



QUICK START GUIDE

Smart Reverse-positioning Blue Laser 3D
Scanner

-for **MARVELSCAN**

Apr. 21st, 2024

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1. PRECAUTION



1. PRECAUTION

Device Maintenance

- The scanner contains precision optics, so be careful to avoid damaging its internal components or calibrating the system.
- Please try to place scanner in carrying case when not using and store in a dry, dust-free, room temperature environment.
- Before starting the project, please ensure that the working environment is neat and orderly, and the cable is placed well. If the project is temporarily interrupted, the device should be placed on a stable surface.
- Scanner should always be stored in an environment that meets the following requirements:
 - Operating temperature: -10 to 40°C (optimum operating temperature 20°C)
 - Humidity: Relative humidity 10% to 90% (non-condensing)

Daily use

- Always use equipment in a clean and dry environment
- Avoid direct sunlight on optical components
- Avoid splashing water, oil and other substances on equipment
- Do not immerse equipment in water
- Avoid falling on floor or big impact on equipment
- Avoid foreign bodies contamination of equipment



1. PRECAUTION

Device Maintenance

Scanner body

- Gently wipe the parts with a soft cotton cloth and a small amount of water or soap

Warning: Do not use solvents to clean the device.

Optical component

- Remove all particles that may scratch optical component by air blower
- Clean optical component and light source with a damp cloth such as a frictionless optical cloth or a microfiber wipe

Calibration plate

- The calibration plate should be stowed in the carrying case well. Do not place any other objects on top of the calibration plate. Do not touch positioning targets on the calibration plate, if any positioning targets are not retro-reflective, adhesive any more or damaged in shape, please contact with your local hexagon sales for service
- Use soft cloth to rub the industrial alcohol and gently clean retro-reflective positioning target
- Do not use acetone or solvents to clean retro-reflective positioning target

Note: The above suggestions also apply to the cleaning of optical reflectors.

Other materials

- Please use original power adapter, otherwise it may cause malfunction or damage to scanner.
- When folding the cable, the bending radius must not be less than 5 cm
- Do not squeeze or step on the cable

2. PRODUCT INTRODUCTION



2. PRODUCT INTRODUCTION

Product Specification

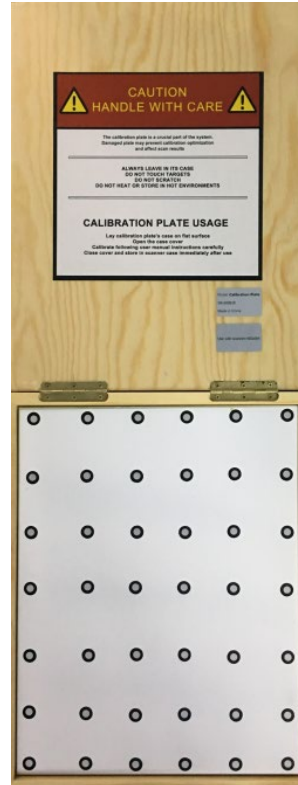


Model		MARVELSCAN	
Scanning Modes		Standard Mode	Fine Mode
Measurement Rate		2,100,000 points/second	900,000 points/second
Scanning Area		Up to 600 x 550mm	
Laser Source		22 blue laser lines for standard scanning	
		Single blue laser line for areas hard to reach	
		5 blue laser lines for fine scanning	
Light Class		Class II (Eye Safe)	
Resolution		Up to 0.02mm	
Accuracy		Up to 0.02mm	
With target	Volumetric Accuracy	0.02+0.04mm/m	-
	Volumetric Accuracy + Scale Bar	0.02+0.03mm/m	-
	Hole Accuracy	Up to 0.03mm	
	Hole Volumetric Accuracy	0.03mm+0.04mm/m	
target-Free	Volumetric Accuracy	0.05+0.020mm/m	-
	Hole Volumetric Accuracy	0.06+0.020mm/m	-
Stand-off Distance		300mm	150mm
Depth of field		550mm	150mm
Depth of field @ Furthest range		550mm	
Connection Standard		USB 3.0	
Working Temperature		-10 - 40°C	
Working Humidity (Non-condensing)		10% - 90%RH	
Weight		1 .3KG	
Dimensions		300mm x 150mm x 75mm	
Export format		.stl, .ply, .obj, .txt, .xyz, .asc. etc.customizable	
Compatible Softwares		3D Systems (Geomagic Solutions), InnovMetric Software (PolyWorks), Dassault Systems (CATIA V5 and SolidWorks), PTC (Pro/ ENGINEER), Autodesk (Inventor, Alias, 3ds Max, Maya, Softimage), Siemens (NX and Solid Edge) etc.	



2. PRODUCT INTRODUCTION

Product Snapshot



Calibration Plate



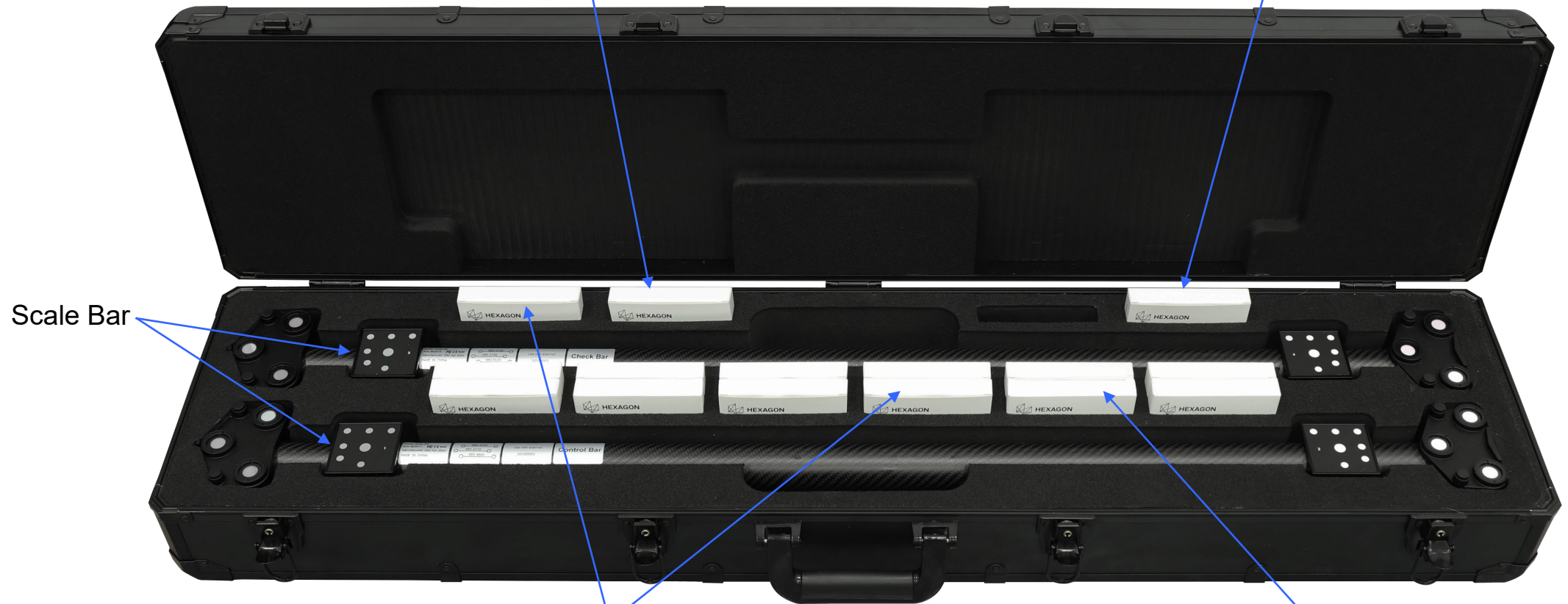


2. PRODUCT INTRODUCTION

Product Snapshot

6mm (ID) Positioning Targets (Self-adhesive type)

16mm (ID) Positioning Targets (Self-adhesive type)



Scale Bar

Circular Positioning Targets (7.7*7.7cm, self-adhesive type)

Coded Targets (10*10 cm, Self-adhesive type)



2. PRODUCT INTRODUCTION

Workstation Configuration

Workstation Configuration Requirements	
CPU	Intel Core i7 12800HX or Higher Configuration
Graphics card	NVIDIA RTX A2000 8G or Higher Configuration
RAM	64GB DDR4 or higher
Operation system	WIN 10 or WIN 11
Data transmission requirements	USB3.0 (at least 2 ports)

***Notes:

The graphics card driver must be NVIDIA official driver, you can download from NVIDIA official website, otherwise device may not work properly.

NVIDIA Driver Download Link: <https://www.nvidia.com/Download/index.aspx?lang=en-us>



2. PRODUCT INTRODUCTION

Camera Driver Setup

FLIR SPINNAKER

End-User License Agreement

Please read the following license agreement carefully

FLIR Spinnaker® SDK License Agreement

READ CAREFULLY: This is a legal agreement between you (an individual or a single entity) ("you") and FLIR Systems Inc. ("FLIR"). Information contained in this software or document pertains to a Canadian product that is not controlled by the Canadian Government. Before installing and using the Spinnaker® Software Development Kit and any updates to it that we may at our discretion provide to you (collectively, the "SDK"), you should read this agreement. If you do not agree with all of the terms of this agreement, do not install or use the SDK. FLIR may change this agreement at any time and it is your responsibility to review the most updated version of it on FLIR's website. By continuing to use the SDK following such changes, you agree to be bound by them.

1. **Grant of License:** Subject to the terms of this agreement, you are hereby granted a limited, terminable, non-transferable, non-exclusive license and right to use the SDK only in conjunction with: (a) those FLIR cameras listed at <https://www.flir.com/products/spinnaker-sdk> (as such list may be amended by FLIR at any time and from time to time) and owned by you; and (b) the images derived from such cameras. FLIR Systems processes your personal

I accept the terms in the License Agreement

Exit Back Next

FLIR SPINNAKER

Installation Profile

Please select the installation type to continue...

Camera Evaluation Installs the SpinView camera application and related documentation.

Application Development Installs the Spinnaker software development kit (SDK), SpinView camera application and related documentation.

Exit Back Next

FLIR SPINNAKER

Installation Components

The features below have been preselected based on the installation profile previously chosen. Click on the headings to make modifications.

- Spinnaker SDK Feature List
 - Documentation
 - Drivers
 - GigE Driver
 - USB Driver
 - USB Driver Legacy
 - Visual Studio Version
 - Visual Studio 2010
 - Visual Studio 2013
 - Visual Studio 2015
 - Runtime Files
 - Utilities
 - SpinView
 - SpinVideo
 - C# Source
 - C++ Source
 - C Source
 - VB Source
 - Third Party
 - SpinnakerAIK

*****Note: No Change**

Exit Back Next



2. PRODUCT INTRODUCTION

Camera Driver Setup

FLIR **SPINNAKER**

GigE Interface

Select to enable enumeration of GigE interfaces.

I will use GigE Cameras. To change this option after installation: Run the EnableGEVInterfaces or DisableGEVInterfaces shortcut from the Utilities shortcut or use the SystemNodeConfig executable to set the system TL node 'EnumerateGEVInterfaces' to 'true' or 'false'

*****Note: No Change**

Exit Back **Next**

FLIR **SPINNAKER**

Ready to install Spinnaker 2.5.0.80 (x64)

Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Exit to exit the wizard.

Installation Folder: C:\Program Files\FLIR Systems\Spinnaker ...

Exit Back **Install**

FLIR **SPINNAKER**

Spinnaker Installation Completed

- Participate in the Spinnaker feedback program
- Open the Getting Started documentation
- Launch the Adapter Config GUI to optimize GigE Camera performance

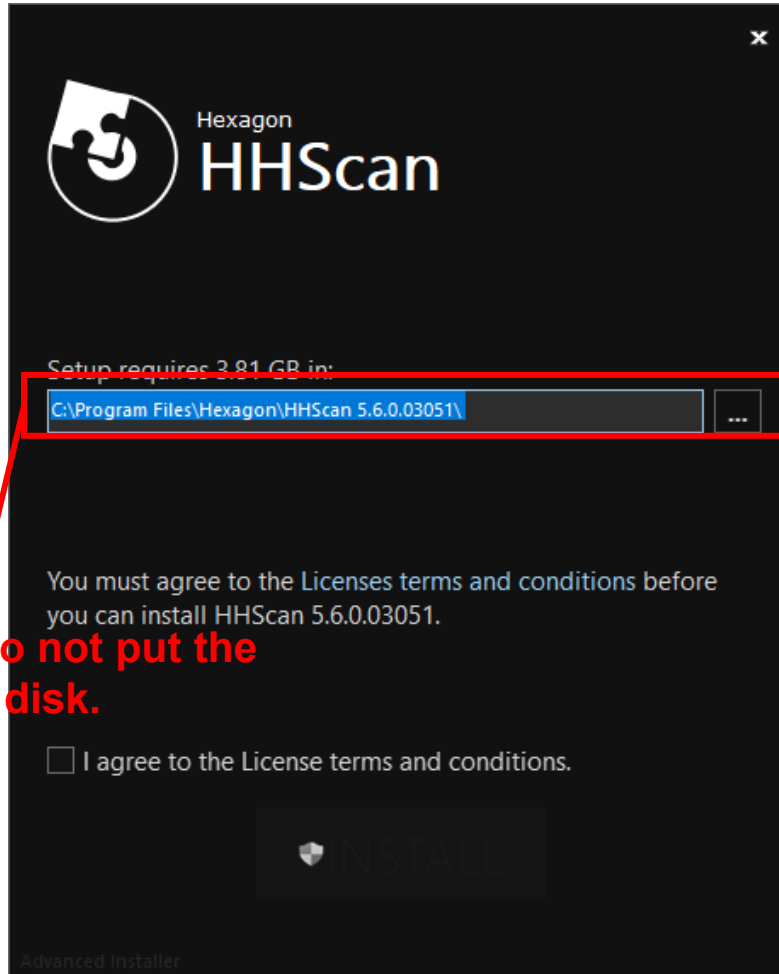
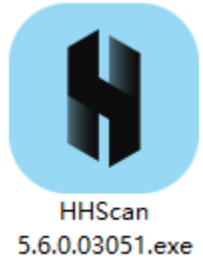
*****Note: Deselect All Options**

Exit

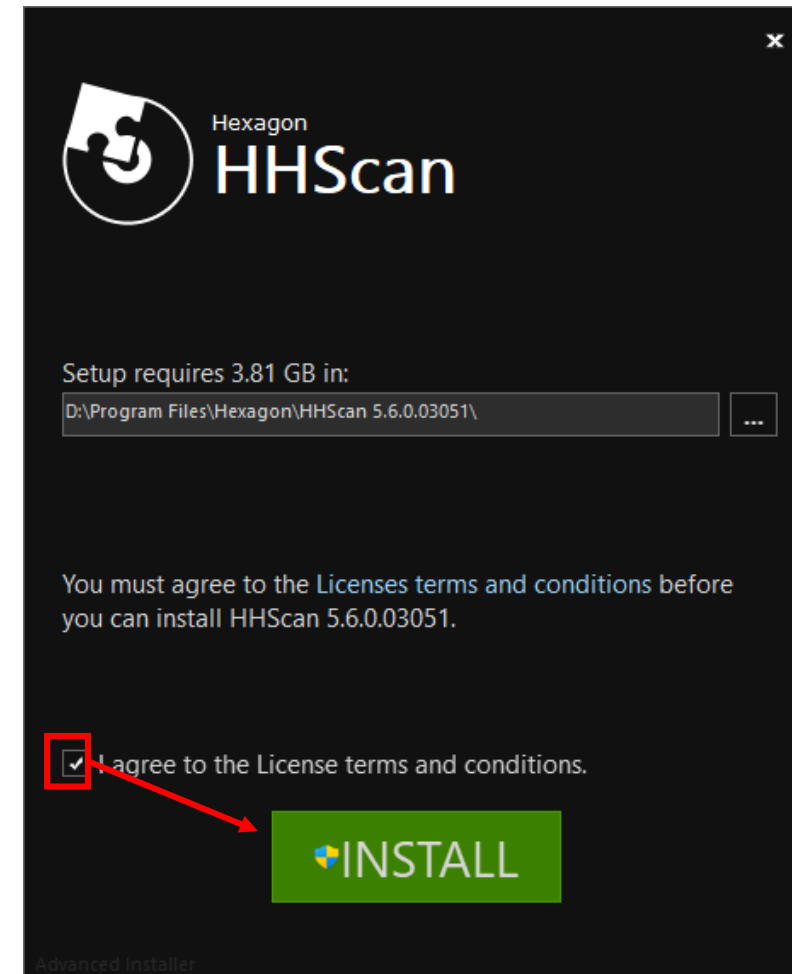


2. PRODUCT INTRODUCTION

HHScan Software Setup



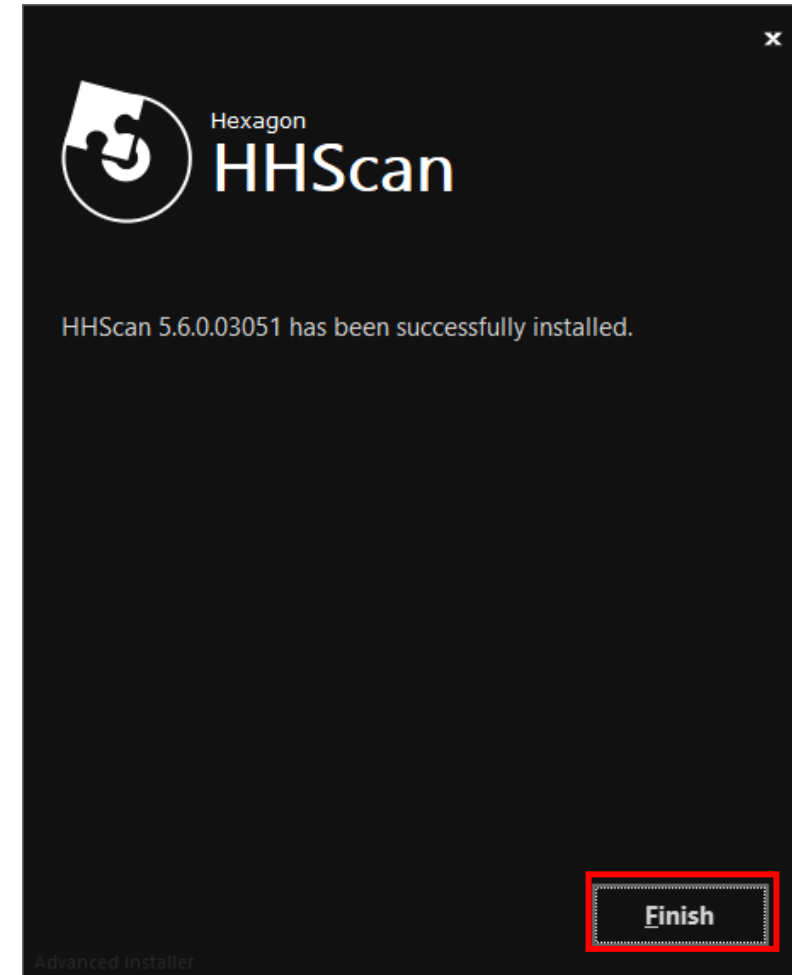
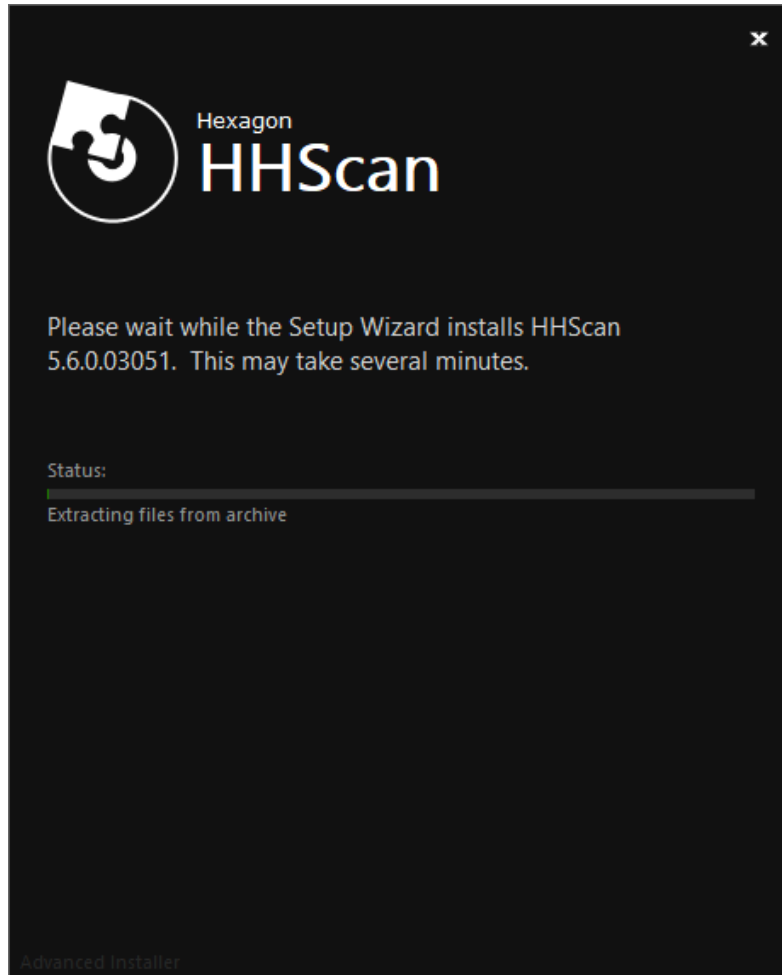
*****Note: Please do not put the program into OS disk.**





2. PRODUCT INTRODUCTION

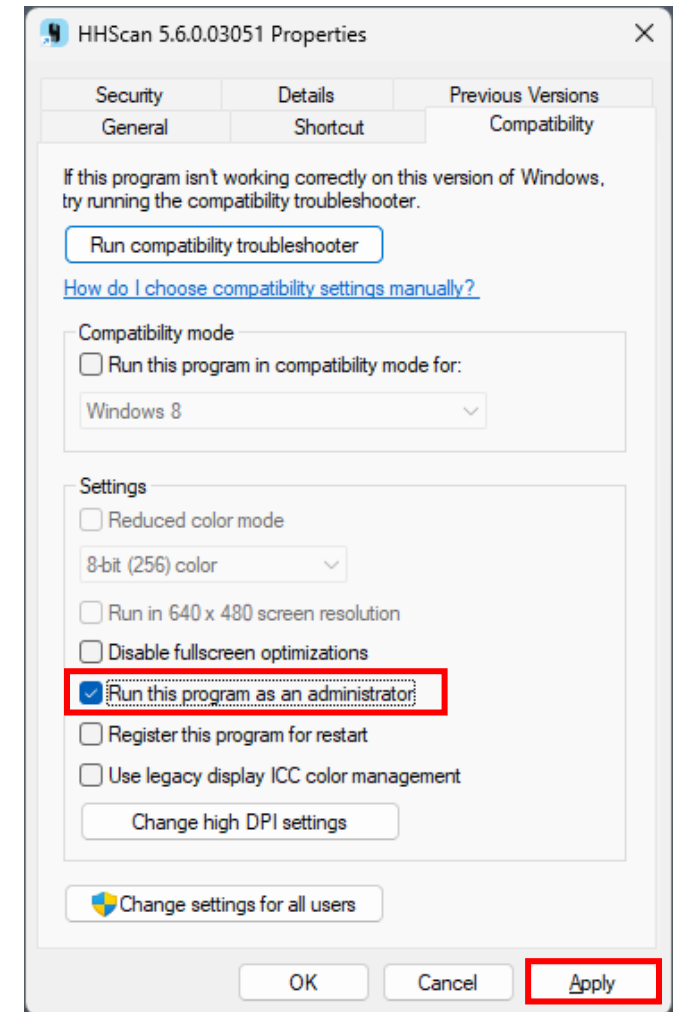
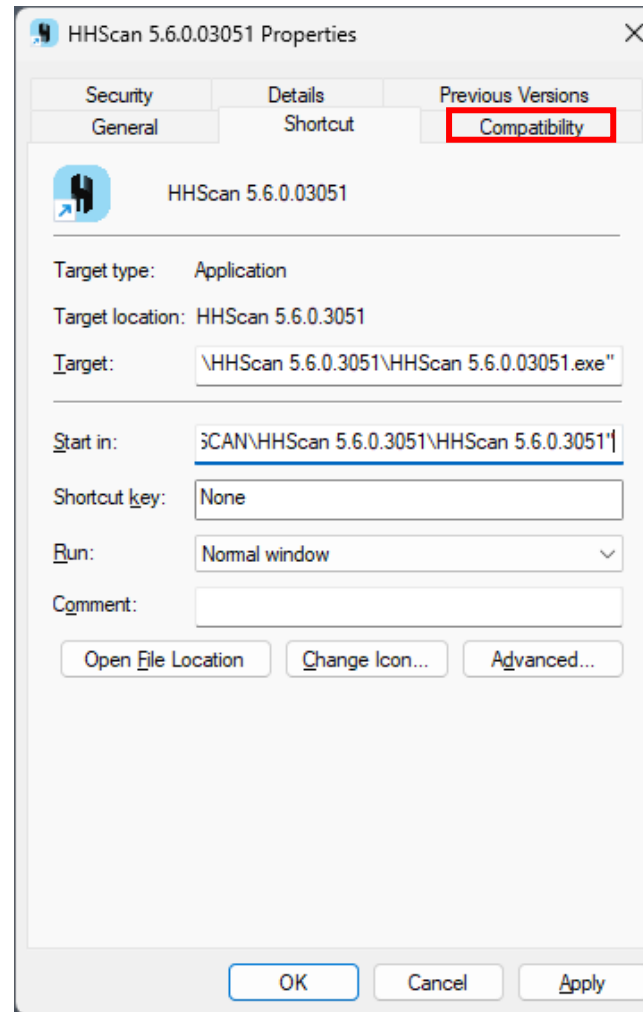
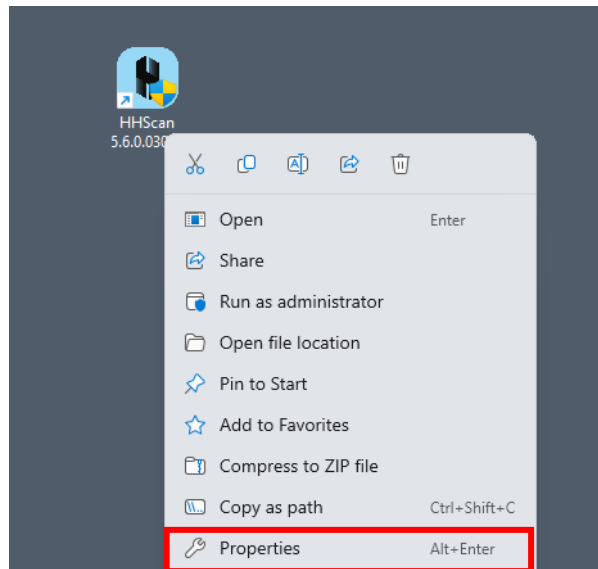
HHScan Software Setup





2. PRODUCT INTRODUCTION

HHScan Software Setup



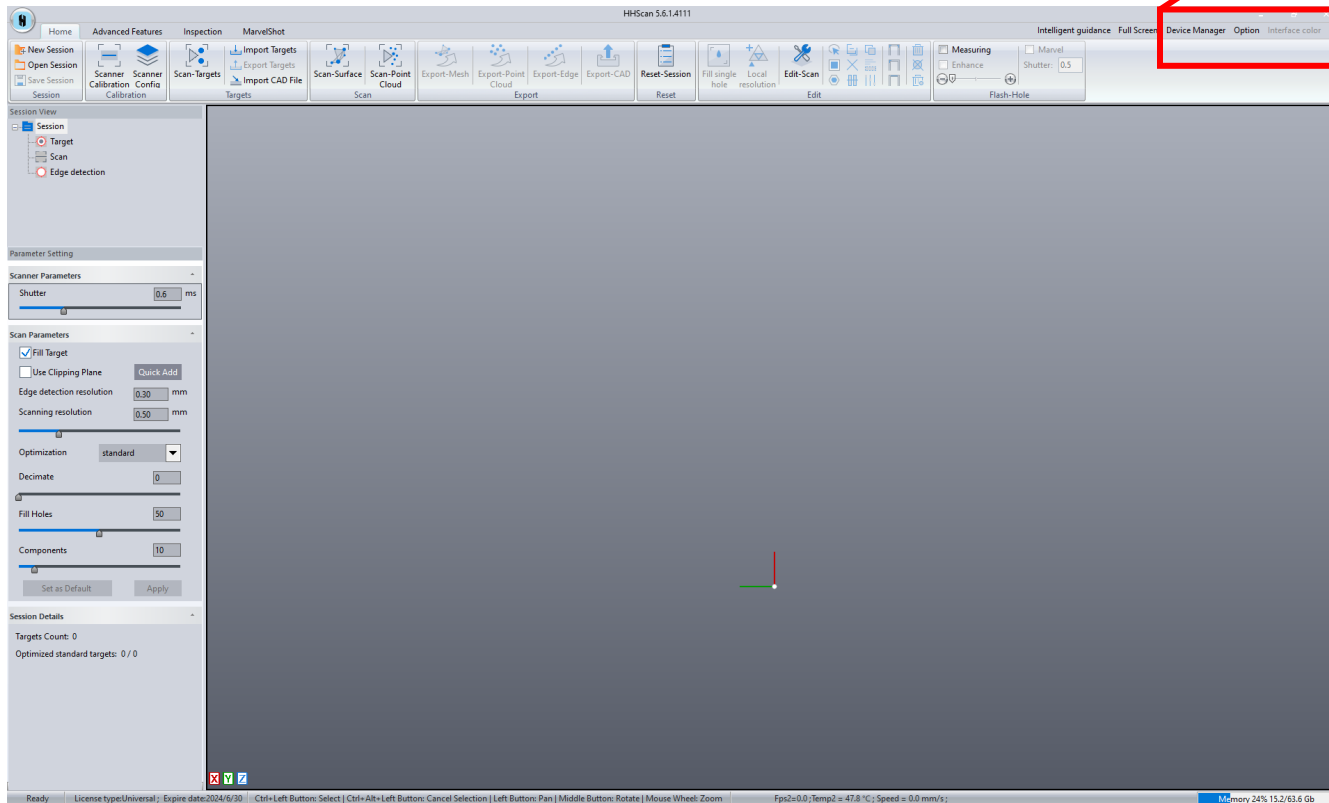
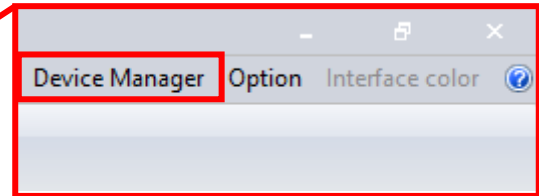


2. PRODUCT INTRODUCTION

Device Manager

DEVICE ACTIVATION

STEP ONE: Click on “Device Manager” to pop up activation windows



2. PRODUCT INTRODUCTION

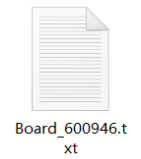
Product Manager



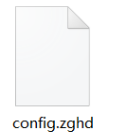
The main software interface shows a top toolbar with various icons for session management, scanning, and exporting. On the left, there are panels for 'Session View', 'Parameter Setting', and 'Session Details'. The 'Device Manager' window is open in the center, displaying a table of scanner files.

The 'Device Manager' window displays the 'Scanner Files' section. It includes an 'Import' button and a table with the following data:

Status	Serial number	Calibration Board No.	Calibration date	Remark
✓	11210008	Board_603303	2023/10/12	-



Calibration File



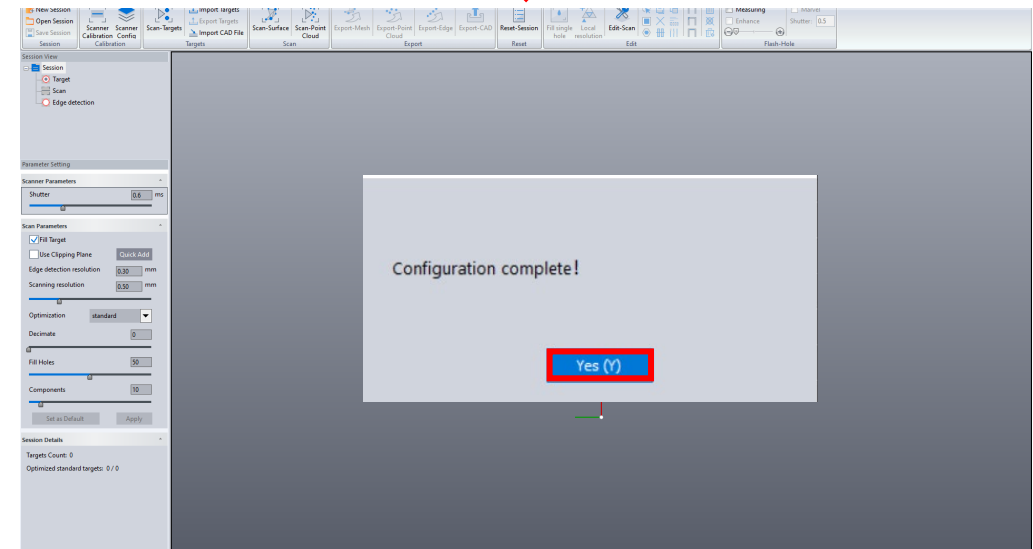
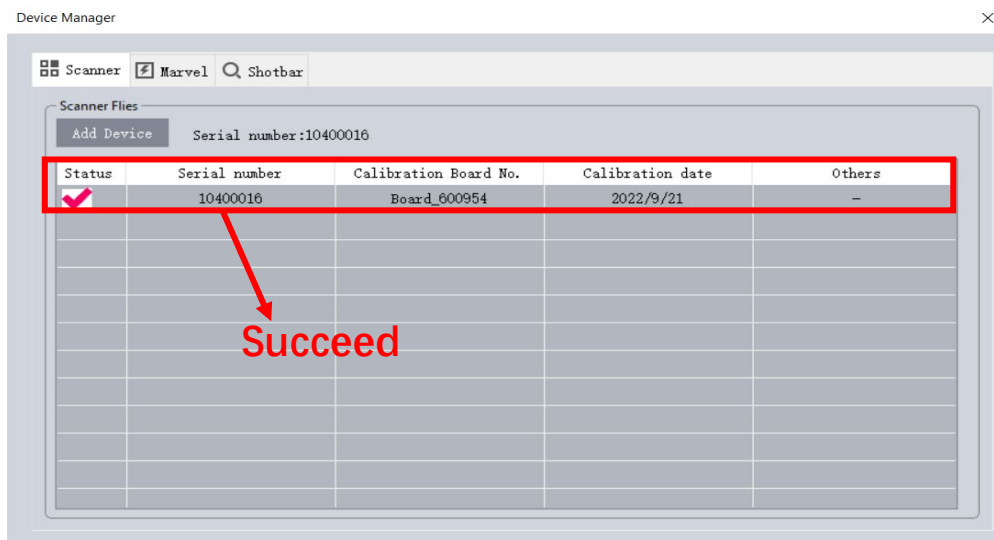
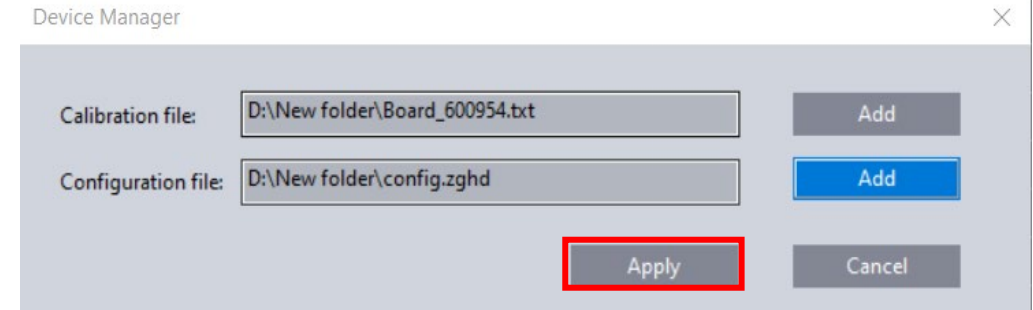
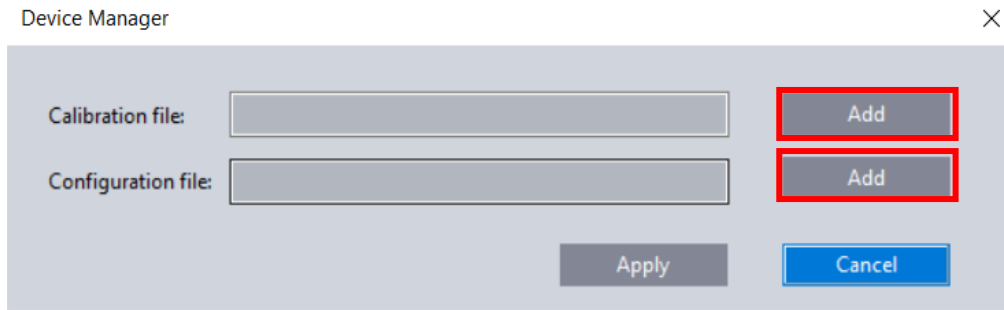
Configuration File





2. PRODUCT INTRODUCTION

Product Manager

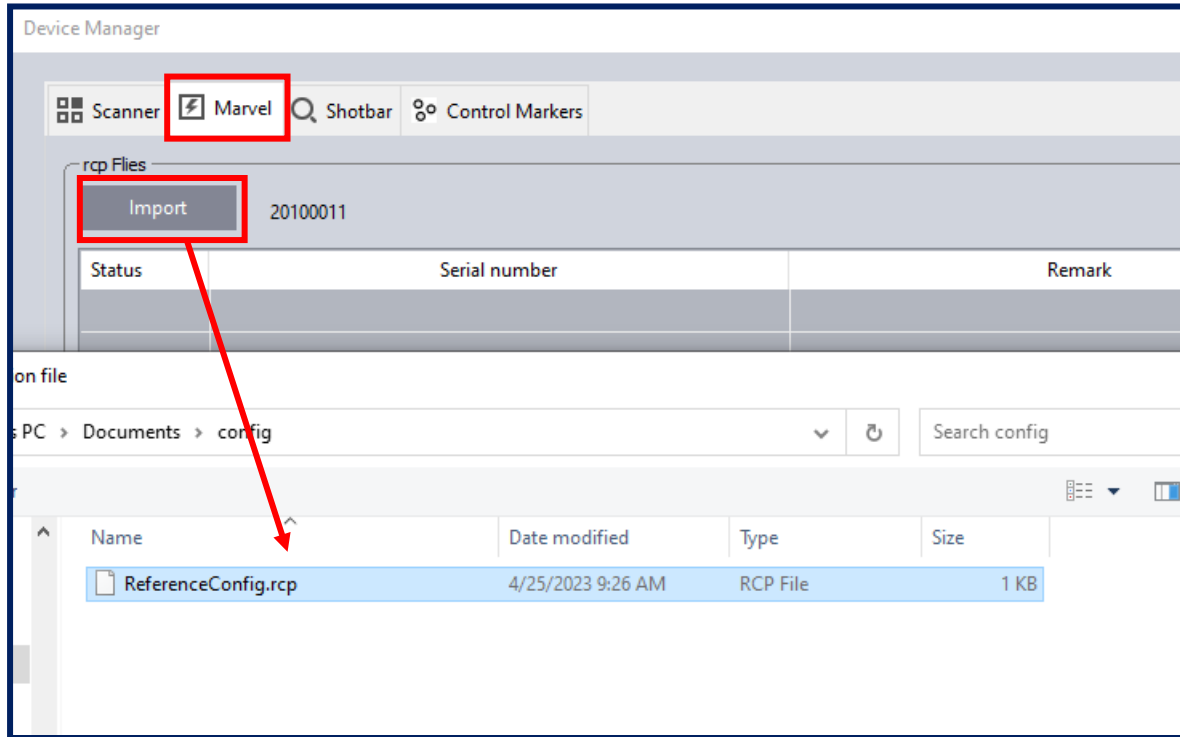




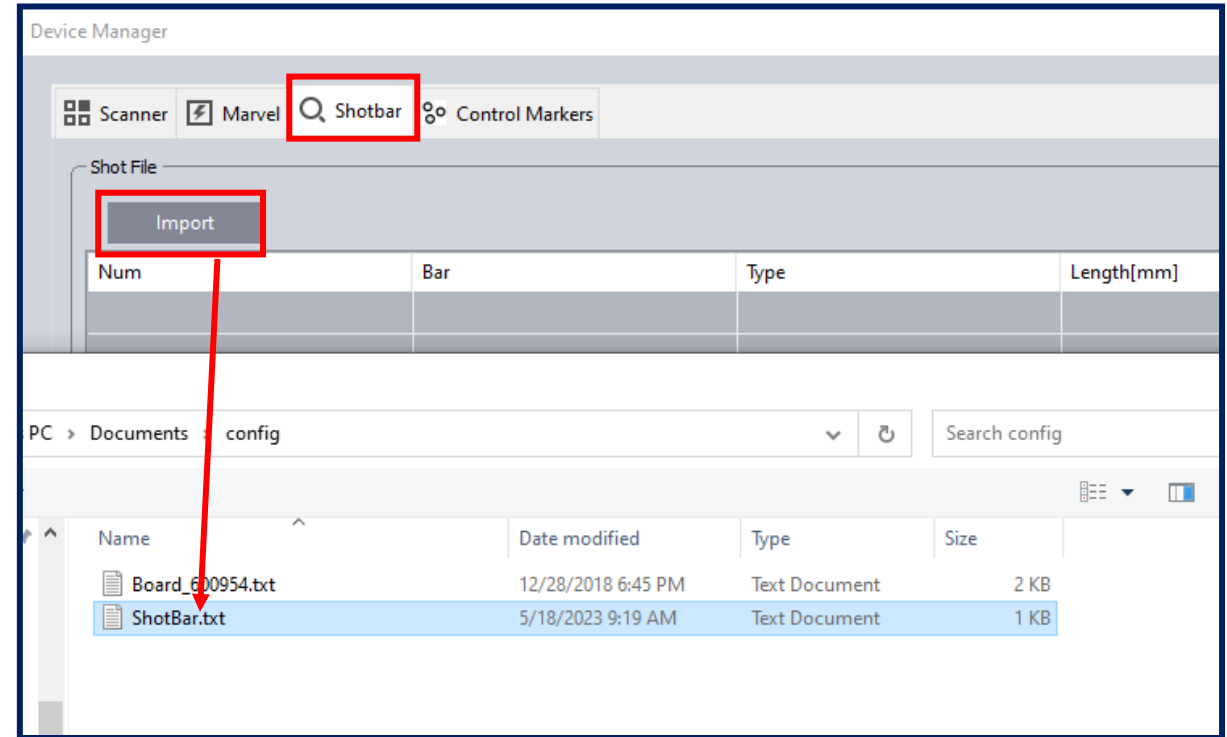
2. PRODUCT INTRODUCTION

Product Manager-Marvel mode

STEP THREE: Click “Marvel” and import the” Reference Config.rcp” profile.



STEP FOUR: Click “Shotbar” and import the “ShotBar.txt” profile.





