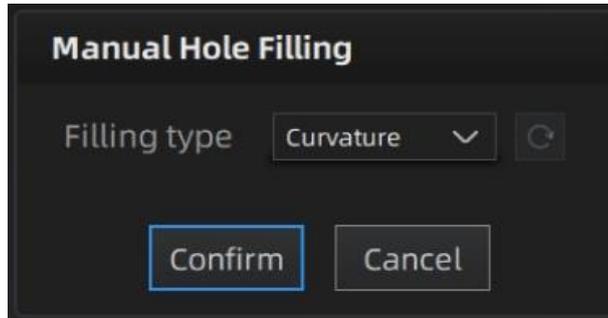

Figure 3-50 Manual hole filling

Click the edge of the hole to fill it.

Click [image], according to the order of filling holes, from the last hole to cancel hole filling. Ctrl + Z can also cancel hole filling.

Click **Confirm** to apply.

Click **Cancel** to quit and go back to the original data.

⚠ **Caution**

The data will not be automatically saved after the post-processing, saving the post-processing data manually is necessary.
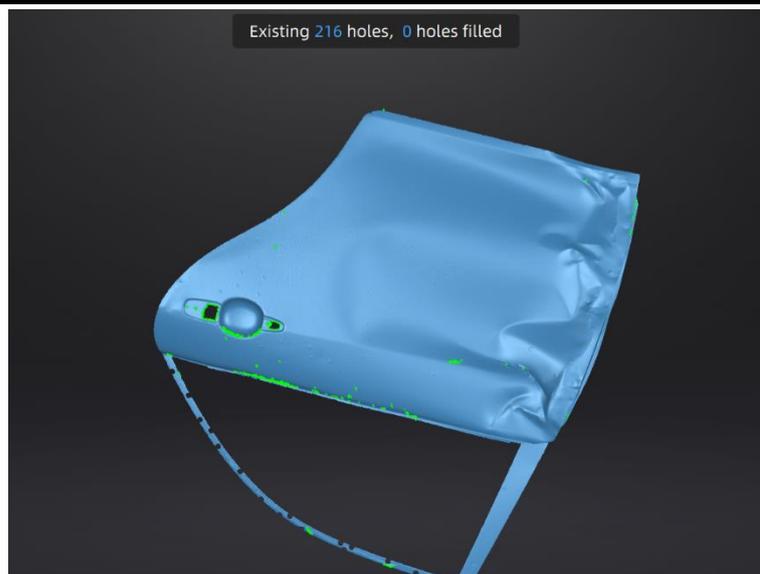

Figure 3-51 Fill Holes

3.7.6 Texture Remapping

If the following post-processing operations (such as hole filling, simplification) have been performed, texture remapping can be applied before saving the data.

Click 🔷 Texture Remapping to display the Texture menu.

After the post-processing, 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.
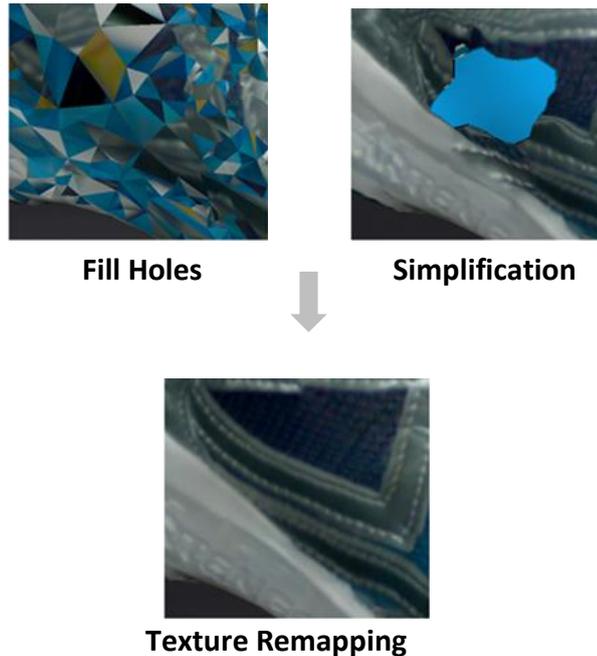