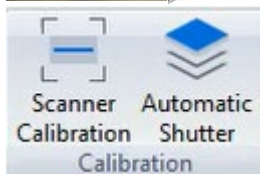
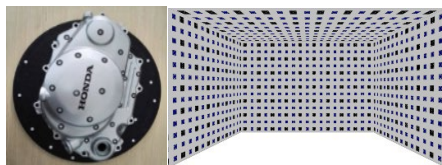
2. PRODUCT INTRODUCTION

Typical Workflow

1

Preparation

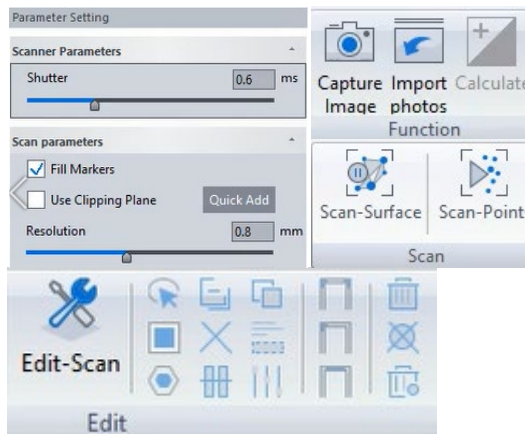
- Pre-calibrate Room Building
- Place targets
- Scanner calibration
- Parameter setting



2

Scanning Process

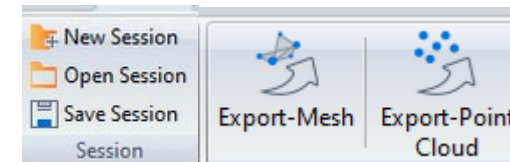
- Capture target
- workpiece scanning
- Data edit



3

Data Save

- Save as session
- Save as mesh/point cloud

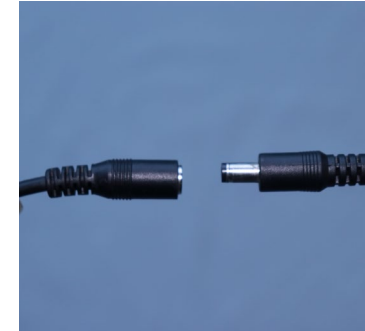




2. PRODUCT INTRODUCTION

Device Connection

1. Connect USB & Power cable to Scanner
2. Connect power cable to USB cable
3. Connect power cable to power adaptor
4. Connect to main power
5. Connect USB cable to computer
6. Start HHScan



*****Note: Plug out the power cable before disconnecting scanner.**



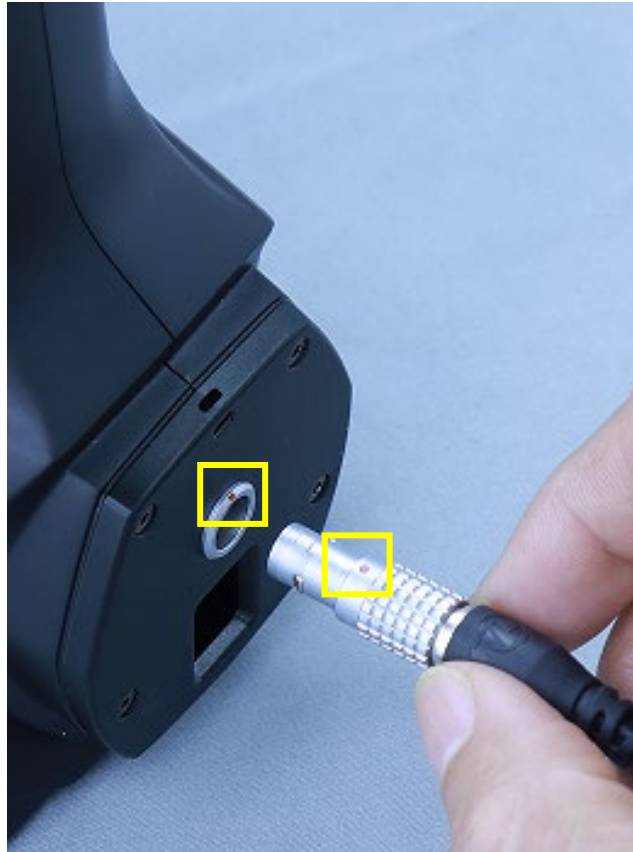
HHScan 5.6.0.03051.exe



2. PRODUCT INTRODUCTION

Device Connection

- Connect power cable as below



- Pull out the metal sleeve and then disconnect the cable





2. PRODUCT INTRODUCTION

Push Buttons

1. Central Button

- Single press: Start/Pause Scanning
Switch on/off third camera
- Double press: Scanning mode switch

2. Left/Right Button

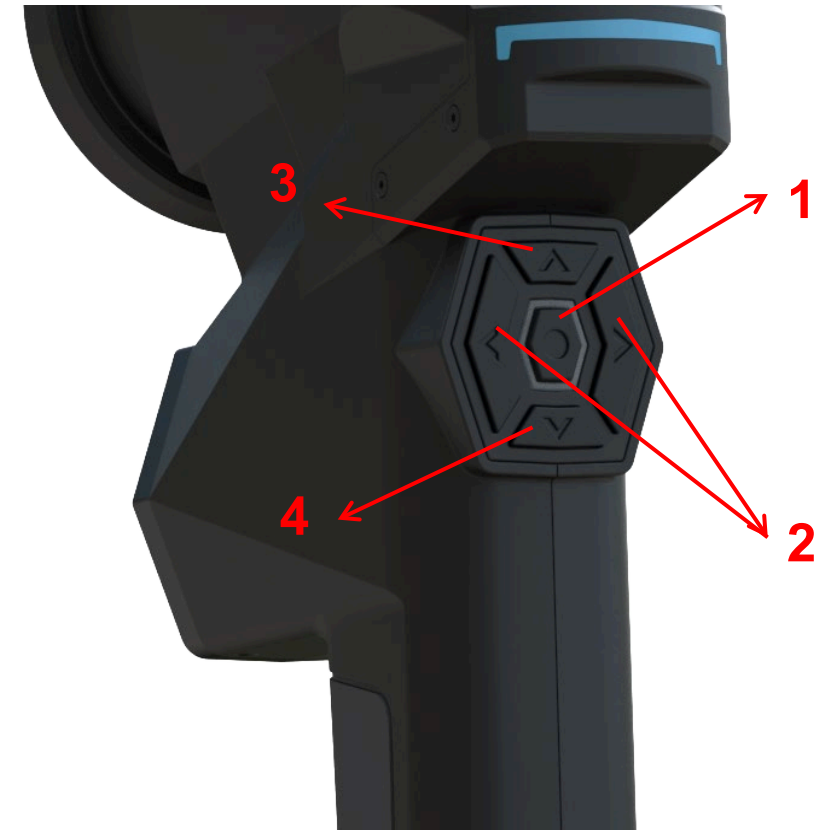
- Left Button: Zoom in or Increase shutter
- Right Button: Zoom out or Decrease shutter or Take photo under photogrammetry mode

3. Up Button

- Single press: Zoom or Shutter
- Double press: Hole Flash Capture or New group Scanning

4. Down Button

- Single press: Long-range scanning→Edge Detection→Standard Scanning and recycle in the sequence.
- Double press: Intelligent Interactive System



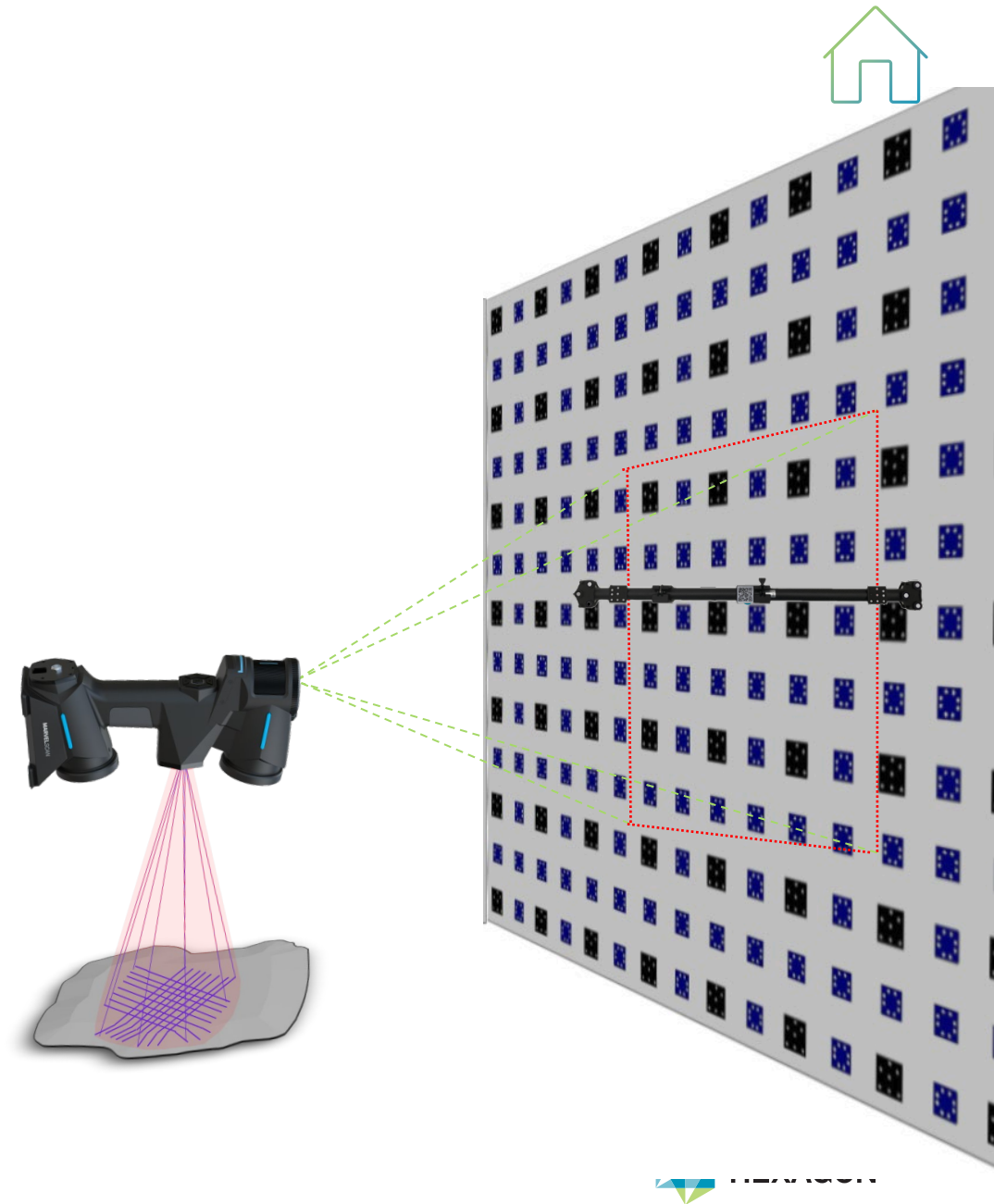
2. PRODUCT INTRODUCTION

Working Principle

1. Unique inside-out monocular positioning technology, keep third camera tracking the targets wall when scanning workpiece.
2. Laser lines projected onto the object deforms with the shape of the object. When scanning, the camera takes the specific shape and calculates it.

Tips:

- ✓ The indicator red dot should project on the targets wall.
- ✓ The visibility of laser lines projected on the workpiece is a key to success of data acquisition.
- ✓ The visibility of laser lines is affected by color and material type.
 - High reflectivity workpiece will have mirror effect, which makes it difficult to catch laser lines.
 - Black color absorbs light and makes laser lines difficult to detect laser lines.
- ✓ The effects of black, reflective and transparent objects can be offset by adjusting shutter parameters.
- ✓ Good preparation in advance will lead to satisfying scanning results.





2. PRODUCT INTRODUCTION

Scanning Software UI

Main Toolbox

3D Viewer

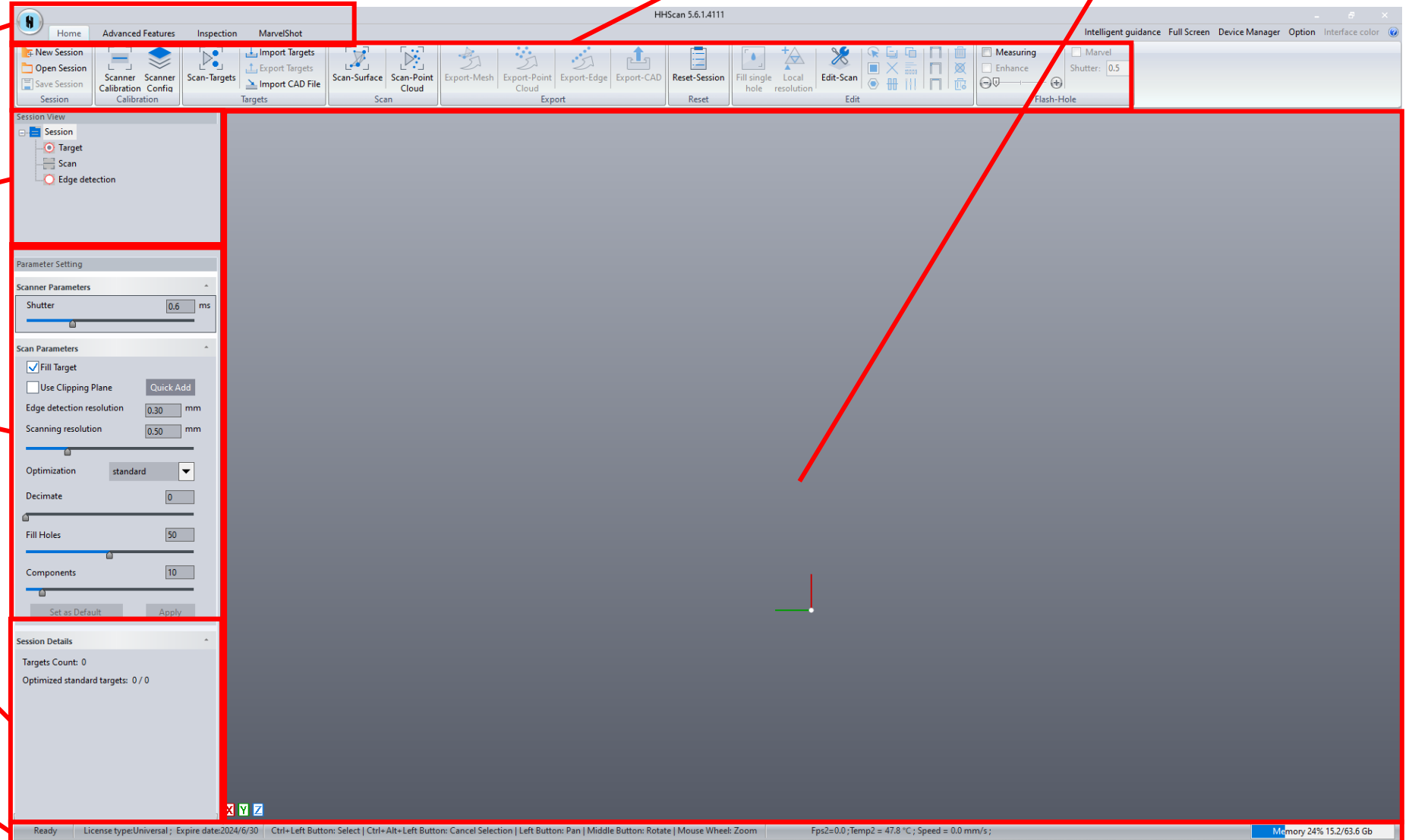
Menu

Model Tree

Parameter Setting

Session Details

Monitoring Bar

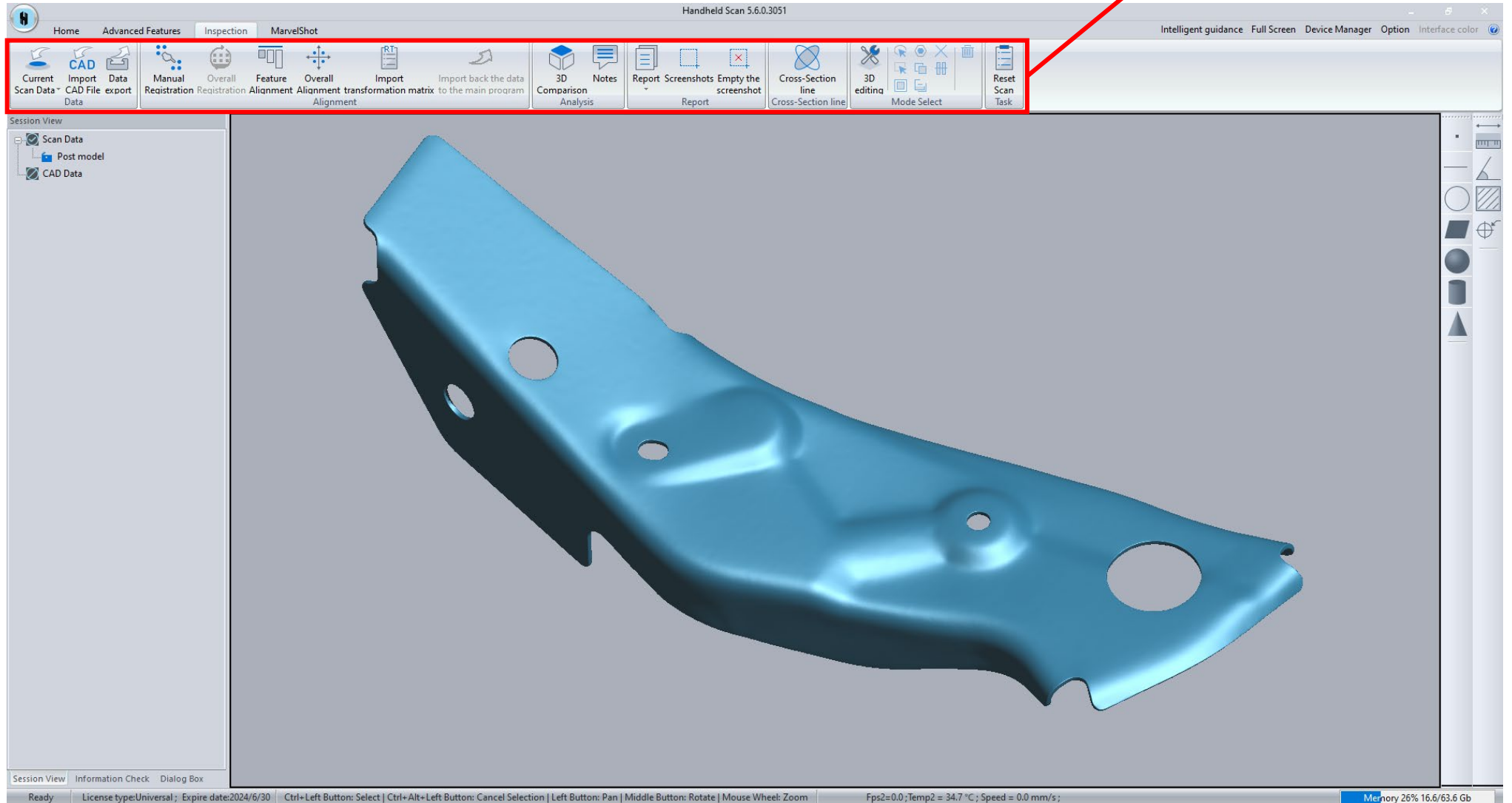


2. PRODUCT INTRODUCTION

Scanning Software UI



Measurement Tool Bar



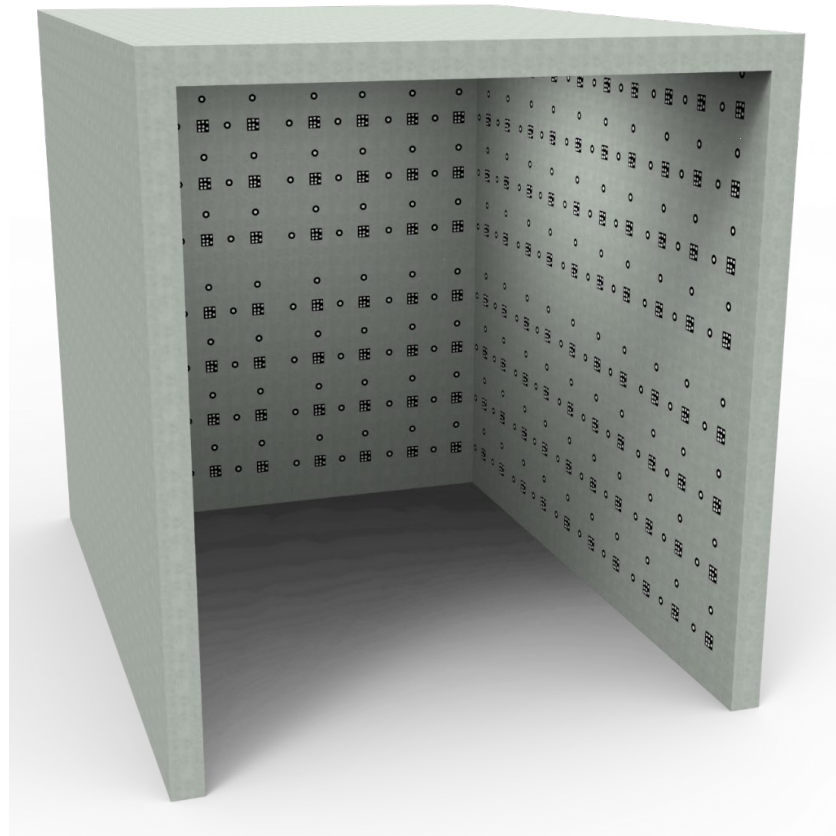
3. TARGET-FREE SCANNING SETUP



3. TARGET-FREE SCANNING SETUP

Pre-Calibrated Room Setup

Concrete Structure



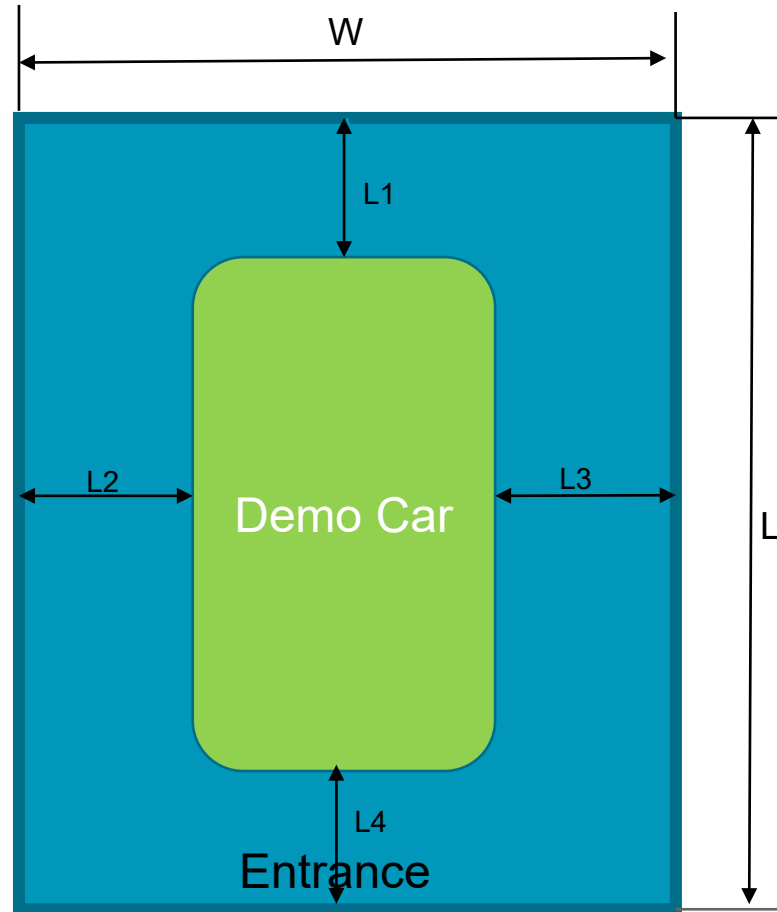
Requirement:

- 1, Keep away from the vibration source, otherwise vibration-proof foundation should be required to consider.
- 2, Room Temperature Requirement: 20 ± 5 °C.
- 3, If room temperature is unstable, please make sure that room temperature difference for encode acquisition and workpiece scanning shall not exceed ± 5 °C.
- 4, Concrete surface roughness $\leq Ra3.2$ (otherwise encode targets & positioning targets will fall easily).



3. TARGET-FREE SCANNING SETUP

Pre-Calibrated Room Dimension Requirements



Bird's-eye View

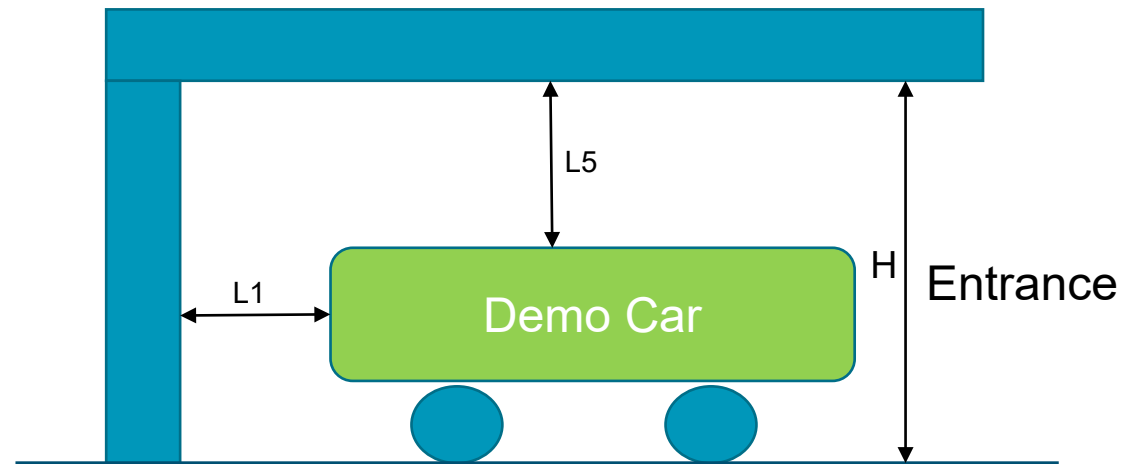
Best tracking distance (from **MARVELSCAN** to Encoded target): **1~3m**, below example is only for your reference.

Eg: Dimension of Demo Car:
 $X=5m, Y=2m, Z=1.7m$

Pre-Calibrated Room Dimension Suggestion:

- $W=L2+Y+L3=3.8m$
- $L=L1+X+L4=6.8m$
- $H=Z+L5=2.6m$

Note: $L1=L2=L3=L4=L5=0.9m$

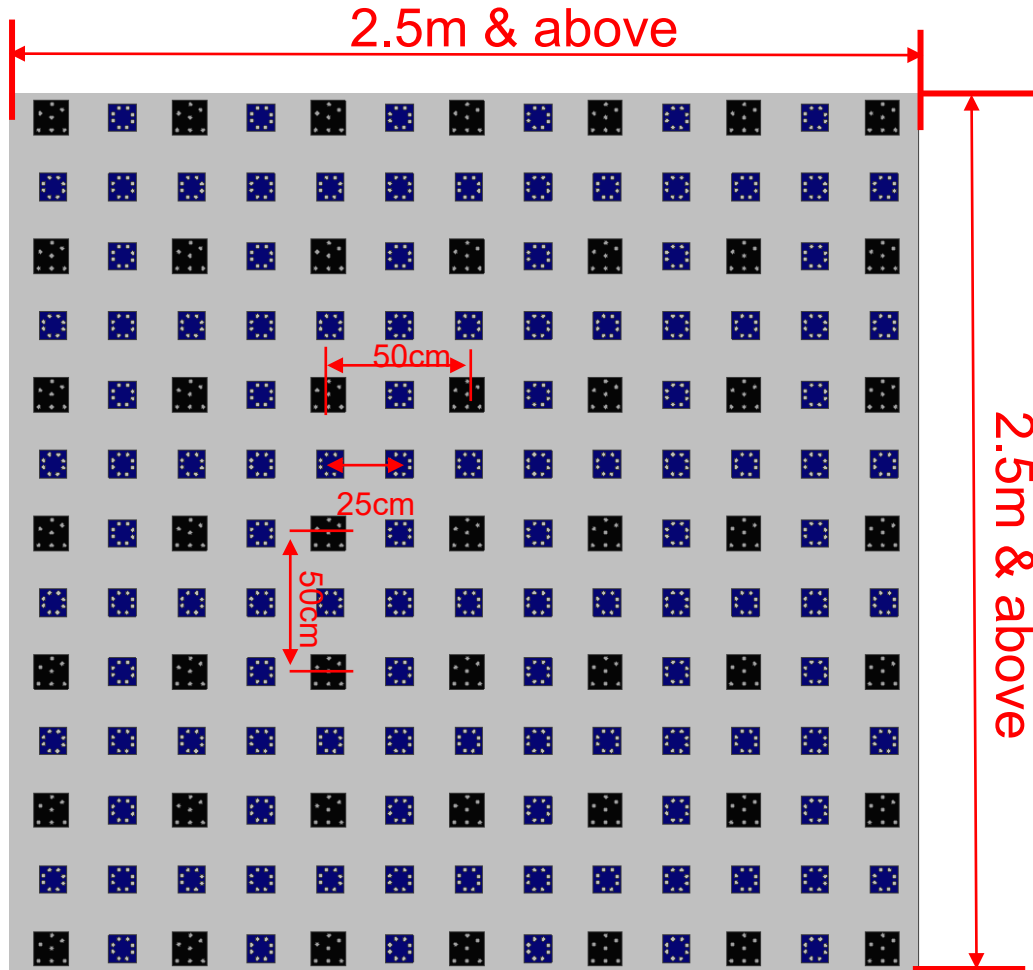


Side View



3. TARGET-FREE SCANNING SETUP

Target Placement Guidance



#1, BIG VOLUME SOLUTION

Target Panel Size: **2.5mX2.5m & above 2.5m.**

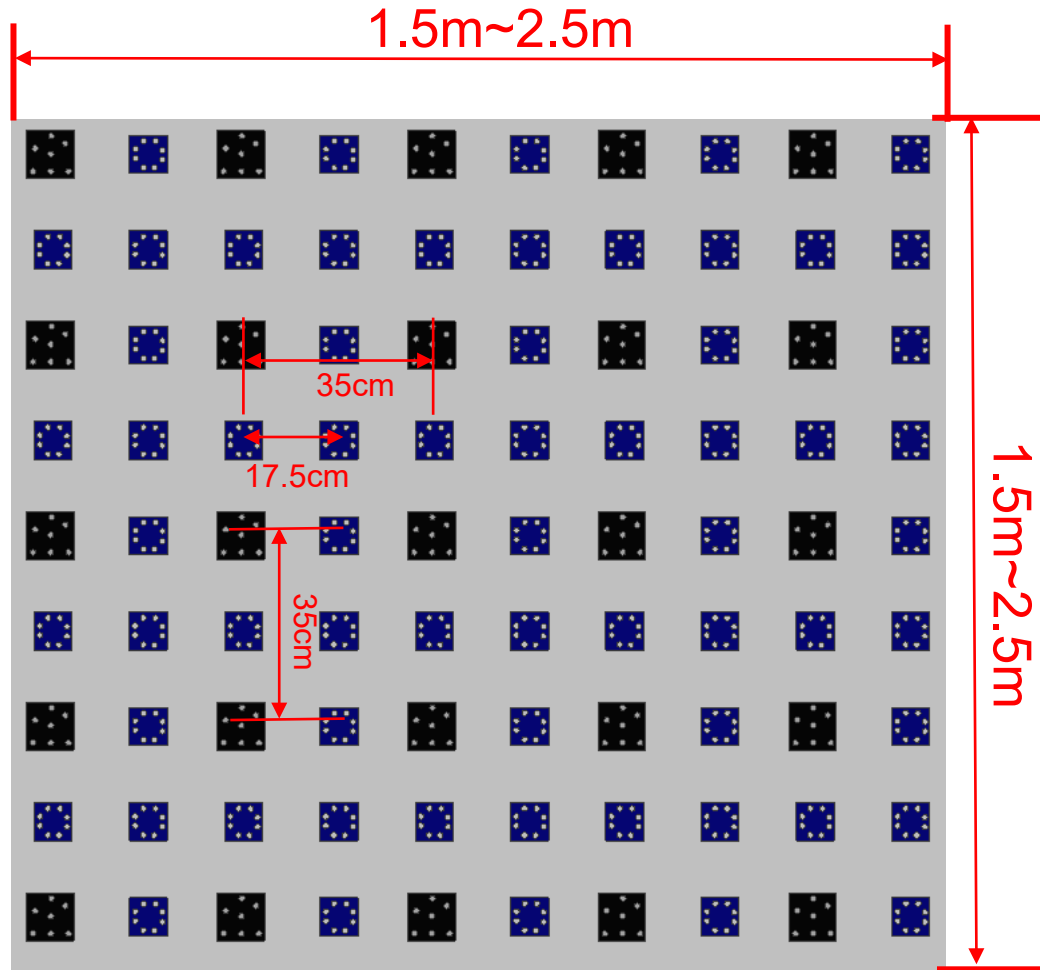
Target Tracking Distance: 0.8-3.5m.

Best Target Tracking Distance: 1-3m.



3. TARGET-FREE SCANNING SETUP

Target Placement Guidance



#2 , MEDIUM VOLUME SOLUTION

Target Panel Size: **between 1.5m~2.5m**

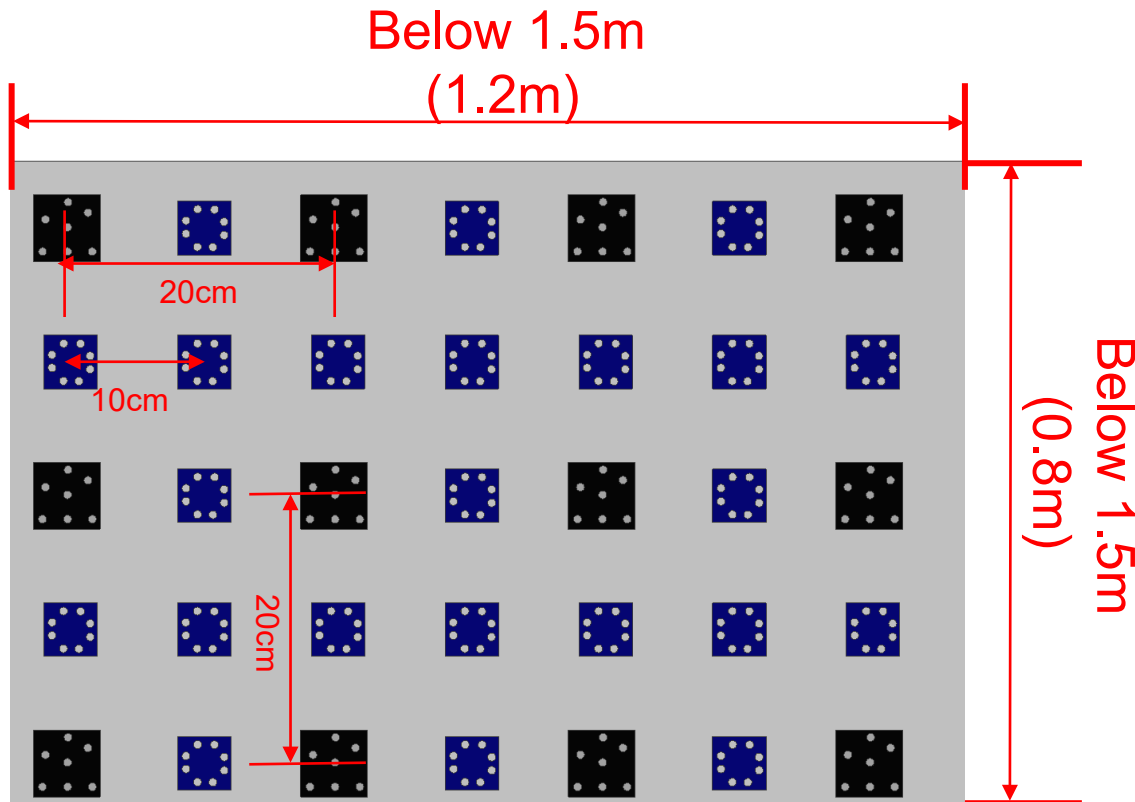
Target Tracking Distance: 0.6-2.5m

Best Target Tracking Distance: 0.8-1.8m



3. TARGET-FREE SCANNING SETUP

Target Placement Guidance



#3 , SMALL VOLUME SOLUTION

Target Panel Size: **below 1.5mX1.5m**

Target Tracking Distance: 0.4-1.5m

Best target Tracking Distance: 0.7-1.2m

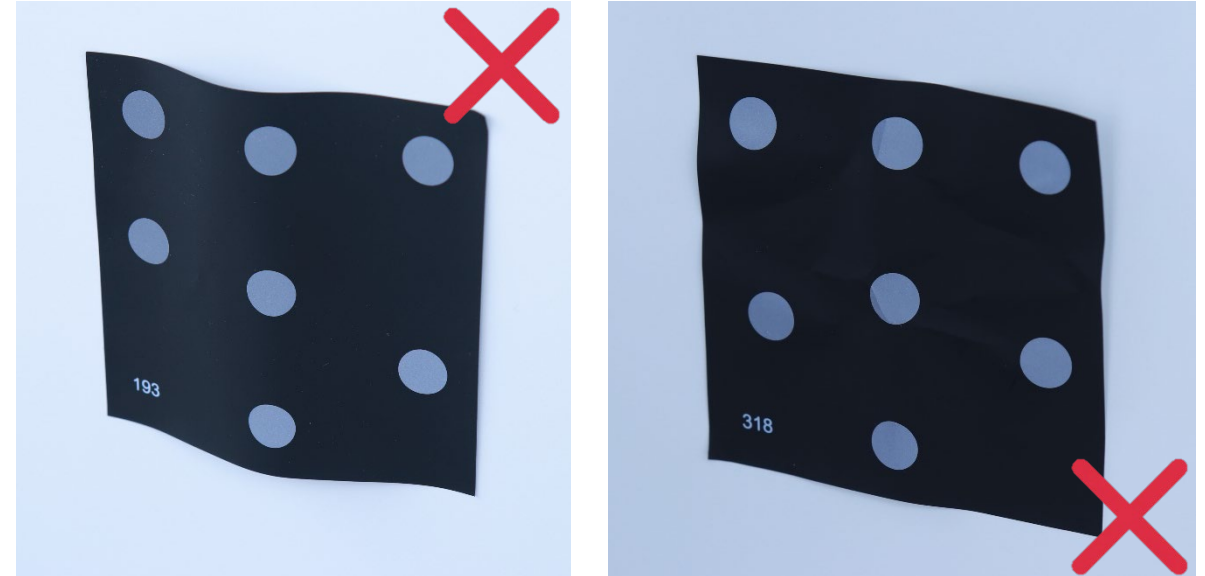


3. TARGET-FREE SCANNING SETUP

Target Placement Guidance

PLEASE DO NOT

- Place encode targets on a surface with high curving rate
- Place encode targets with bubbles inside
- Use damaged or incomplete encode targets
- Use greasy, ashy or dirty targets



Wrong Example



3. TARGET-FREE SCANNING SETUP

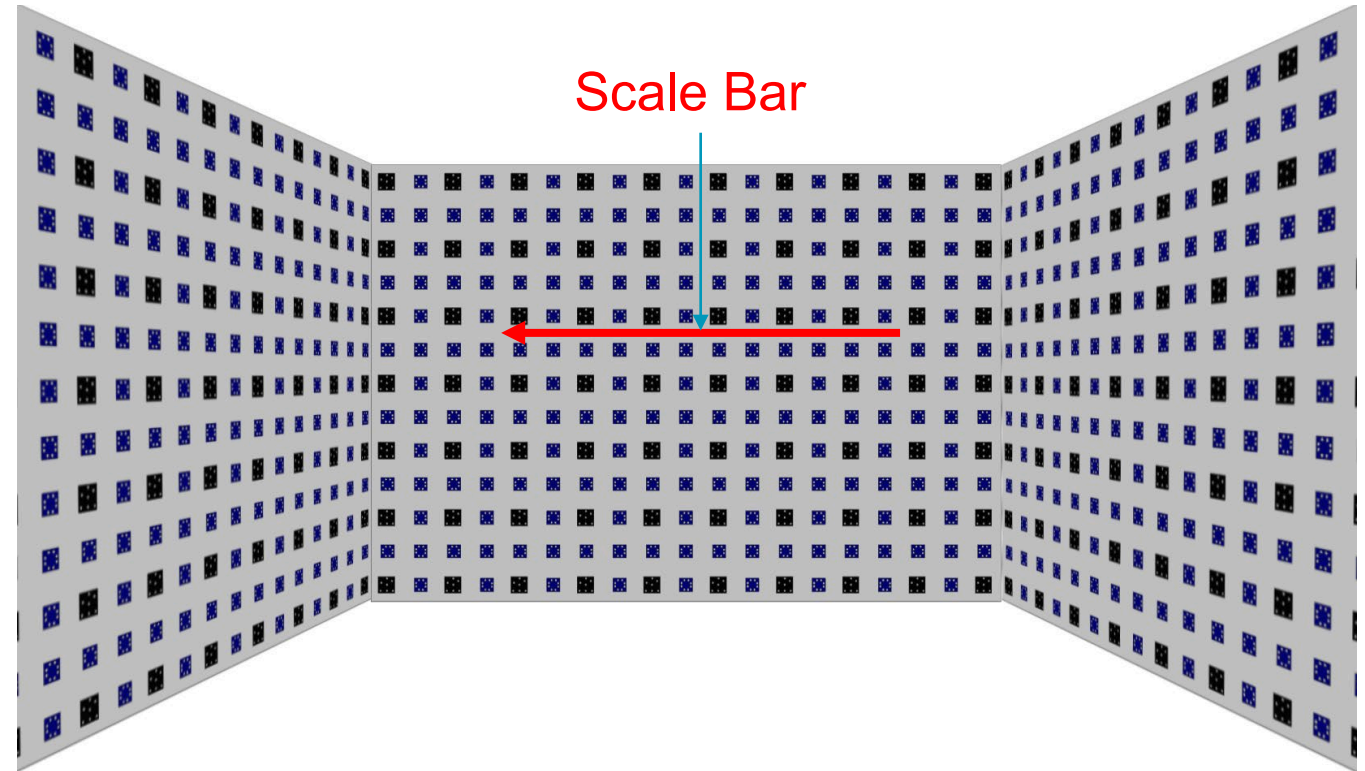
Scale Bar Placement Guidance

Situation 1, To use three walls as shown in the picture

NOTE:
DO NOT PLACE SCALE BAR OVER CODED TARGET OR CIRCULAR POSITIONING TARGET!

Position: Place the scale bar in the middle of the wall as shown in the picture

Direction: The scale bar should place as the arrow indicates direction



One end of the scale bar with direction indicator





3. TARGET-FREE SCANNING SETUP

Scale Bar Placement Guidance

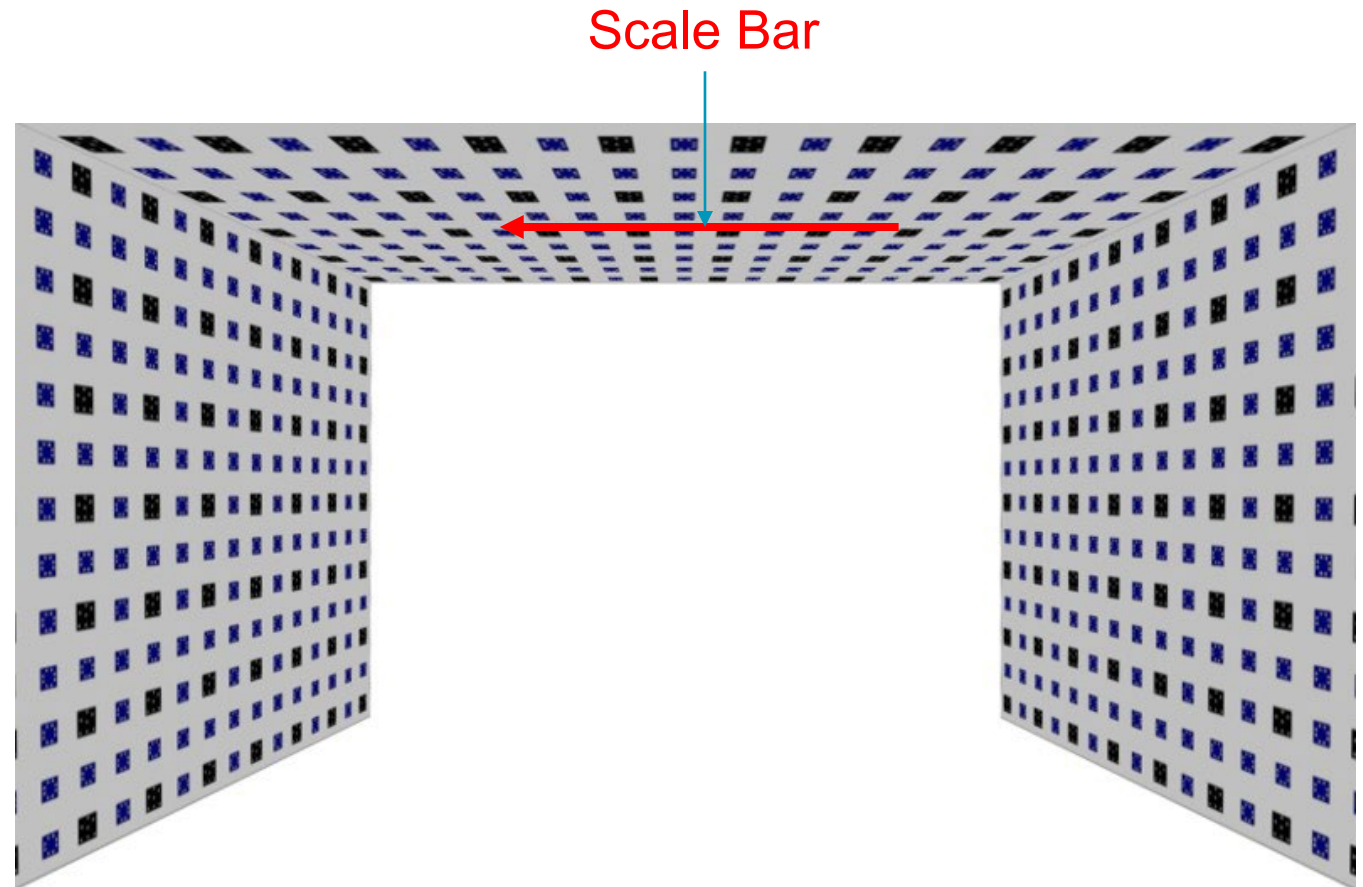
Situation 2, To use three walls as shown in the picture

NOTE:
DO NOT PLACE SCALE BAR OVER CODED TARGET OR CIRCULAR POSITIONING TARGET!

Position: Place the scale bar in the middle of the wall as shown in the picture

Direction: The scale bar should place as the arrow indicates direction

One end of the scale bar with direction indicator





3. TARGET-FREE SCANNING SETUP

Scale Bar Placement Guidance

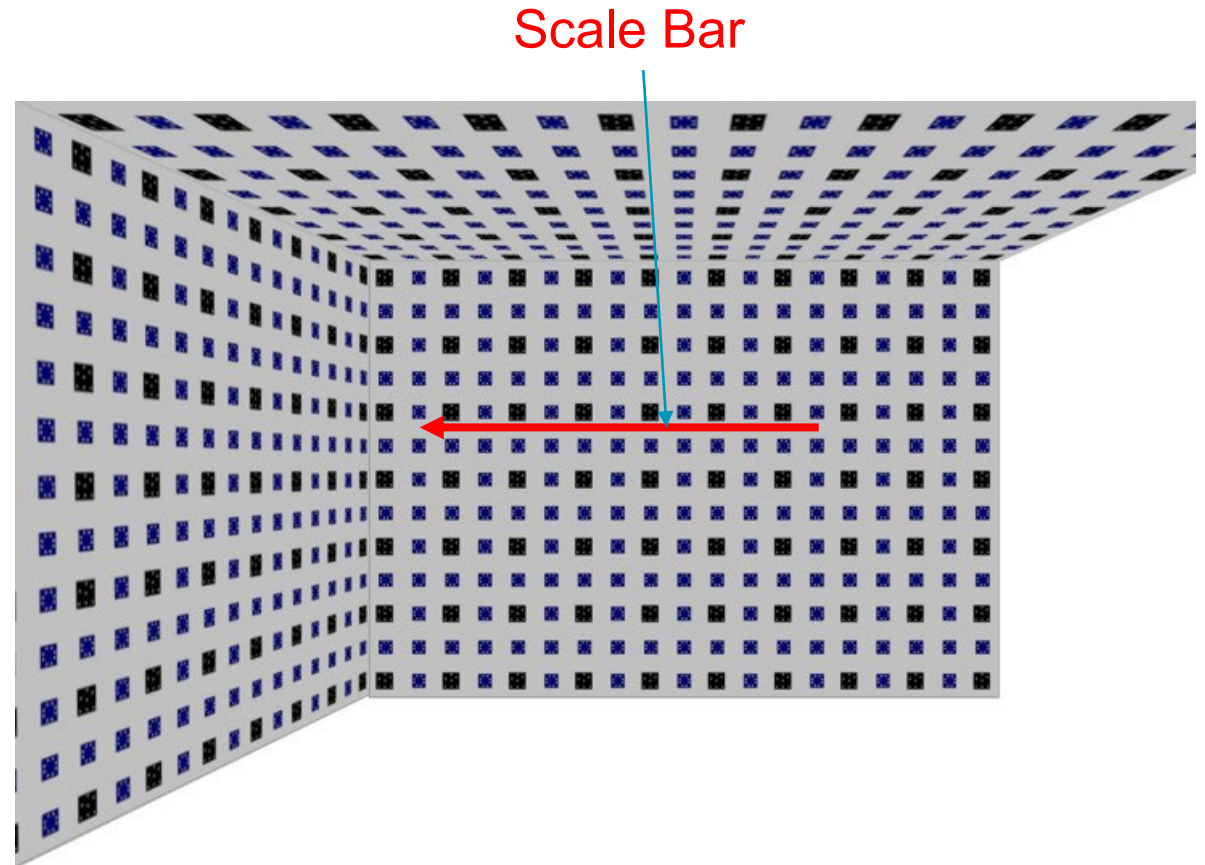
Situation 3, To use three walls as shown in the picture

NOTE:
DO NOT PLACE SCALE BAR OVER CODED TARGET OR CIRCULAR POSITIONING TARGET!

Position: Place the scale bar in the middle of the wall as shown in the picture

Direction: The scale bar should place as the arrow indicates direction

One end of the scale bar with direction indicator



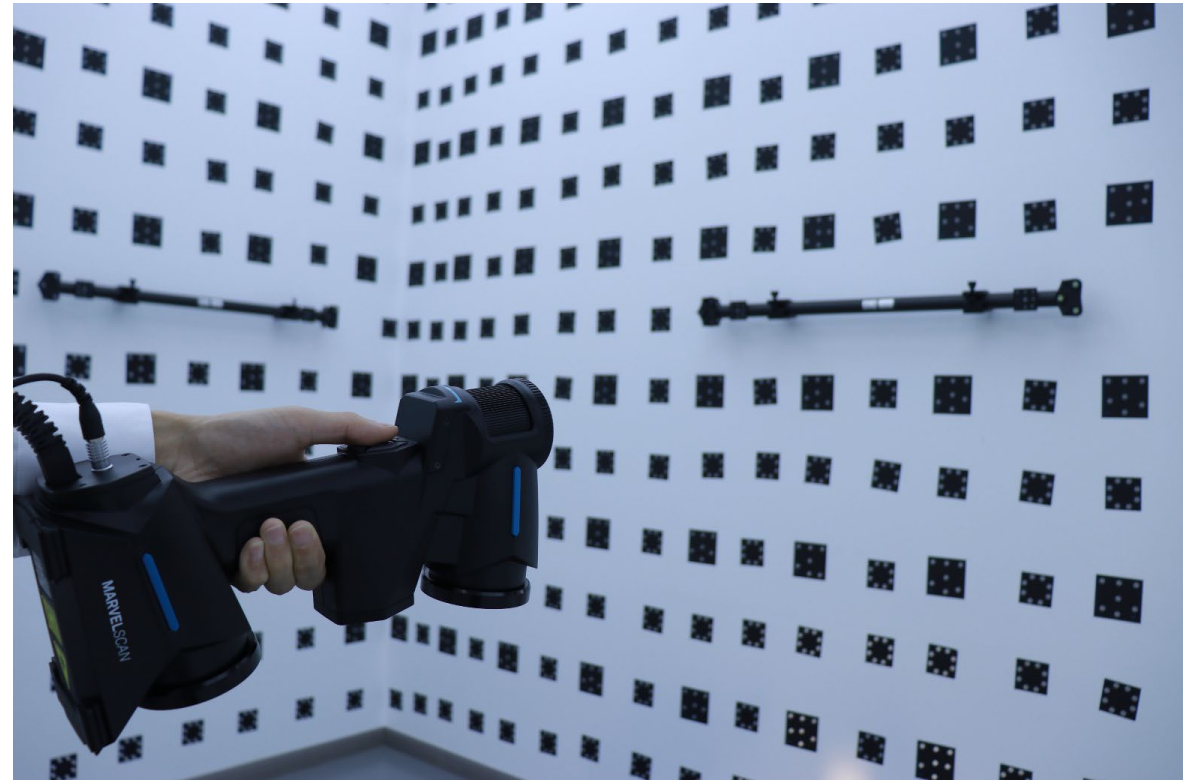


3. TARGET-FREE SCANNING SETUP

Target Collection Guidance

Working principle:

- By adopting our built-in independent photogrammetry in **MARVELSCAN**, we need to take photos for scale bar firstly to ensure the accuracy.
- After all the photos of the scale bar are taken, we will take photos of other places from this scale bar and make sure to cover all targets in the pre-calibrated room.

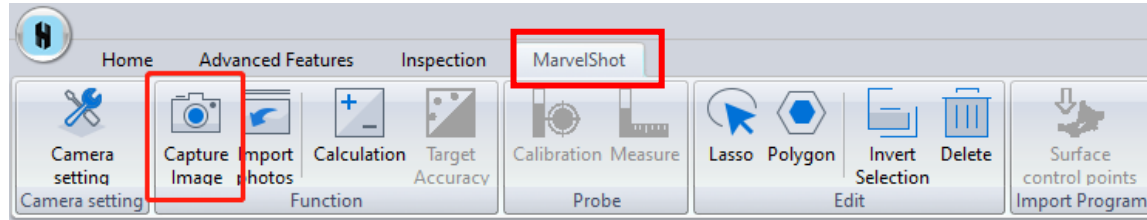




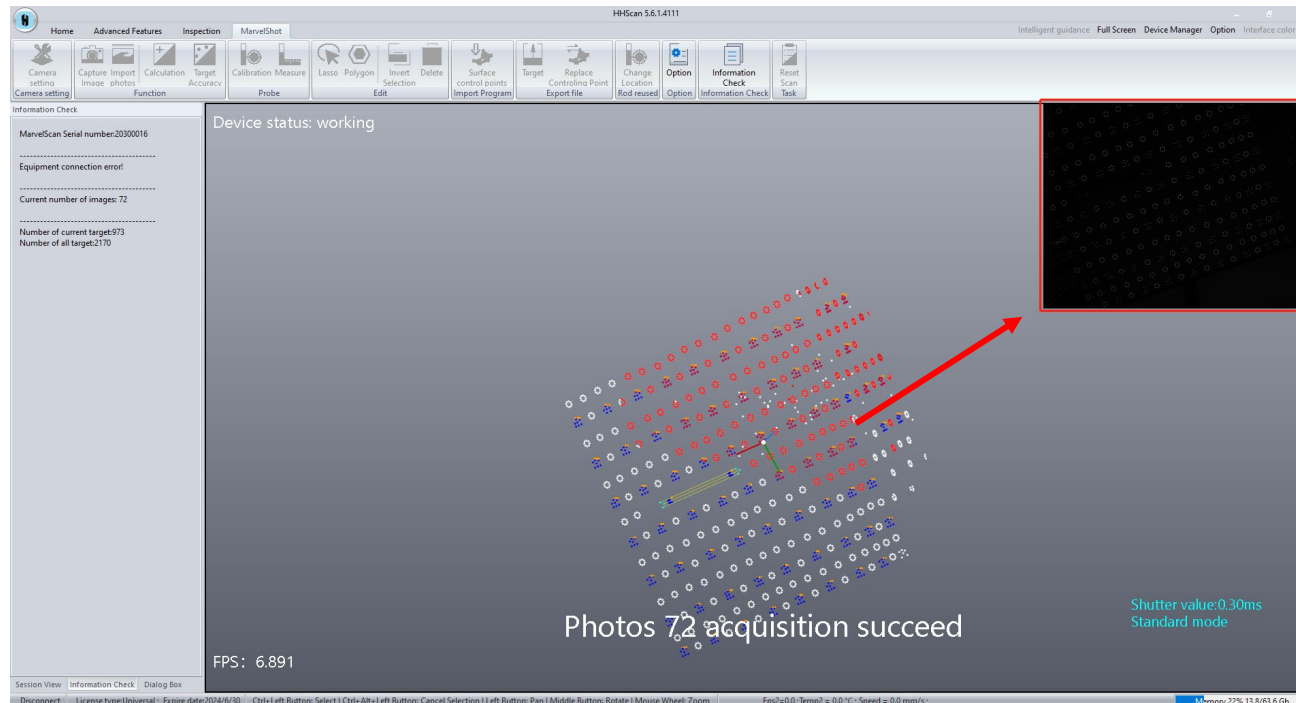
3. TARGET-FREE SCANNING SETUP

Target Collection Guidance--Workflow

1. Select “MarvelShot” to click “Capture Image”



2. Click on center button to switch on third camera, you will see the third camera view on right corner in the software.



3. TARGET-FREE SCANNING SETUP

Target Collection Guidance--Workflow

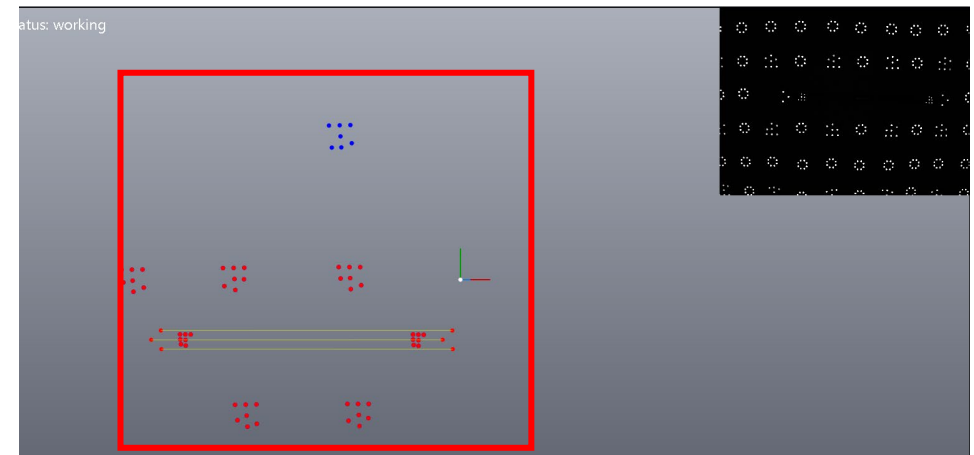
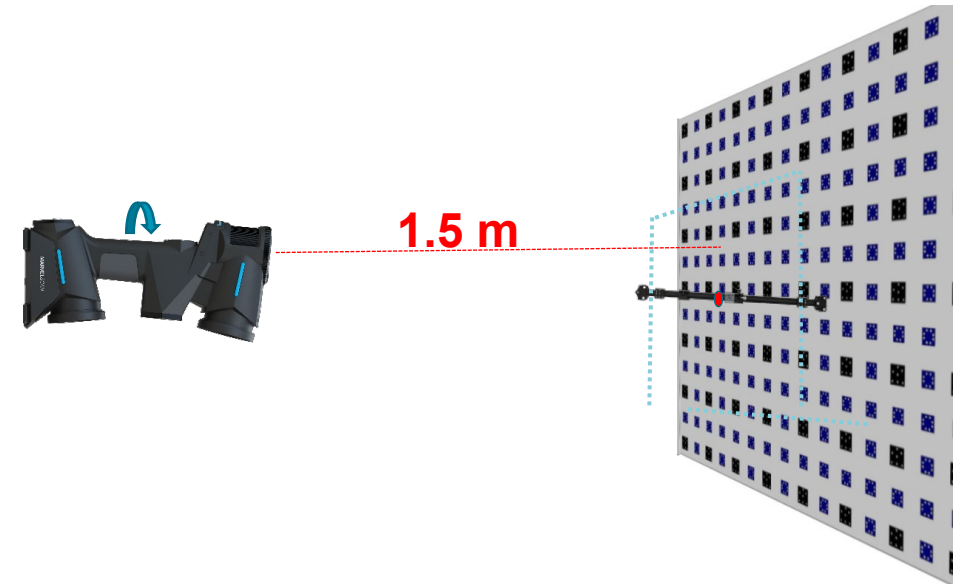
Capture Image Processing:

STEP ONE: Take photos of Scale Bar

#1, Face third camera vertical to target wall, and keep indicator red dot projecting on the center of scale bar and keep red box covered whole scale bar, left click (<) to take one picture.

#2, Rotate scanner 90° at same position clockwise and take second picture while keep third camera facing to target wall, coded target will be captured and appear in the software.

#3, If there is no coded target captured in the software, please repeat above two process until coded target appears in the software.



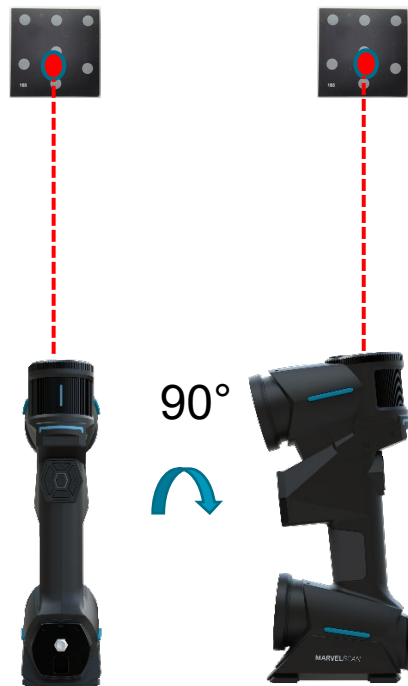


3. TARGET-FREE SCANNING SETUP

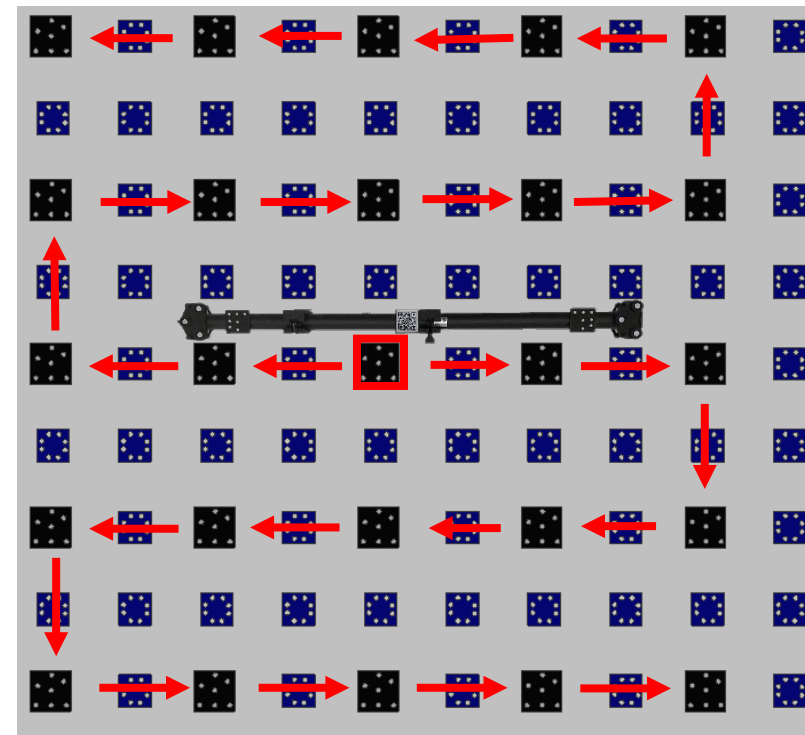
Target Collection Guidance--Workflow

STEP TWO : Capture images of Target

#1, Project indicator red dot on one coded mark to take two pictures at same position by rotate scanner 90° as below.



#2, From center of scale bar to the edge of target wall to take picture of all the targets, the route for collect targets as below.

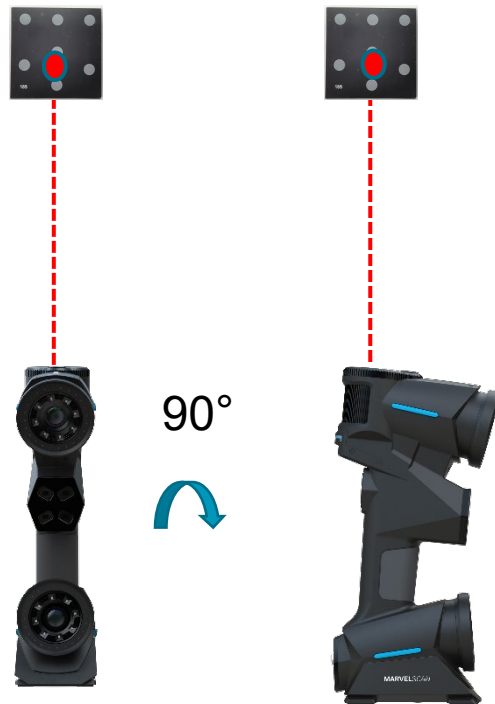




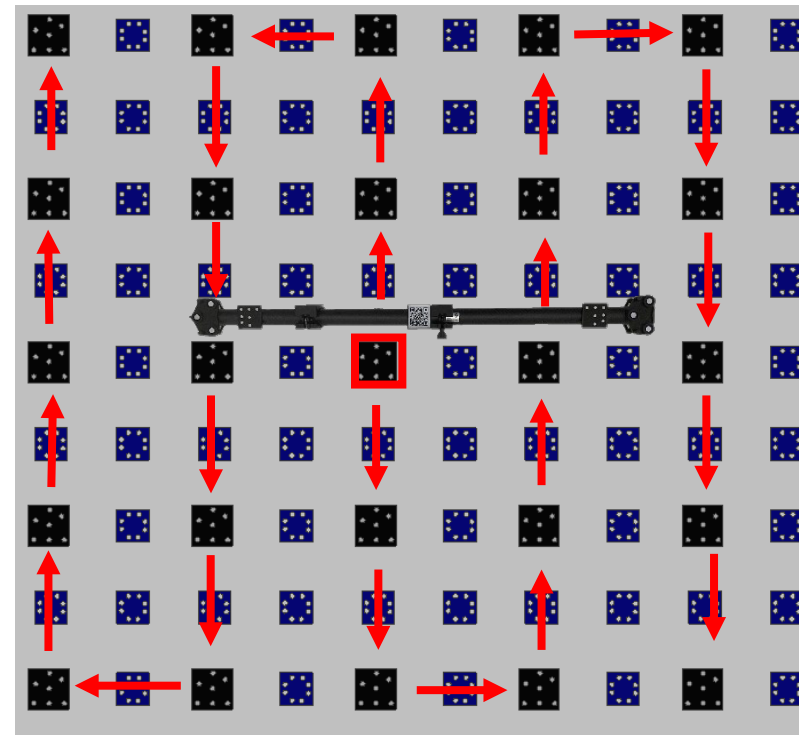
3. TARGET-FREE SCANNING SETUP

Target Collection Guidance--Workflow

#3, Project indicator red dot on one coded target to take two pictures at same position by rotate scanner 90° as below.



#4, From center of scale bar to the edge of target wall to take picture of all the targets, the route for collect targets as below





3. TARGET-FREE SCANNING SETUP

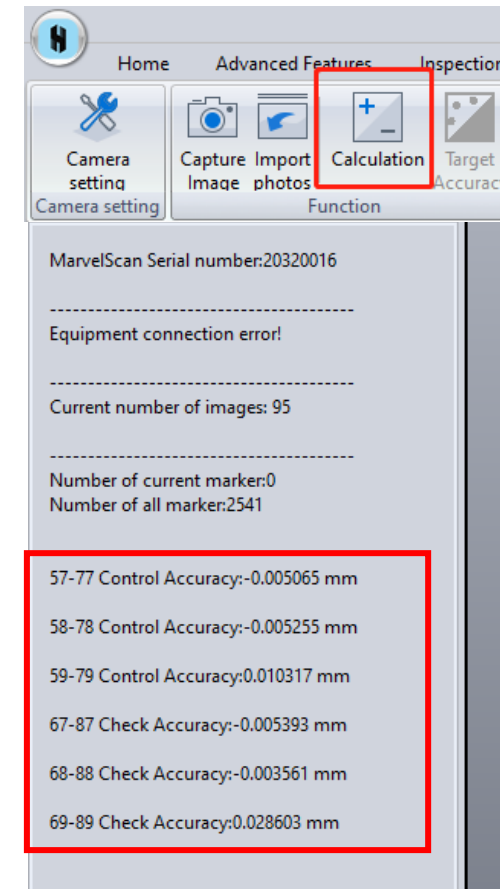
Target Collection Guidance--Workflow

STEP THREE : Calculate Target Images

- Press scan button to switch off third camera
- Click “Calculation” to process target data



Tips: You can check data accuracy in the left column

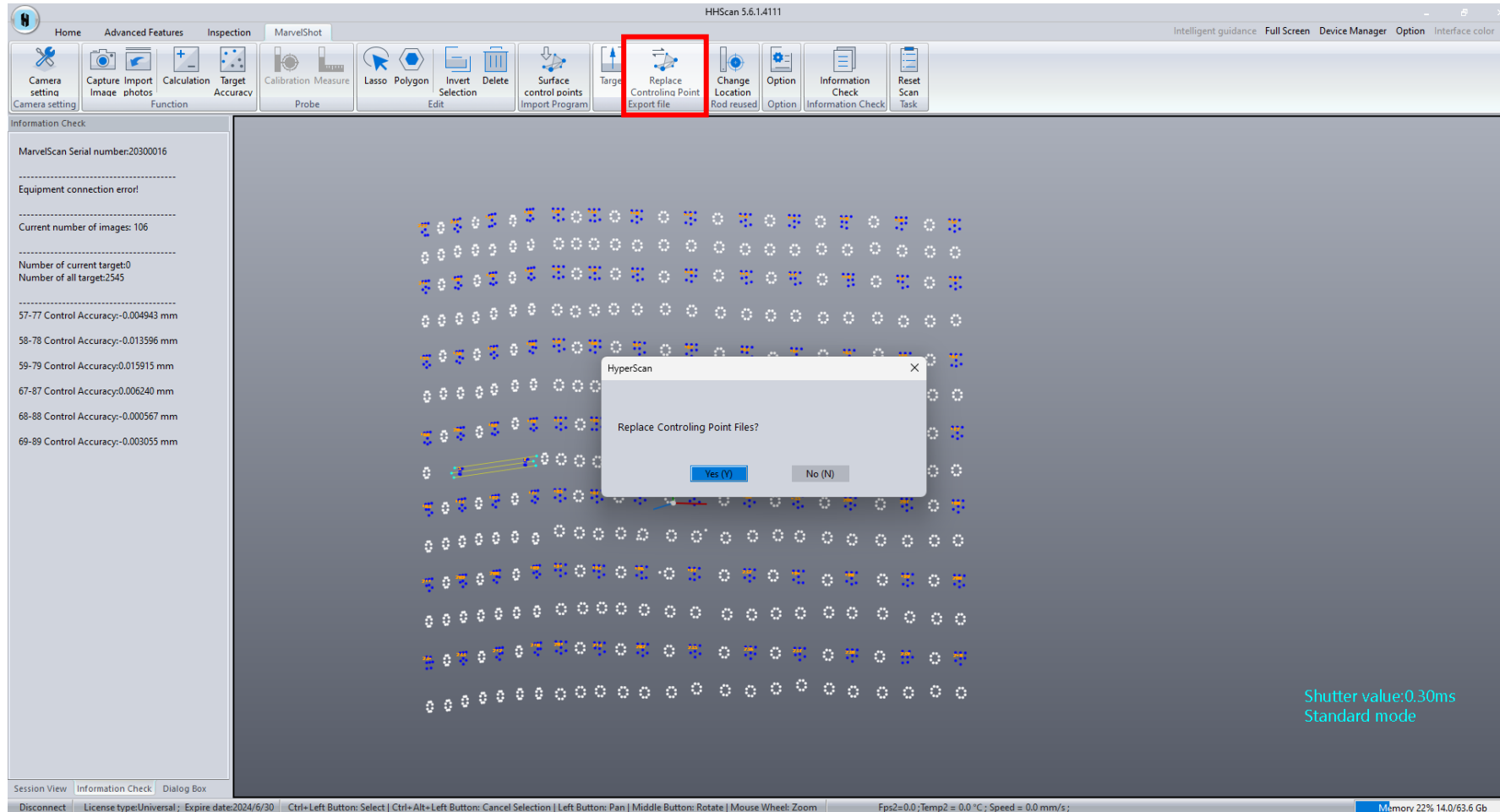




3. TARGET-FREE SCANNING SETUP

Target Collection Guidance--Workflow

- Click scan button to switch off third camera
- Click “Replace Control point” to automatically save targets data in “Config” folder

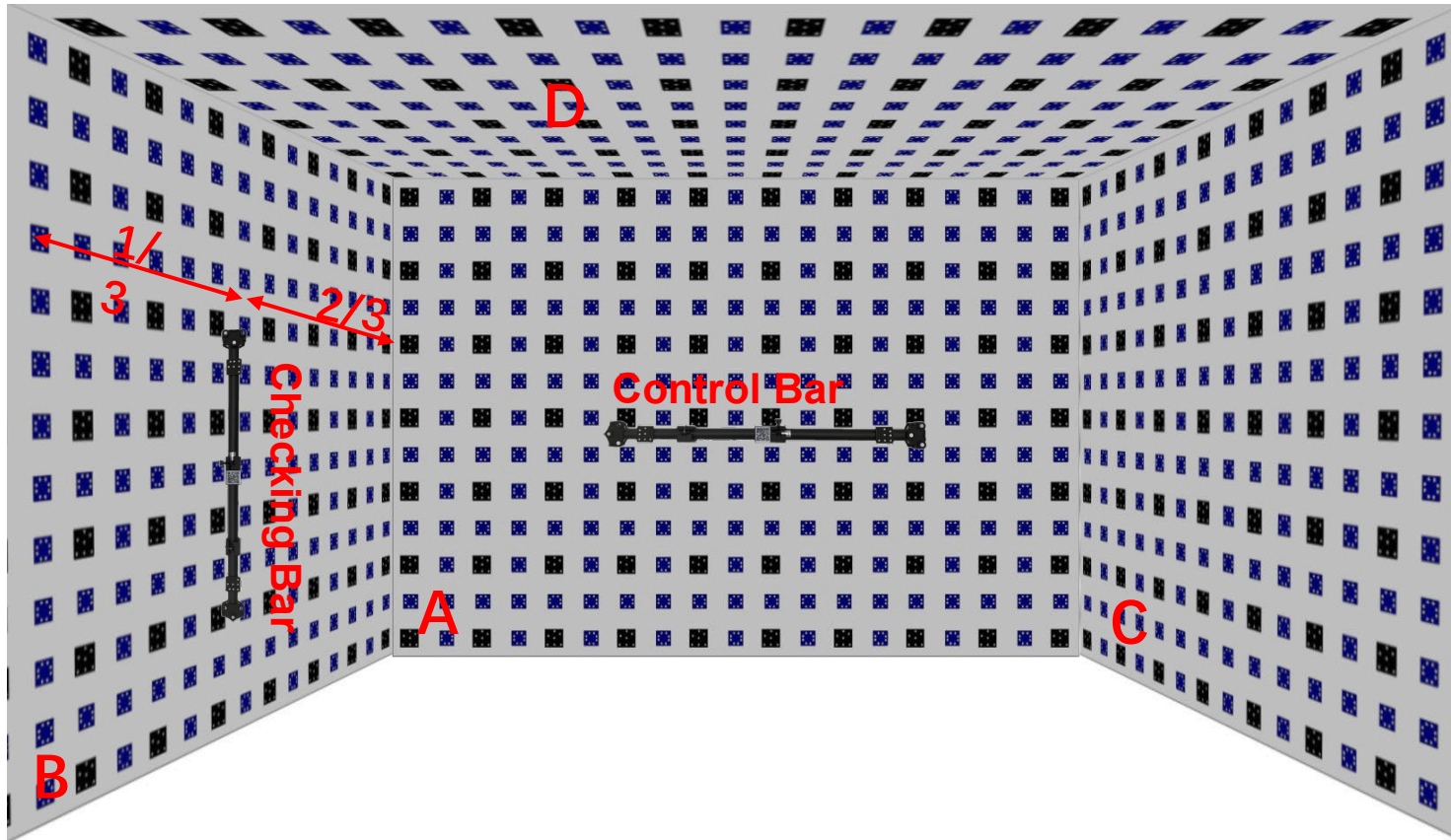




3. TARGET-FREE SCANNING SETUP

Target Collection Guidance--Operation

#1, For pre-calibration room, it's better to place control bar on the center of A target wall and place checking bar on B target wall as below.



Note:

#1-1, Checking bar should be perpendicular to Control bar.

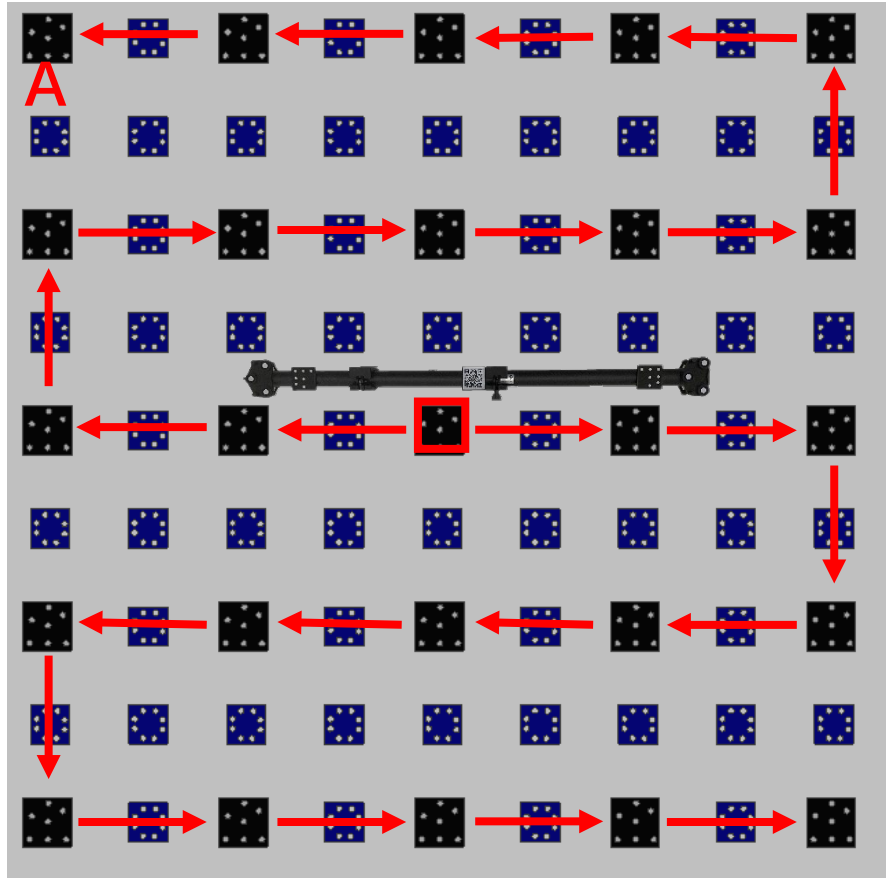
#1-2, As shown in the left image, the checking bar position should be far from the control bar and close to the B target wall edge.



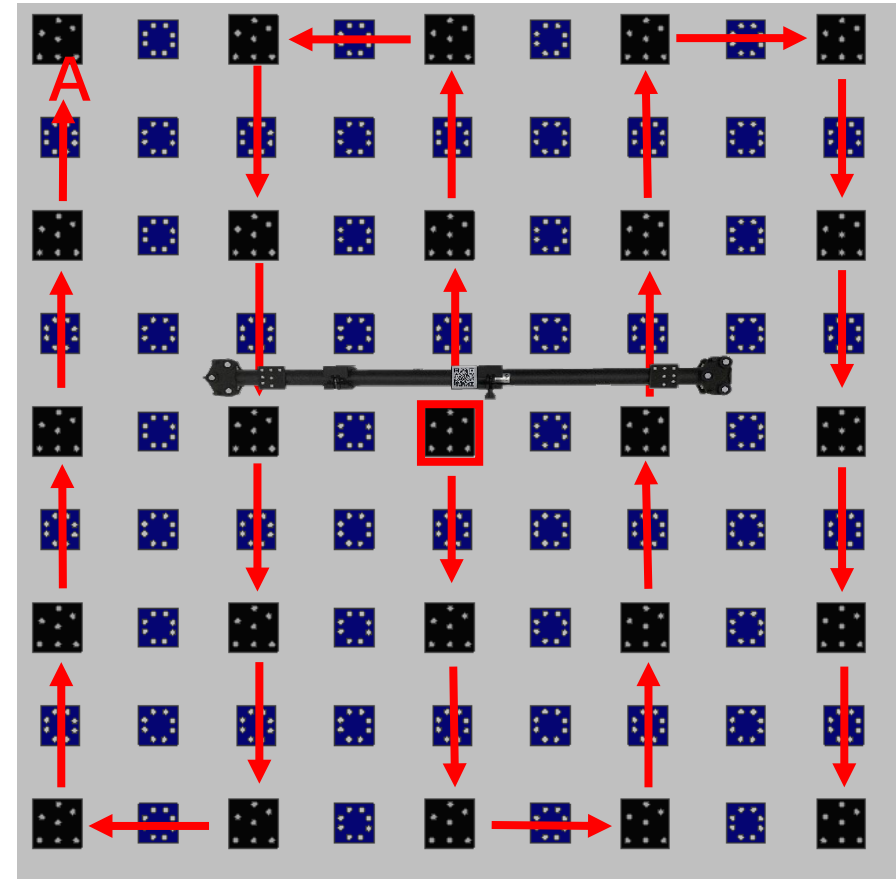
3. TARGET-FREE SCANNING SETUP

Target Collection Guidance--Operation

#2, Take pictures of the A target wall where control bar is placed.



Horizontal orientation



Vertical orientation



3. TARGET-FREE SCANNING SETUP

Target Collection Guidance--Operation

#3, Take pictures around the **A target wall** as below.

#3-1, Take photos of the junction between the A and B walls from up to down at a 45° angle.

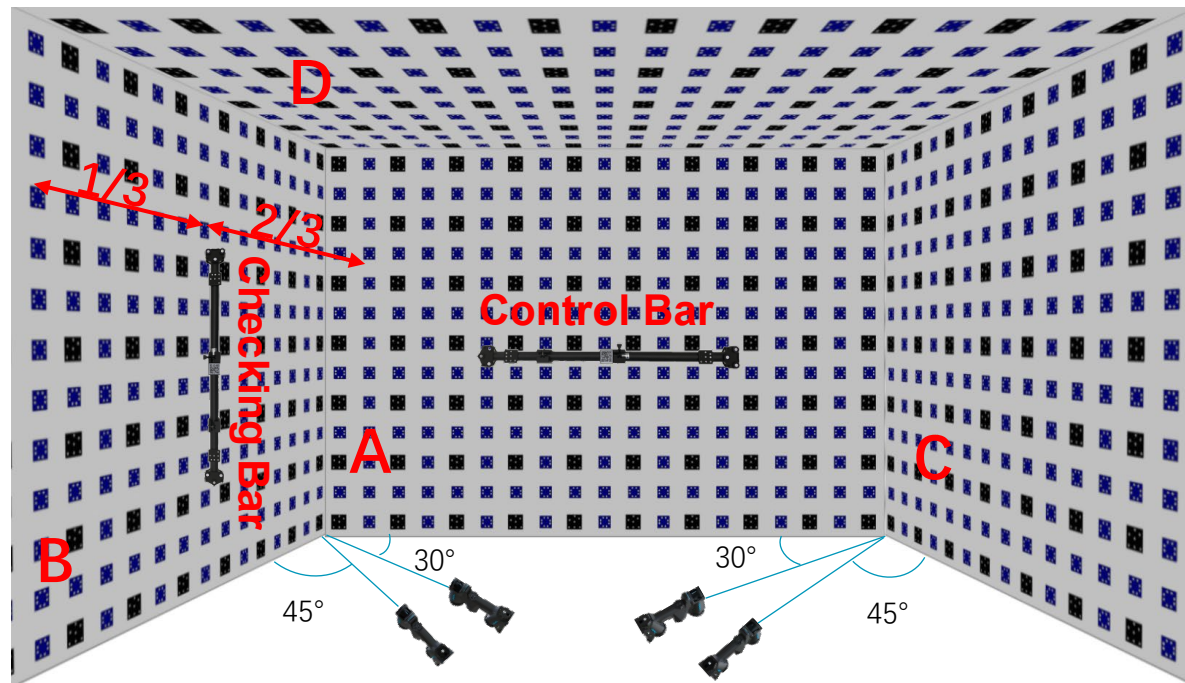
#3-2, Take photos of the junction between the A and B walls from down to up at a 30° angle.

#3-3, Take photos of the junction between the A and C walls from up to down at a 45° angle.

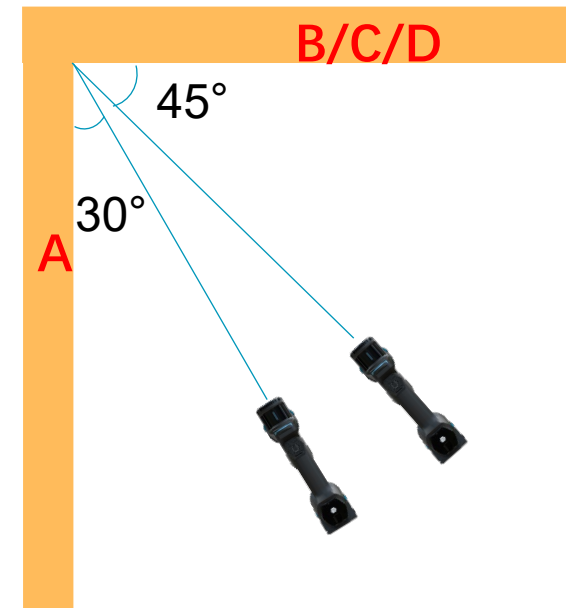
#3-4, Take photos of the junction between the A and C walls from down to up at a 30° angle.

#3-5, Take photos of the junction between the A and D walls from left to right at a 45° angle.

#3-6, Take photos of the junction between the A and D walls from right to left at a 30° angle.



Front View



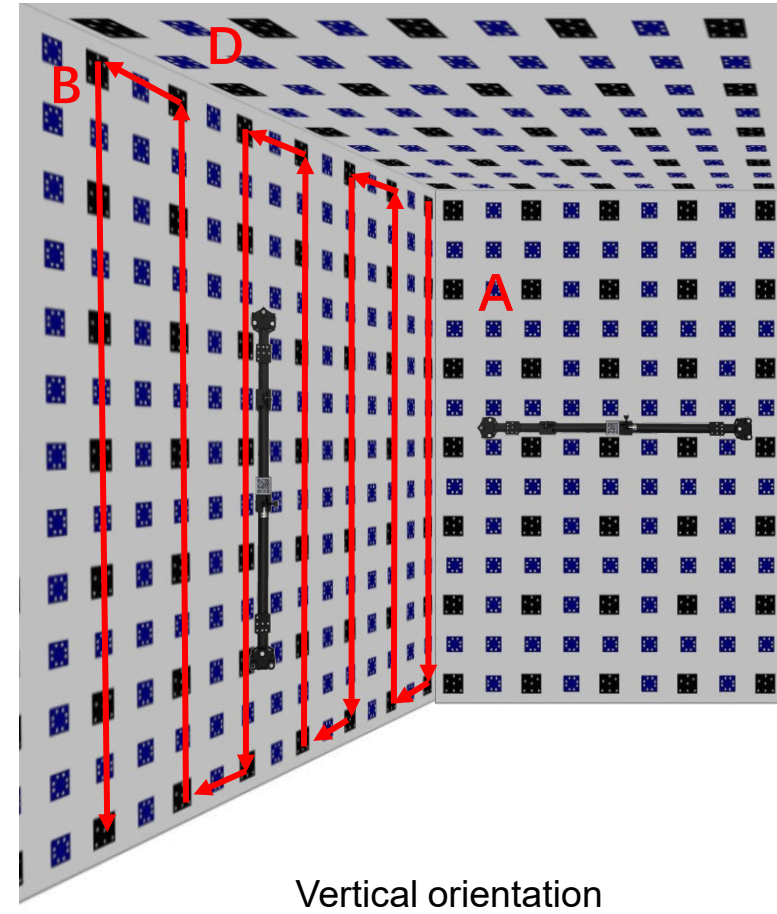
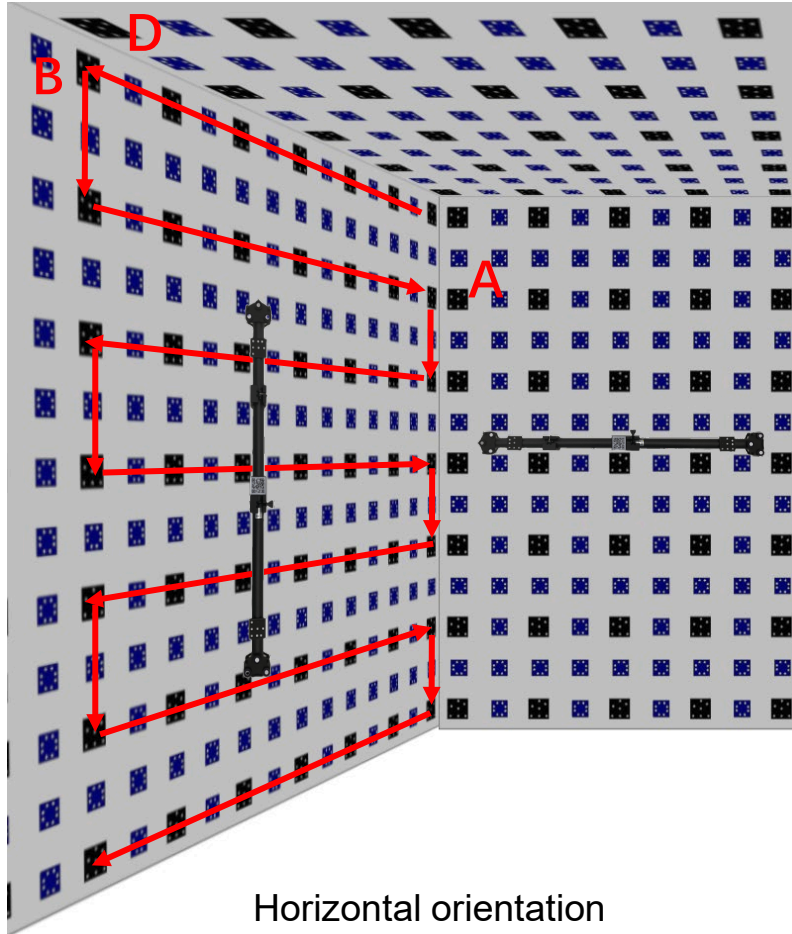
Side View



3. TARGET-FREE SCANNING SETUP

Target Collection Guidance--Operation

#4, Take photos of coded target on B wall as below.

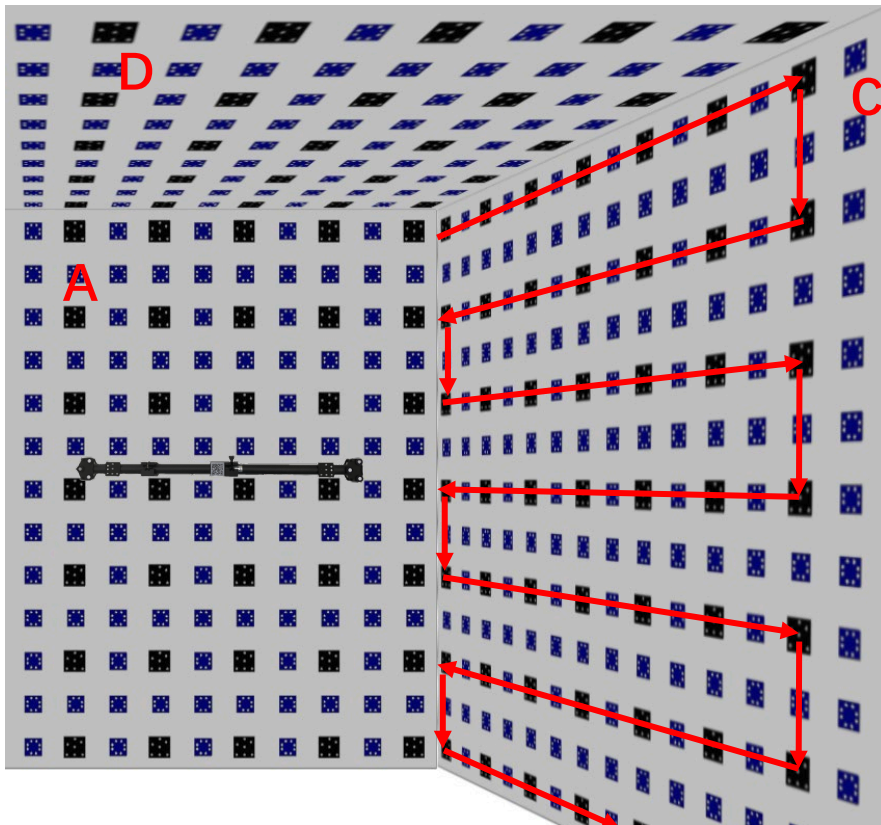




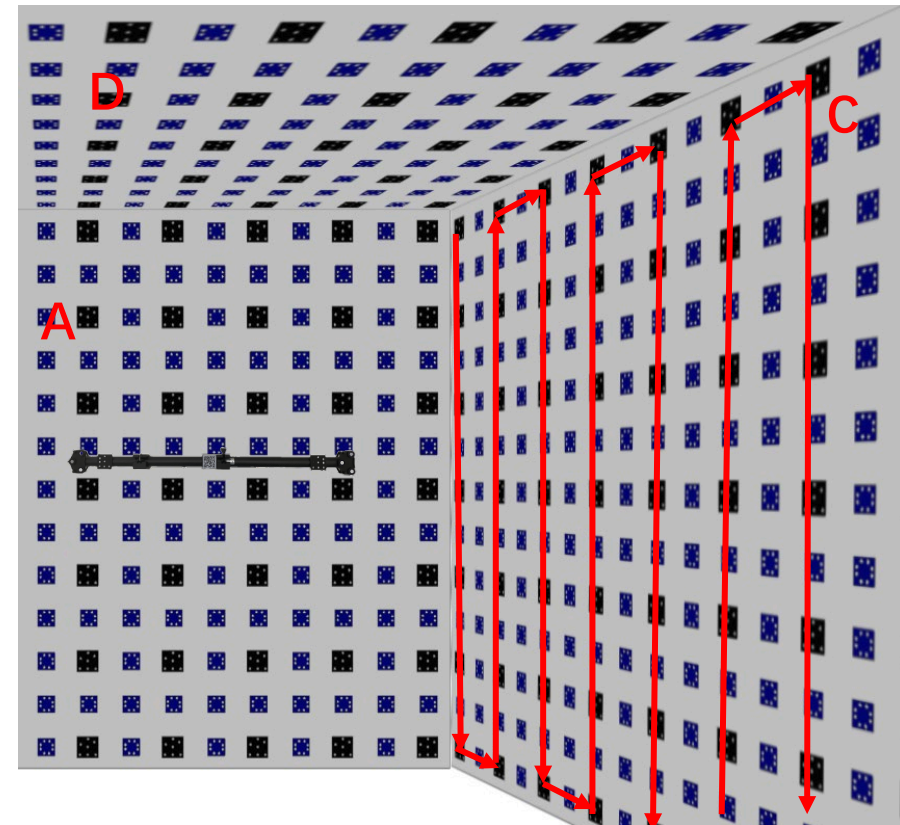
3. TARGET-FREE SCANNING SETUP

Target Collection Guidance--Operation

#5, Take photos of coded target on C wall as below.