Fill Holes   **Simplification**

Texture Remapping
Figure 3-52 Texture Remapping

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.
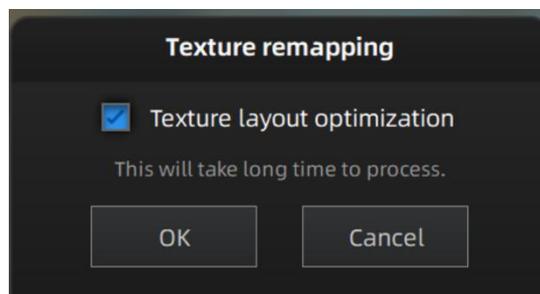

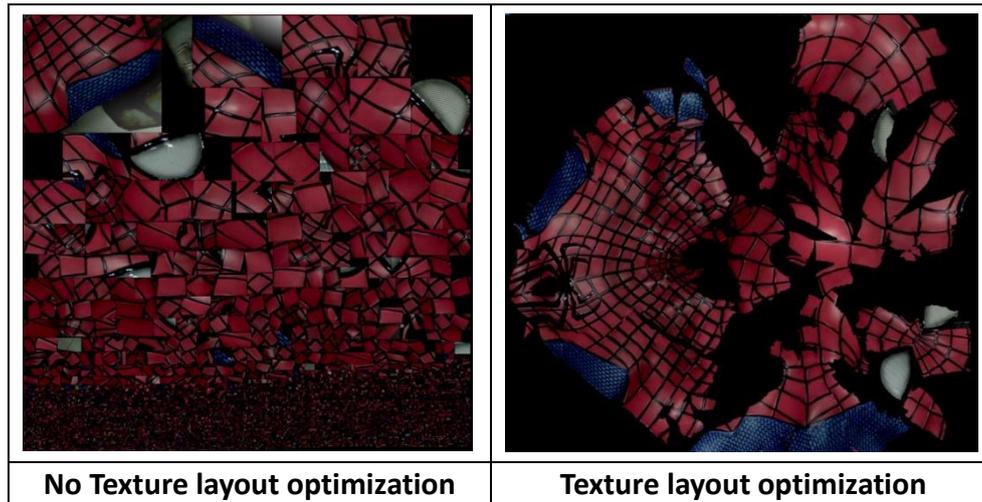**Figure 3-53 Texture layout optimization**

No Texture layout optimization	Texture layout optimization

Figure 3-54 Texture Layout Optimization

⚠ **Caution**

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

After meshing, the brightness/contrast adjustment can be adjusted under the camera viewport.
-**Brightness** (-100—100): the larger the value, the brighter the result.
-**Contrast** (-100—100): The larger the value, the more obvious differences between the colors.
-**Reset**: After clicking **reset**, the brightness/contrast are reset to 0.

3.7.7 Flip Normal

To redefine the front direction of the scanned data in reversal design.

⚠ **Caution**

After the normal is flipped, the texture remapping cannot be performed. You should complete the texture remapping before performing the flip normal.

Select the part of the grid that needs to be flipped by clicking Select Through (the mode is enabled by default).
All the parts are flipped by default.
Select the data area, click **Apply** to flip the selection area; if you don't select the flip area, all the parts are flipped by default.
After flipping, undo is not supported.
Click **Apply** again to perform multiple flips.
Click **apply** to save the current flip result and close the Flip Normal window.
Click **Cancel** to reset to the original data.

3.7.8 Cutting Plane Tool

Define a plane by drawing a straight line. Delete the selection and close the mesh at the intersection. Use the cutting plane to align the mesh to the CSYS.

Steps
1. Hold down the **Shift+ LMB** and drag the cursor to create a plane. The front is above the plane.
2. Click **intersect plane**, the scanned data in the reverse direction of the plane is displayed in red (the data to be deleted); if you select "Reverse Selection", the scanned data in the forward direction of the plane is displayed in red (the data to be deleted).
3. Select **Delete Selection and Close Intersection** or **Delete Selection**.
   -Delete the selection and close the intersection: delete the red area and fill in the scan data that coincides with the created plane.
   -Delete selected area: delete the red area.
4. Click **Orient Based On Plane**, the scanning model will be readjusted according to the direction of the plane arrow.
5. Click **Apply** to delete the red area.
6. Click **Confirm** to save the current result and close the Cutting Plane Tool window.

3.7.9 Mirror

Mirror the mesh through a plane defined by a straight line.

⚠️ **Caution**

After mirroring, texture remapping cannot be performed. You should complete texture remapping before performing mirroring.

Steps
1. Hold down **Shift+LMB** and drag the cursor to create the center axis.
2. Check **keep Original Grid Data**, the original scan data will be retained; If this box is not checked, the original scan data will be deleted and only the mirrored data will be saved.
3. Click **Apply** and the symmetry data will be copied with the central axis.
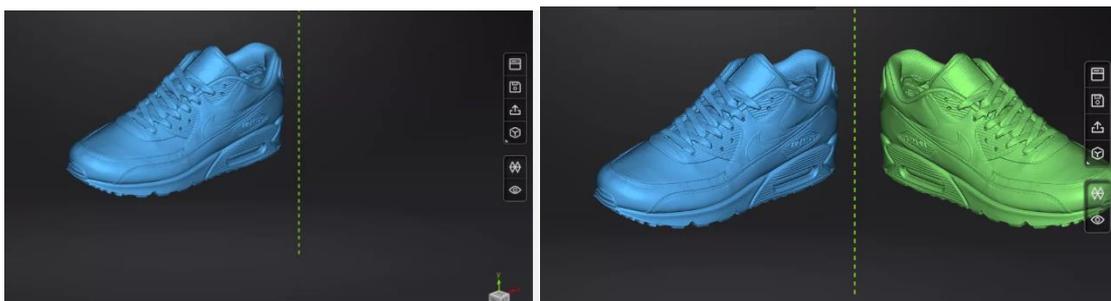**4.** Click **Confirm** to save the current result and close the Mirror window.

Figure 3-55 Mirror

3.8 Measurement

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

The measurement interface and the post-processing interface share the same data.

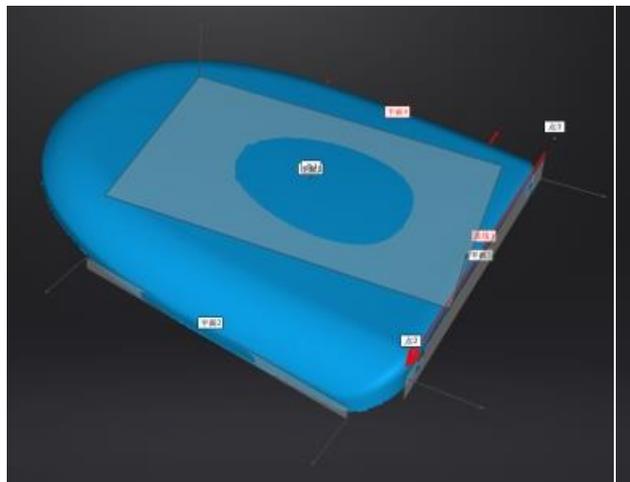Click ![icon] to enter the measurement interface.

Click ![icon] to select the file to be measured; or directly drag STL, OBJ or PLY   files in format onto the measurement interface. Drag texture ply file onto the interface and non-texture data will be shown.