Horizontal orientation



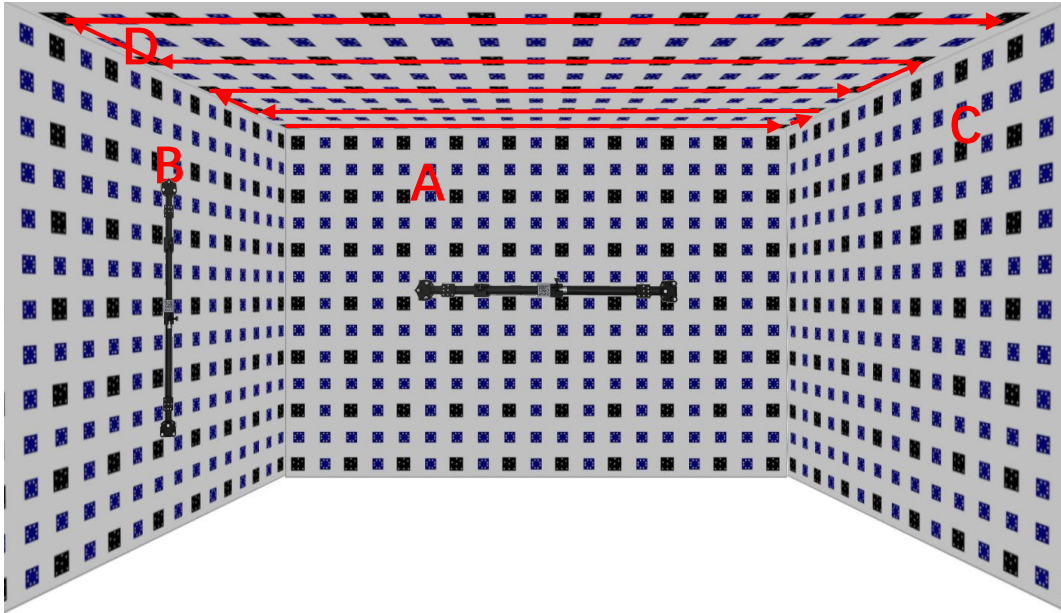
Vertical orientation



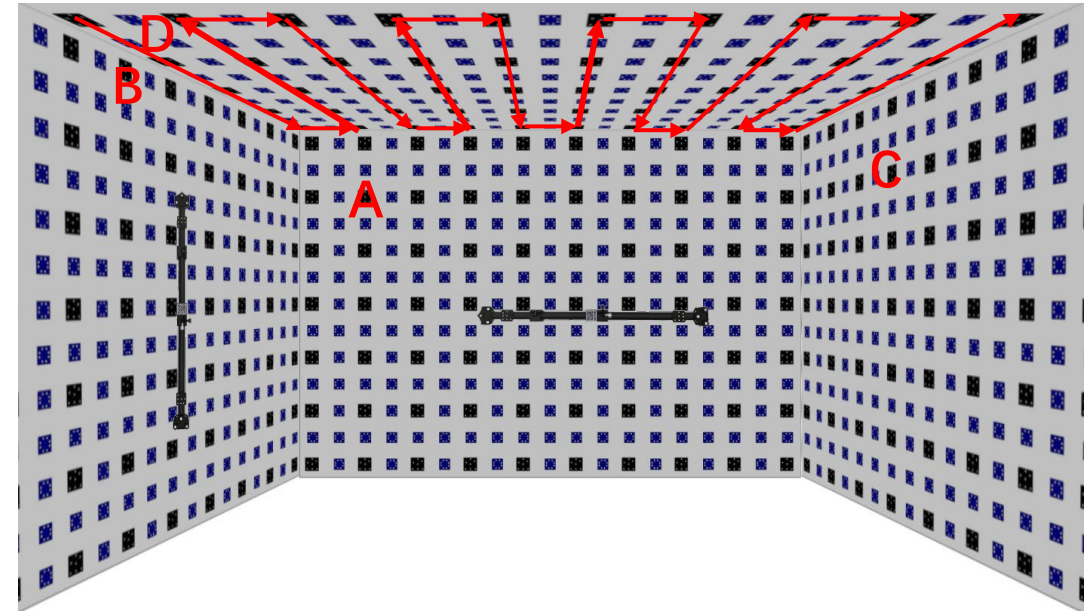
3. TARGET-FREE SCANNING SETUP

Target Collection Guidance--Operation

#6, Take photos of encode targets on D wall as below.



Horizontal orientation



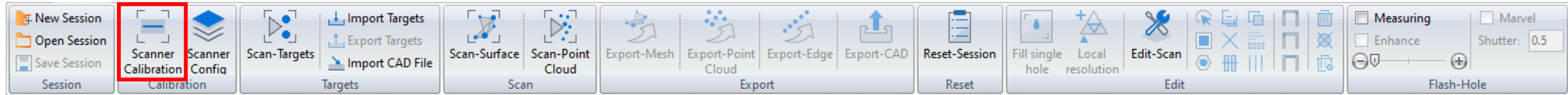
Vertical orientation

4. CALIBRATION



3. CALIBRATION

Scanner Calibration



Tips:

To get good quality data, it is recommended to calibrate the scanner before each scanning job.

While if initial scanning quality is very poor or environment temperature keeps changing, please warm scanner up for 5-10 mins and then calibrate scanner again.



4. CALIBRATION

Scanner Calibration

- Make sure there are no extra targets near the calibration plate
- Make sure there are no reflectors near the calibration plate
- If possible, store the calibration plate in a carrying case
- Please relax when performing scanner calibration and make sure whole process runs as smoothly as possible
- The calibration process may fail if an incorrect, damaged or displaced targets are detected.





4. CALIBRATION

Scanner Calibration

In calibration process, the position and attitude of scanner should be aligned with the corresponding position of each indicator bar (cross circle is aligned with solid circle, three red indicators are aligned with three green ones respectively).

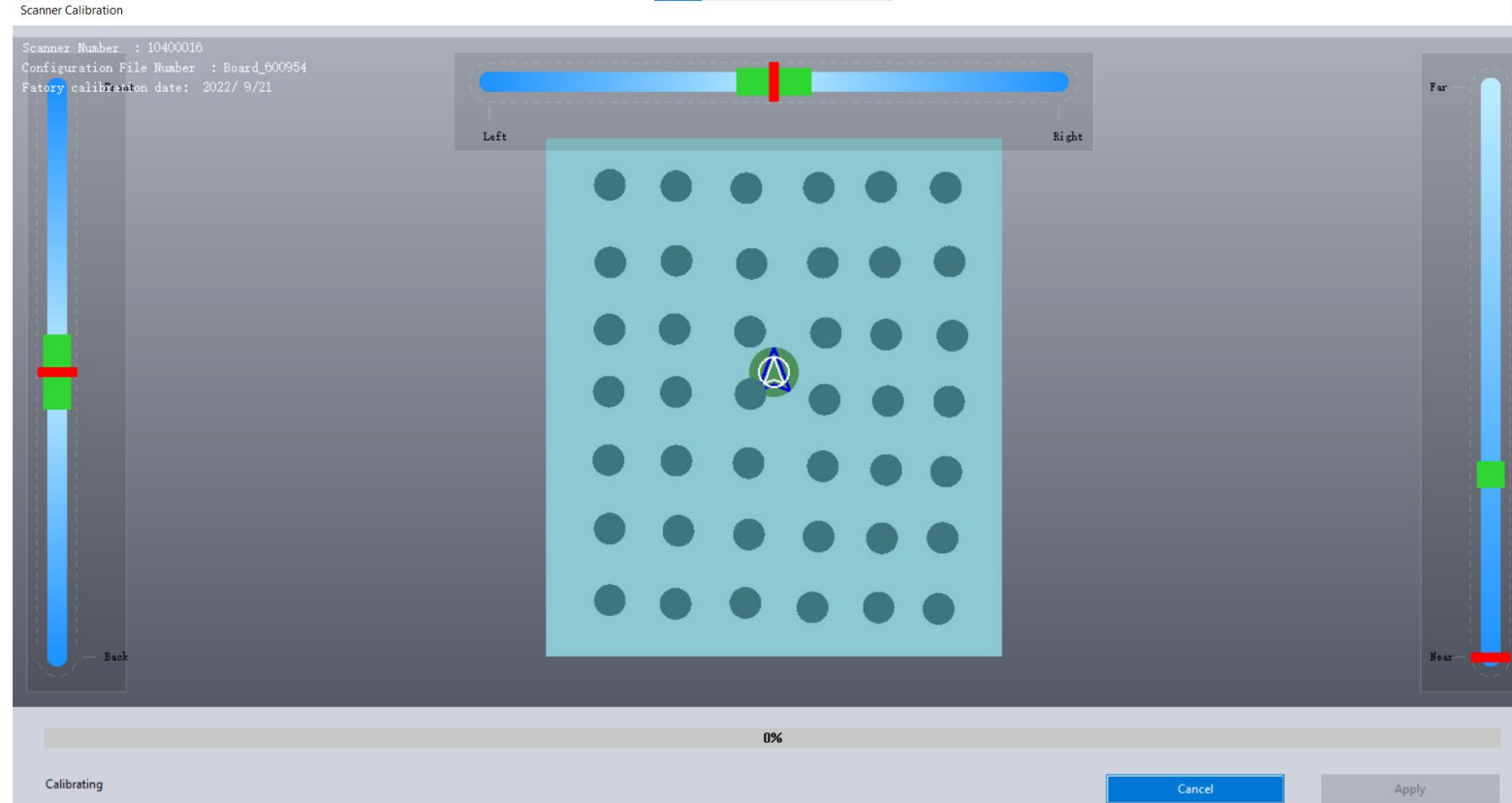
The screenshot shows the 'Scanner Calibration' window. At the top left, it displays: 'Scanner Number : 10400016', 'Configuration File Number : Board_600954', and 'Factory calibration date: 2022/ 9/21'. The main area features a 6x6 grid of dark teal circles. A central circle is highlighted with a white crosshair. Three red indicator bars are visible: a horizontal one at the top, a vertical one on the left, and a vertical one on the right. Each bar has a green segment and a red segment. Three red callout boxes with arrows point to these bars, labeled 'Top indicator bar', 'Left indicator bar', and 'Right indicator bar'. At the bottom, there is a progress bar at 0%, a 'Calibrating' status, and 'Cancel' and 'Apply' buttons.



4. CALIBRATION

Scanner Calibration

- There are 24 prescribed postures in whole calibration process.
When the current posture is aligned, it automatically jumps to the next prescribed posture.
- Application: Apply calibration result to cover previous scanner configuration file.





4. CALIBRATION

Scanner Calibration

The scanner must point to the center of the calibration plate, as indicated by the circle, and the red line (the height and direction of the scanner) should be always in the green area.

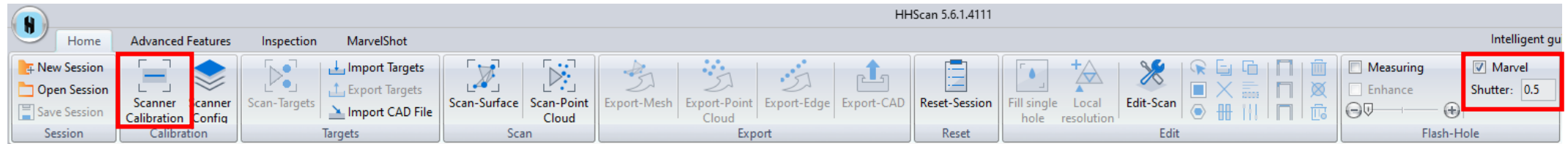
- 1. Right indicator bar:** The height of the scanner from the calibration plate, adjusting the height in the direction perpendicular to the calibration plate
- 2. Top indicator bar:** The horizontal tilt angle of the scanner, tilted left and right
- 3. Left indicator bar:** The vertical tilt angle of the scanner, tilted front and back
- 4. Arrow:** indicates the rotation angle of the scanner around the coordinate axis of the vertical calibration plate. When scanning, try to ensure that the crosshair does not rotate. The left and upper green indicator bar indicates the specified tilt angle, and the right green bar indicates the height
- 5. The Arrow Circle:** Indicates the current position of the scanner; the size of the circle indicates current height of the scanner from the calibration plate
- 6. The Green Solid Circle:** Indicates the specified position where the scanner needs to be aligned



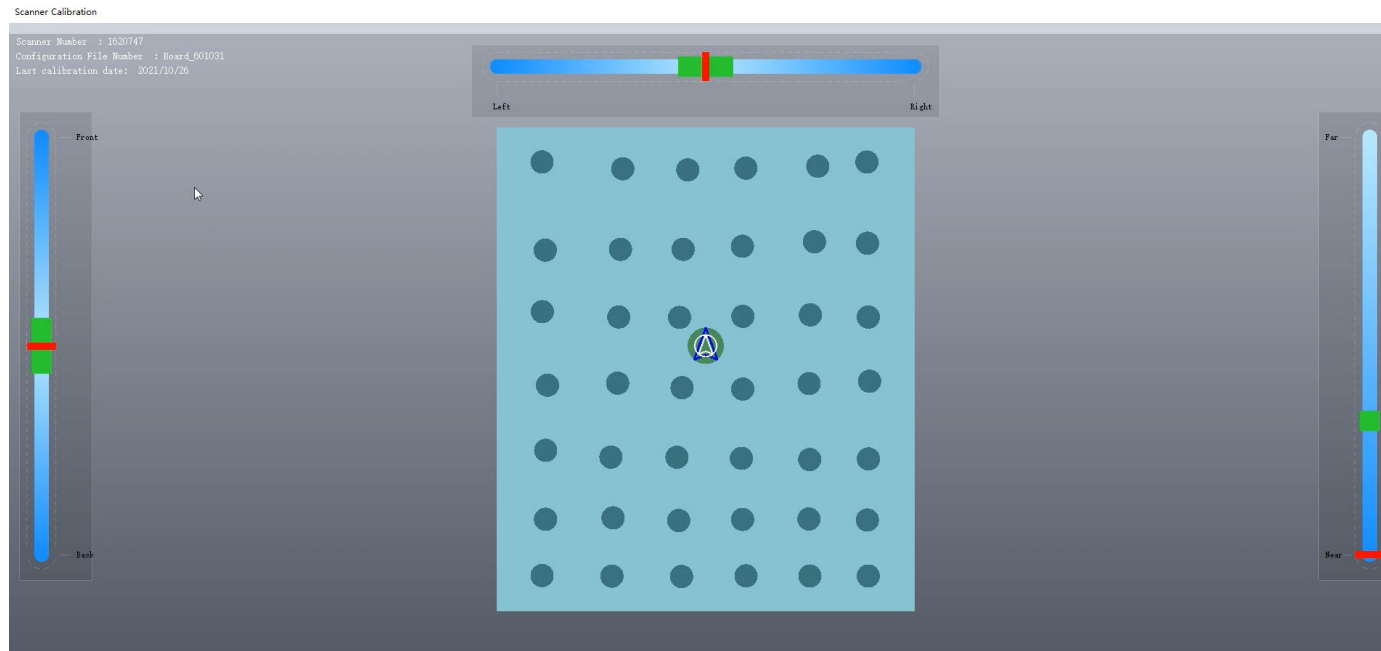
4. CALIBRATION

Third camera

- Third Camera Calibration: Select “Marvel” before calibration



- Click “Scanner Calibration” to enter calibration interface

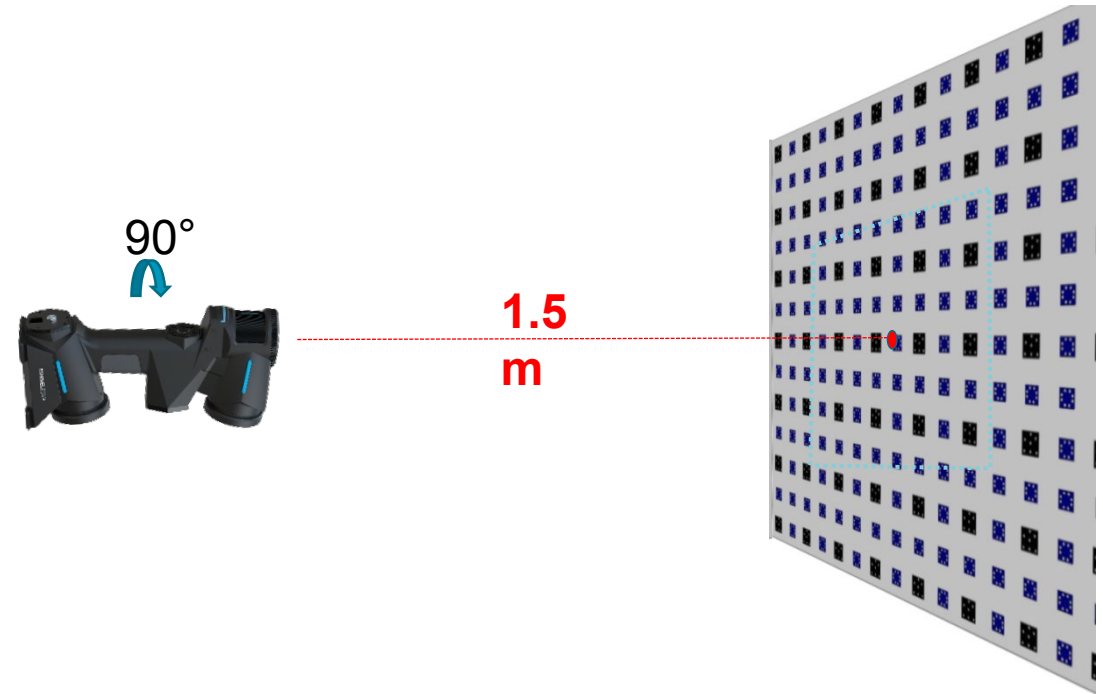




4. CALIBRATION

Third camera

- Put calibration plate 1.5 meters away from TARGETs wall
- Keep third camera tracking the TARGET wall when doing calibration
- In calibration, the position and attitude of the current scanner should be aligned with the corresponding position indicator bar same as two camera calibration





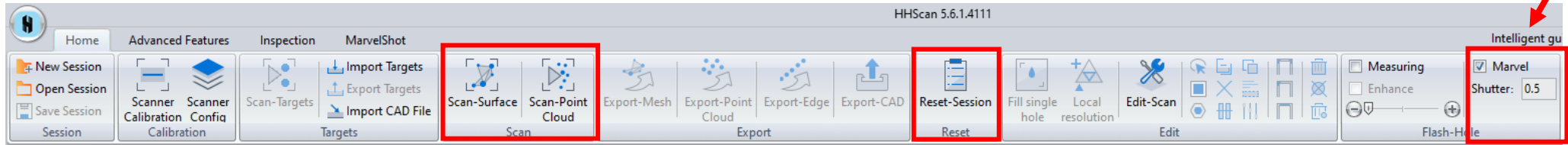
“ TRY IT BY YOURSELF

5. SCANNING PROCESS WITHOUT TARGET



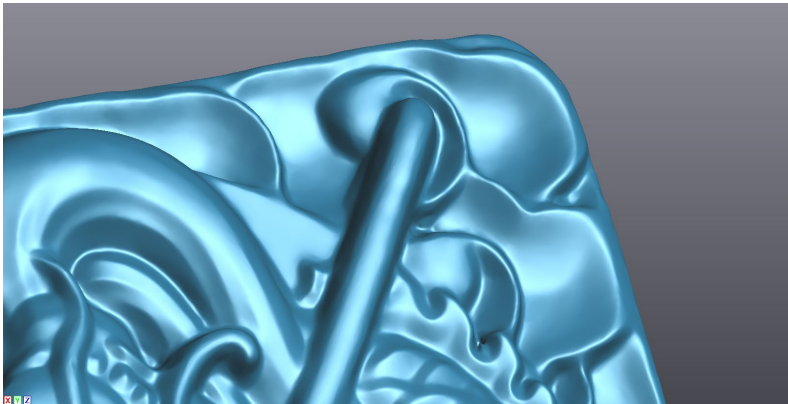
5. SCANNING PROCESS WITHOUT TARGET

Scanning Mode

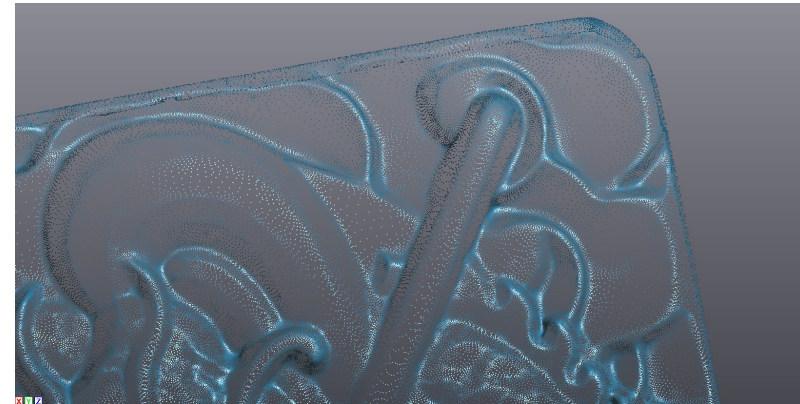


- **Scan-Surface:** to scan surface and export as mesh or point cloud
- **Scan-Points:** to scan point cloud and export as point cloud
- **Reset-Session:** to reset current project (save project if you need original data)

Mesh Presentation



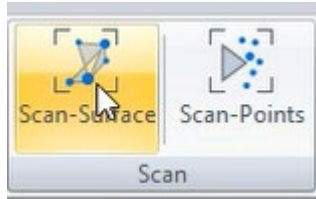
Point Cloud Presentation



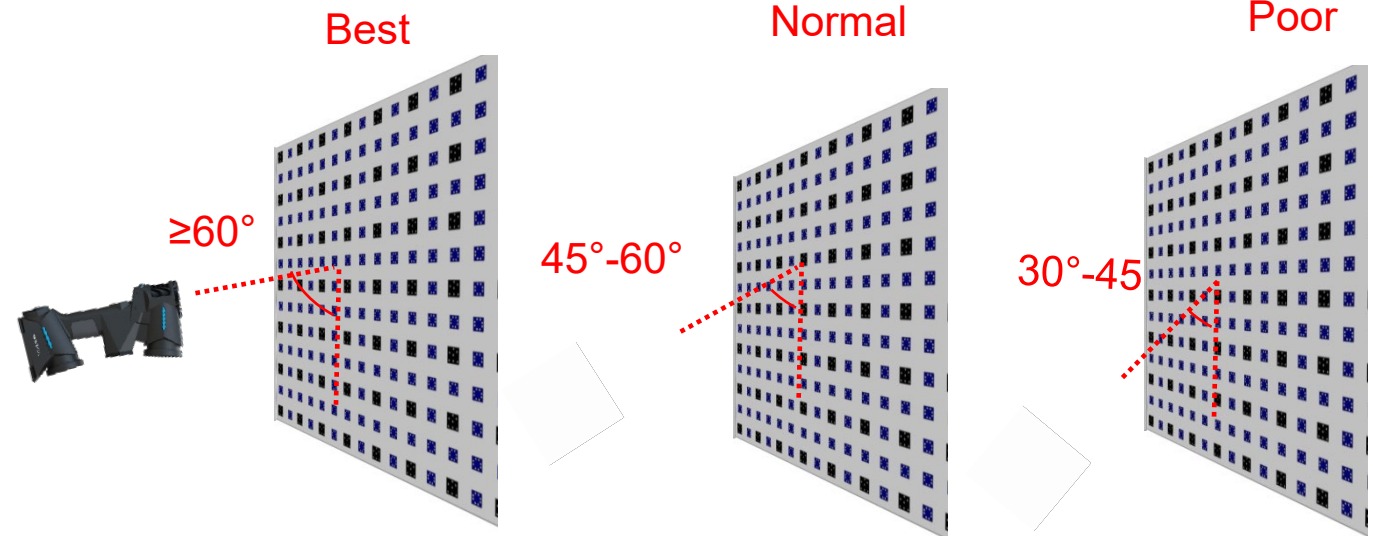


5. SCANNING PROCESS WITHOUT TARGET

Scanning Mode



Click “scan surface” and press scan button to start scanning



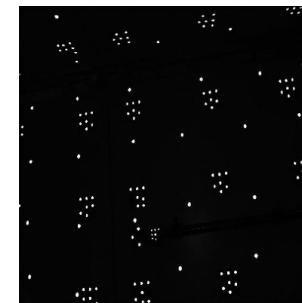
Tips:

To secure Marvel Mode scan data quality,

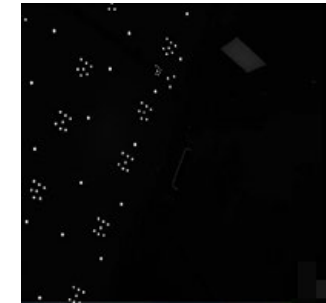
#1, The angle between the scanner top camera and targets wall is better more than 60°.

#2, Keep third camera tracking enough targets for Marvel Mode scanning.

Good Tracking



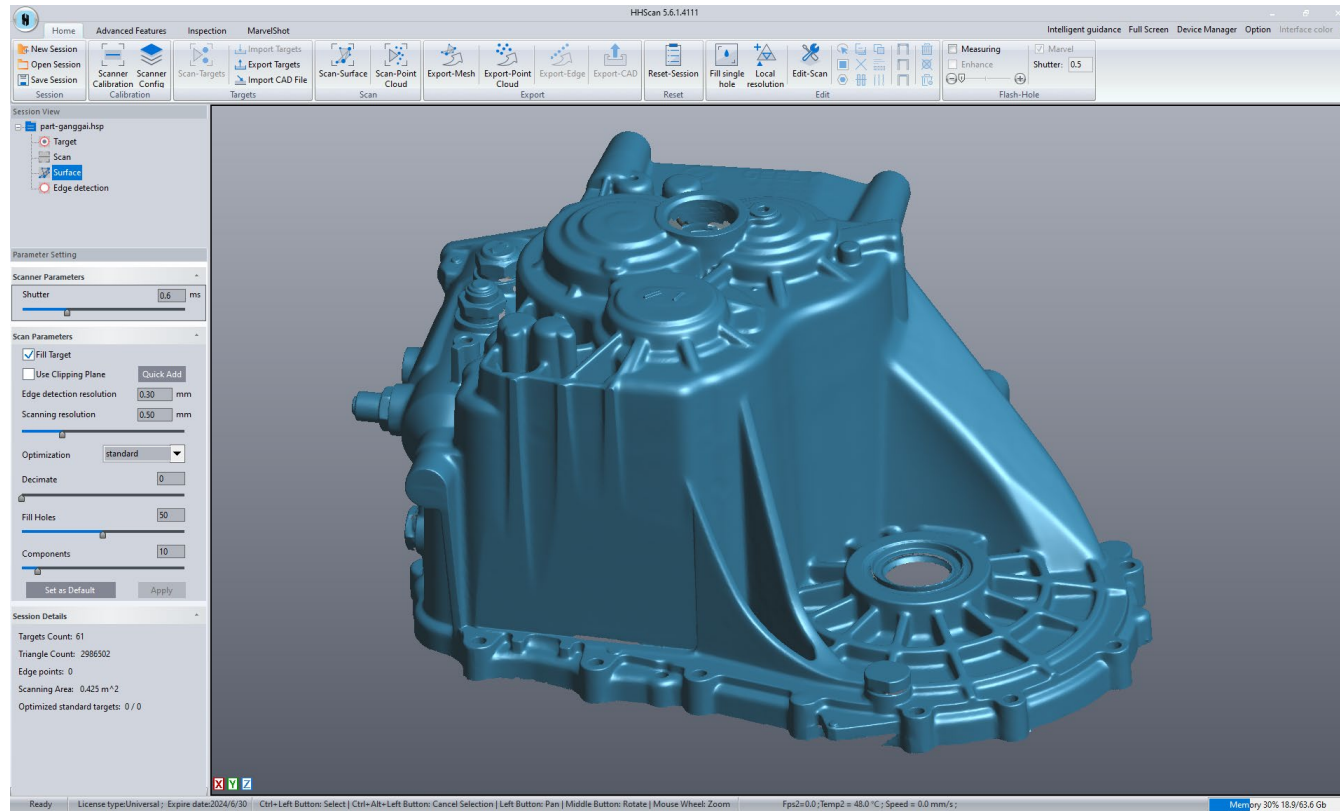
Poor Tracking





5. SCANNING PROCESS WITHOUT TARGET

Scanning Mode



- When we scan parts, normally we choose the scanning mode of either scanning surface or scanning point cloud, both of scanning modes are to collect surface data.
- The difference between two scanning mode is type of export data.
 - To scan surface is to collect surface data and export as mesh or point cloud.
 - To scan point cloud is to collect surface data and export as point cloud.



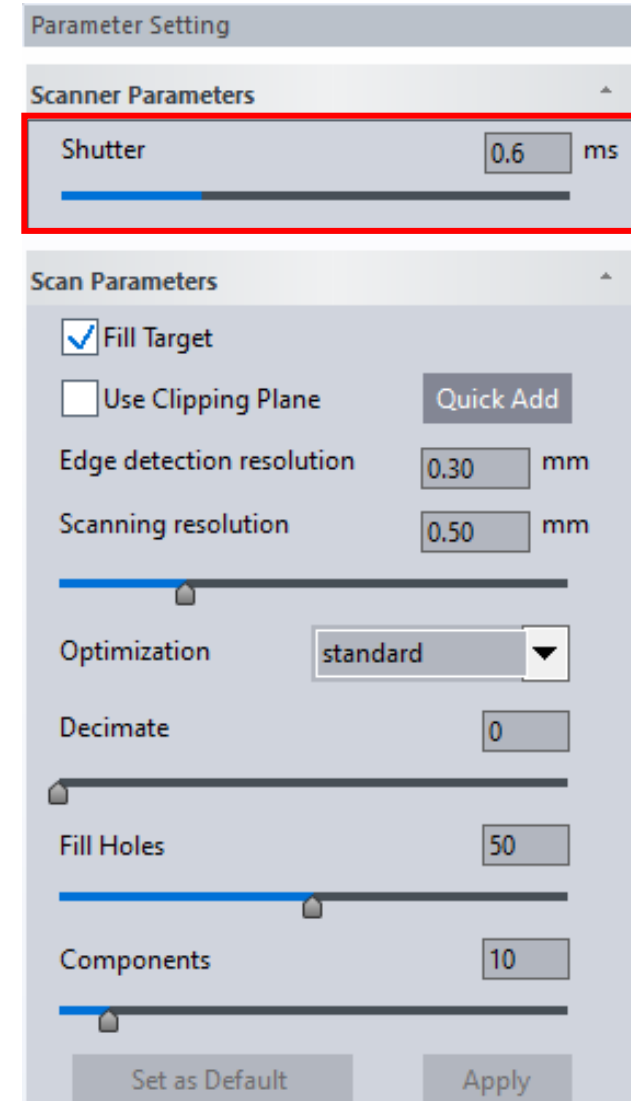
5. SCANNING PROCESS

Shutter Setting

- Shutter setting:
 - 1. Set the value directly with keyboard
 - 2. Press "-" or "+" on the scanner itself to adjust
- Shutter setting range: 0.1ms-10ms
- The general scan setting shutter is from 0.4ms to 3ms.
- The shutter adjusts the camera exposure time, the exposure time is adjusted according to different scanning objects. Light color objects use a low-value shutter, and dark color/shiny objects use a high-value shutter.

Tips:

The use of high shutter for light objects can result in poor data surface quality, and the use of low shutter for dark objects will lose laser lines.

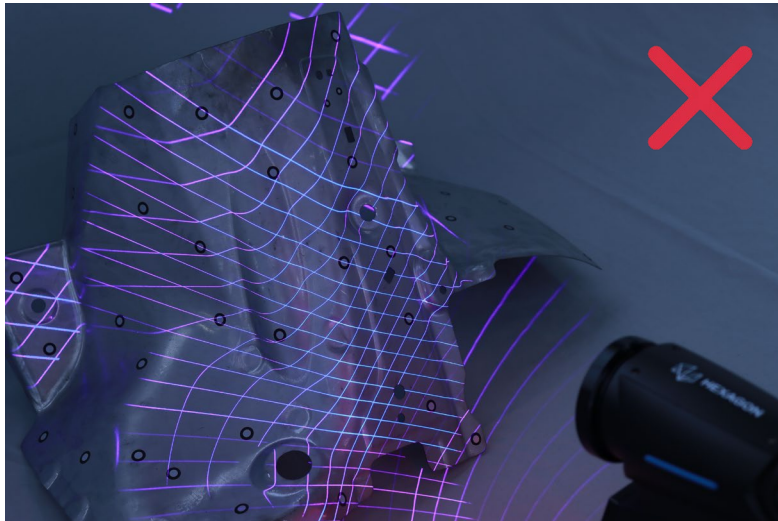




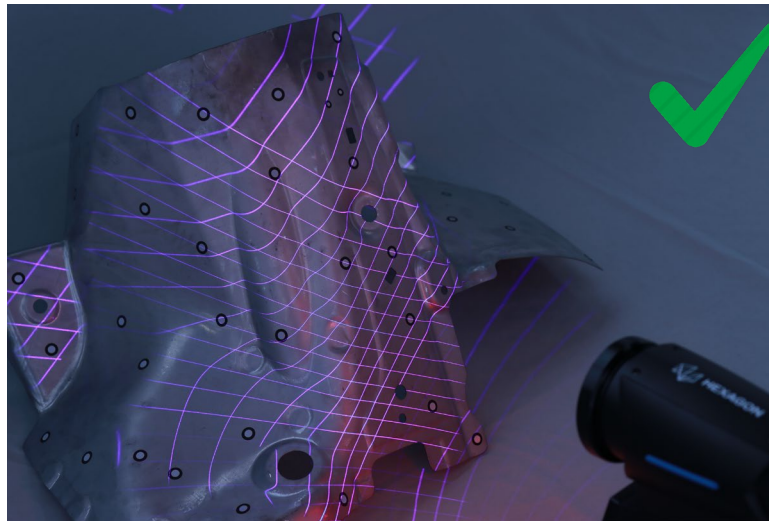
5. SCANNING PROCESS

Shutter Setting

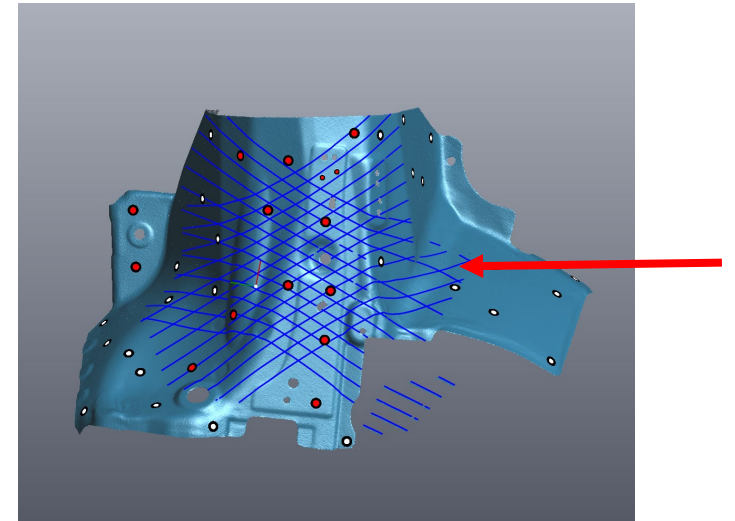
Wrong shutter setting—too shine



Correct shutter setting



Tips: It is better to have a continuous blue laser line in scanning software under the scanning mode (as shown below).

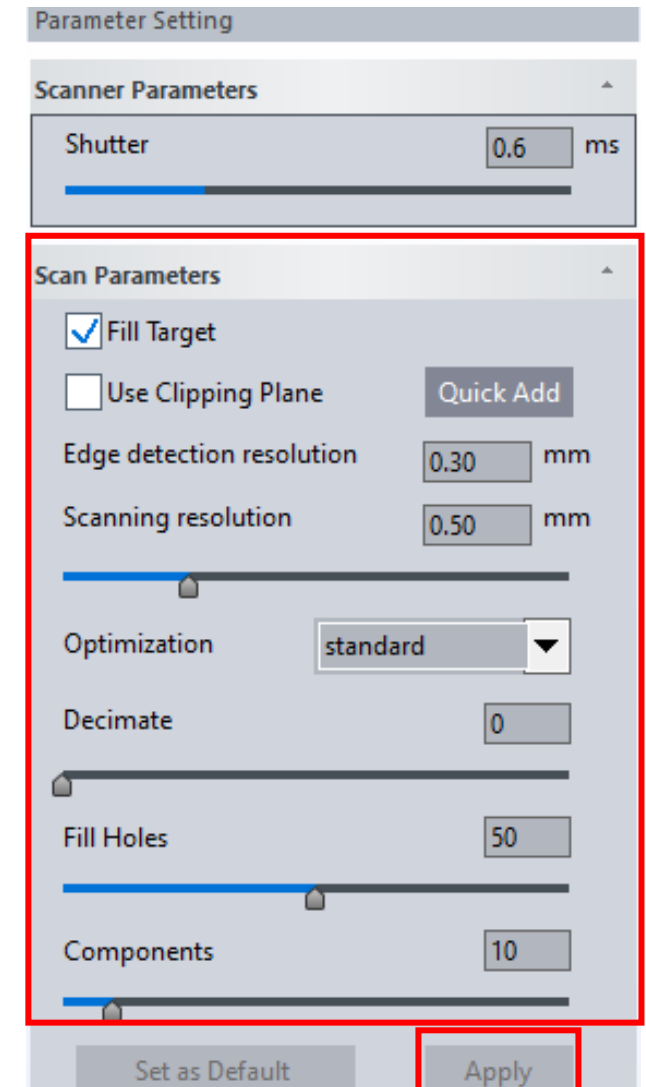




5. SCANNING PROCESS

Parameters Setting

1. **Fill target:** To fill target hole according to the surrounding curvature
2. **Use Clipping Plane:** To save the data above the clipping plane and delete the data below the clipping plane
3. **Optimization:** To improve the surface quality of the curvature section and smooth the surface data- (Without, Standard, Middle, High & High-enhance).
4. **Resolution:** Set the value in column and then apply to execute (value varies from 0.02mm to 10mm)
5. **Decimate:** To simplify the amount of model data that is ultimately generated
6. **Fill Holes:** To fill the small holes that are not scanned completely (value varies from 0 to 100, the bigger the value sets, the larger the hole fills)
7. **Components:** Automatically eliminate noisy data (value varies from 0 to 100, the bigger the value sets, the larger data will be eliminated).

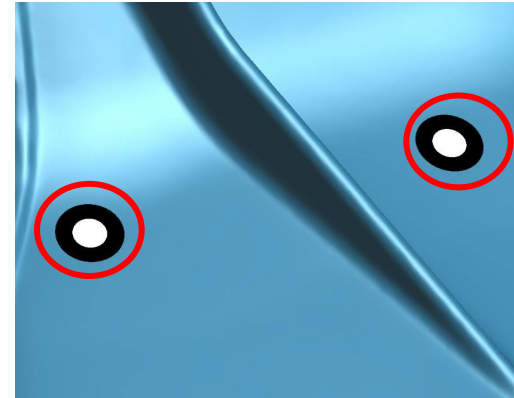
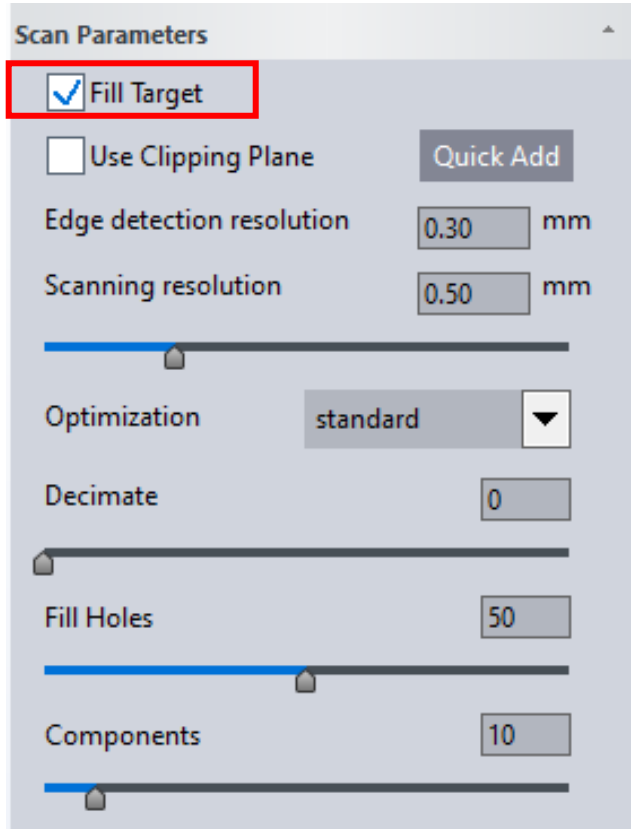




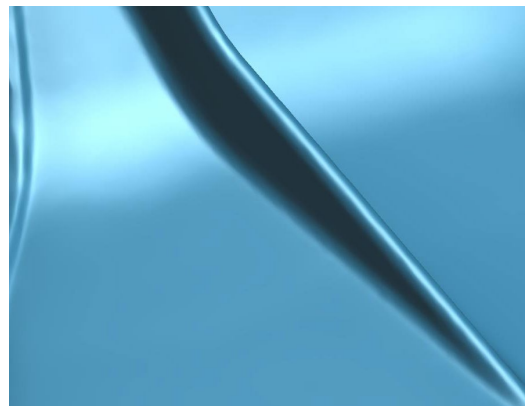
5. SCANNING PROCESS

Fill target Setting

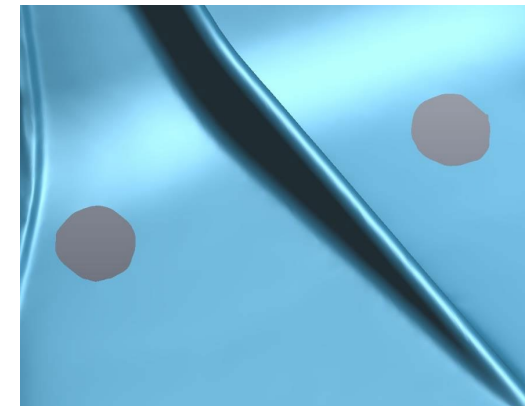
Fill target—To fill the target hole according to the surrounding curvature



Scanning With targets



Select Fill target Option



Deselect Fill target Option

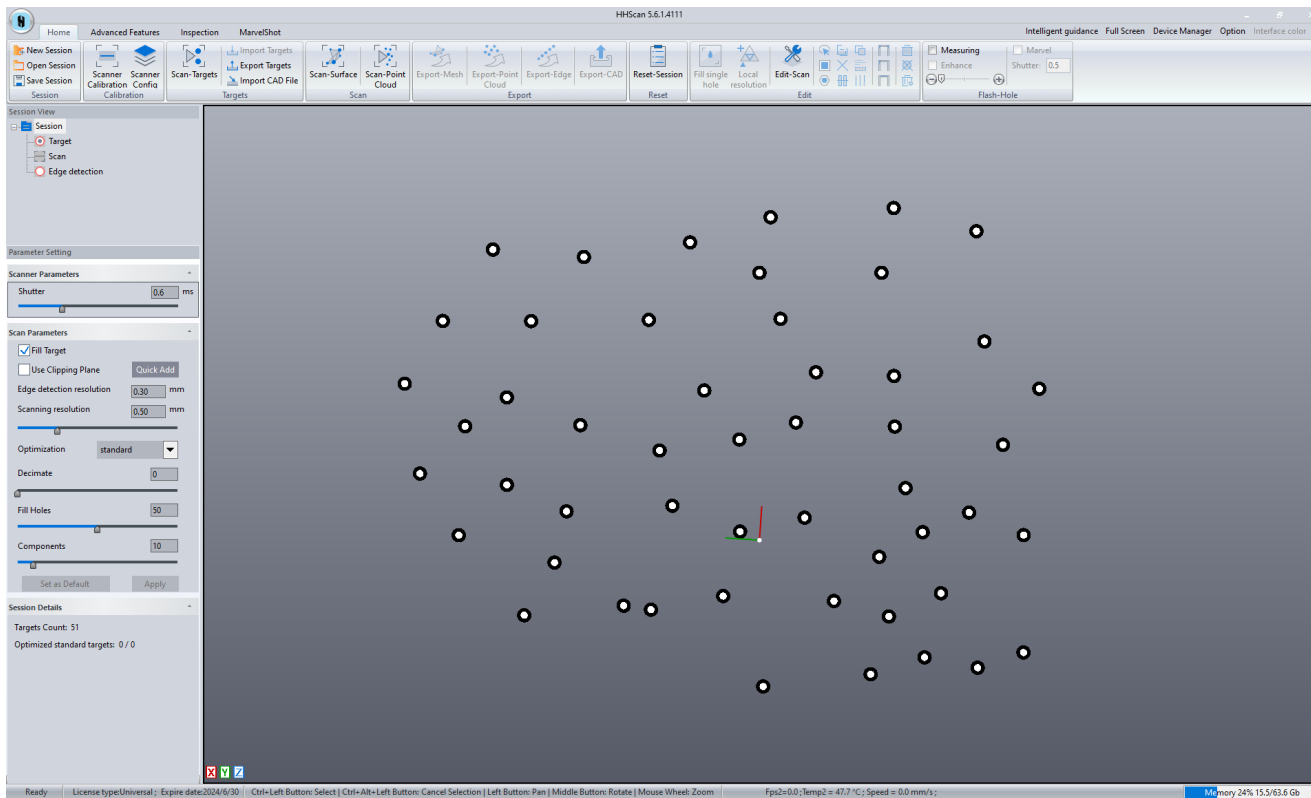


5. SCANNING PROCESS

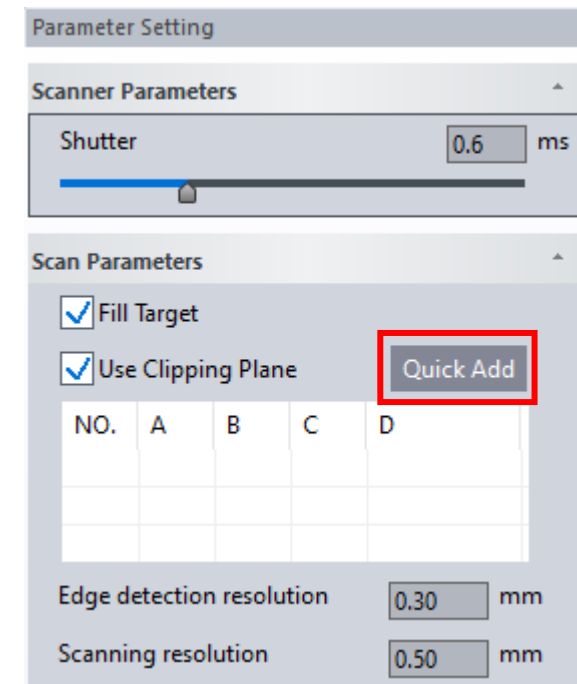
Clipping Plane Setting

Use **Clipping Plane**—To delete the data below the clipping plane.

STEP ONE: Scan targets to capture the targets data.