3.8.1 Create Features

Click **feature** to display the menu, click again to close the menu.
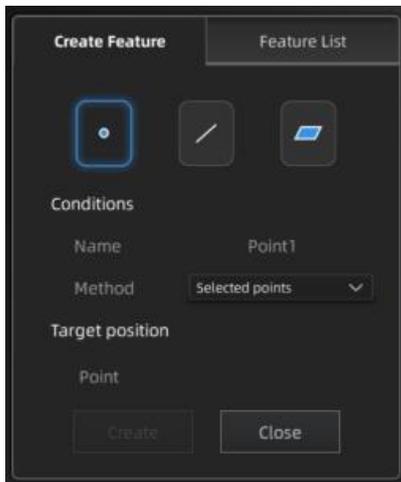
Feature Menu	Display of Features

Figure 3-56

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 is in Red. In the feature list, click **delete** to remove (Delete action cannot undo).

Table 3-14

Feature	Creation Method	Requirement	Description
Point ![icon]	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 points 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 points 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 elements to re-select 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 deselect. The plane generated is the position with the smallest deviation from the selected area.

3.8.2 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:

Adjust the coordinates in real time by observing the angle and position of the data.
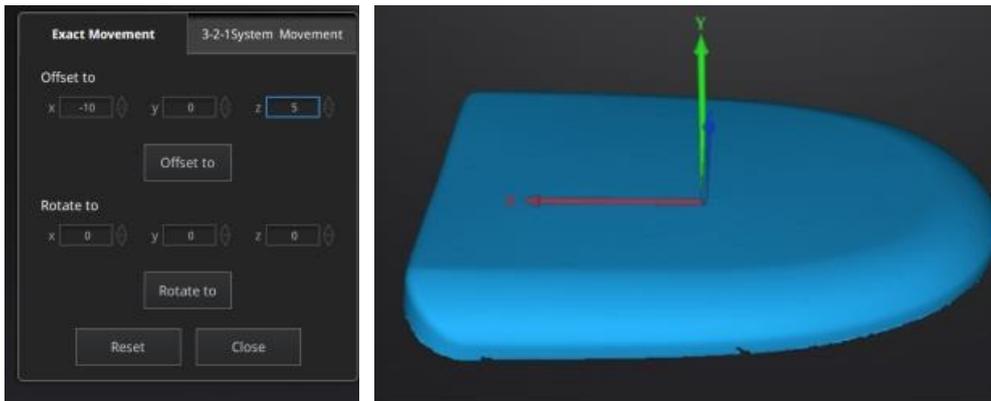
Figure 3-57 Exact Movement Menu

- Offset: Enter the coordinates of the object data center in the X, Y, and Z axes, and click the **Move to** button to make the data center consistent with the input coordinates.
- Rotation: Enter the coordinates of the object data center in the X, Y, and Z axes, and click the **Move to** button to make the data center consistent with the input coordinates. Make sure that the X, Y, and Z axes of Offset are 0.

1. Click ⊞ to view the models from different perspectives.

2. Enter the corresponding value and click **Move To**.

3. Repeat step 2 until a suitable rotation value is reached.

4. After adjusting, click "Close" to exit and save the results.

5. Re-enter the Exact Movement window and repeat steps 2 to 4 until the model is placed in the required position under different viewing angles.

Click **Reset** to cancel all movement after entering the precise alignment interface.

Click **Close** to confirm the movement and exit the movement interface.
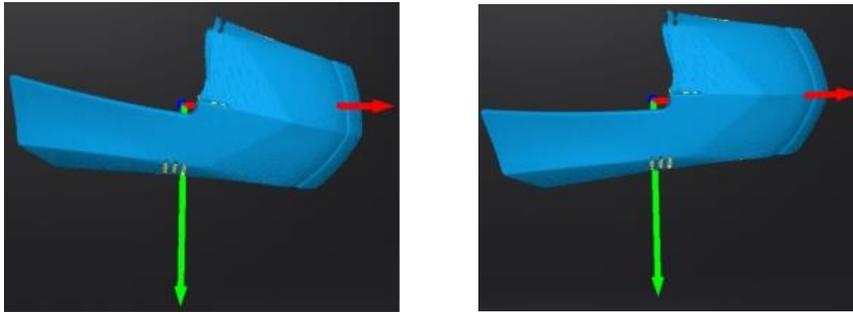
Figure 3-58 Movement

3-2-1 System Movement

3-2-1 system movement aligns data by selecting the point, line and plane. Before movement, create feature points, lines and planes. The feature lines created are not perpendicular to the plane.

Note

Create features before using the 3-2-1 system movement. For details, see 3.8.1 Creating Features.

The coordinate system on the interface represents the global coordinate system. Red=X+, Green=Y+, Blue=Z+.

1. Make a one-to-one correspondence between the created feature points, lines and planes with the origin and axis of the coordinate system to be aligned. That is, the normal of the selected plane corresponds to the coordinate axis; the selected feature point corresponds to the origin.

● Select a feature surface in the plane drop-down menu, and select an axis in the corresponding constraint drop-down menu of the plane. The arrow on the plane corner indicates the positive direction of the plane, and the selected axis direction will be consistent with the plane direction.

● Select a feature line in the drop-down menu of the line, and select an axis in the drop-down menu of the line. The arrow of the line indicates the positive direction of the line, and the direction of the selected axis will be consistent with the direction of the projection of the line on the selected plane.

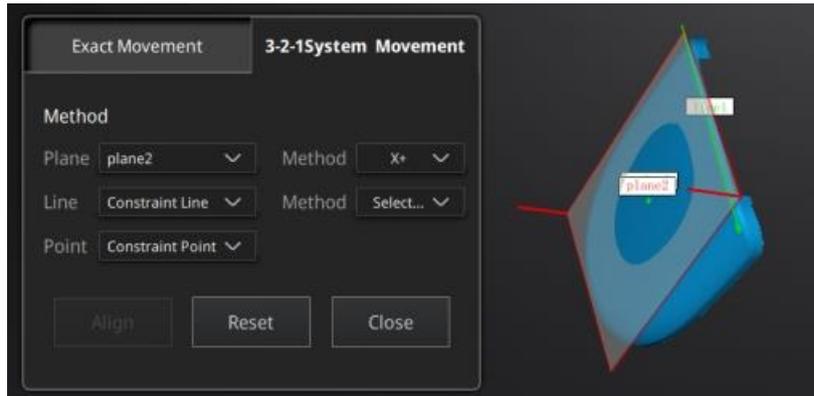● Click the drop-down menu to select a point, the position of this point is the origin of the coordinates (0, 0, 0).

Figure 3-59 Movement menu

2. Click **Move** to perform the movement. When the line is perpendicular to the plane, the movement will fail.
Click **Reset** to cancel.
Click **Apply** to confirm the transformation.

3.8.3 Measure

Click 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.
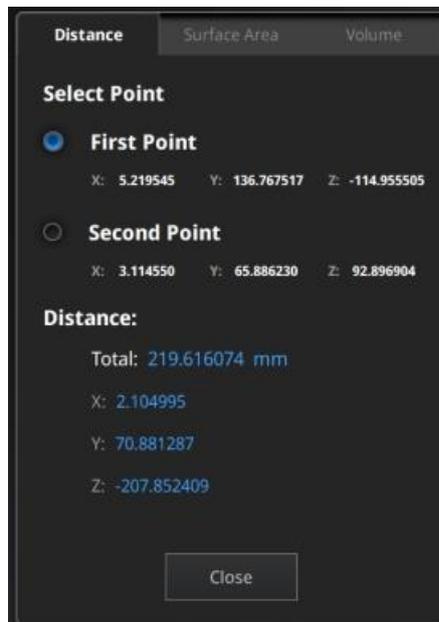

Figure 3-60 Distance menu

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
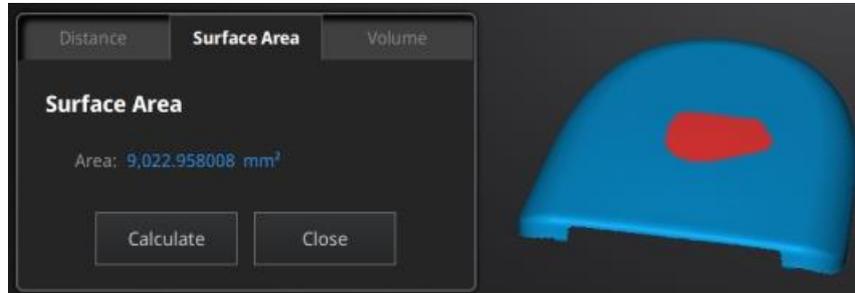Redo the selection and click **Calculate** again to update.