STEP TWO: Click “Quick Add”

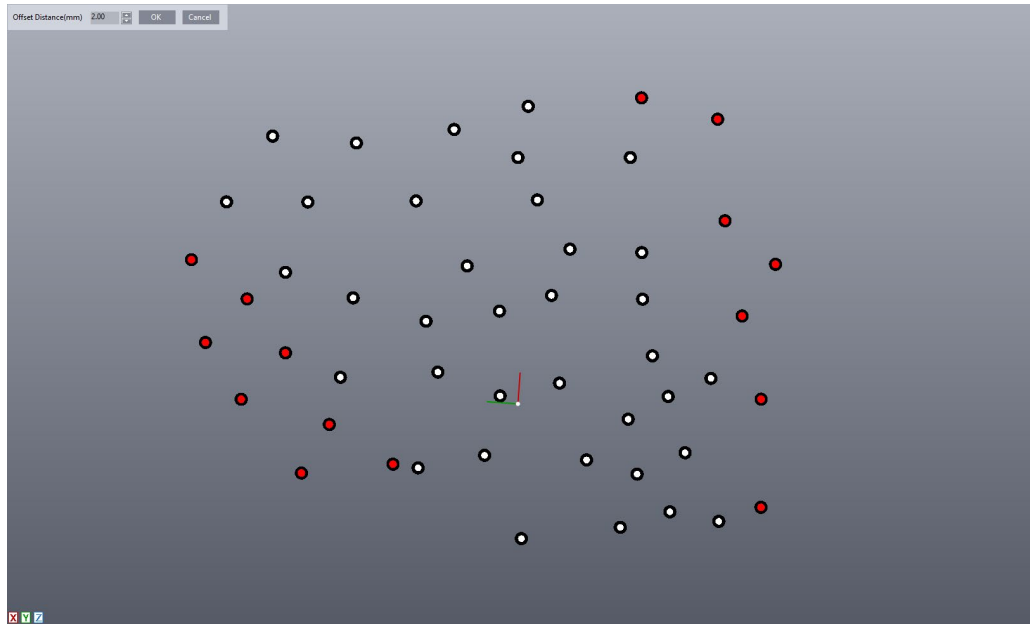




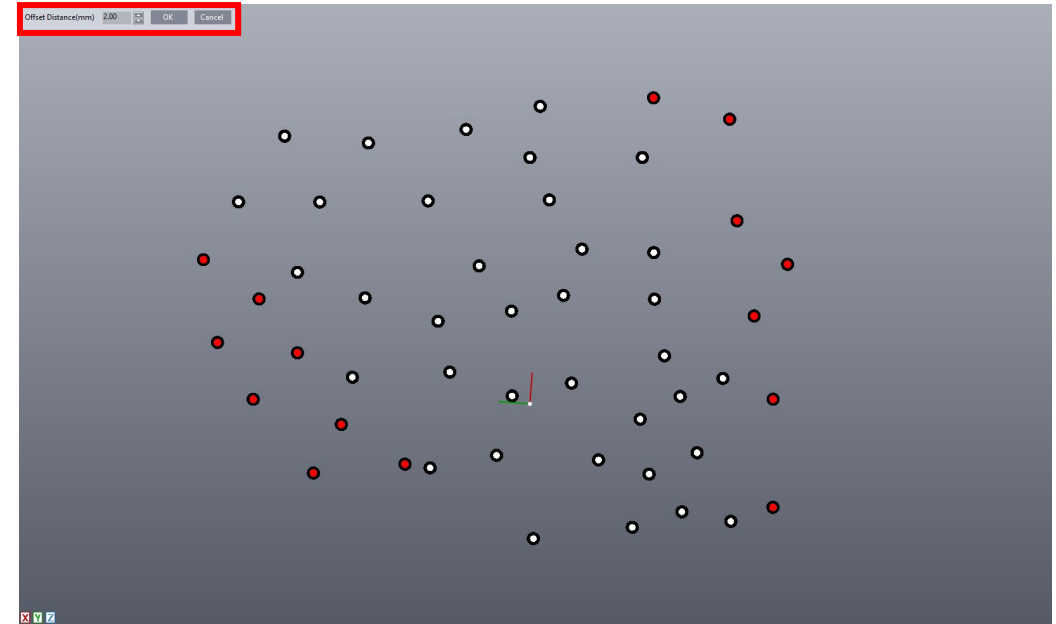
5. SCANNING PROCESS

Clipping Plane Setting

STEP THREE: Press the “ctrl” key on the keyboard and click the left mouse button to select the targets.



STEP Four: Set the offset distance (the distance between the clipping plane and the original plane created by the selected targets).

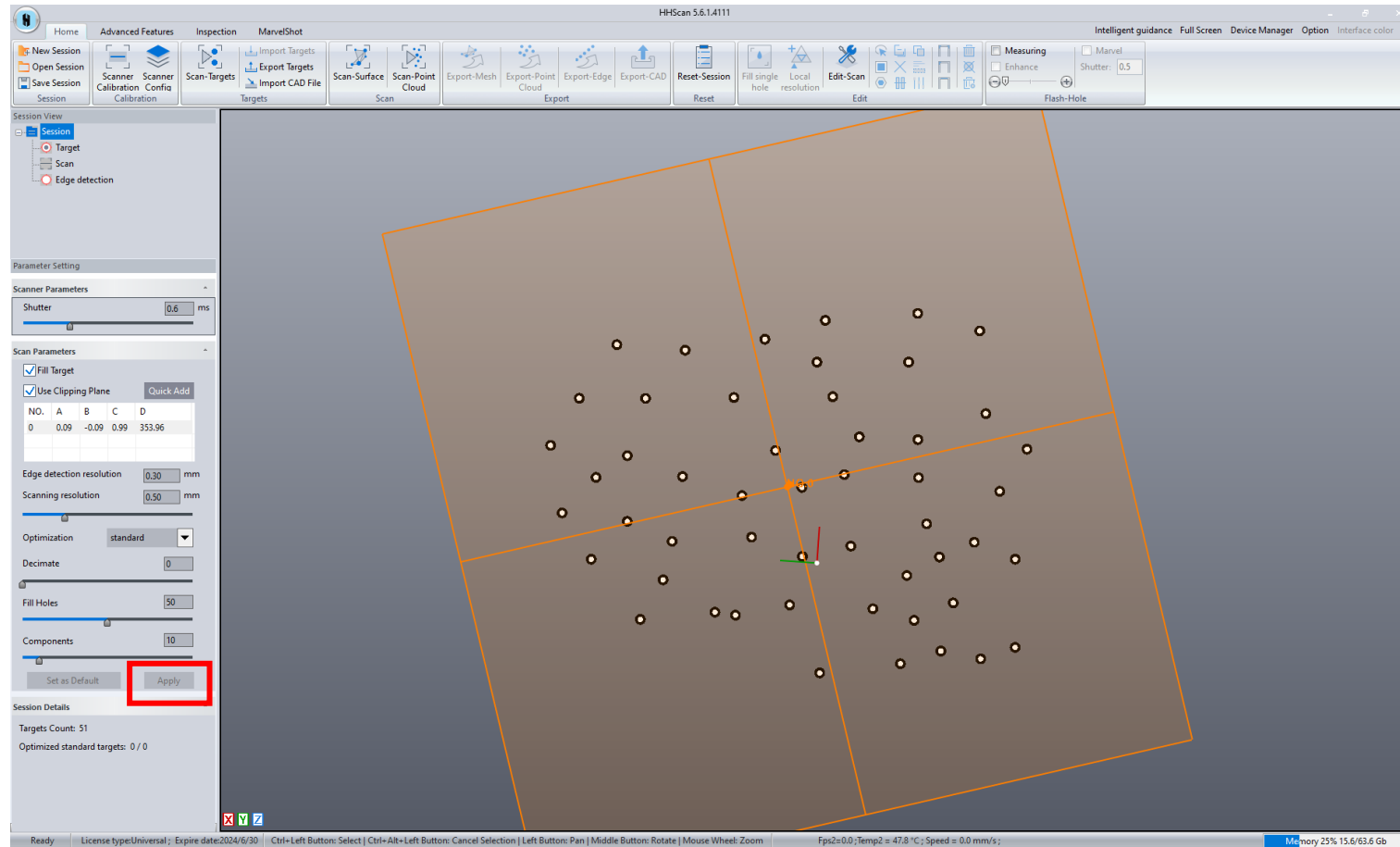




5. SCANNING PROCESS

Clipping Plane Setting

STEP FIVE: Click “Apply”.





5. SCANNING PROCESS

Resolution Setting

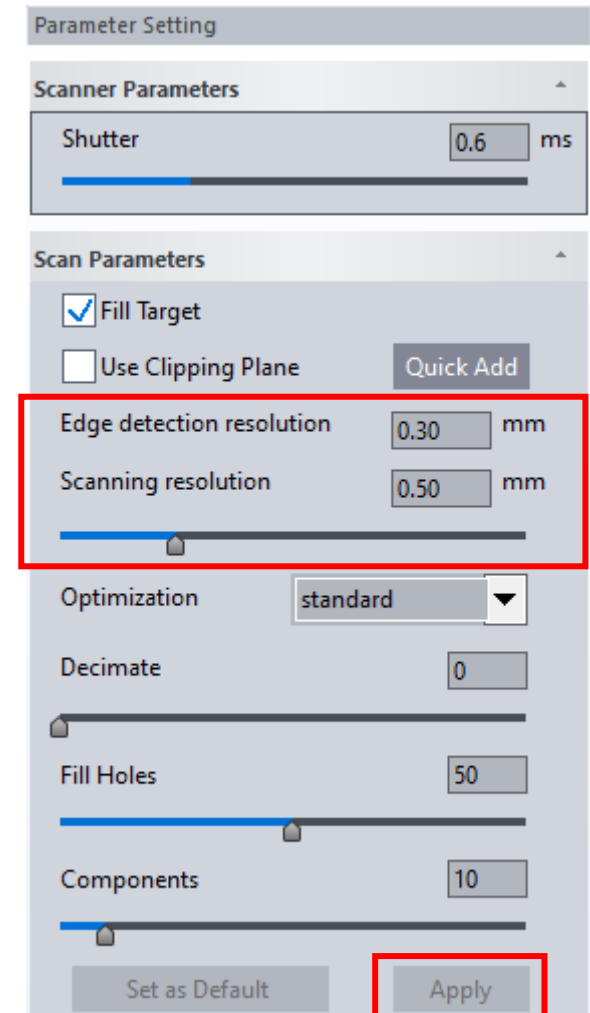
- Resolution—Set the value in column and then apply to execute
- Resolution range: 0.02mm~10mm
- For most scanning job, the resolution can be set between 0.2mm~2.0mm.

Tips:

It's not the higher resolution the better. We should set the reasonable resolution according to the complexity and details of the parts.

For your reference:

1. Metal Sheet Part: 0.2mm-1mm
2. Carved, Cultural Relics: 0.2mm-0.5mm
3. General Mechanical Parts 0.2mm-0.8mm

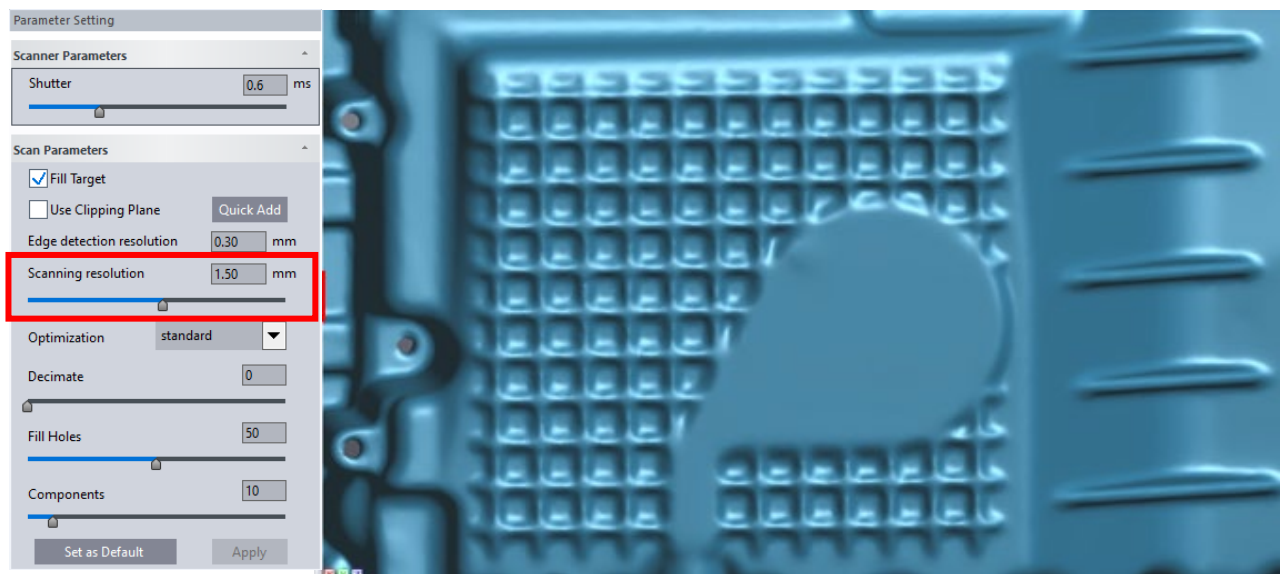




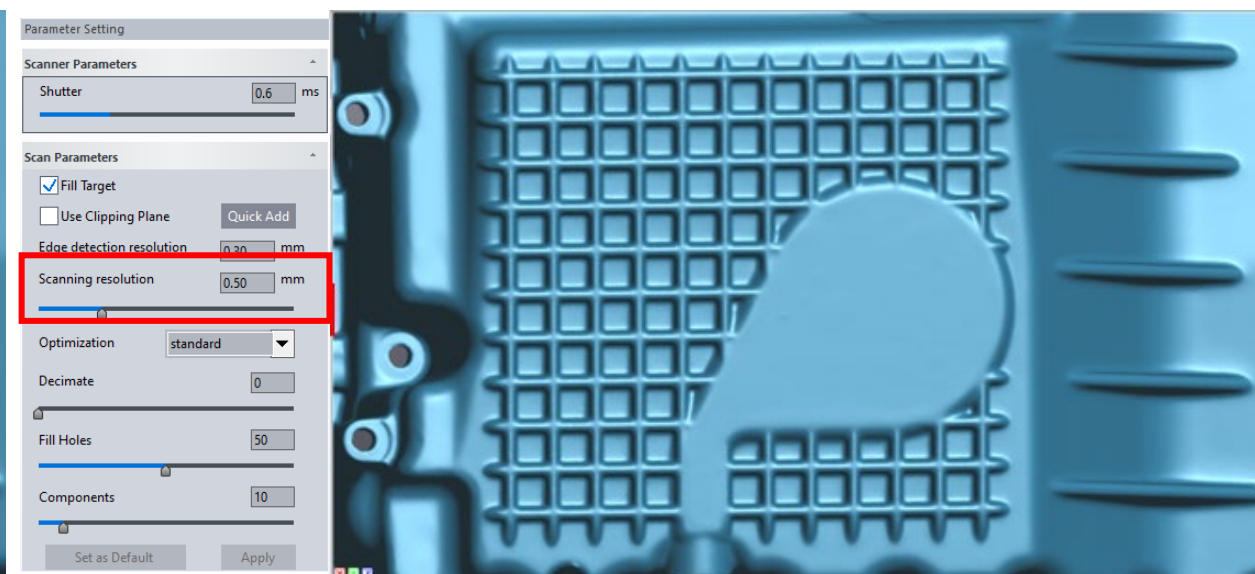
5. SCANNING PROCESS

Scanning Resolution

➤ Scanning resolution represents scan data-collecting details class and shows optical scanning ability.



Resolution: 1.5mm



Resolution: 0.5mm



5. SCANNING PROCESS

Mesh Resolution

- Mesh resolution refers to size of the triangle edges which build scanned surface. Point cloud refers to the distance between each point
- Mesh resolution is directly related to digital capacity or detail remeshing
- For our scanner, it is best to set the mesh resolution to a value greater than or equal to 0.2 mm

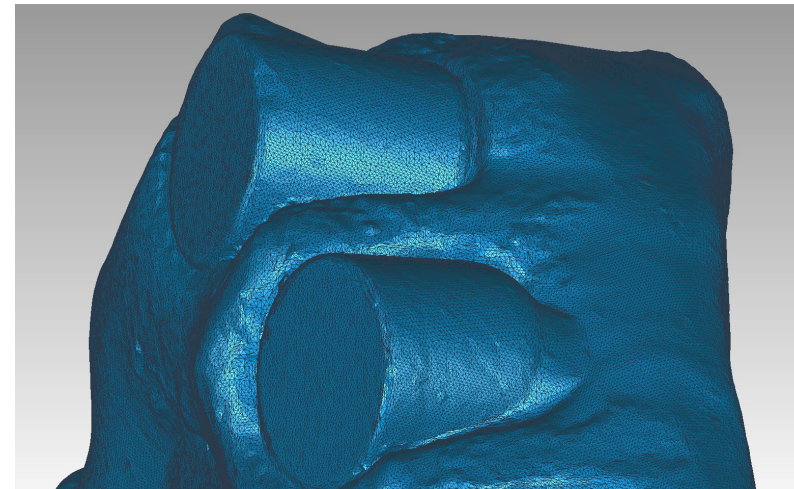
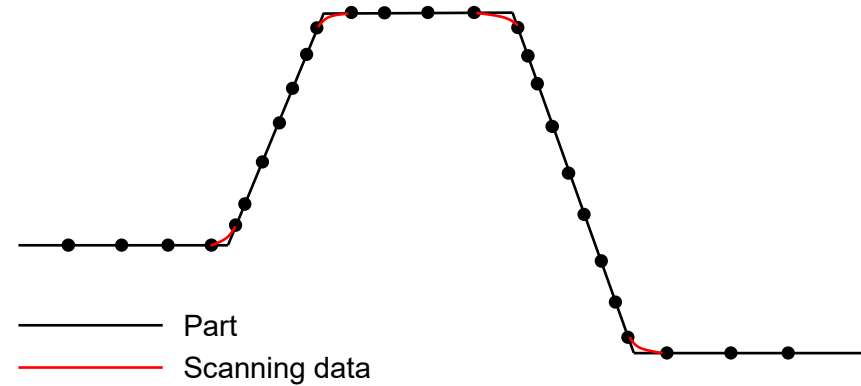
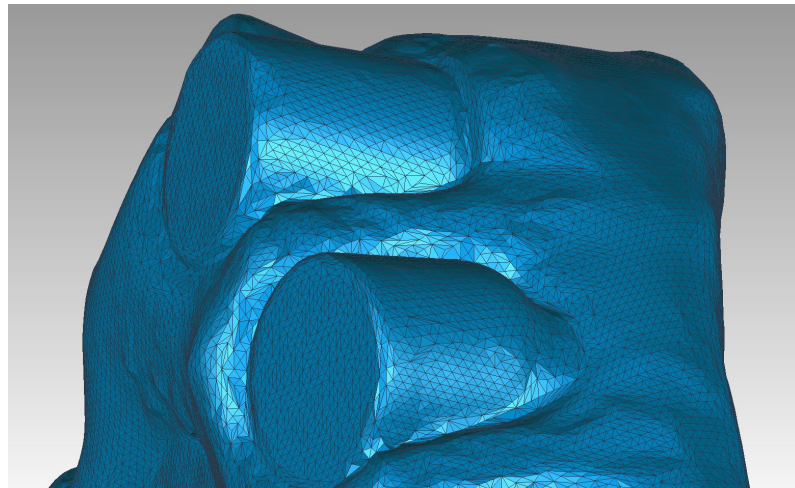
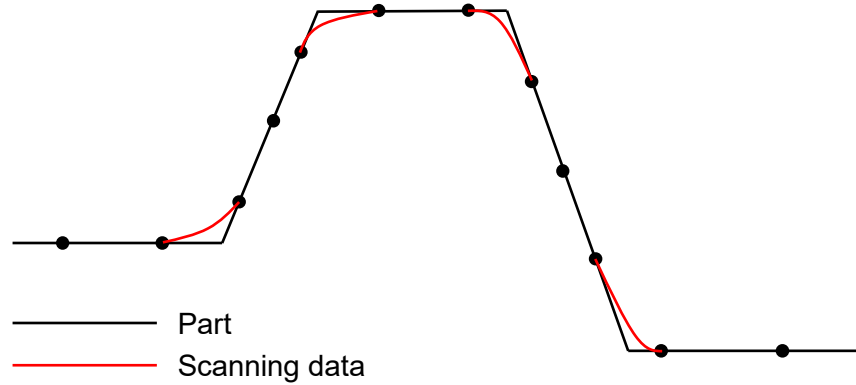




5. SCANNING PROCESS WITHOUT TARGET

Resolution & Accuracy

- Resolution refers to the level of detail that scanner can collect.

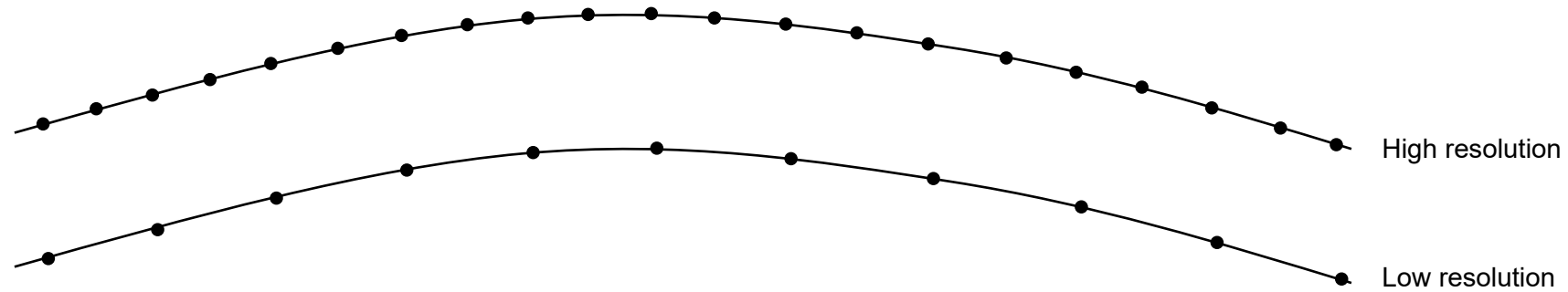




5. SCANNING PROCESS WITHOUT TARGET

Resolution & Accuracy

➤ Low resolution does not necessarily mean low accuracy.





5. SCANNING PROCESS WITHOUT TARGET

Optimization Setting

- **Optimization**— To improve the surface quality of the curvature section and smooth the surface data.

Optimization value
“without”



Optimization value
“standard”



Optimization value
“middle”



Optimization value
“high”



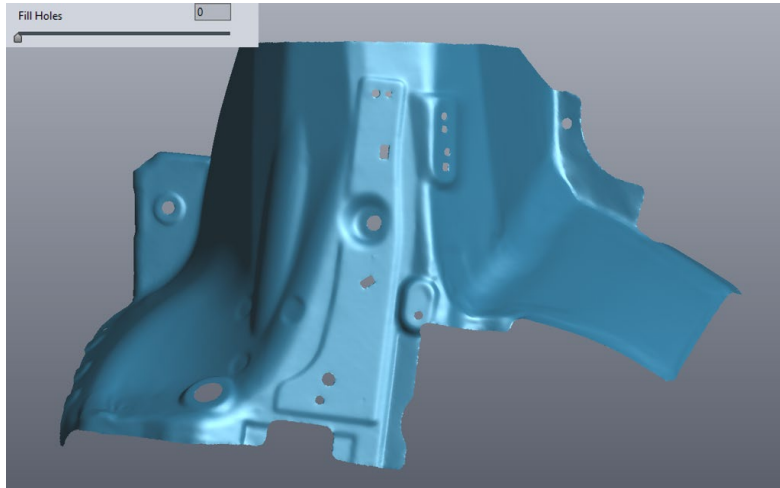
Optimization value
“high-enhance”





5. SCANNING PROCESS WITHOUT TARGET

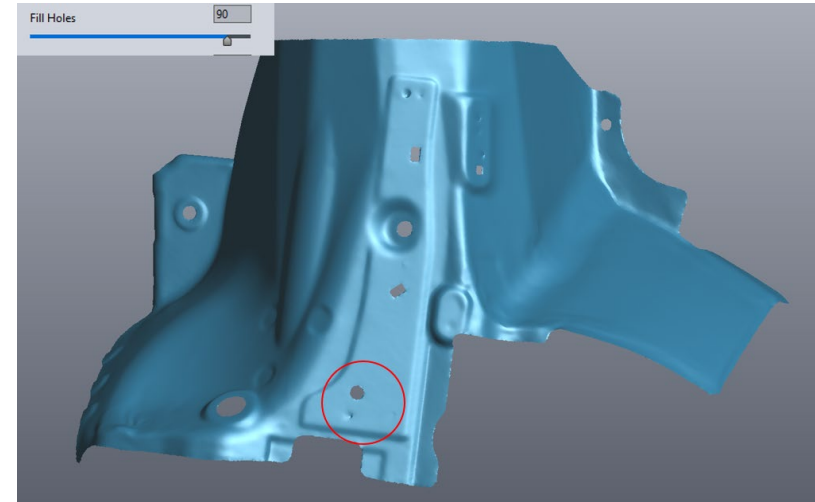
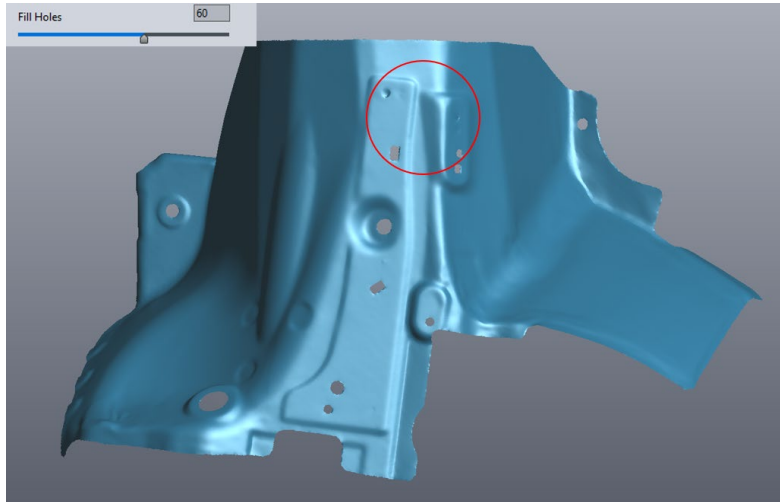
File Holes



➤ **Fill Holes**—To fill the small holes that are not scanned completely.

Tips:

Setting range: 0 to 100. The value represents the hole size that will be filled. The default value is "50", which will fill $\phi 5$ mm holes.





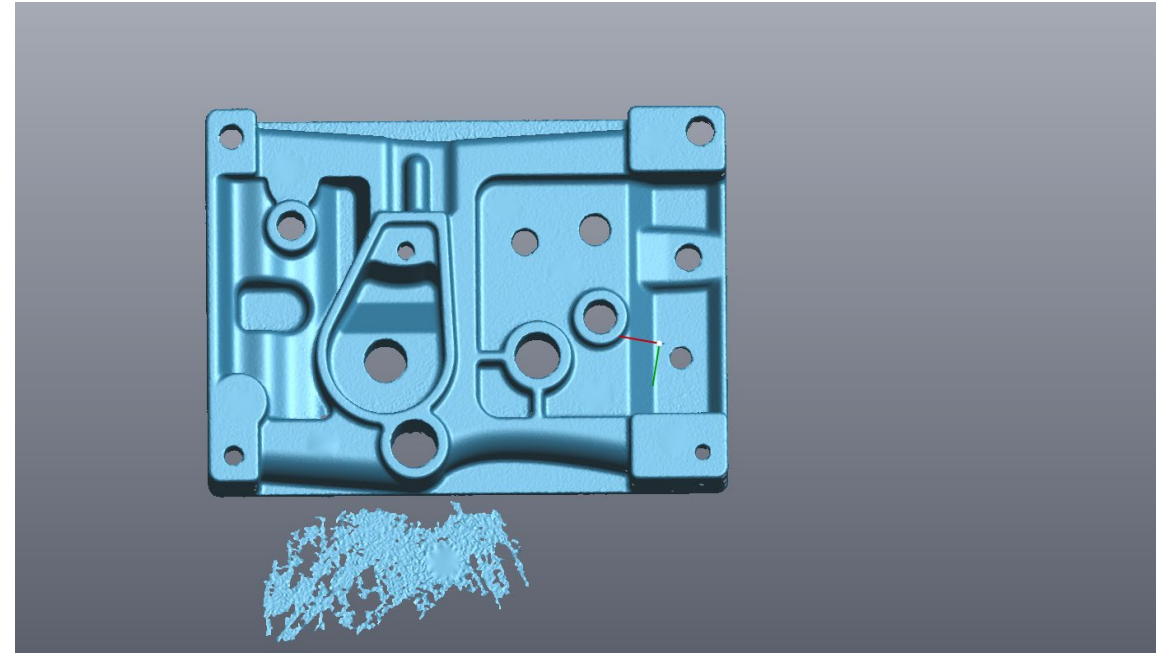
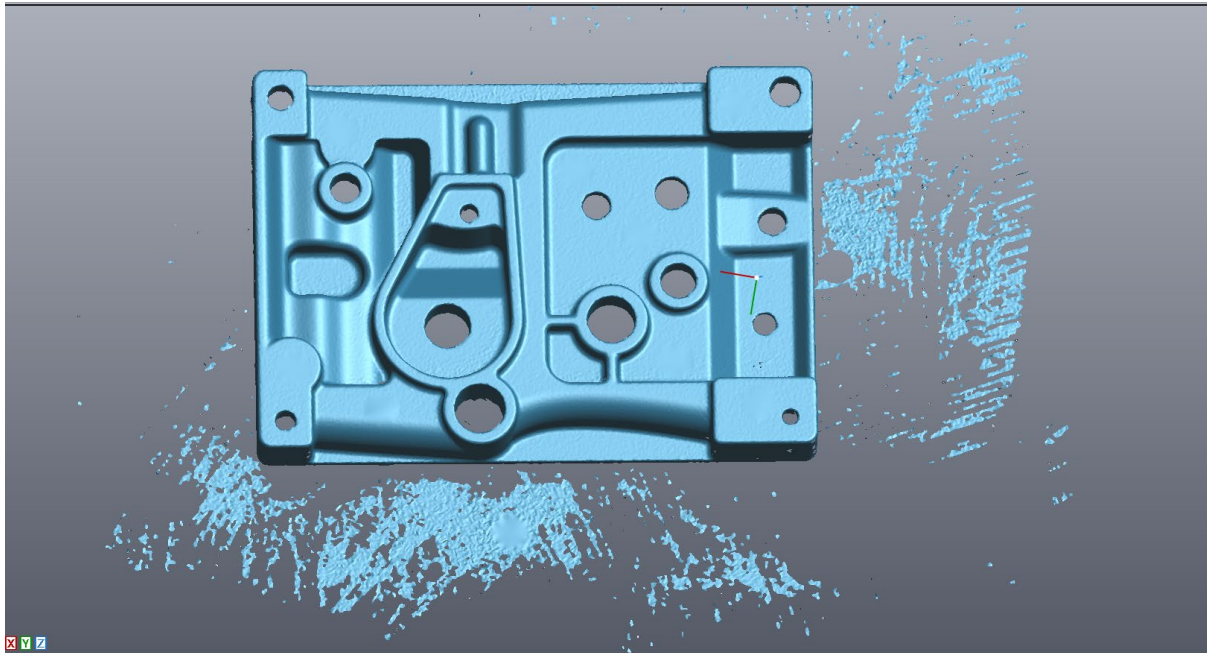
5. SCANNING PROCESS WITHOUT TARGET

Components

- **Components**—filter noisy data automatically

Tips:

Setting range: 0 to 100. The value represents the size of the component to be deleted. The default value is "10".

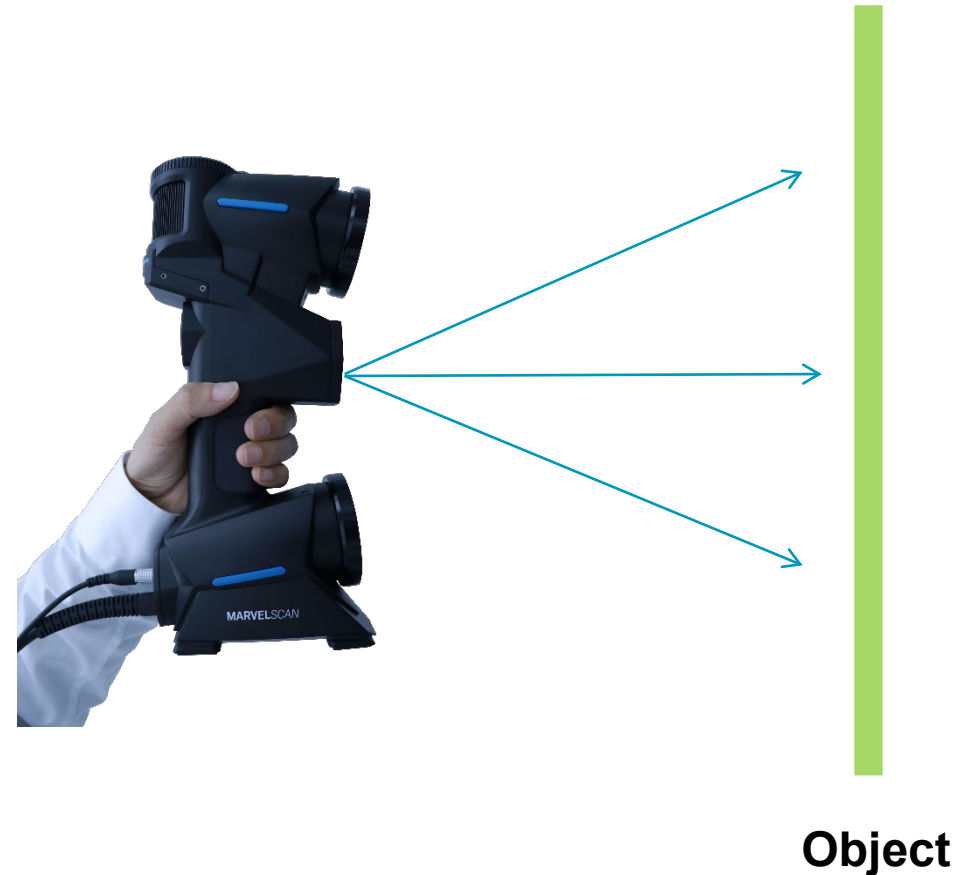




5. SCANNING PROCESS WITHOUT TARGET

Orientation

- The direction of scanner is as perpendicular as possible to the surface
- The scanner can be tilted but the angle of inclination should not be too large



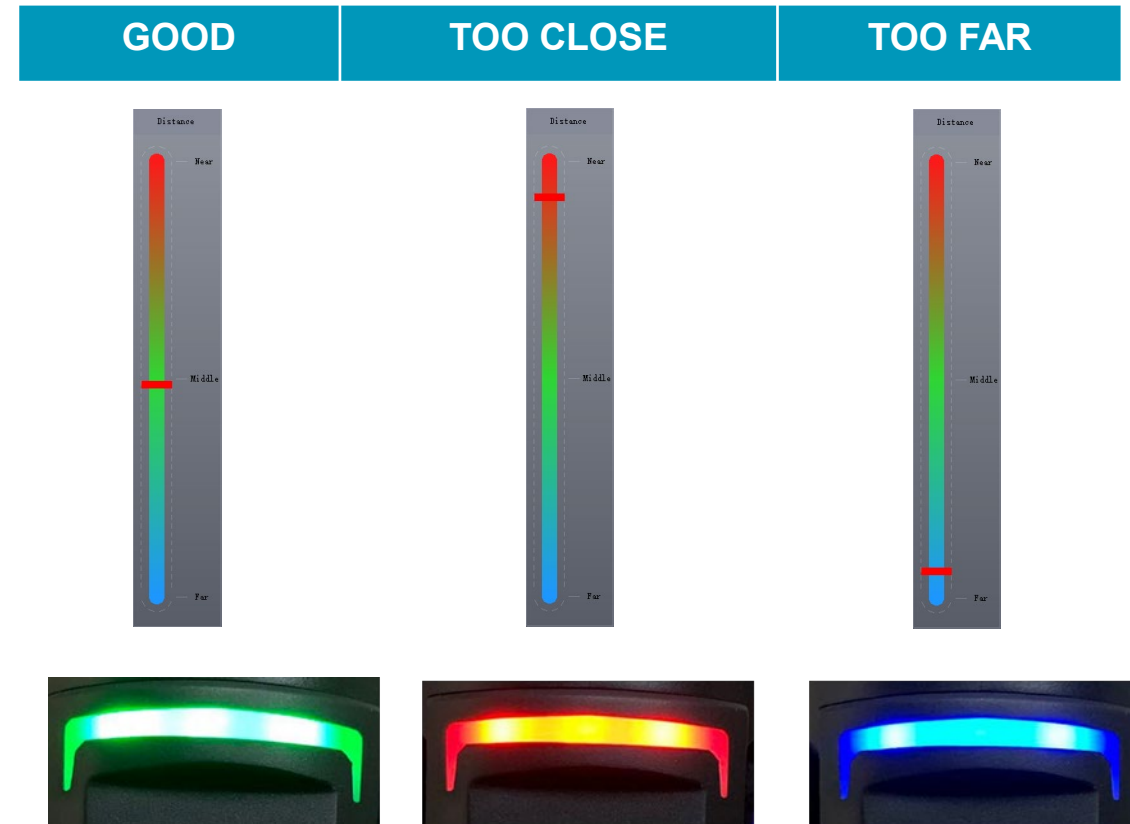
5. SCANNING PROCESS WITHOUT TARGET

Scanner Indicator

- The scanner is too close or too far away from the workpiece to collect data well and get poor data
- The LED on the top of the scanner can also indicate the distance by three different colors
- Make sure that both cameras can capture at least 4 targets at the same time

Tips:

In the process of scanning, sometimes we get too close or too far from workpiece which will cause some targets can not be recognized. You need to change the angle or scan again, at the same time make sure the indicator bar in the green area.

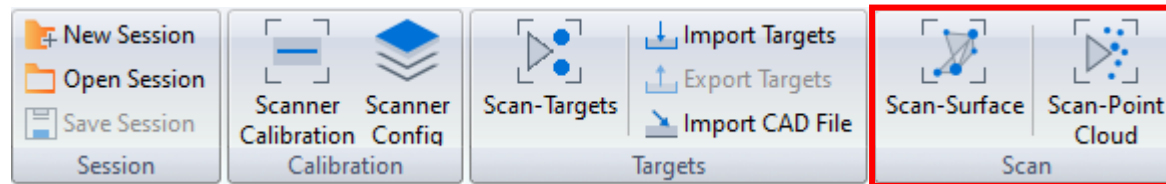




5. SCANNING PROCESS WITHOUT TARGET

Data Acquisition

- Second “Scan-Surface” or “Scan-Points”



- Press scan button to scan



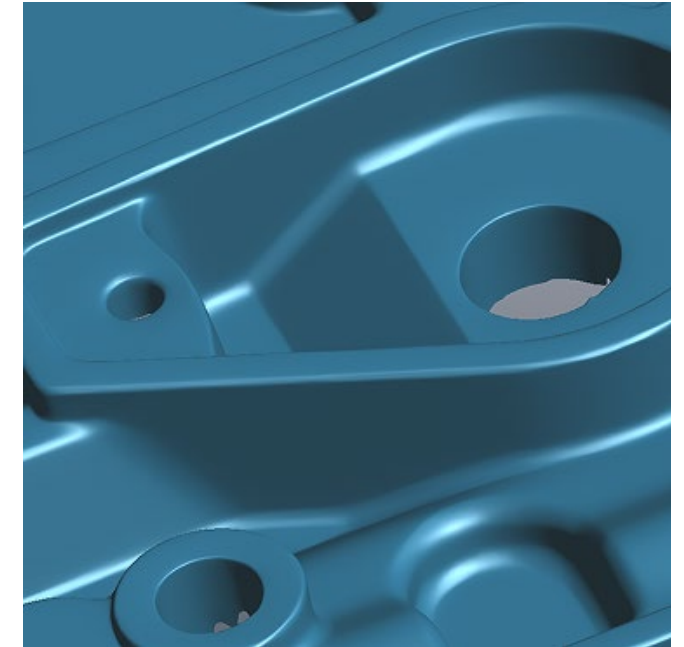
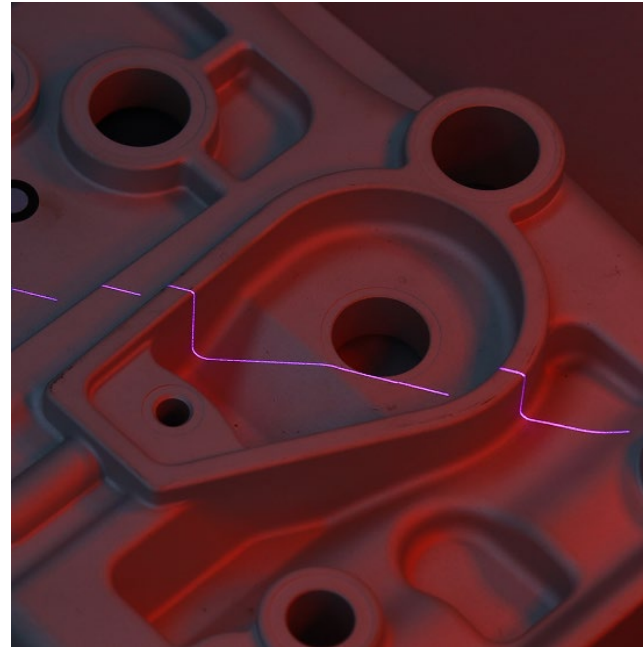


5. SCANNING PROCESS

Data Acquisition

Tips:

During the process of scanning, if you find some places which is hard to reach or scan by standard laser line, you can switch to extra single laser line to rescan.





“ TRY IT BY YOURSELF

6. SCANNING PROCESS WITH TARGET



6. SCANNING PROCESS WITH TARGET

Target Placement

- Put targets to cover entire surface of workpiece **evenly & randomly**
- Distance between two targets: **around 60-100mm (2.5-4 inch)**
- Flat area: less targets required
- Curved/complex area with features: more targets needed
- Place appropriate quantity of targets on workpiece based on above rules, keep in mind that it's easy to place while hard to remove later.





6. SCANNING PROCESS WITH TARGET

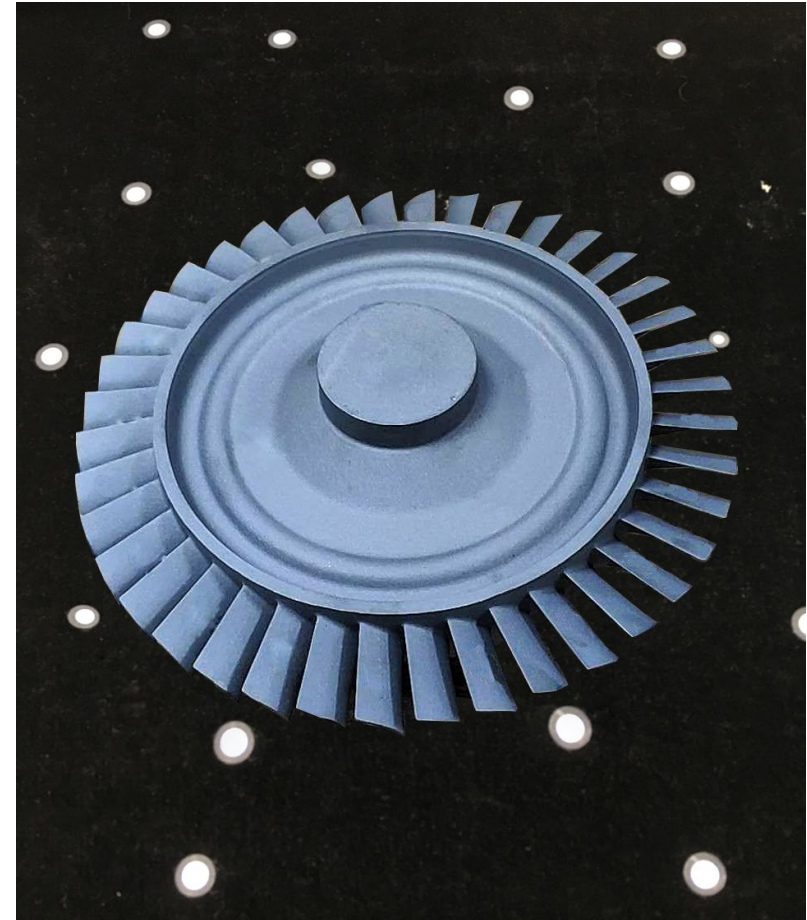
Target Placement

Please place targets around workpiece in following cases:

- When workpiece is too small to place
- When targets are not allowed to place on workpiece

Tips:

During the scanning, DO NOT move workpiece or targets nearby.





6. SCANNING PROCESS WITH TARGET

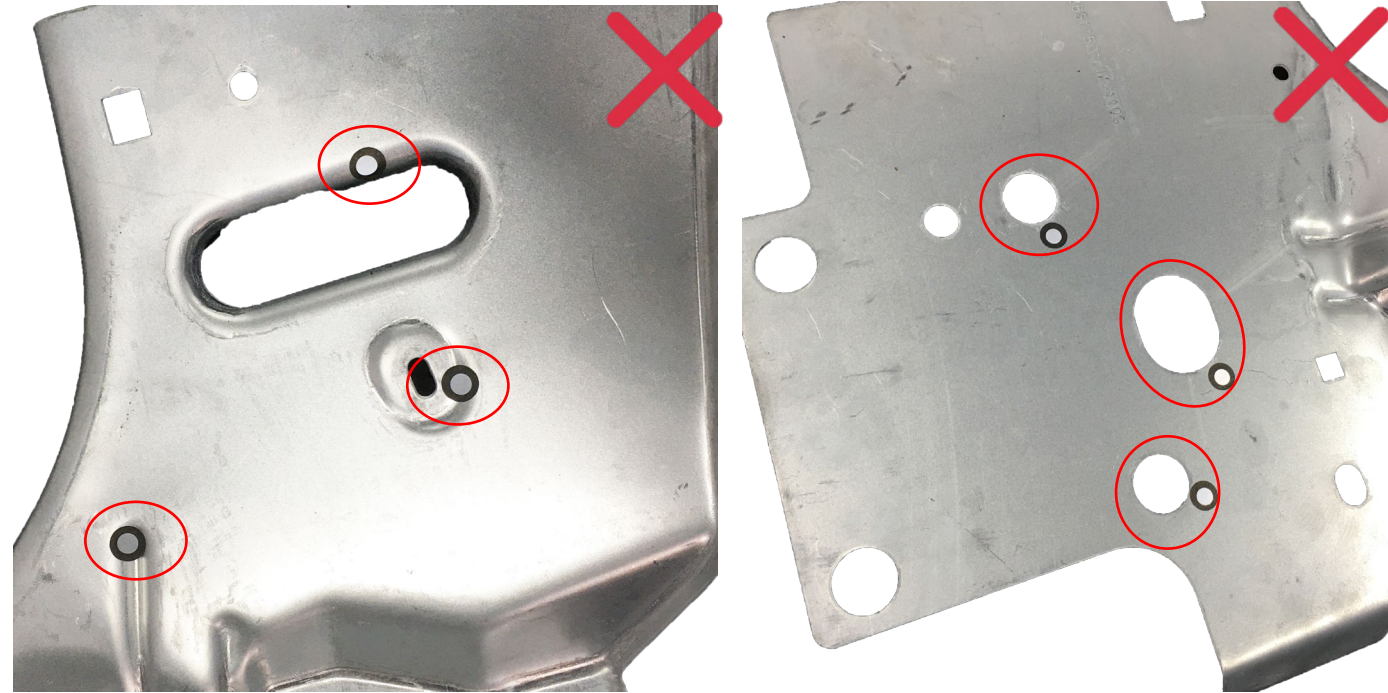
Target Placement

PLEASE DO NOT

- Place targets **on a surface with high curvature**
- Place targets **on obvious features of the workpiece**
- Place targets **near the edge/detail (< 4mm)**
- Use damaged or incomplete targets
- Use greasy, ashy or dirty targets

Tips:

make sure that at least 4 targets can be seen in same vision of scanner from different angles at all time.