Figure 3-61 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.
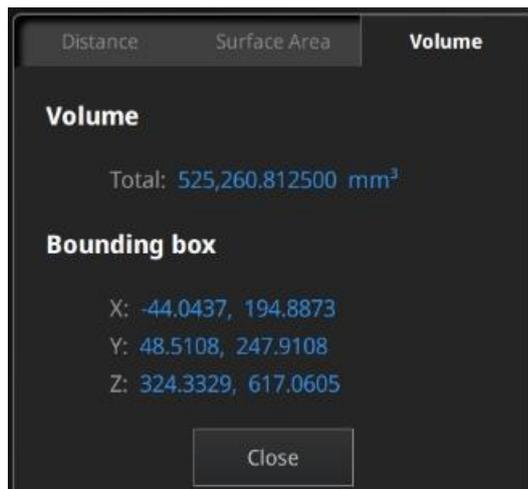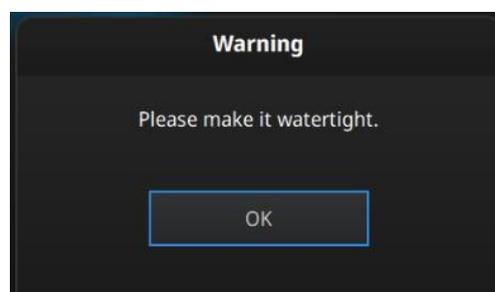

Figure 3-62 Volume Menu

Figure 3-63 File Notwatertight Alert

Enter/exit the measurement interface

Click **Measurement** [icon] to enter the measurement interface and display the measurement menu,

click the button again to exit the measurement interface.

3.9 Export Data

3.9.1 Save Data

Click ![save icon] to export the data. 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. The format of textured scanning is .obj. by default. At least one type needs to be selected.
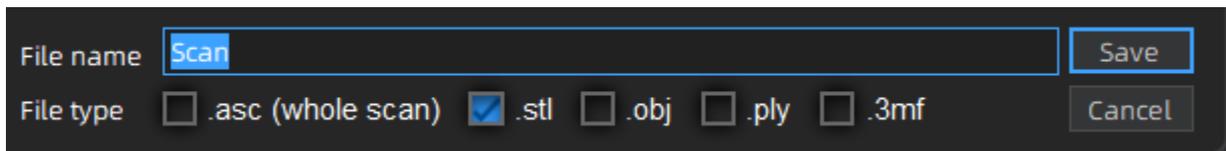

Figure 3-64 Save Folder

Table 3-15

| Format	Types of data	Save as	Recommendation
ASC (whole piece)	Optimized point cloud	scan.asc	● Check the data; ● Quick export (no need for post-processing for handheld scanning); ● Post-processing can be done through other software.
STL	Mesh data	scan.stl	● 3D printing; ● Reverse designing; ● Compatible with most post-processing software.
OBJ	Mesh data	scan.obj scan.jpg scan.mtl	● Used in artwork; ● 3D rendering; ● Compatible with most post-processing software.
PLY	Mesh data	scan.ply	● The file is small; ● Easy for texture editing.

3MF	Mesh data	scan.3mf	● The file is small; ● Compatible with Microsoft 3D printing software.
P3	Markers file	scan.p3	● Universal framework point file of Einscan software; ● Identifying the positional relationship between markers.

3.9.2 Scale Data

To scale data when you save it.
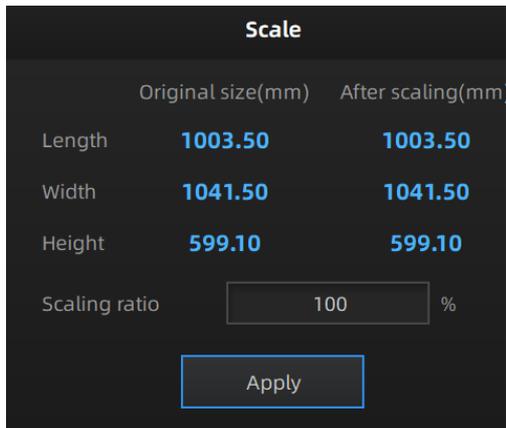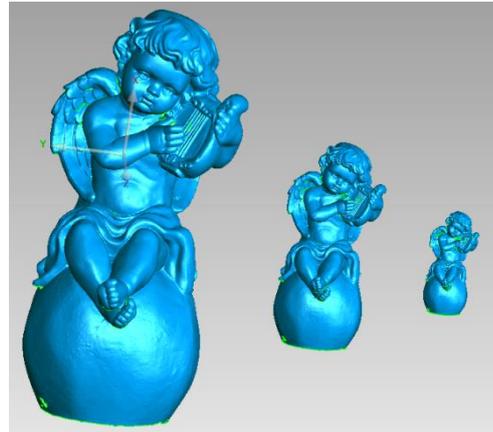
Scale Window   **Scale Result**

Figure 3-65 Scale

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 changed.

The result of data size scaling is as shown in the figure above: from left to right, the size is doubled, the original size, and the size is half.

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

If you need to use inches, you can enter Scale Data, or process it in third-party software (be careful to avoid double scaling).

3.9.3 Share Data

Click [icon] after mesh to share data to Sketchfab.

The scanned model can be shared to the Sketchfab website, where the title, username and password are required to be provided. You can register an account on the Sketchfab (http://sketchfab.com) to view the shared models.

Caution

The maximum upload model file size for ordinary accounts is 50M, the maximum for PRO

premium accounts is 200M, and only PRO accounts can set the model private mode.

The uploaded file is in stl format without texture.

3.9.4 Third-party Software

Five third-party software, including Geomagic Control X, Verisurf, Geomagic Design X, Geomagic

Essentials and Solid Edge SHINING 3D Edition are included. Users can import scanned mesh data into

the third-party software with one click.

Geomagic Control X

	Export data to Geomagic Control X

Mainly used for inspection. If the GeomagicControl X software has been installed, clicking this button

will open the Geomagic Control X software and import the mesh data.

Verisurf

	Export data to Verisurf

If Verisurf software has been installed, clicking this button will open the Design with Verisurf and

import the encapsulated stl data into Design with Verisurf.

Geomagic Essentials

	Export data to Geomagic Essentials

Mainly used for mesh data design, working as a bridge between scan to CAD. If the Geomagic

Essentials has been installed, clicking this button will open the GeomagicEssentials and import the

mesh data.

Geomagic Design X

Dx	Export data to Geomagic Design X

Mainly used for reverse design. If the GeomagicDesign X has been installed, clicking this button will open the GeomagicDesign X and import the mesh data.

Solid Edge SHINING 3D Edition

◥	Export data to Solid Edge SHINING 3D Edition

Solid Edge SHINING 3D Edition is a 3D CAD software. If Solid Edge SHINING 3D Edition has been installed, clicking this button will open the Solid Edge SHINING 3D Edition and import the encapsulated stl data into Solid Edge SHINING 3D Edition.

- Note

- The third-party software should be installed and activated in advanced.
- Solid Edge Shining 3D Edition is included in the scanner. Please follow the license card to activate the software.
- The rest above mentioned software are not included. Please contact us if you are interested to buy.

3.9.5 Preview Model

Preview Tool	Double-click the **Preview Tool** shortcut on the desktop

Or open the Model Preview Tool in the start menu, i.e., start menu>Shining3d_Freescan UE>Preview Tool. As shown in the figure below:
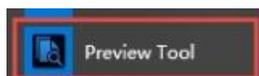
Figure 3-66 Preview Tool

Drag the file into the window to preview it:

Figure 3-67 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.