Wrong Example

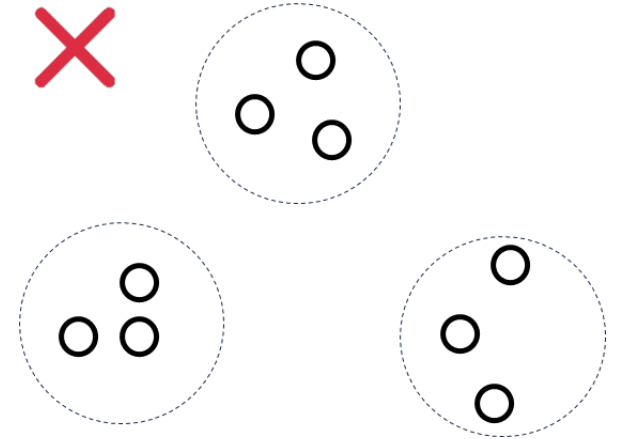
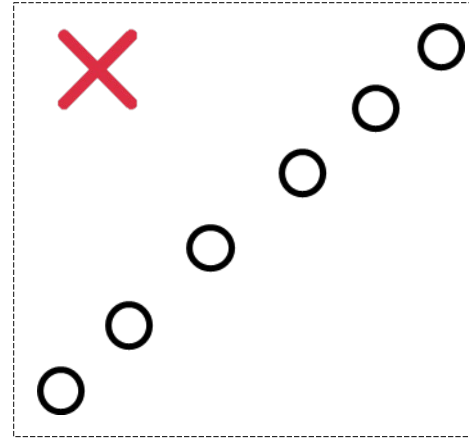


6. SCANNING PROCESS WITH TARGET

Target Placement

PLEASE DO NOT

- Place targets in crowded groups
- Place targets neatly in one line



Wrong Example



6. SCANNING PROCESS WITH TARGET

Workpieces Preparation

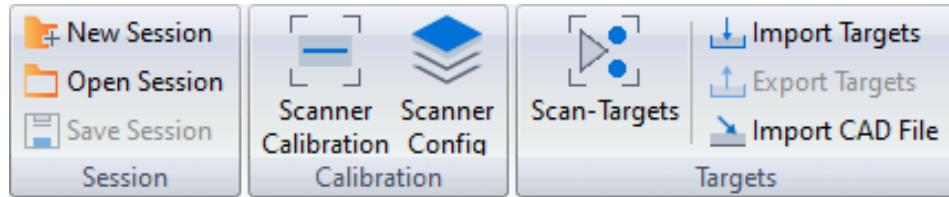
- To improve the data acquisition of black, reflective or transparent workpieces.
- Use following products when necessary:
 - Matting agent
 - Spray powder





4. PREPARATION

Target Scanning



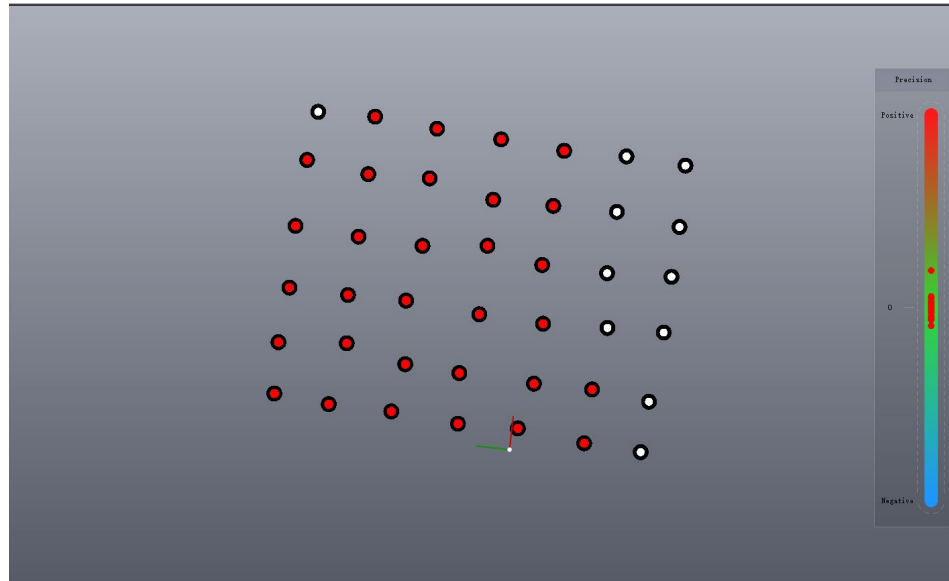
- Scan-targets: to scan targets
- Import targets: to import targets data into scanning software (this function is for big object scanning or assembling part)
- Export targets: to export targets data

Tips:

When scanning big part, we suggest to start from the middle part towards two sides with the goal of reducing splice error and improving accuracy.

During the scanning, to achieve steady scan, make sure to hold scanner at the horizontal and vertical direction.

- The red target is the point that the scanner can recognize
- Other color targets such as blue and white are unrelated points

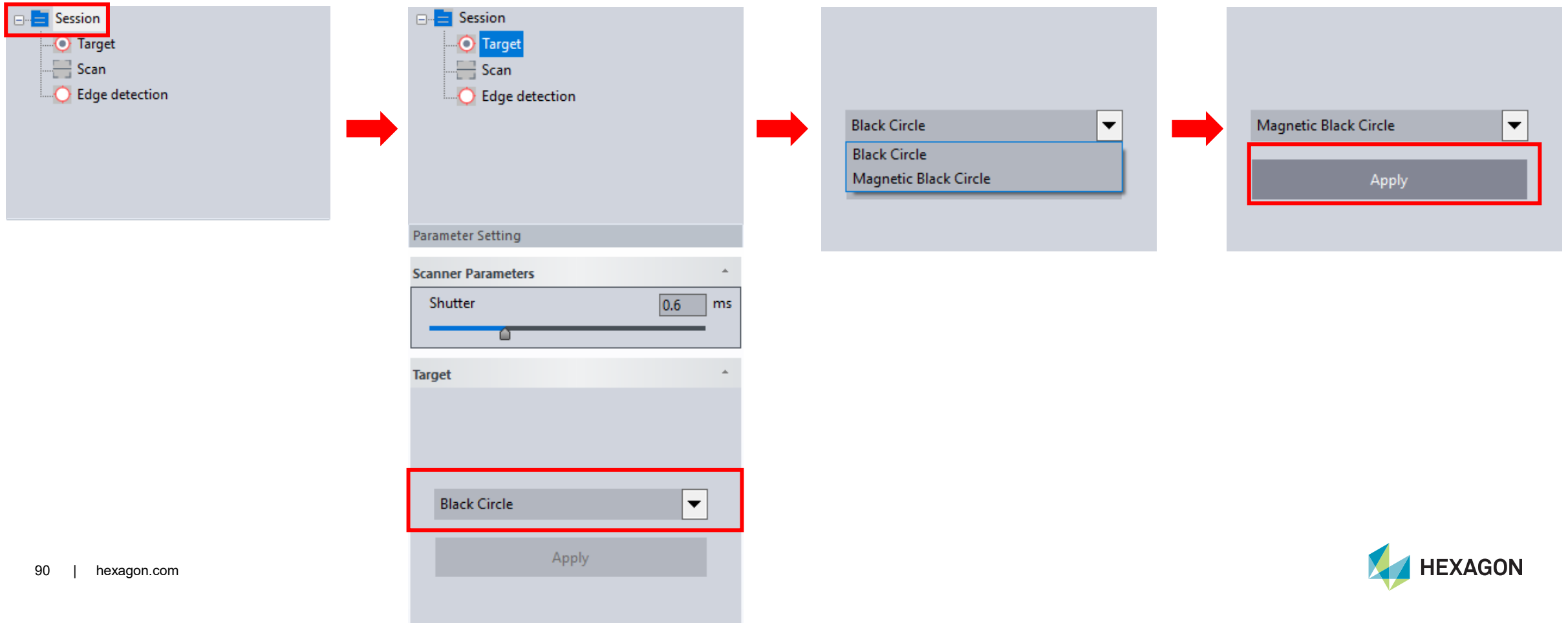




4. PREPARATION

Extra Tips

When using magnetic targets, we need to optimize magnetic targets in our scanning software for better scanning results because of thickness.





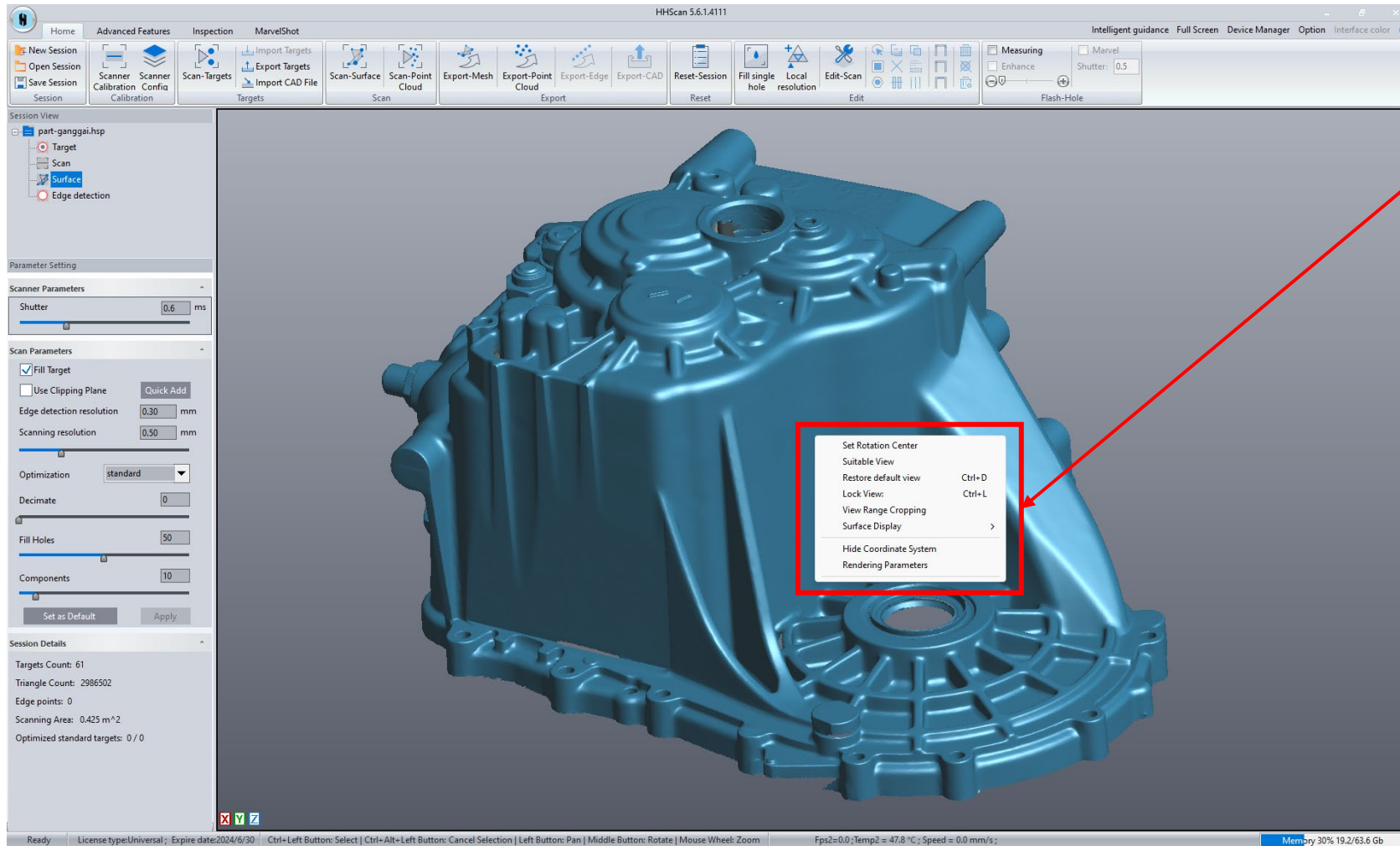
“ TRY IT BY YOURSELF

7. DATA EDIT & SAVE



5. SCANNING PROCESS

Data Acquisition

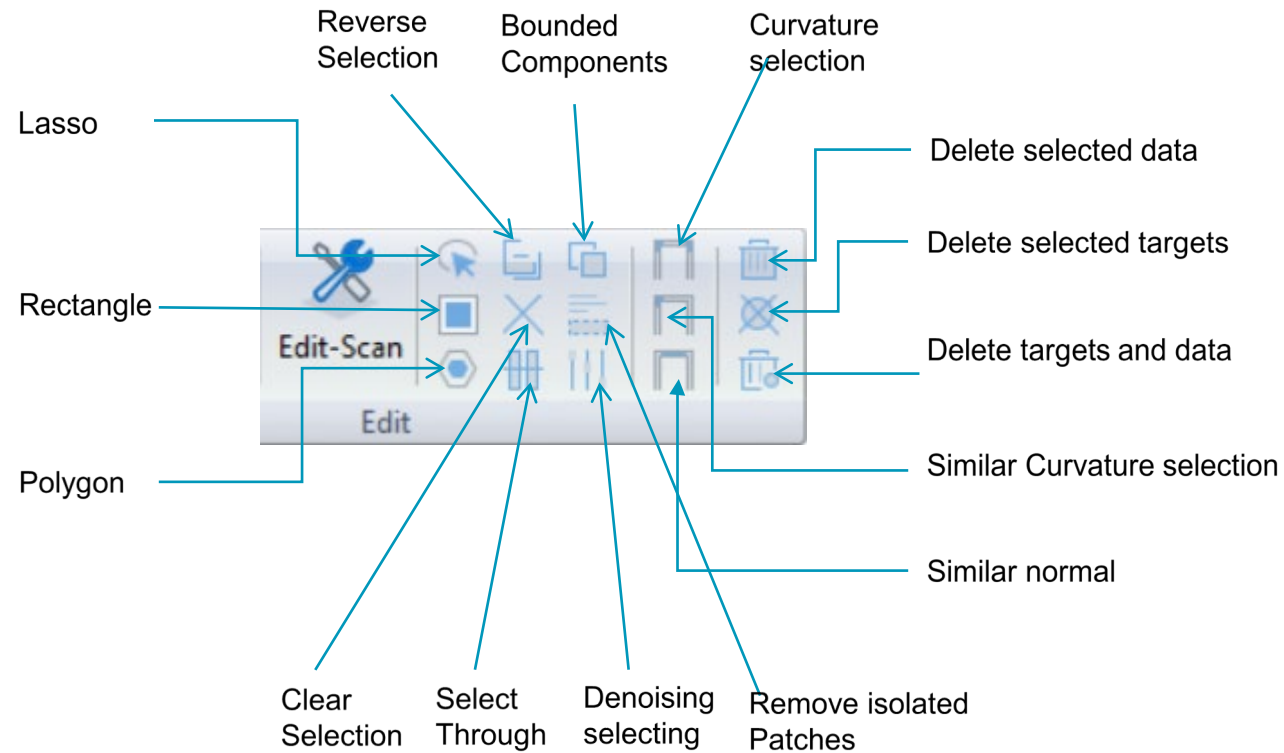
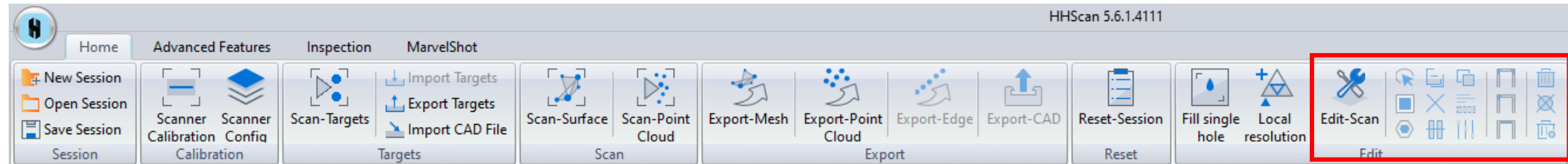


Tips:
Right click to show
the sub-menu



5. SCANNING PROCESS

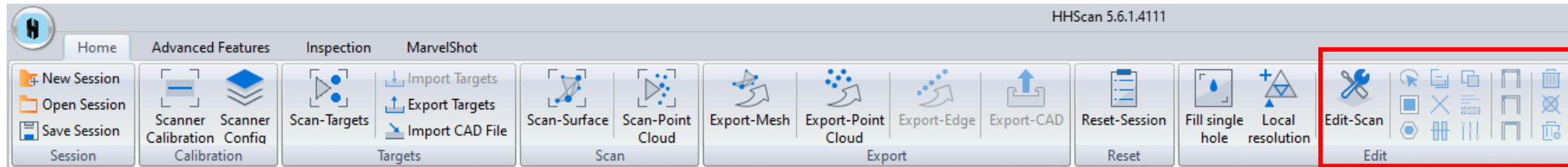
Data Edit



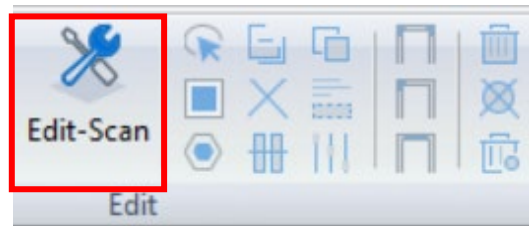


5. SCANNING PROCESS

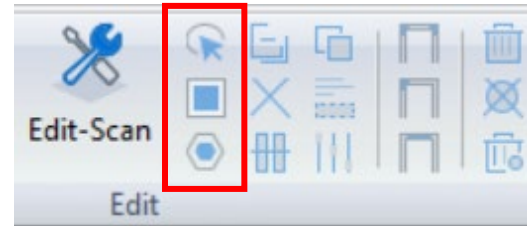
Data Edit Operation



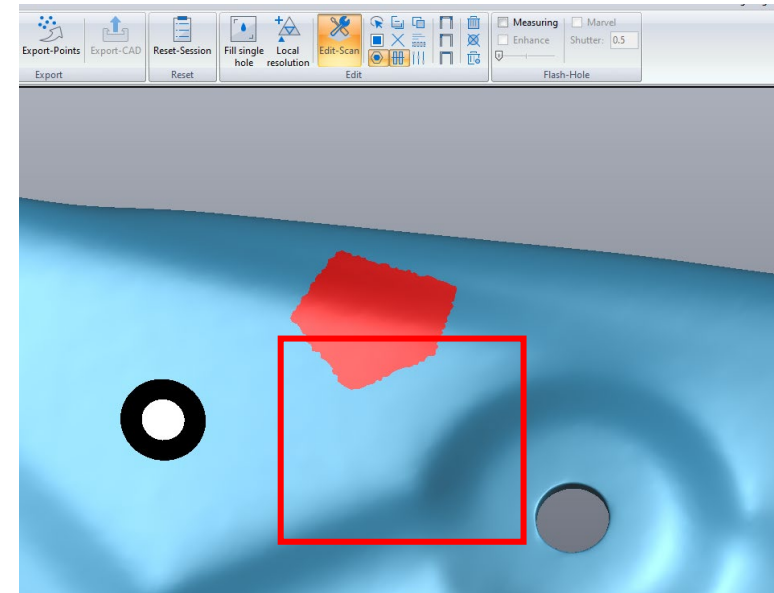
STEP ONE: Click “Edit-Scan”



STEP TWO: Choose “Lasso”, “Rectangle” or “Polygon”.



STEP THREE: Press “ctrl” in keyboard and click left mouse to select an area.

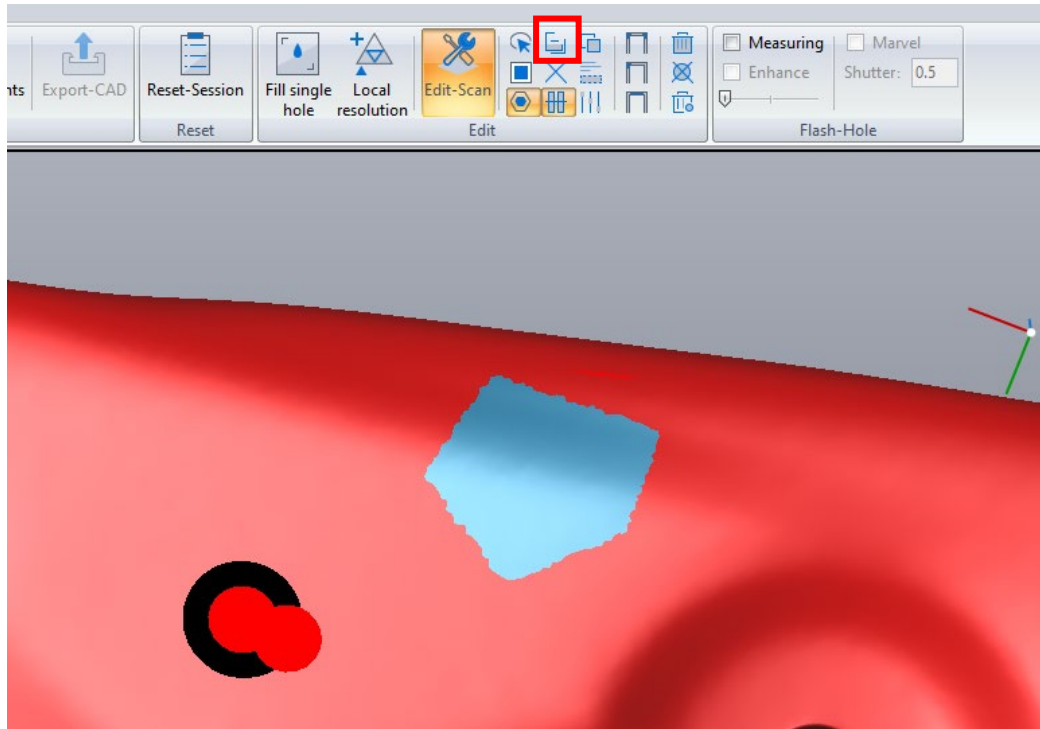




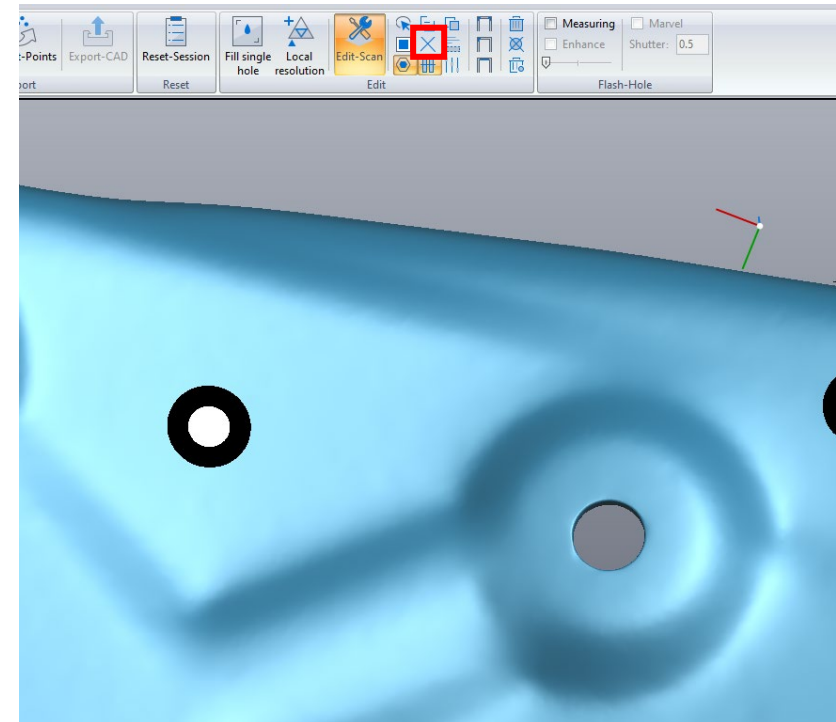
5. SCANNING PROCESS

Data Edit Operation

STEP FOUR: Click “reverse” to reverse select the rest of area.



STEP FIVE: Click “Clear Selection” to reverse select the rest of area.



Tips:

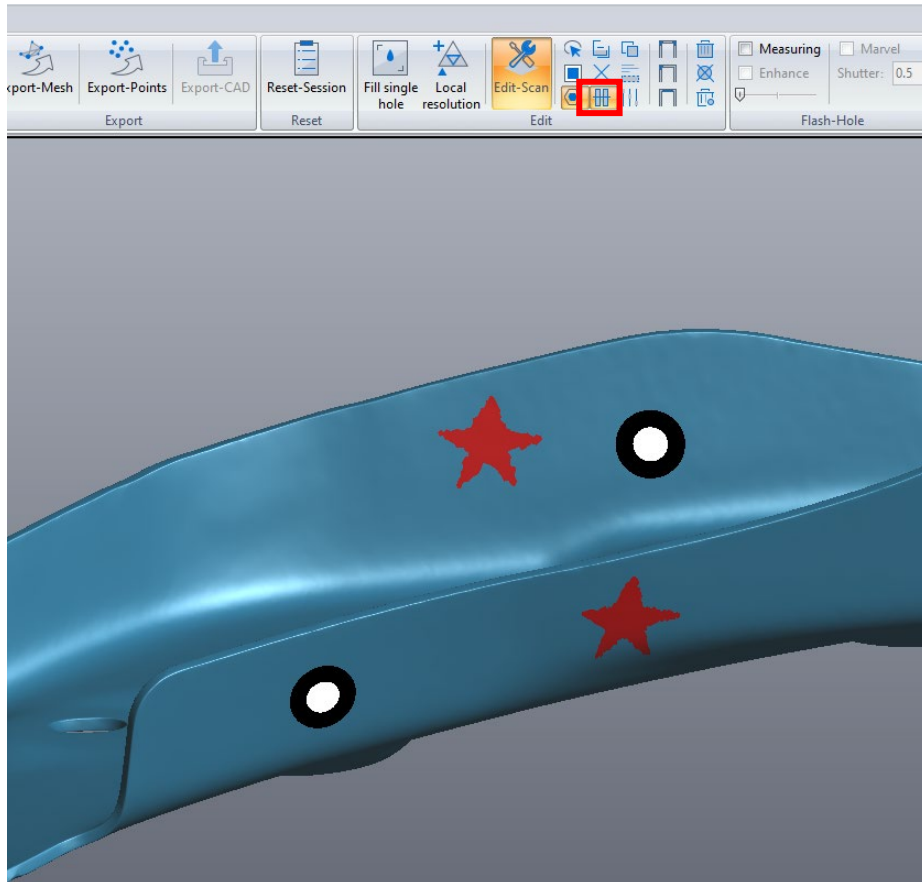
In the process of selecting data, the computer has a calculation time. During this time, please do not click on the computer, wait until it's been selected and deleted.



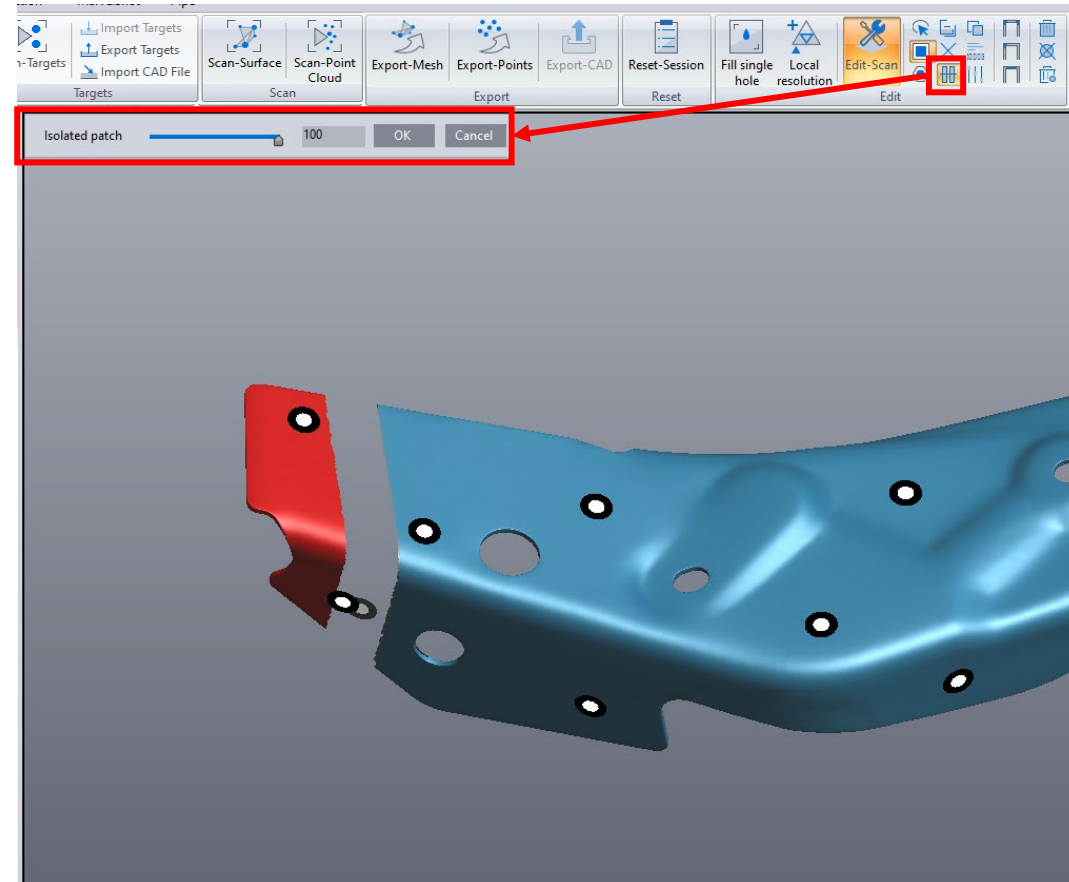
5. SCANNING PROCESS

Data Edit Operation

STEP SIX : Click “go through” and then select an area.



STEP SEVEN : Click “Remove Isolated Patches” and then setup the value to select isolated patches.

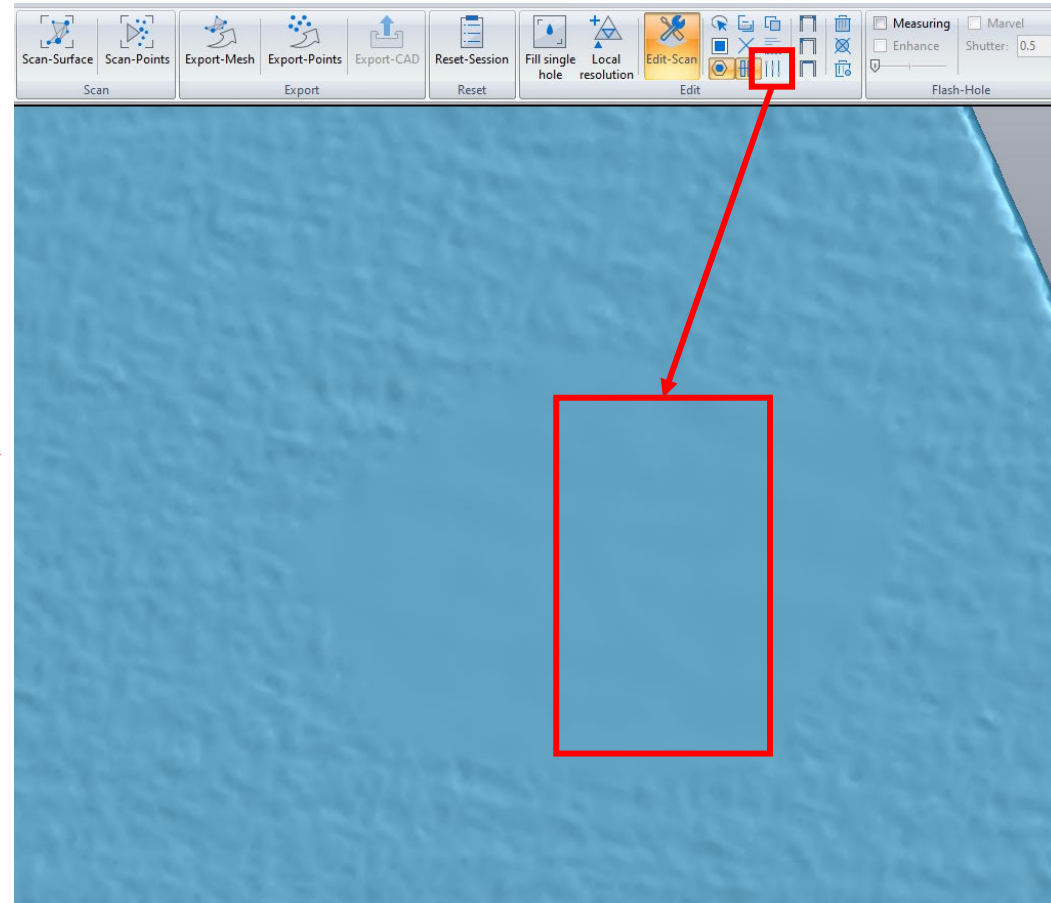
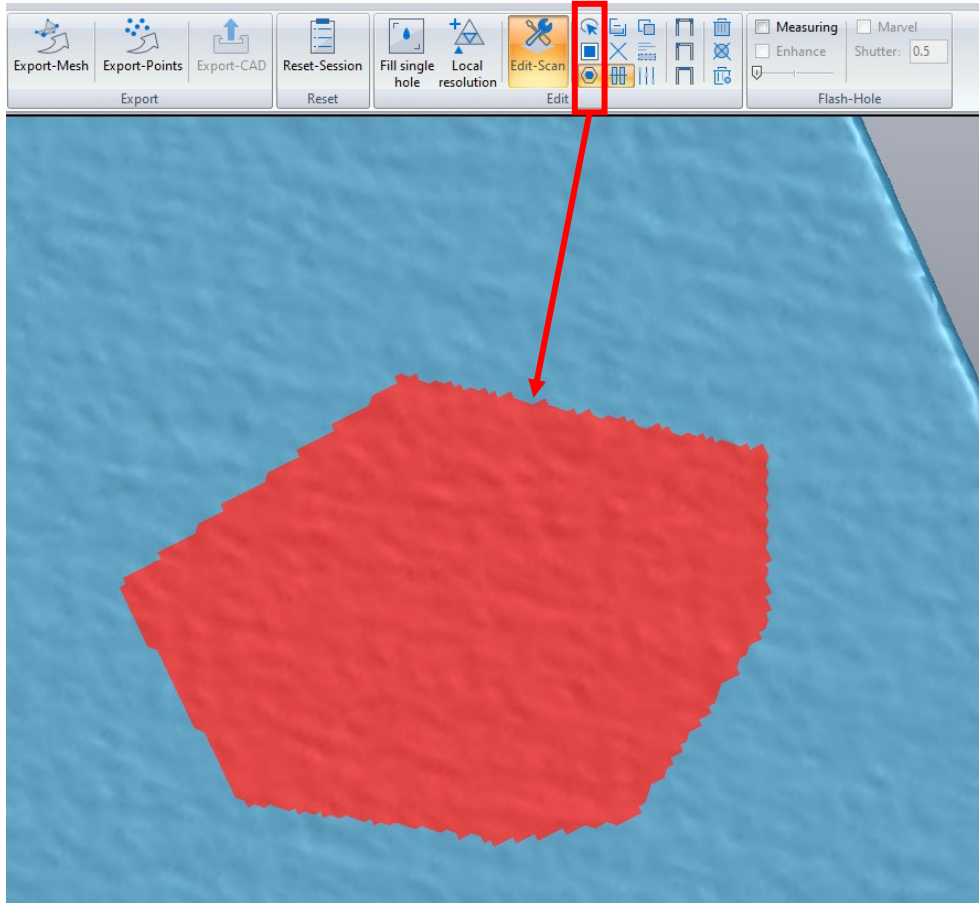




5. SCANNING PROCESS

Data Edit Operation

STEP EIGHT: Select targeted area and click "denoising selecting" to targeted area.





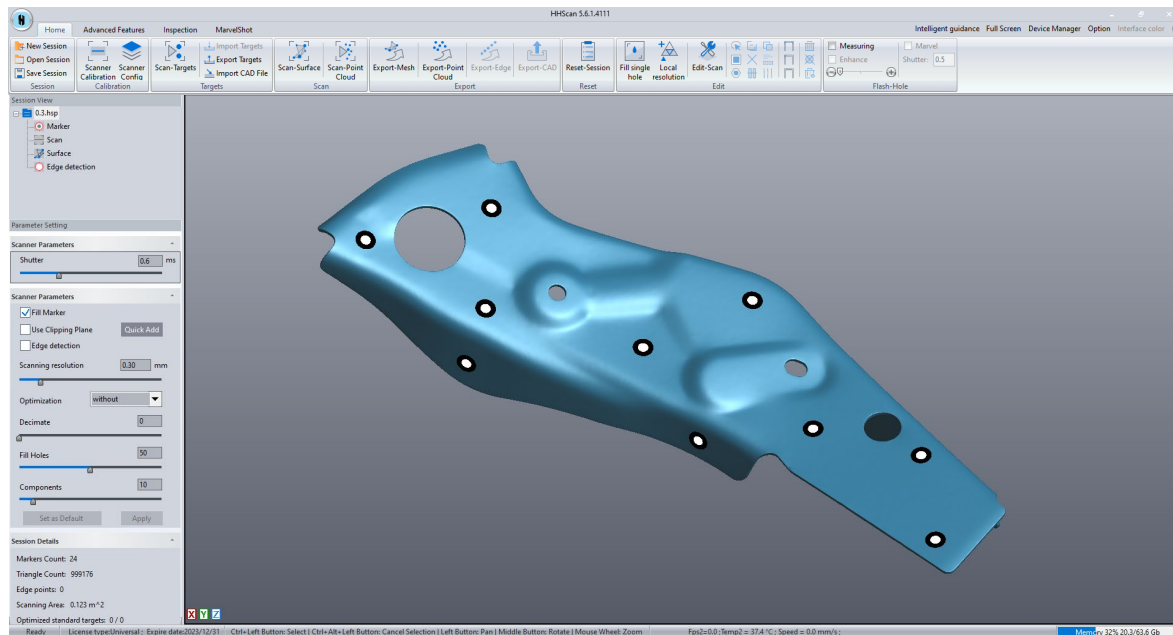
5. SCANNING PROCESS

Data Edit Operation

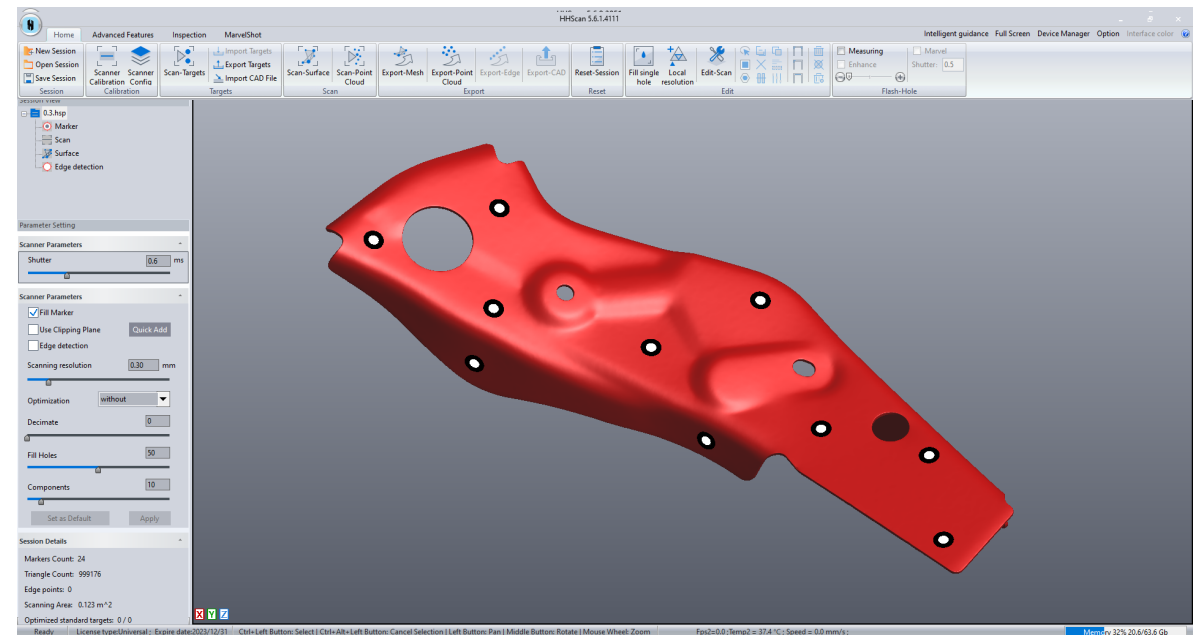
STEP NINE: To click “bounded component” and then select the target object.



Before Selection



After Selection

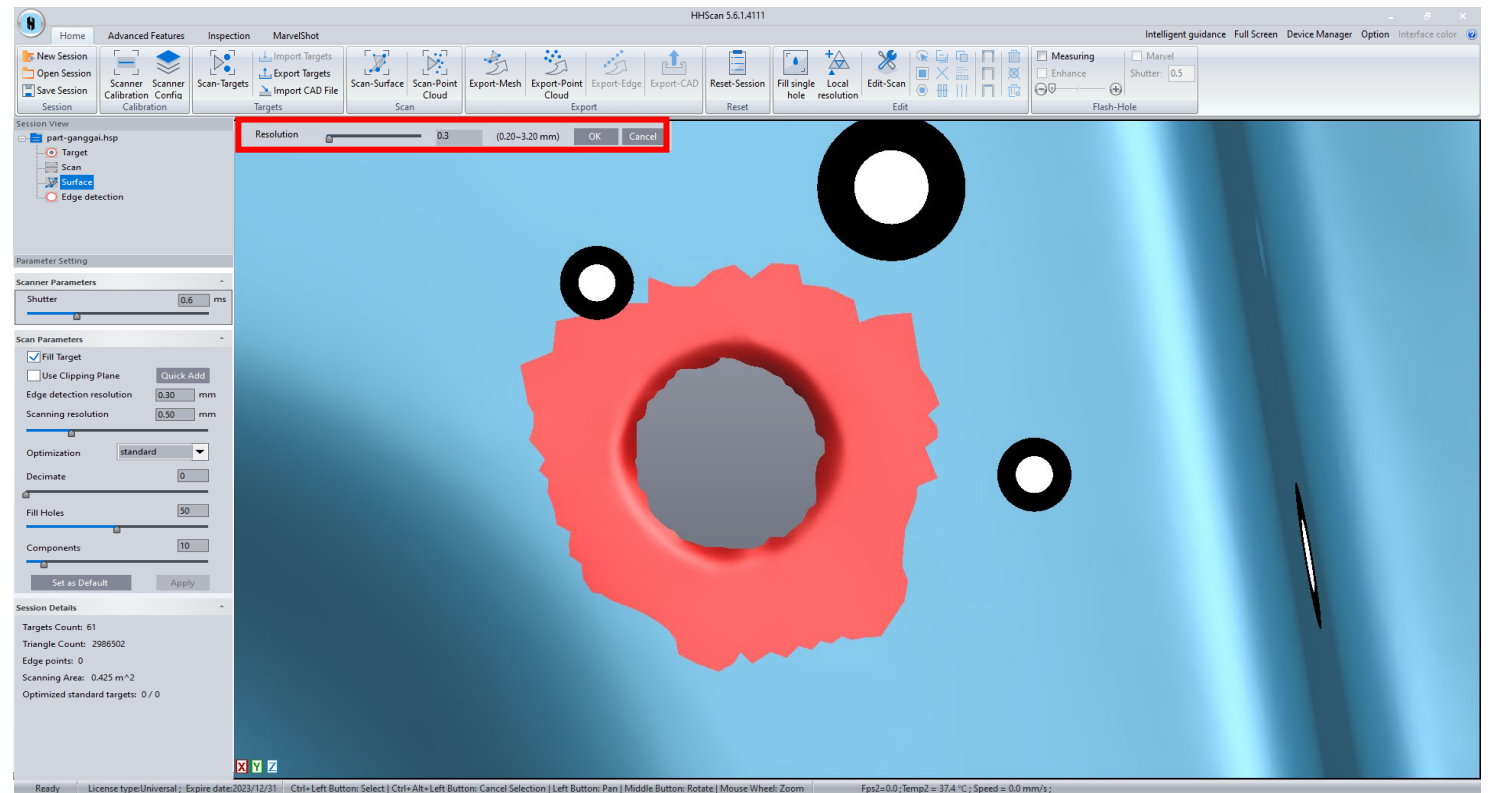
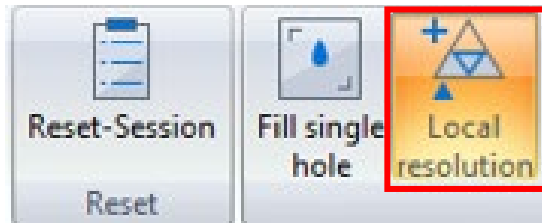




5. SCANNING PROCESS

Data Edit Operation

STEP TEN: Click “local resolution” to adjust the local resolution of some part;
Click “local resolution” firstly, and then mark the target area, set the different resolution to complete the adjustment

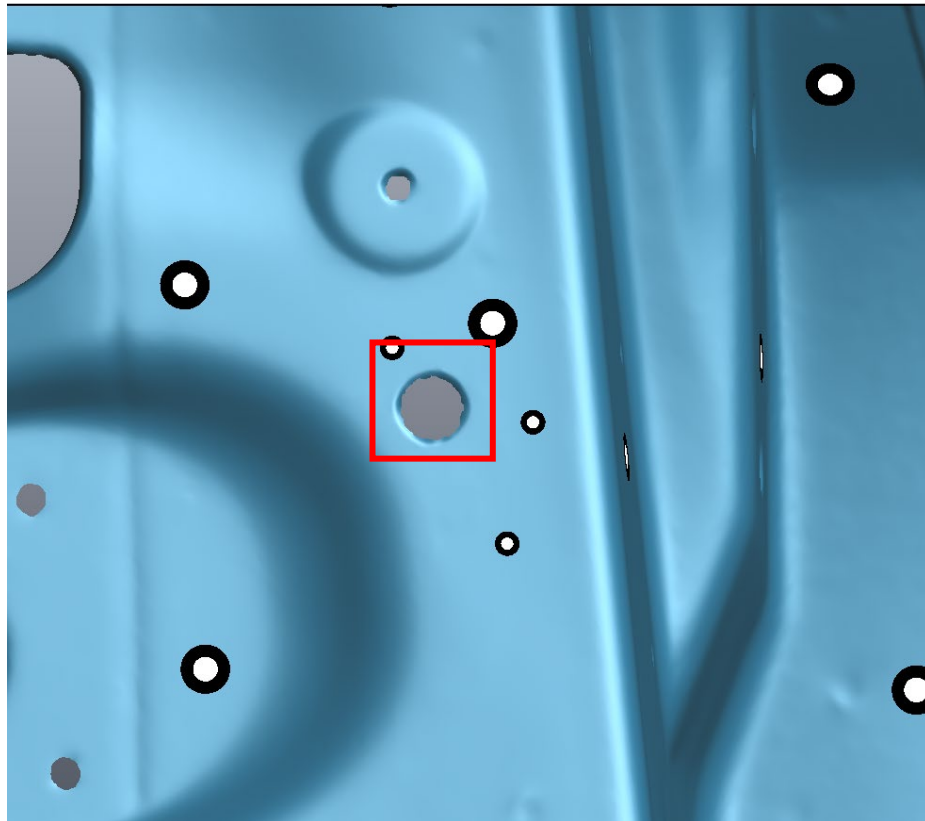




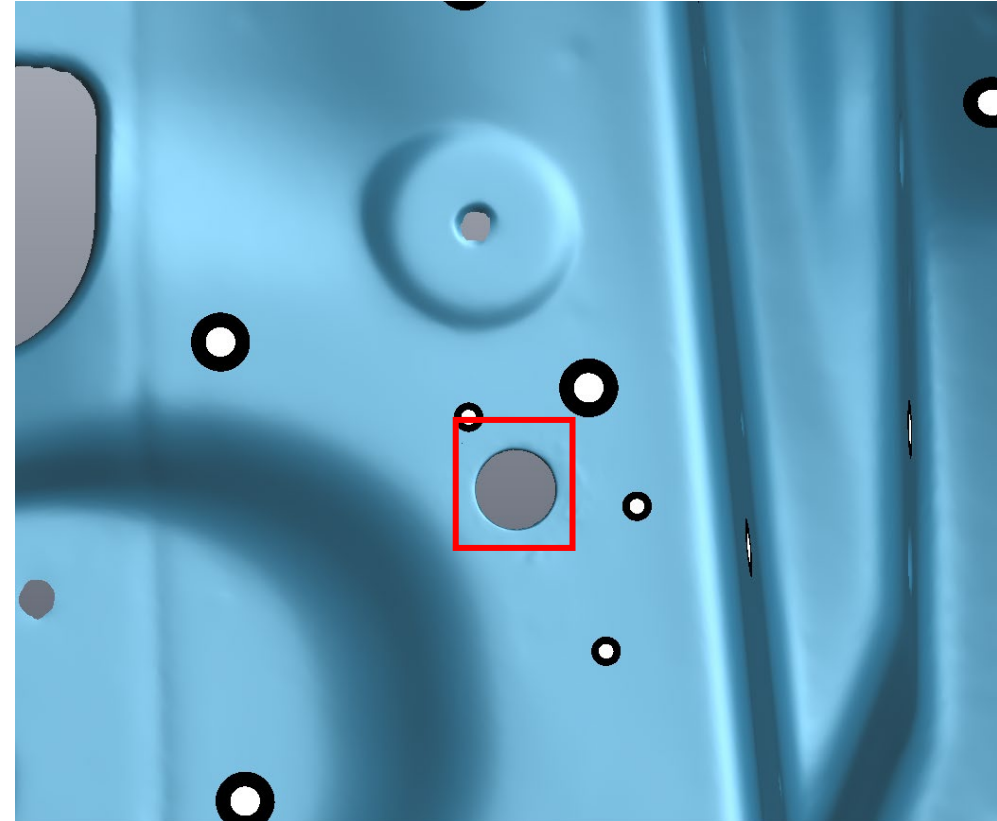
5. SCANNING PROCESS

Data Edit Operation

Before Selection



After Selection



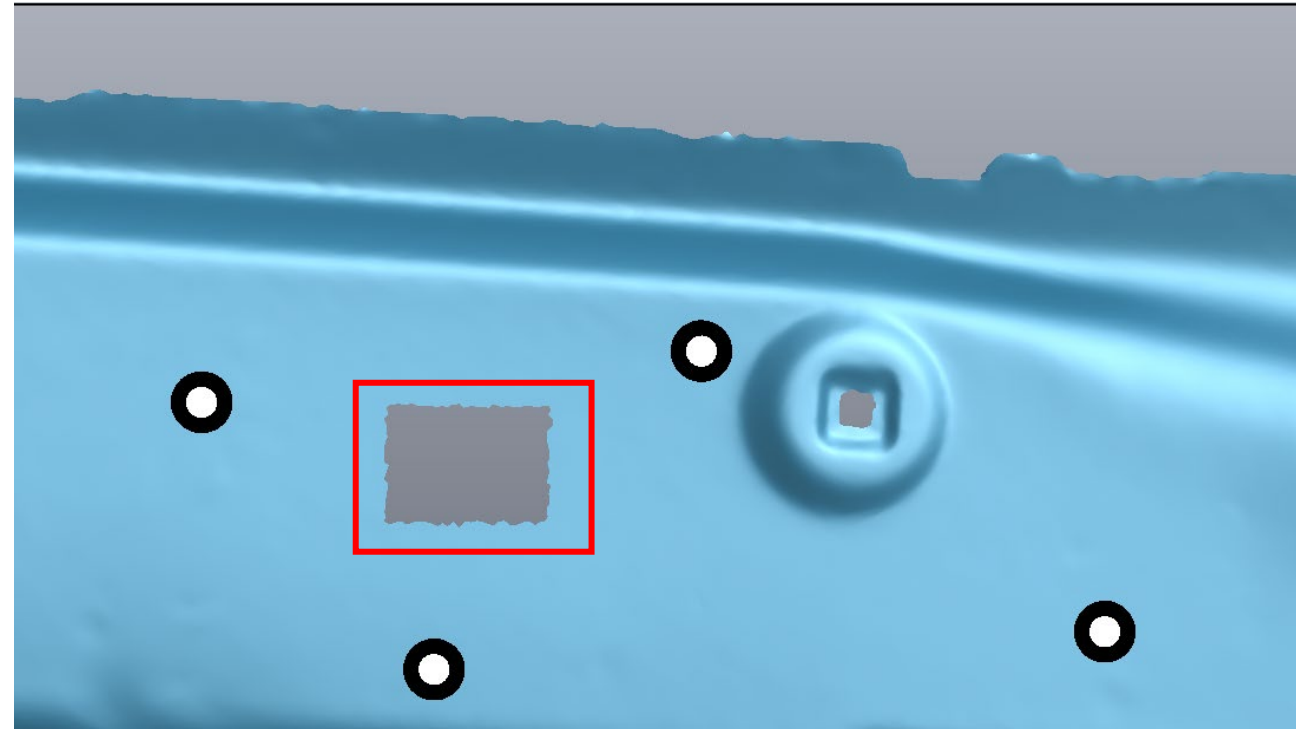
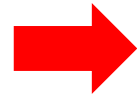
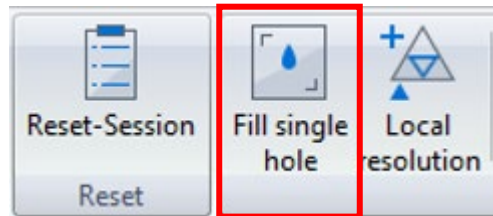


5. SCANNING PROCESS

Data Edit Operation

STEP ELEVEN:

- Click “Fill single hole” to fill the single hole automatically.
- Click “Fill single hole” firstly, and then select the hole and left click to complete filling the hole.