⚠ **Caution**

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.

3.10 Other Operations

Table 3-16 Icon of Other Operations

| Icon	Function	Description
	Official website	Open the official website of Shining 3D to learn about the company's products and information.
	Facebook	Enter Shining 3D's Facebook to view product introduction and other operations.
	Support Platform	Enter Shining 3D's support platform to view product introduction and other operations.
	Advanced mode	After checking this option, the point distance can be selected as 0.05 when creating a new project.
	User Experience	To help us improve the quality and user experience of device, 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. 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 can be restored to the initial settings, and the software will automatically restart.
	Language	A language selection window pops up, allowing users to choose multiple languages.

|	About	View related software release information, contact information, etc.
	Open help mode	Open the real-time help file.
	Teamviewer	The quick access to remote assistance. Send the ID and password in the pop-up window to the technical supporters for remote assistance.

Support and Contact

Submit a Ticket

Sign up in Shining 3D EinScan Support Platform support.einscan.com or send an email directly to einscan_support@shining3d.com
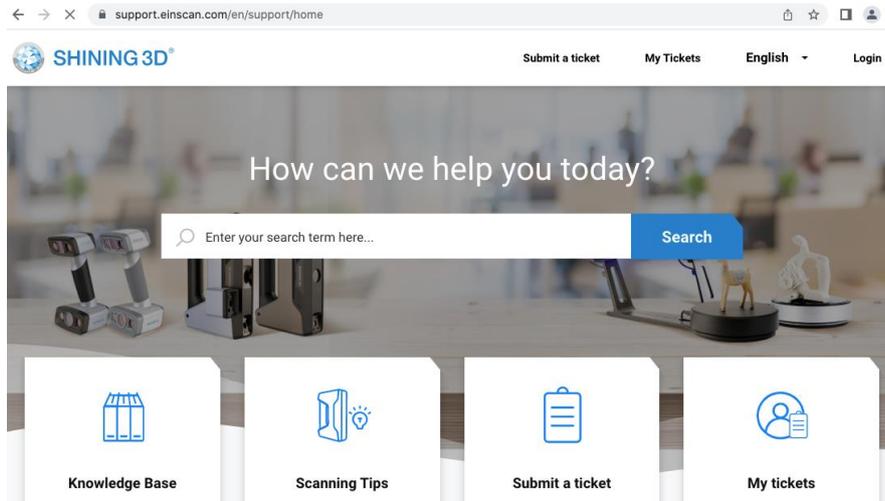
Login with your account. Click Submit a ticket on the tab bar to submit a ticket.
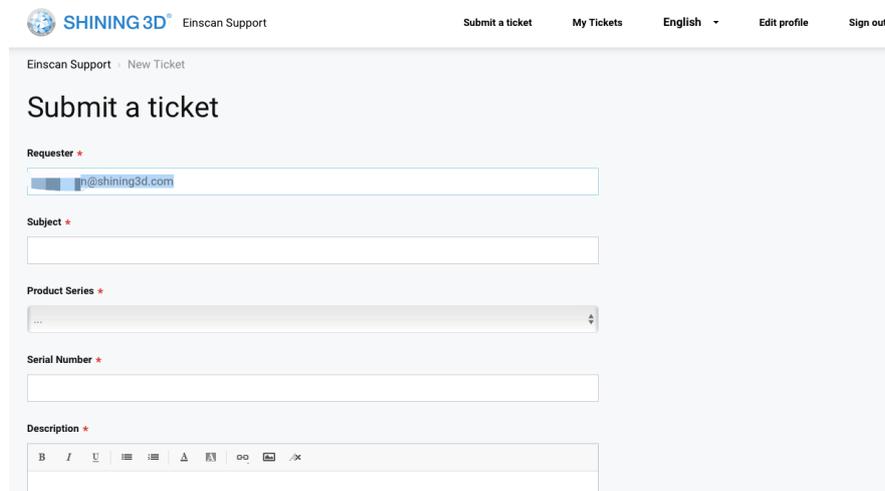
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