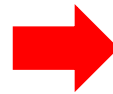
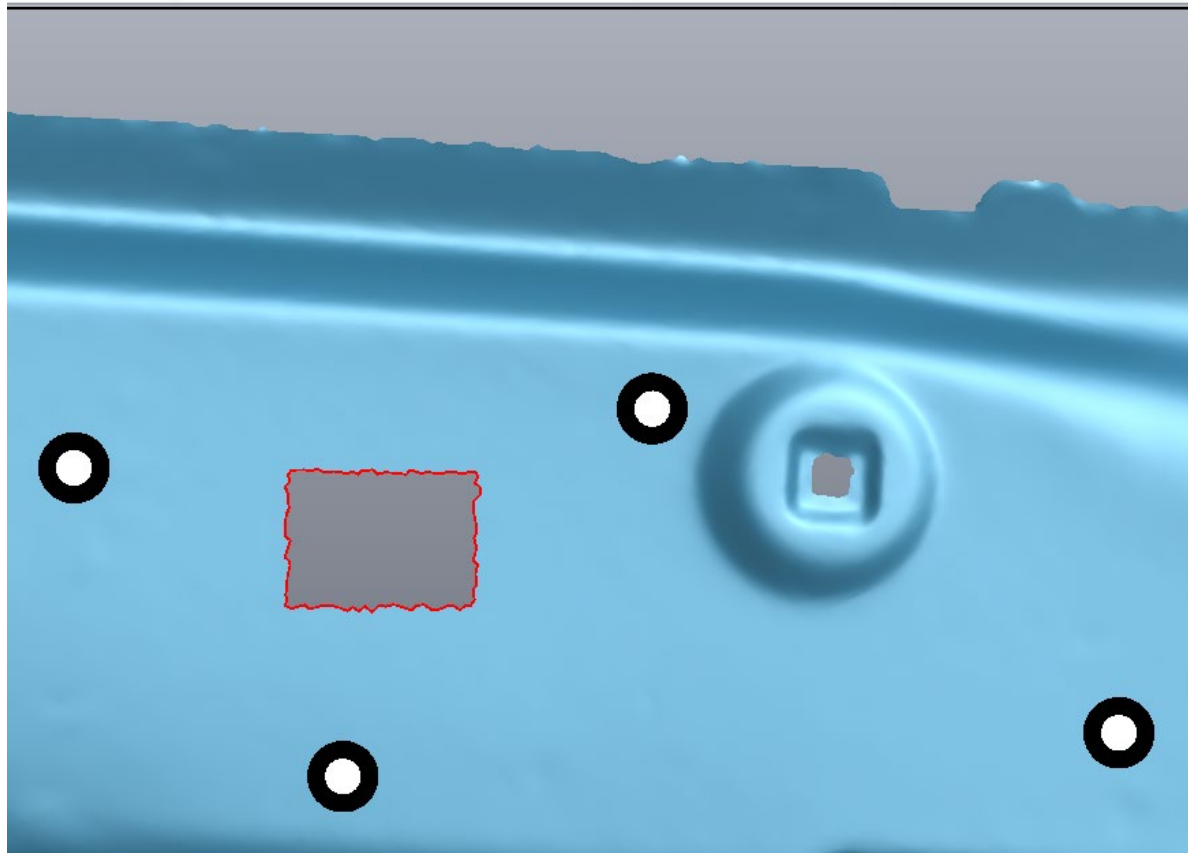




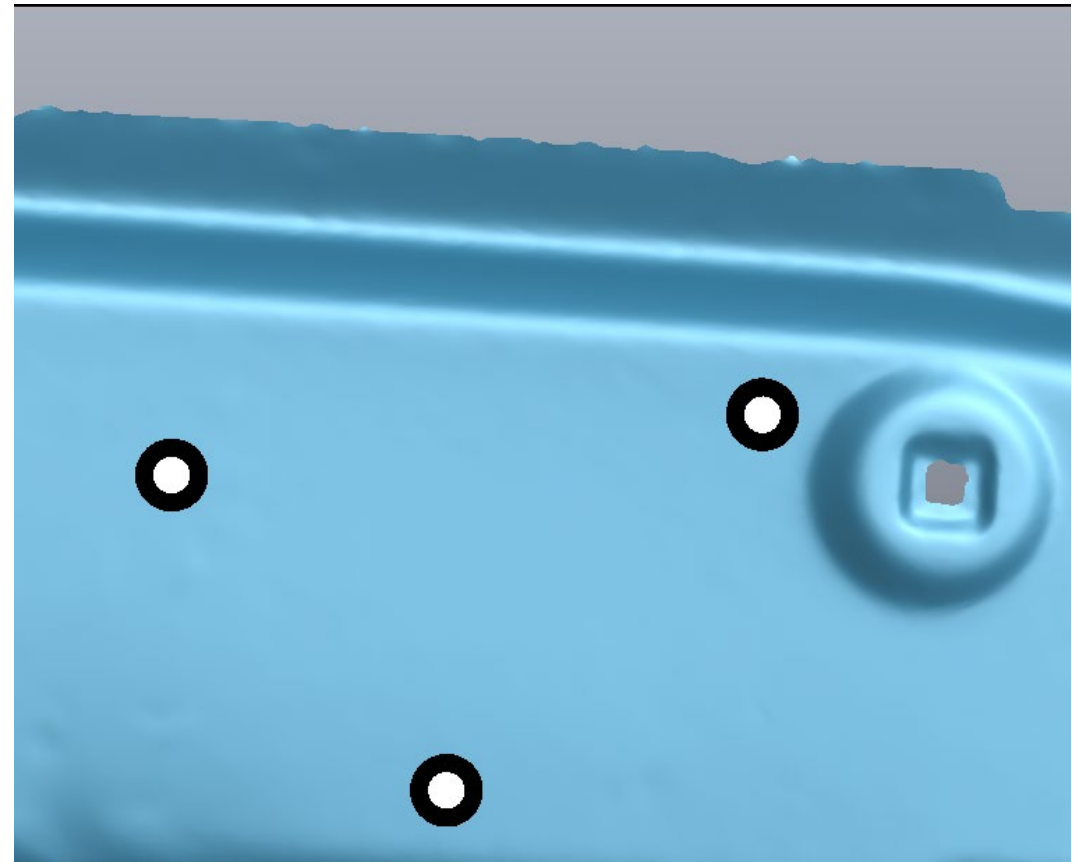
5. SCANNING PROCESS

Data Edit Operation

Before Selection

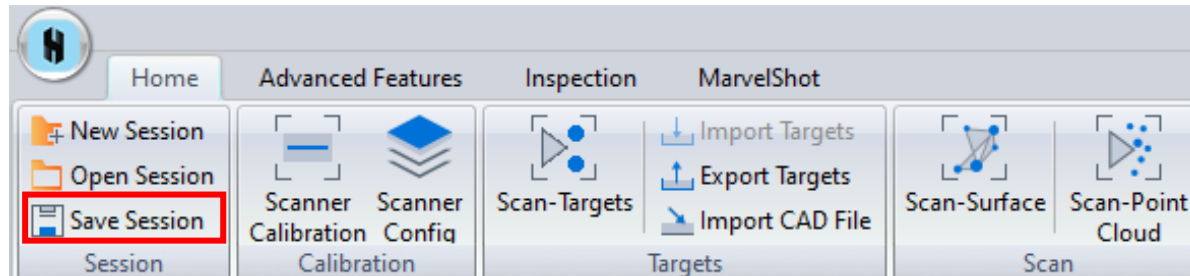


After Selection





6. DATA SAVE



Session:

- New Session: to create a new session
- Open Session: to open a saved session
- Save Session: to save current session

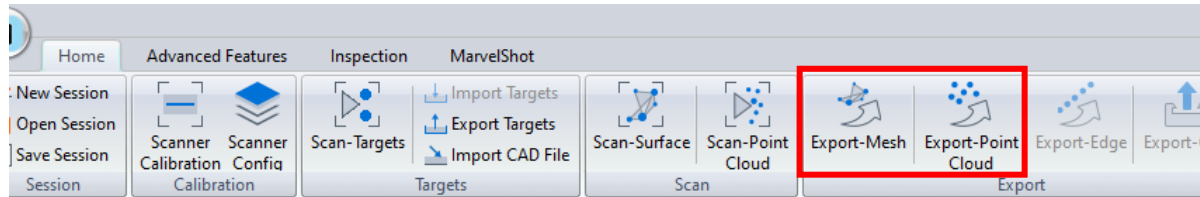
- Project are saved in the format of **.hsp** which can only be opened by ZG Scanning software.

HScanProject.hsp

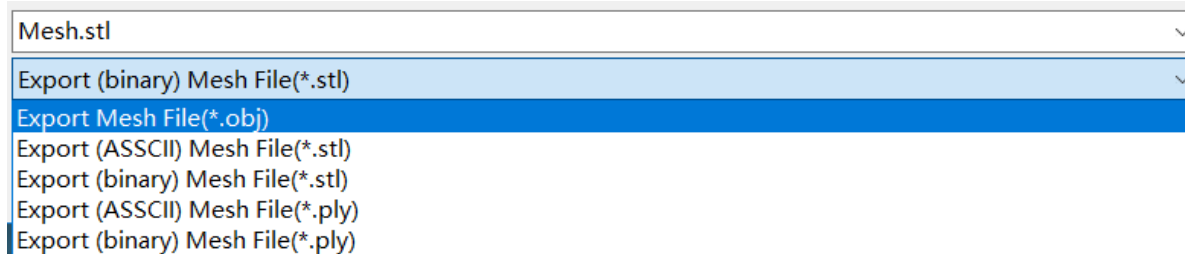
HScanPoj File(*.hsp)



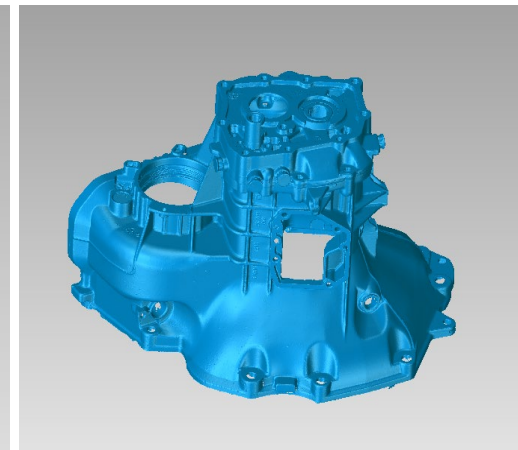
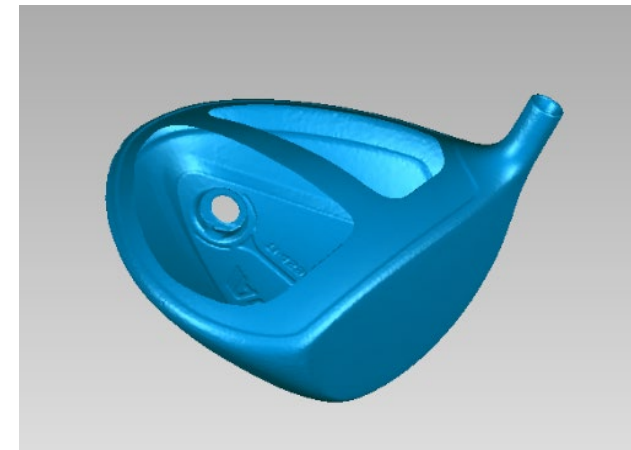
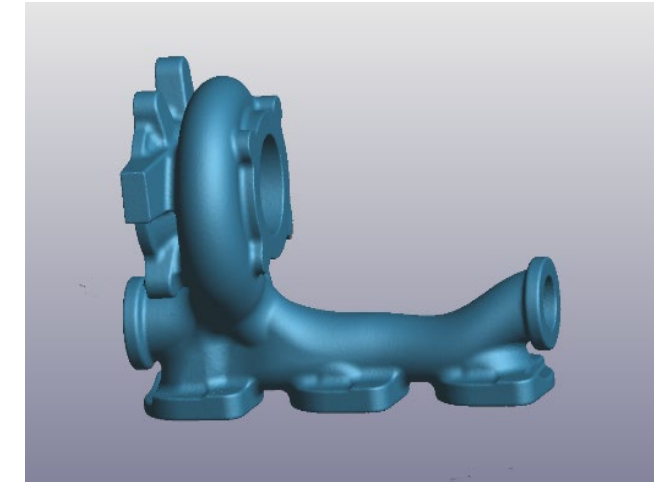
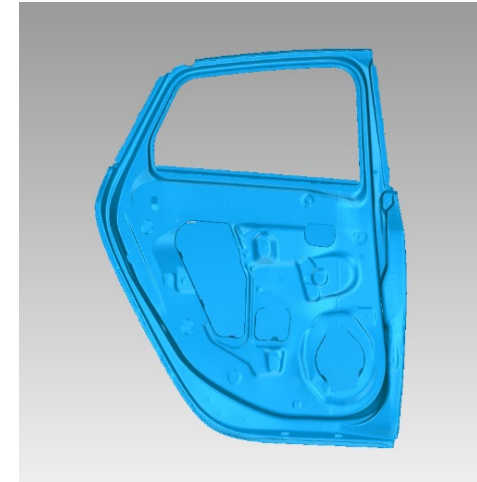
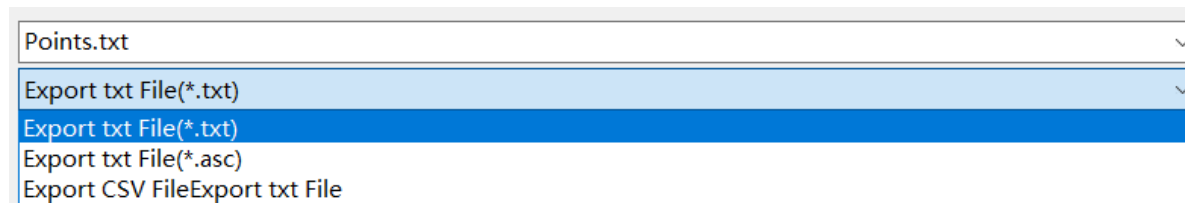
6. DATA SAVE



- Export mesh format as .obj; .stl; .ply; etc.



- Export point cloud format as .txt; .asc; etc.





“ TRY IT BY YOURSELF

9. OTHER FUNCTIONS



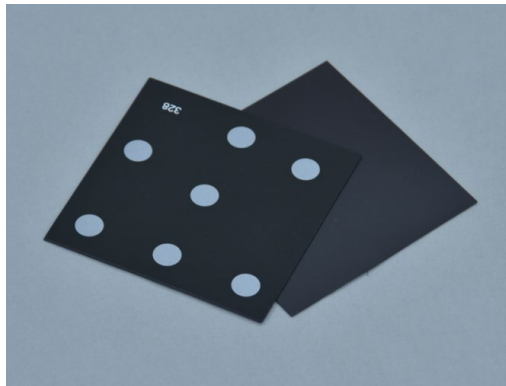
9. OTHER FUNCTIONS

Photogrammetry-Accessory

When scanning part with positioning targets, to secure the accuracy of large part scanning, you can use Photogrammetry system to take pictures of targets in advance.

Necessary accessories for Photogrammetry function

1, Enough Magnetic Coded Targets



2, Two Scale Bars: control bar-1pcs
checking bar-1pcs

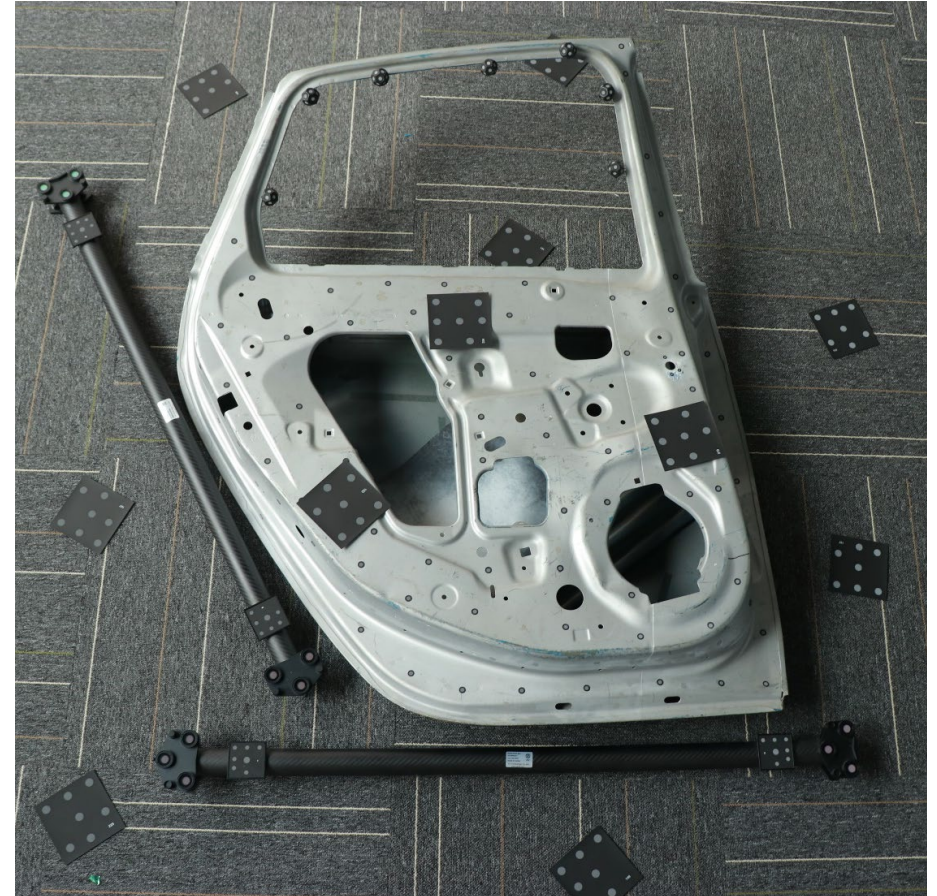




9. OTHER FUNCTIONS

Photogrammetry-Magnetic Coded Target Placement

- Put magnetic coded targets to cover the entire surface of part as show in picture
- The distance between two magnetic coded targets should be 20-40 cm
- Flat area: less magnetic coded targets required
- Bending area: more magnetic coded targets needed
- Don't place magnetic coded targets on the positioning targets

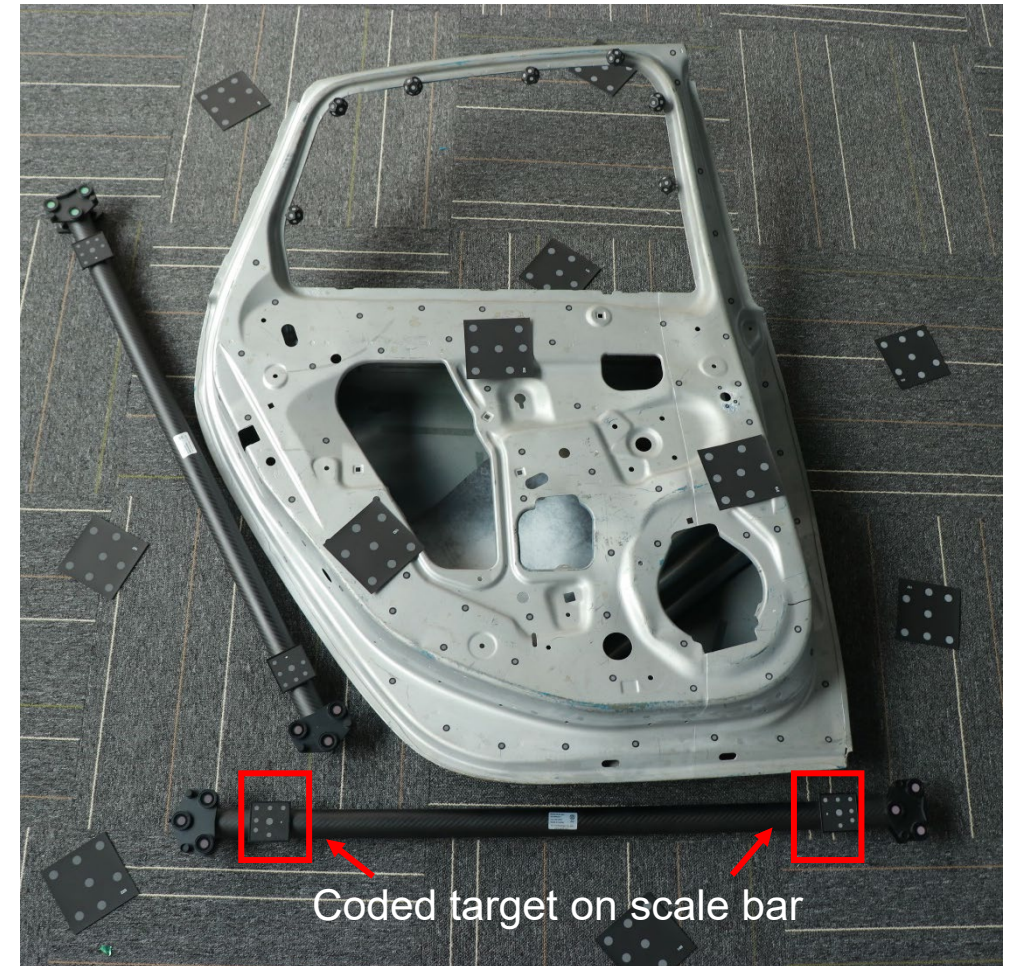




9. OTHER FUNCTIONS

Photogrammetry-Scale Bar Placement

- To better control the volumetric accuracy, the control bar should be placed near the center of the scanning area and the checking bar should be near the edge of the scanning area
- The control bar and checking bar must be in the different direction
- The distance between coded target on the scale bar and magnetic coded target should be more than 5cm

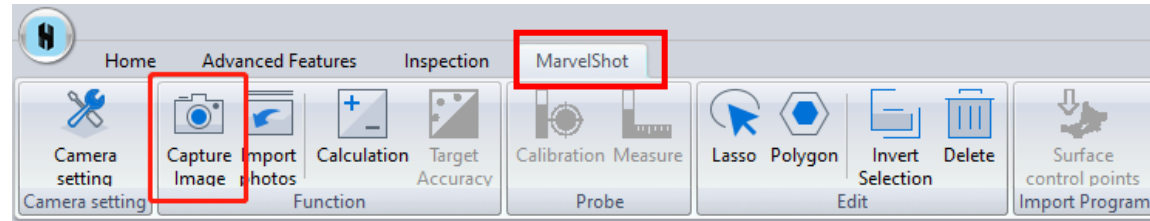




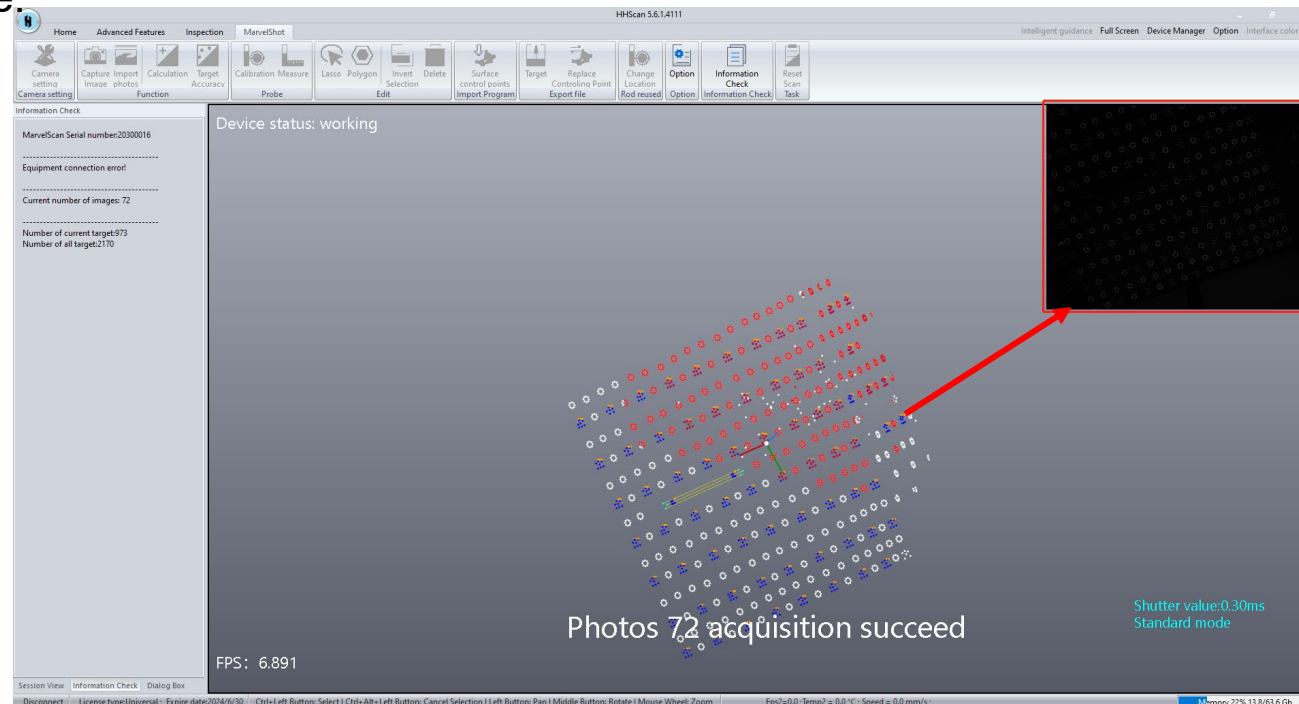
9. OTHER FUNCTIONS

Photogrammetry-Operation Workflow

STEP ONE: Select “MarvelShot” to click “Capture Image”



STEP TWO: Click on center button to switch on third camera, you will see the third camera view on right conner in the software.





9. OTHER FUNCTIONS

Photogrammetry-Operation Workflow

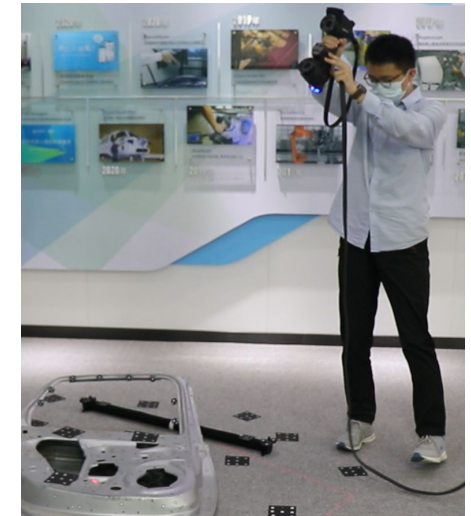
STEP THREE: Take photos of Scale Bars

#1, Face third camera vertical to the control bar as show in the picture, and keep indicator red dot projecting on the control bar and keep red box covered whole scale bar, left click (<) to take one picture

#2, Rotate scanner 90° at same position clockwise and take second picture while keep third camera capture the whole control bar, the encode TARGETs will be captured and appear in the software

#3, Repeat above two process to take 4-6 pictures of control bar from different direction

#4, Take pictures starting from the control bar to the checking bar until two scale bars appear in the software





9. OTHER FUNCTIONS

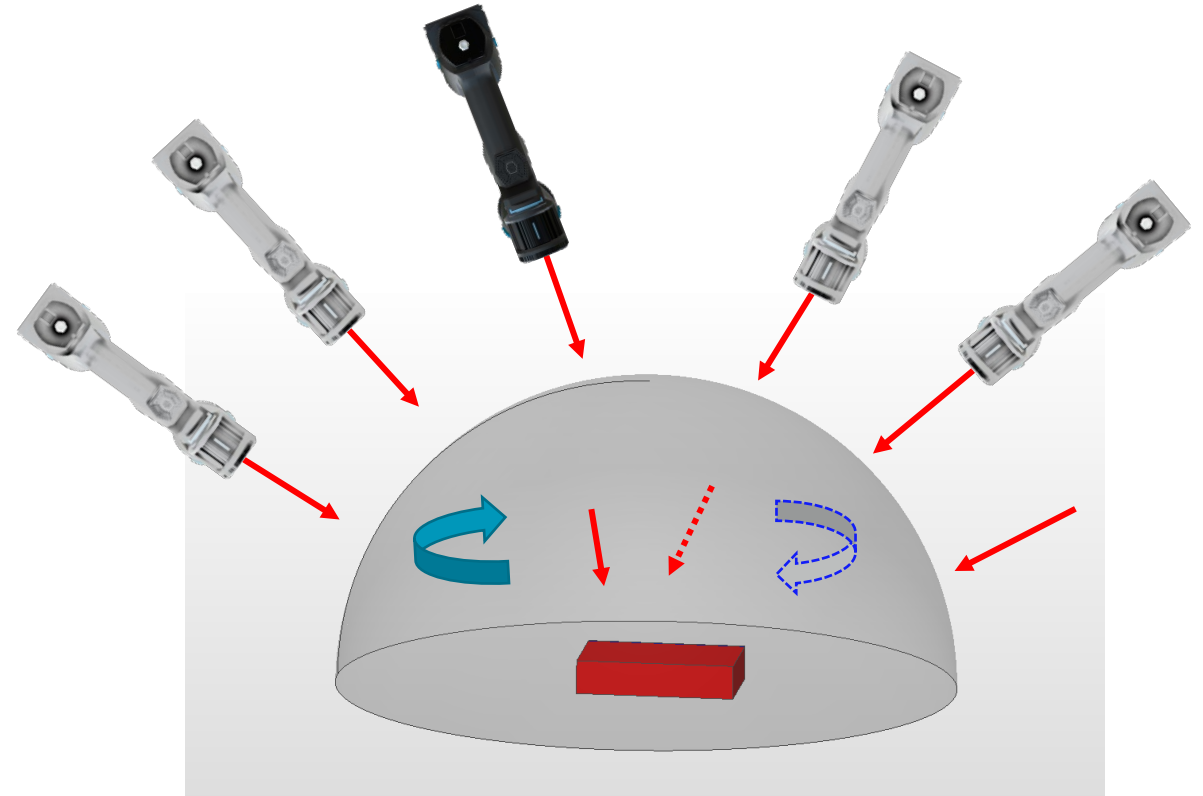
Photogrammetry-Operation Workflow

STEP FOUR: Capture images of Magnetic Coded Targets

#1, Take pictures of magnetic coded targets from center to edge as show in the pictures

#2, Each position should take 2 pictures by rotate the scanner 90° clockwise

#3, Based on adjacent 2 positions to take pictures of magnetic coded targets, it's required to capture at least 4 commons magnetic coded targets within 4 pictures





9. OTHER FUNCTIONS

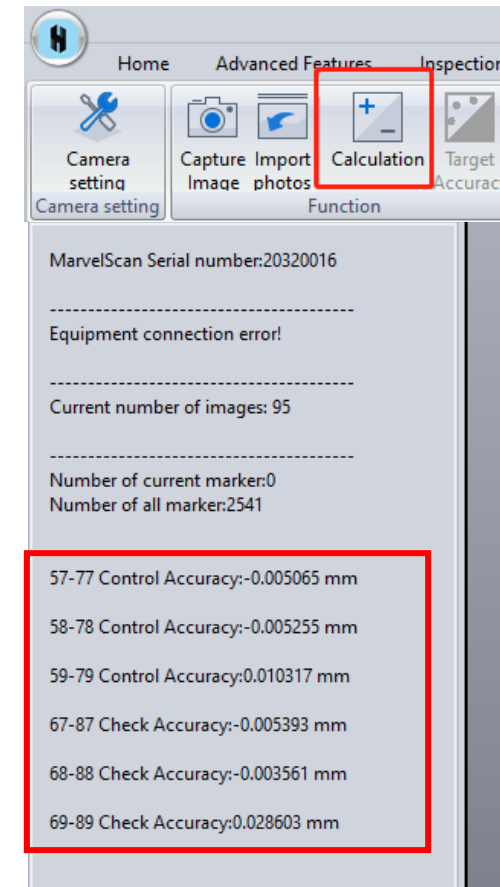
Photogrammetry-Operation Workflow

STEP FIVE: Calculate Magnetic Coded Targets Images

#1, Press center button again to switch off the third camera

#2, Click “Calculate” to process targets data

Tips: You can check data accuracy in the left column

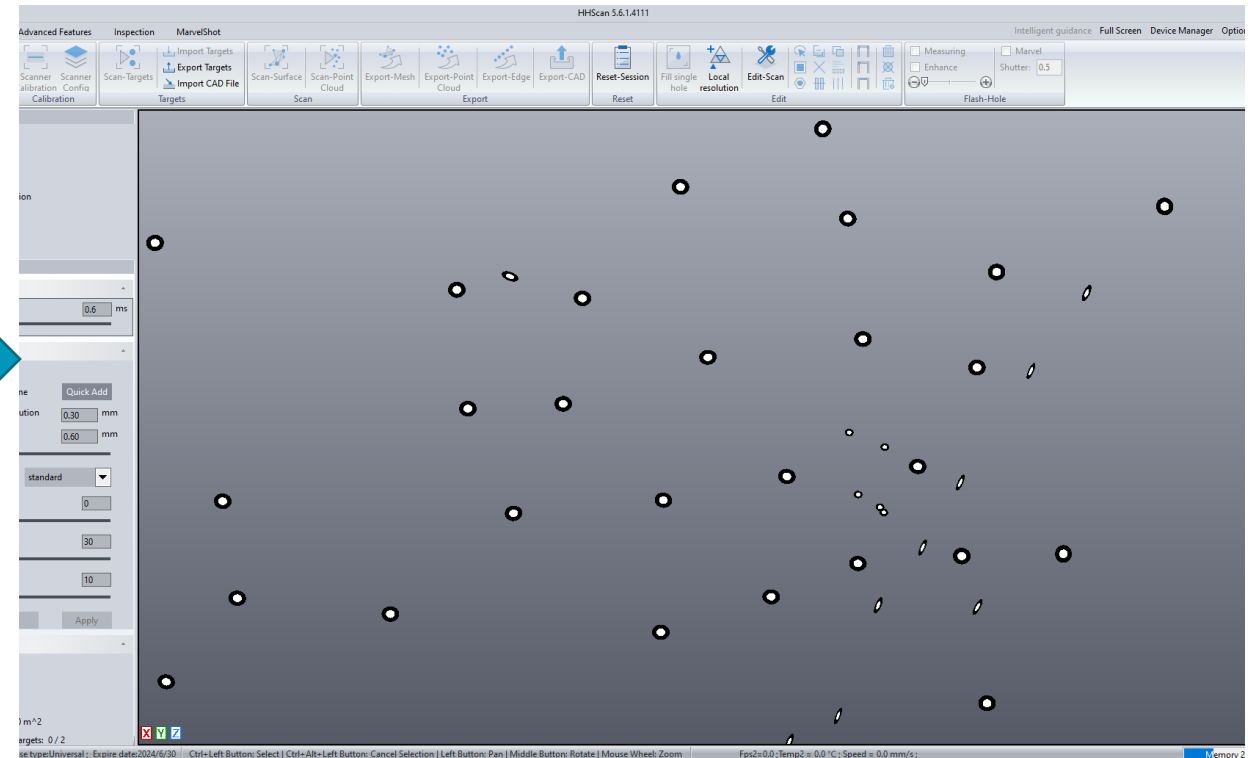
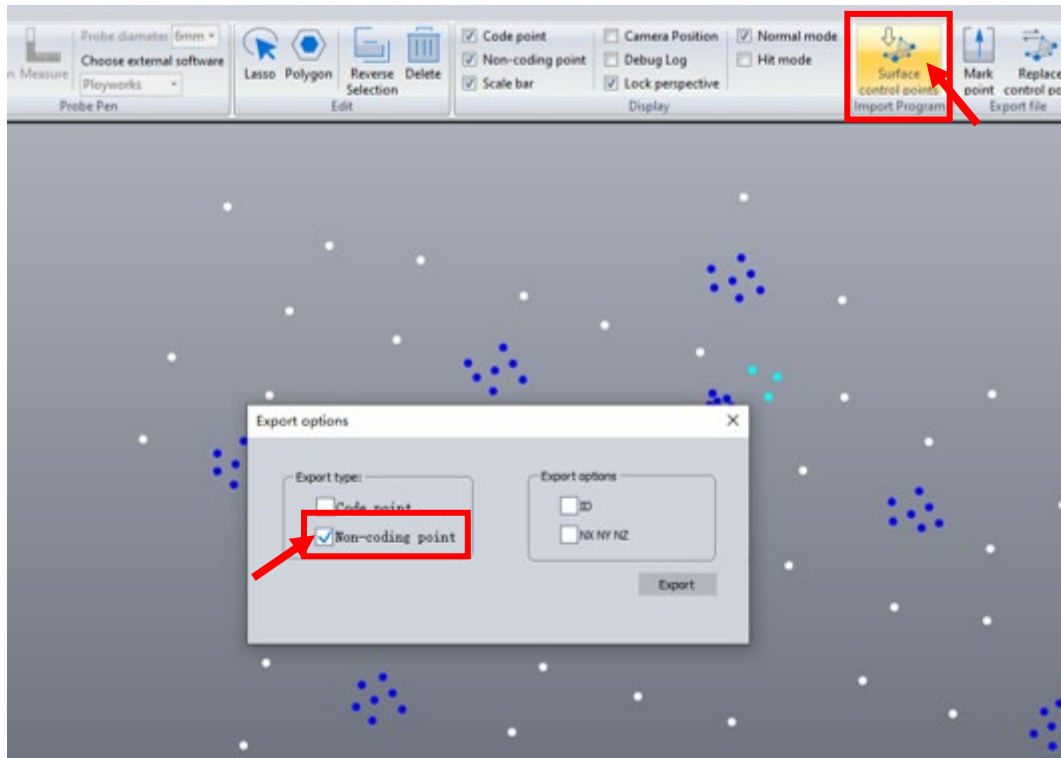




9. OTHER FUNCTIONS

Photogrammetry-Operation Workflow

STEP SIX: Click “Surface Control Points” and select “Non-coding point”, the TARGETs data will be automatically sent to a new scanning project as below





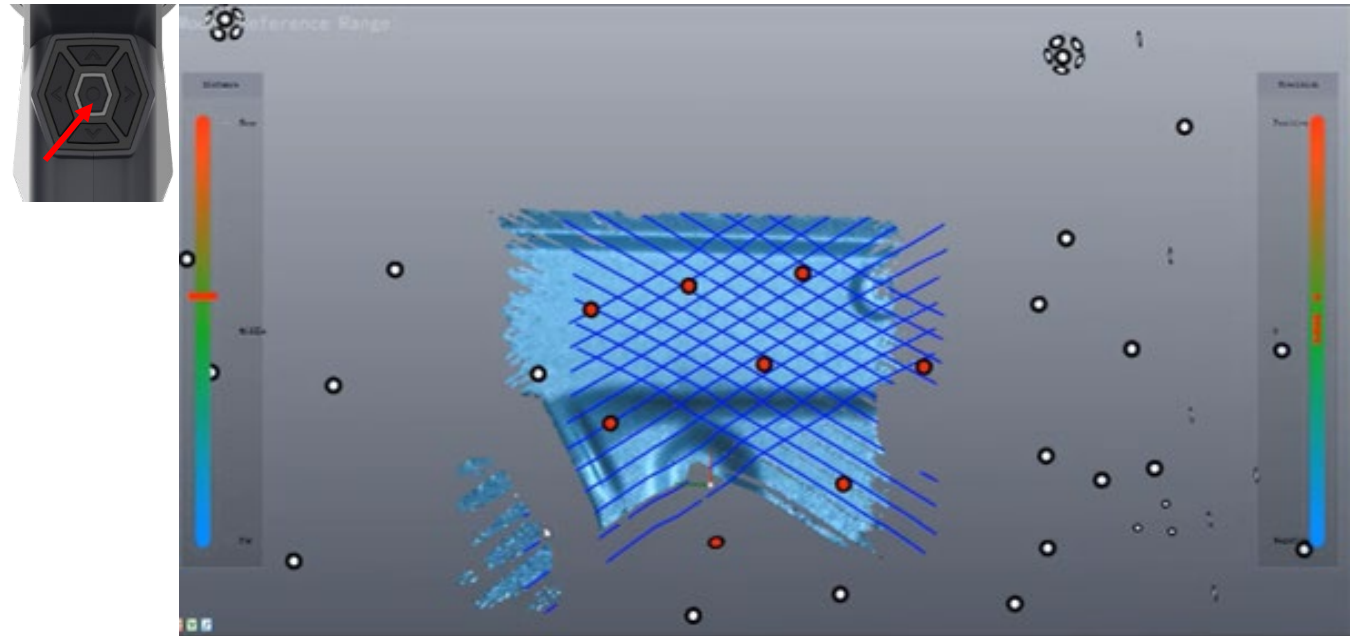
9. OTHER FUNCTIONS

Photogrammetry-Operation Workflow

STEP SEVEN: Take away all magnetic coded targets and put scale bars back to the carrying box



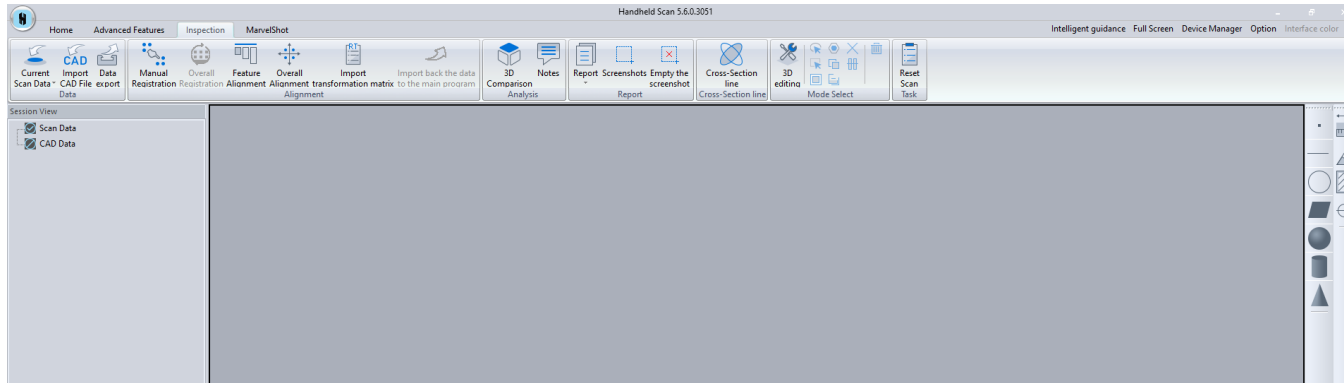
STEP EIGHT: Press the center-push button to activate the dual camera, to scan the surface with targets which are collected by photogrammetry



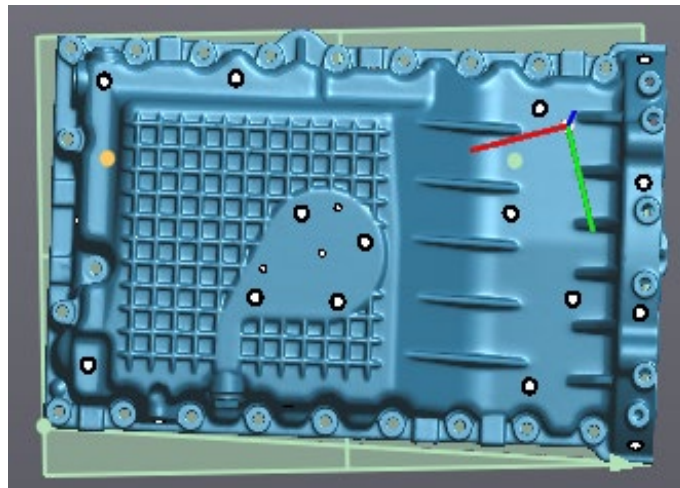


9. OTHER FUNCTIONS

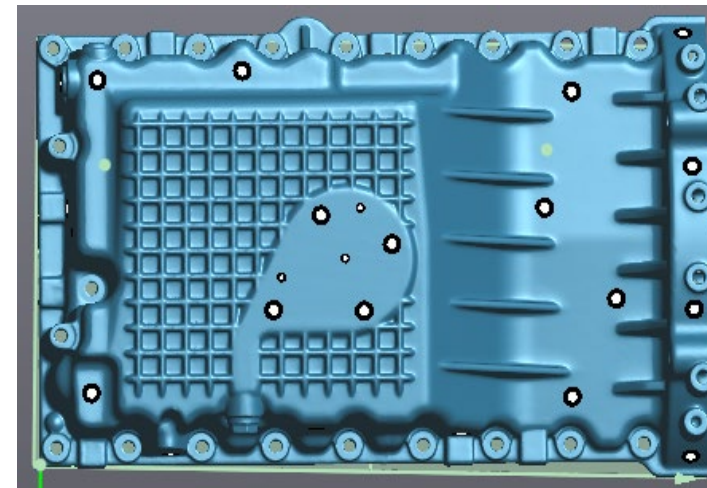
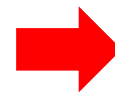
Inspection Module



- To create the features like "point", "line" and "face" on the model
- To align 3D model with the feature establishment of "point", "line" and "face"
- To measure the distance of two points or two features for model



Before alignment



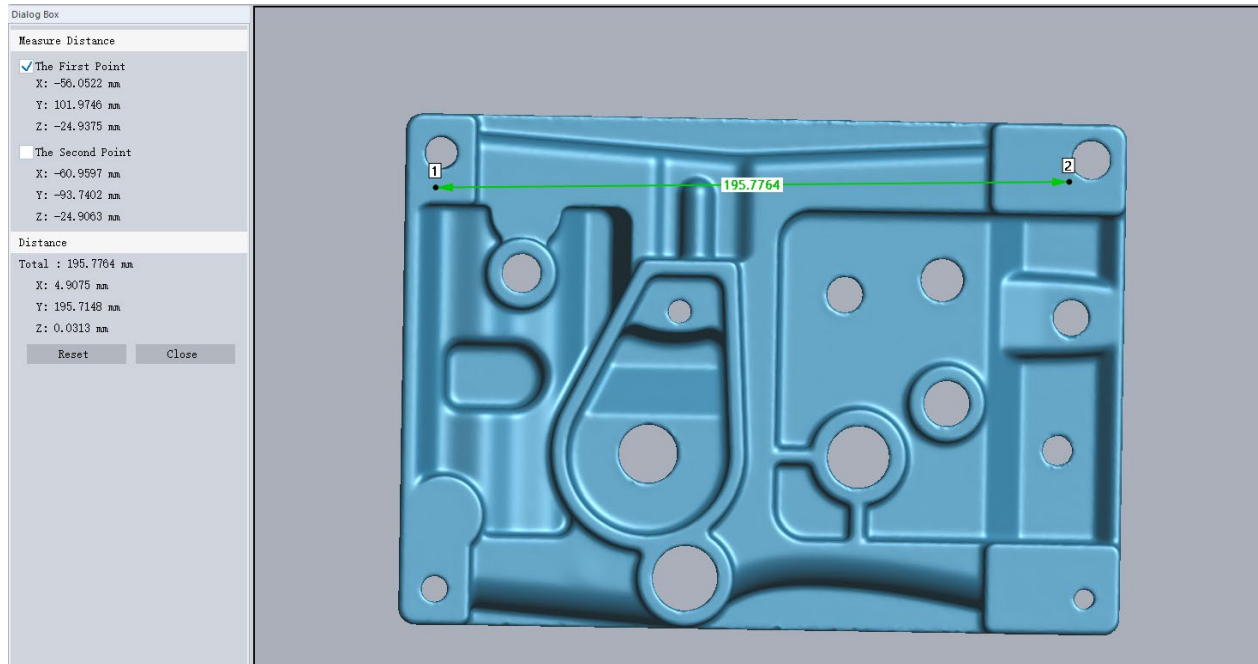
After alignment



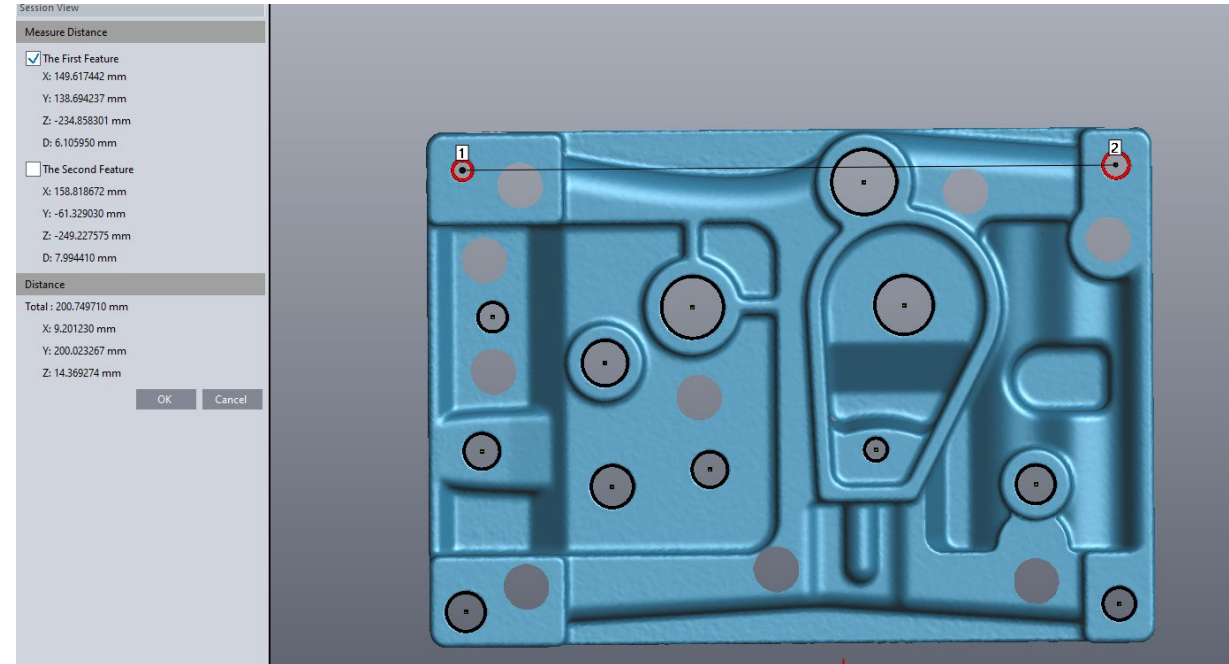
9. OTHER FUNCTIONS

Inspection Module

Distance between two points



Distance between two features

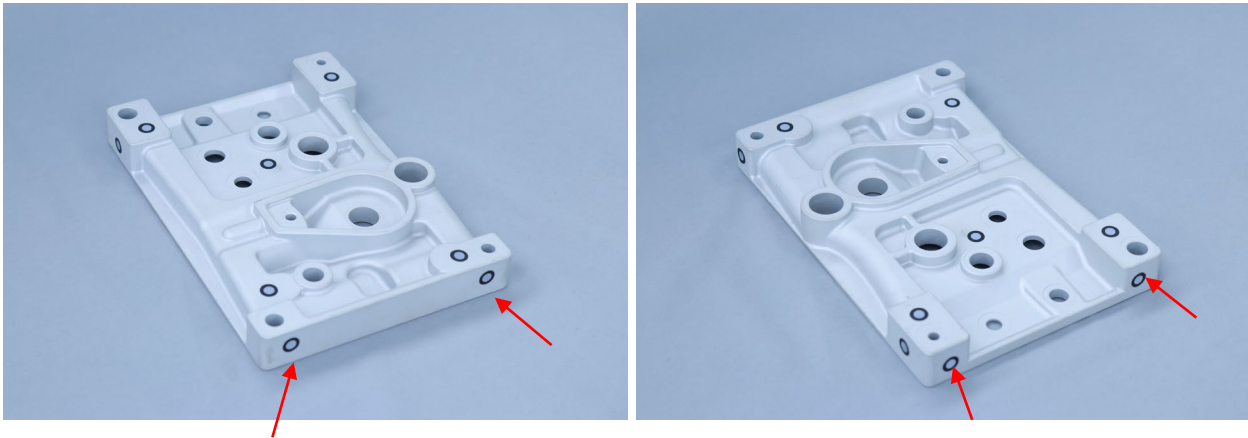




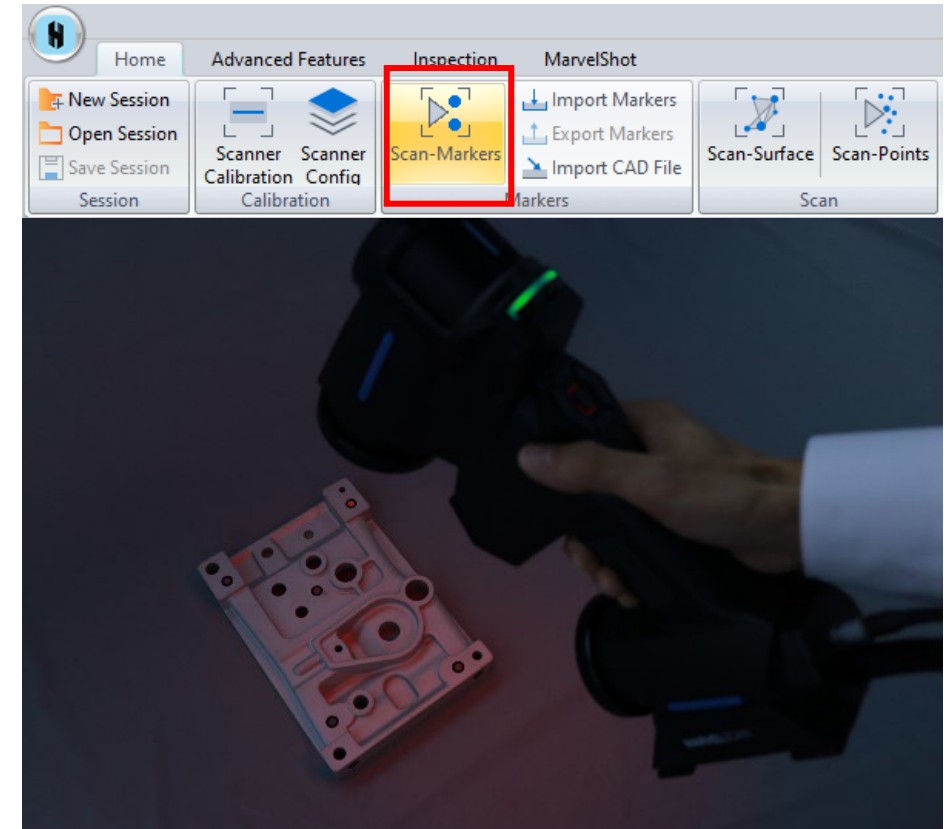
9. OTHER FUNCTIONS

New Group Scanning

SETP ONE: To place targets on surface of object randomly & evenly, especially place 5-6 targets on side of object.



SETP TWO: Click “Scan-TARGETs” to collect targets

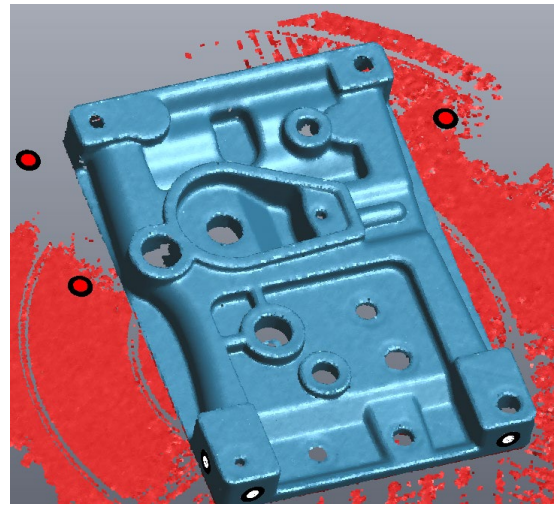
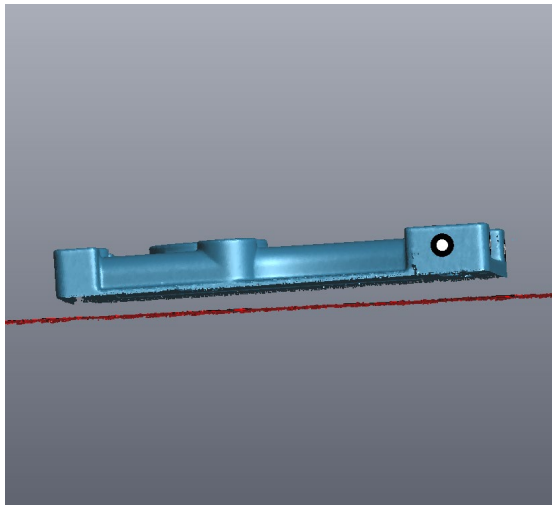
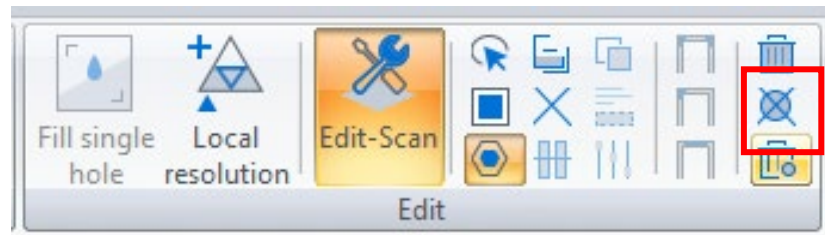




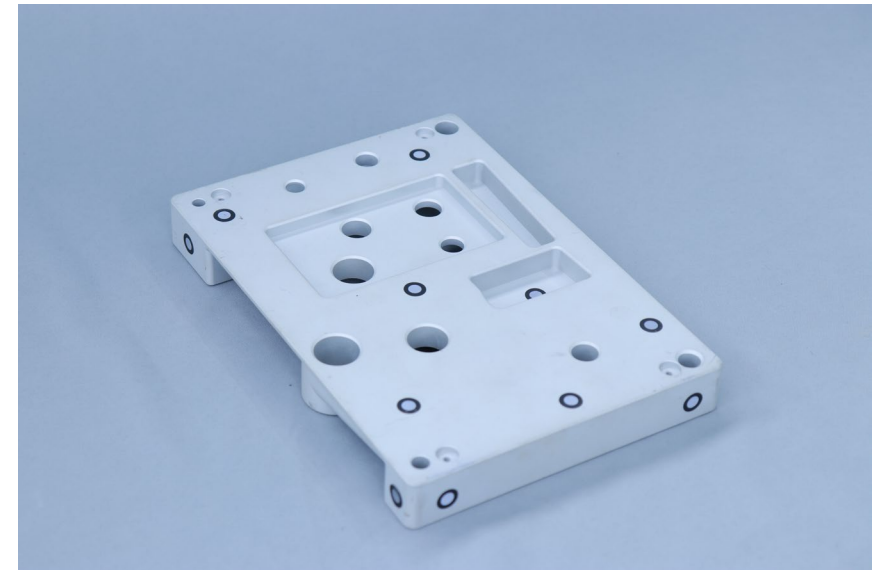
9. OTHER FUNCTIONS

New Group Scanning

STEP THREE: To scan the object with right position and delete extra data and targets



STEP FOUR: To flip the object and continue to scan the object with right position and delete extra data and targets

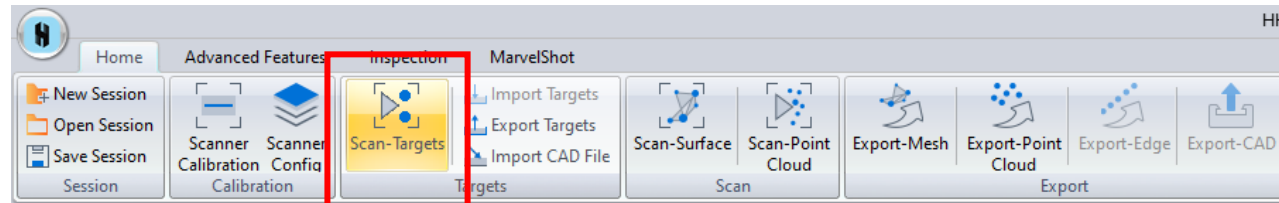




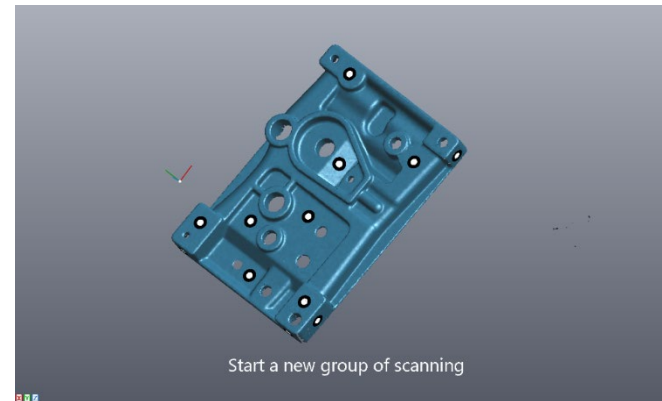
9. OTHER FUNCTIONS

New Group Scanning

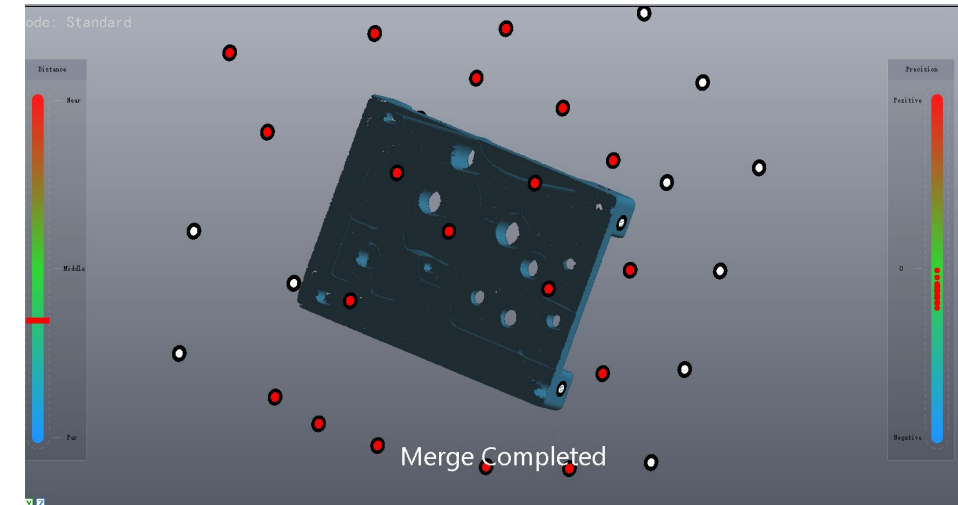
STEP FIVE: Click “Scan-TARGETs” double click the top push button of scanner to start a new group of scanning.



“Press twice”



STEP SIX: Scan the targets from front and sides, then merge them together automatically.

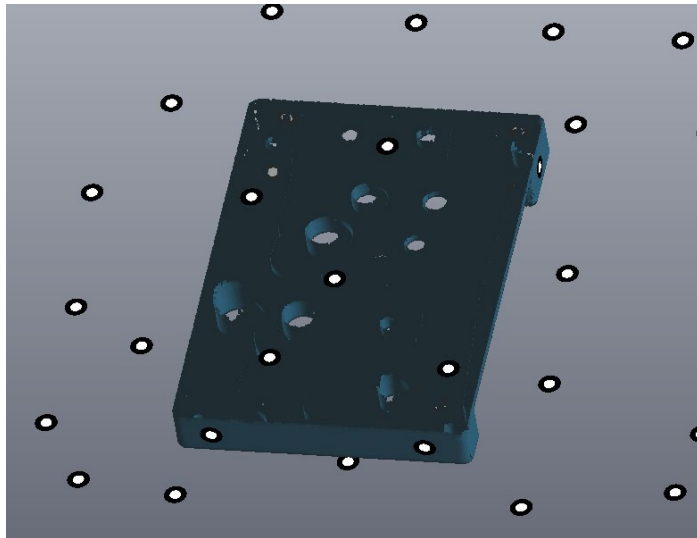




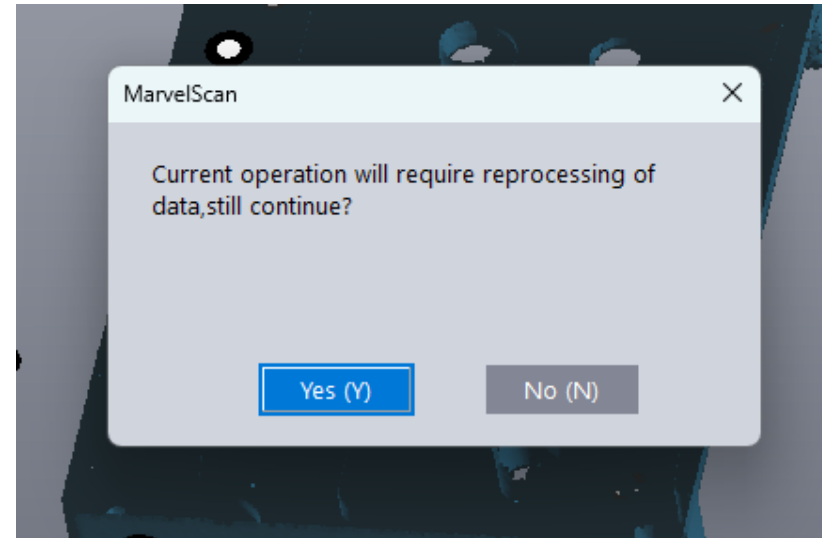
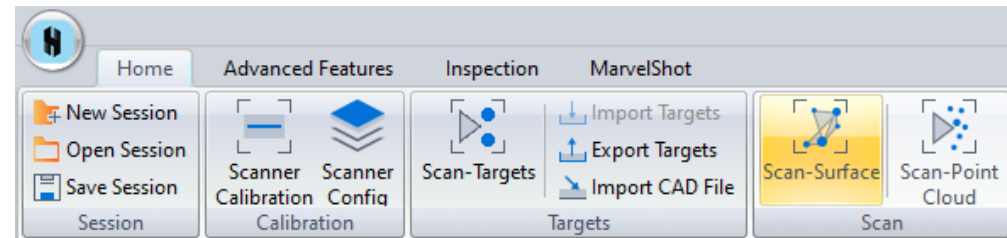
9. OTHER FUNCTIONS

New Group Scanning

STEP SEVEN: Click “Scan-TARGETs” again to calculate the newly added targets.



STEP EIGHT: Click “Scan-Surface”, select “Yes” in prompt window.

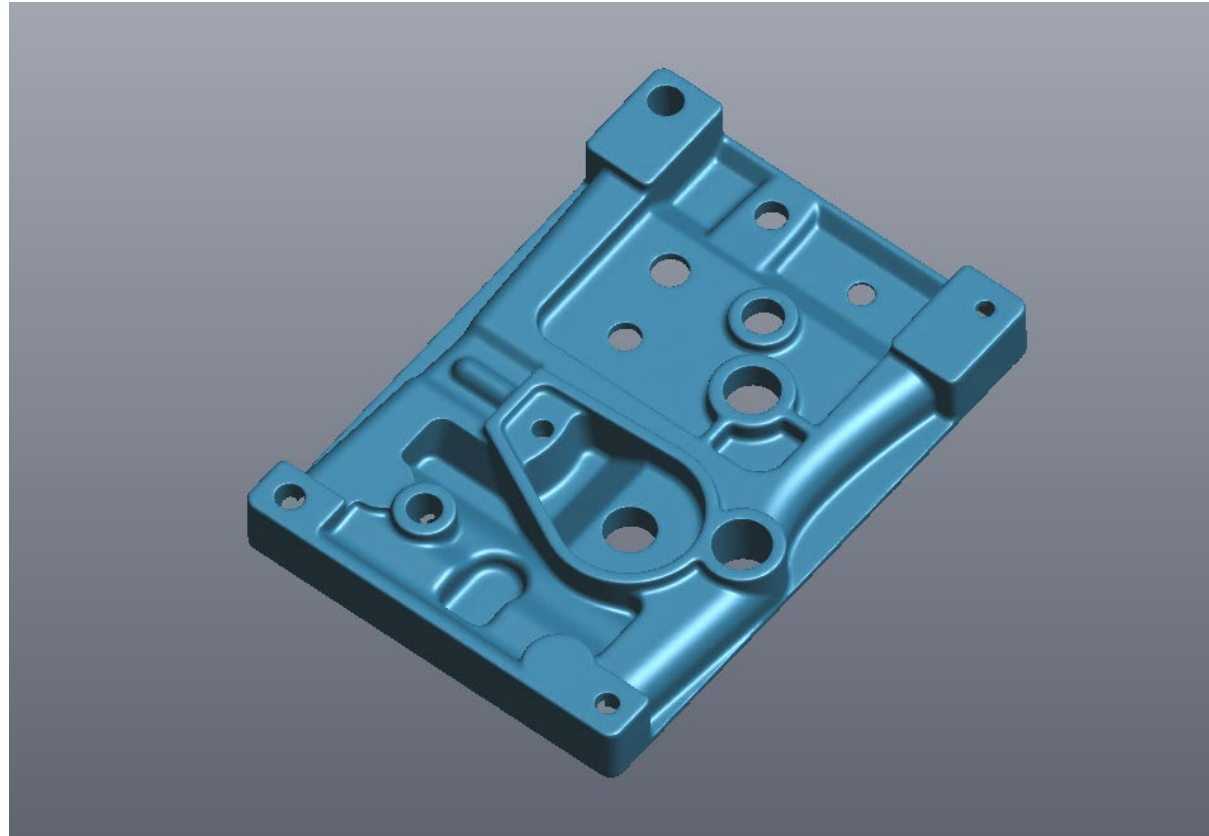




9. OTHER FUNCTIONS

New Group Scanning

STEP TEN: Continue scanning to complete the data collection.



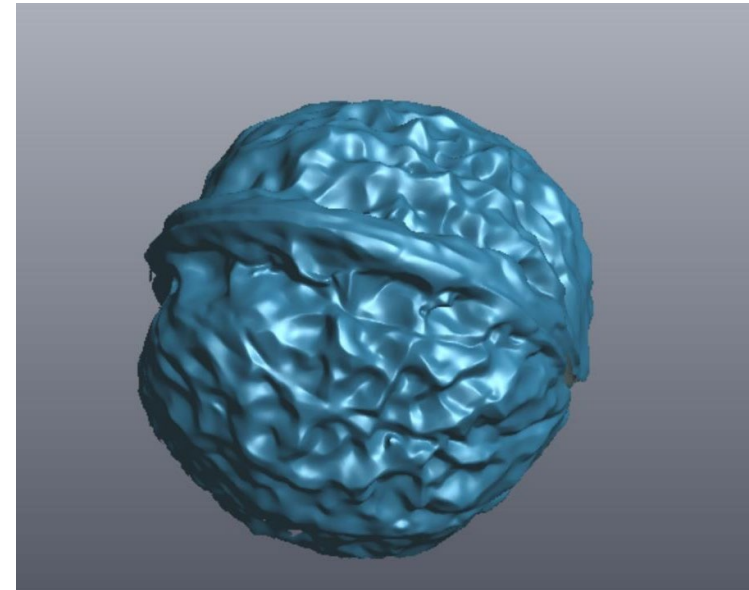
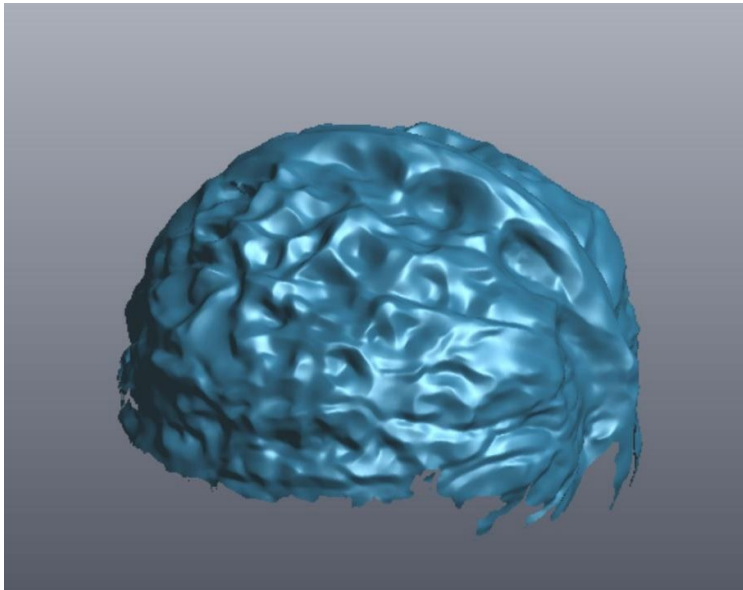


9. OTHER FUNCTIONS

Scan Data Merge

Two methods of Scanning Data Merge:

1. To merge two scanning data by data in common surface
2. To merge two scanning data by common targets



***Take below two scan data as example to demonstrate how to merge by data in common surface.

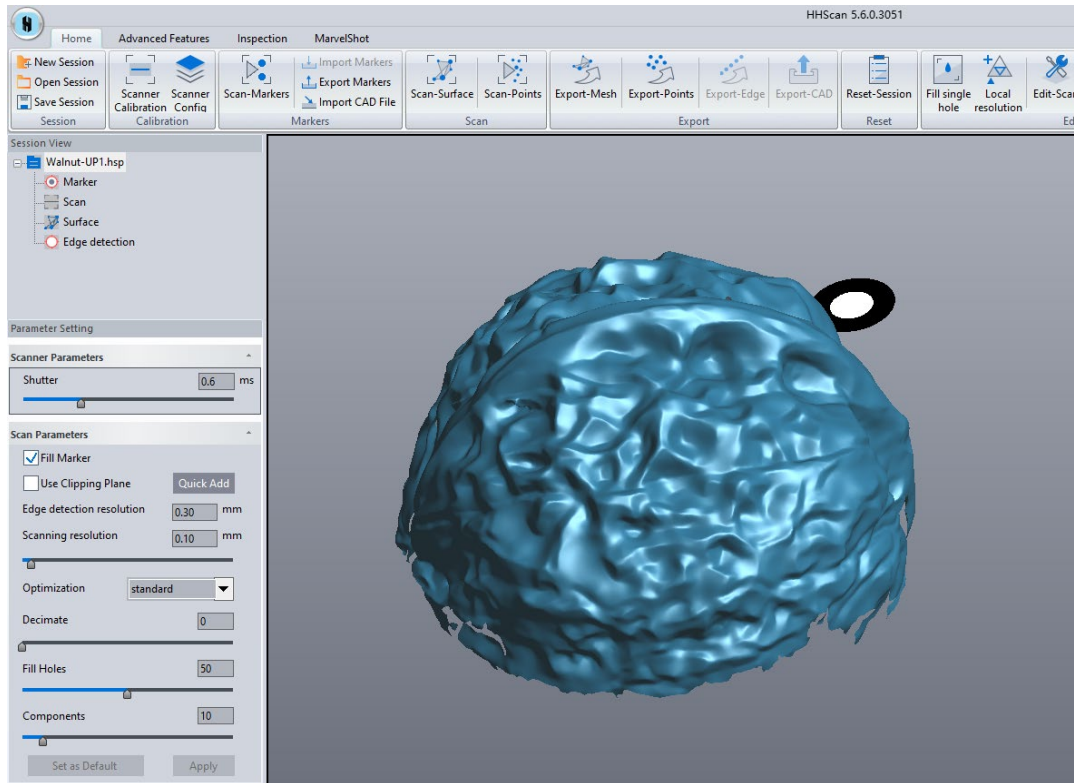


9. OTHER FUNCTIONS

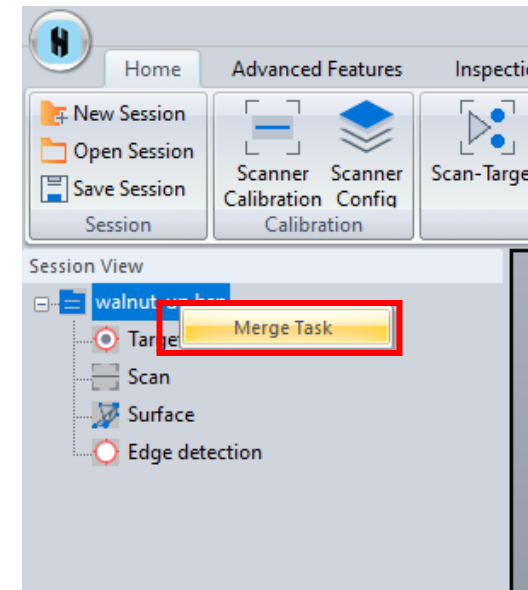
Scan Data Merge

#1, To merge by data in common surface

STEP ONE: To import first session scan data



STEP TWO: To right-click on the session and select “Merge Task”

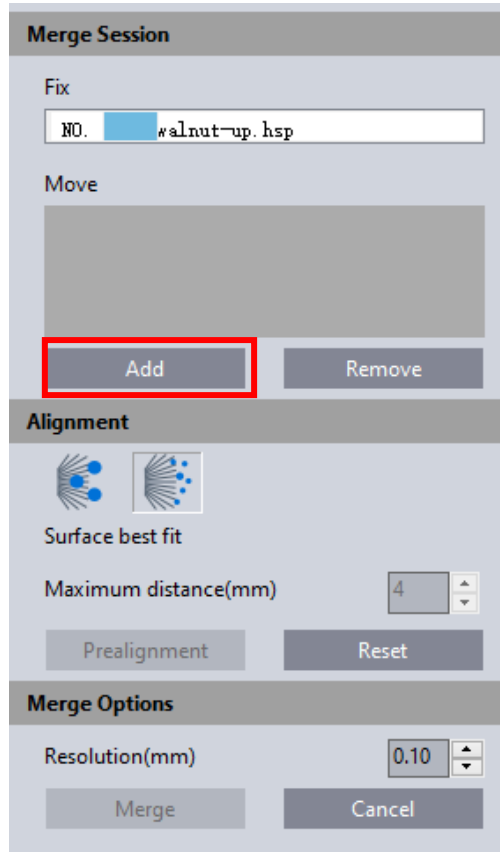




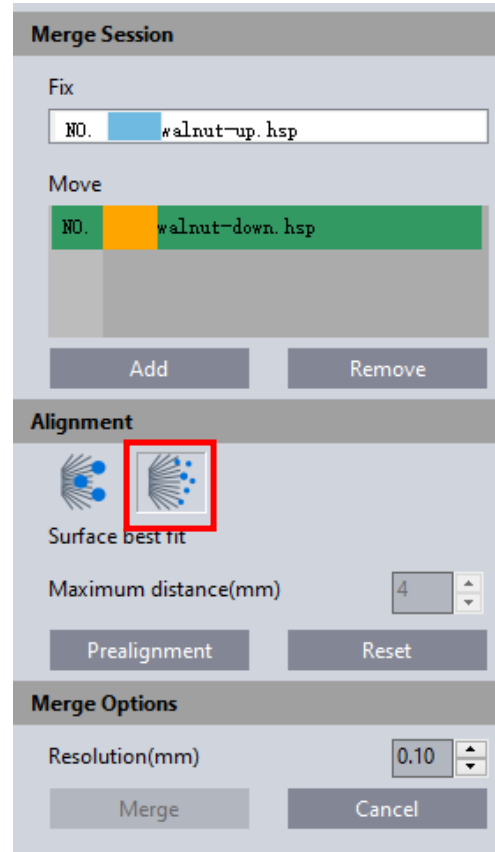
9. OTHER FUNCTIONS

Scan Data Merge

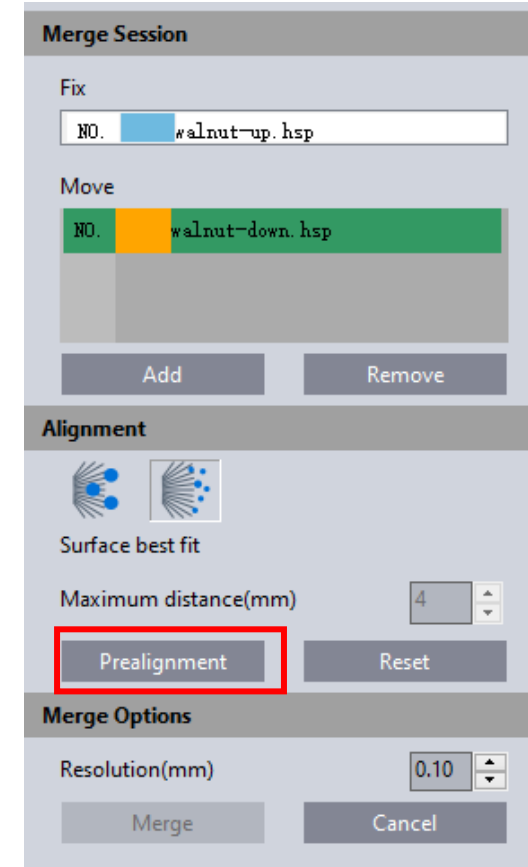
STEP THREE: To import second session scanning data



STEP FOUR: To select "Mesh best fit"



STEP FIVE: To select "Pre-Align"

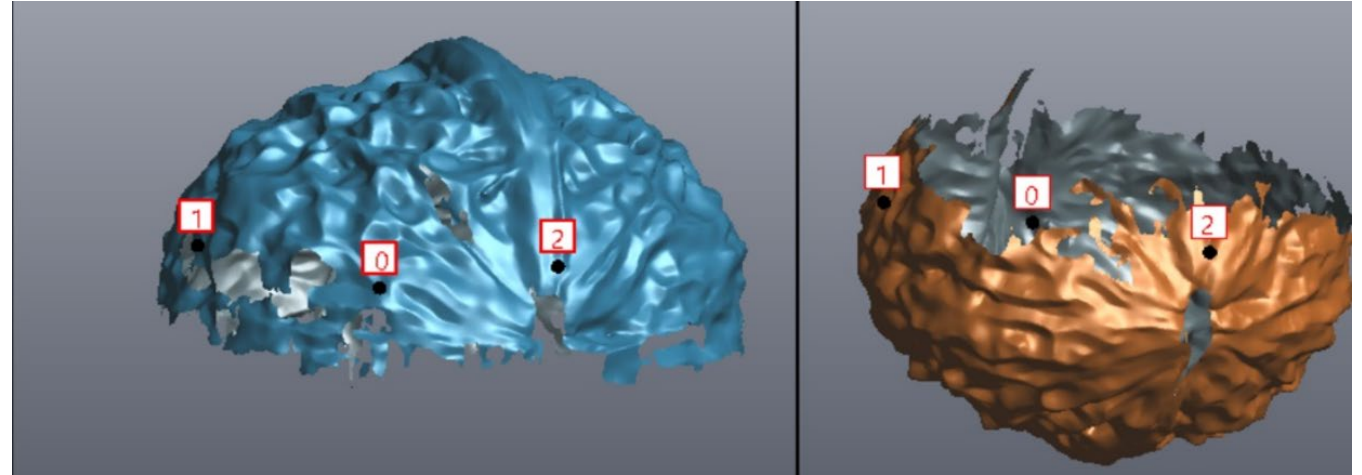




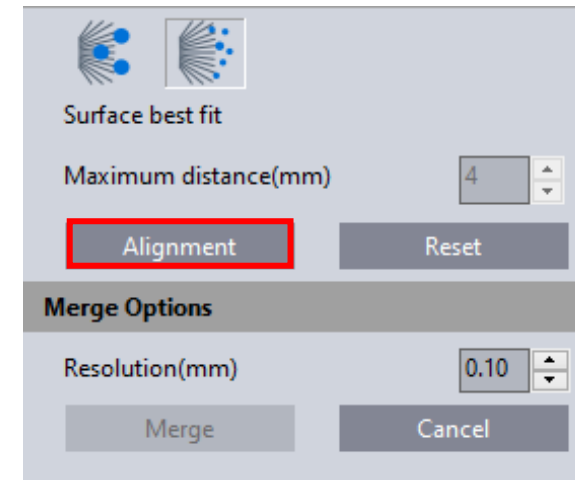
9. OTHER FUNCTIONS

Scan Data Merge

STEP SIX: To select 3 or more points on common surface of two scanning data



STEP SEVEN: To click “Align” to align two scanning data

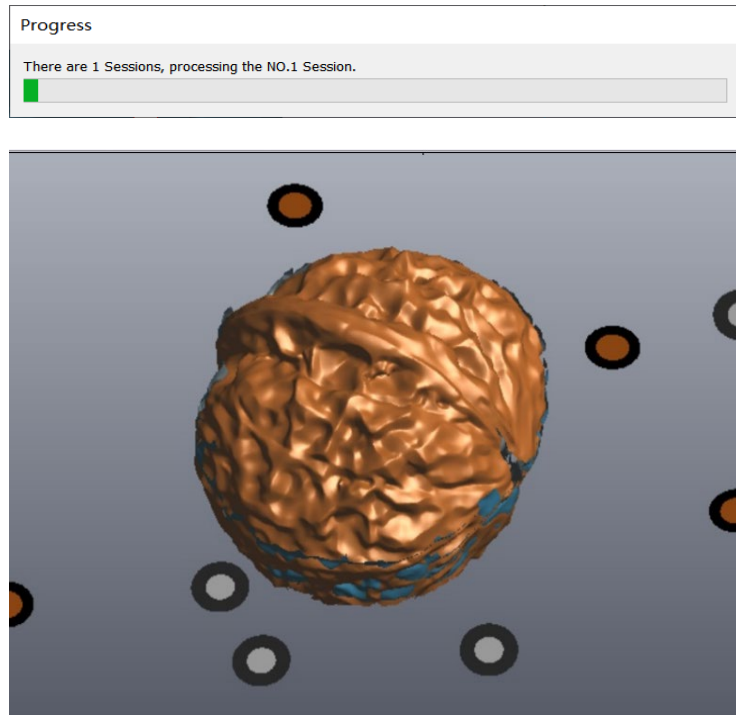




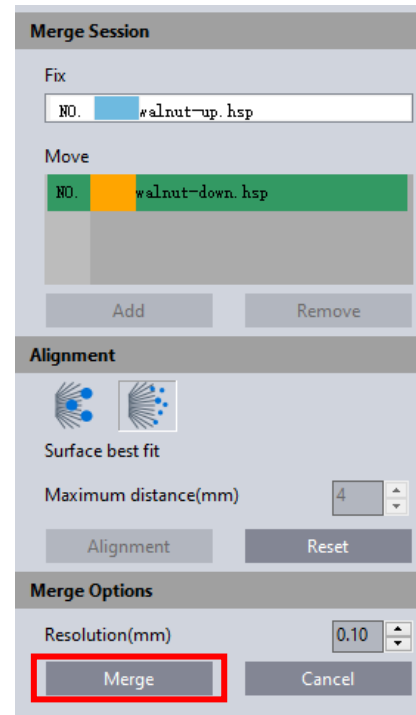
9. OTHER FUNCTIONS

Scan Data Merge

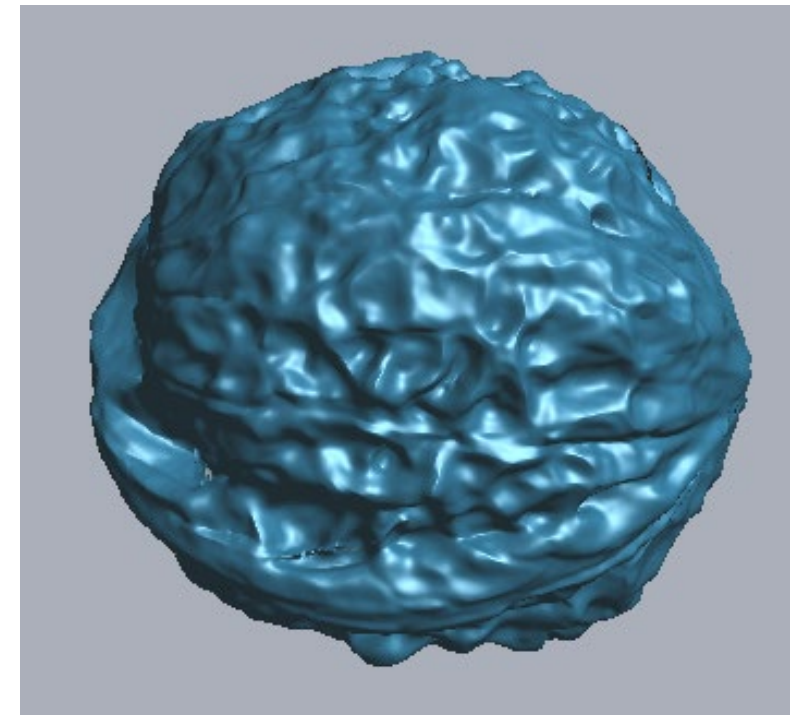
STEP EIGHT: to wait for data processing and show the alignment result



STEP NINE: Click “Merge”



STEP TEN: Complete merged scanning data

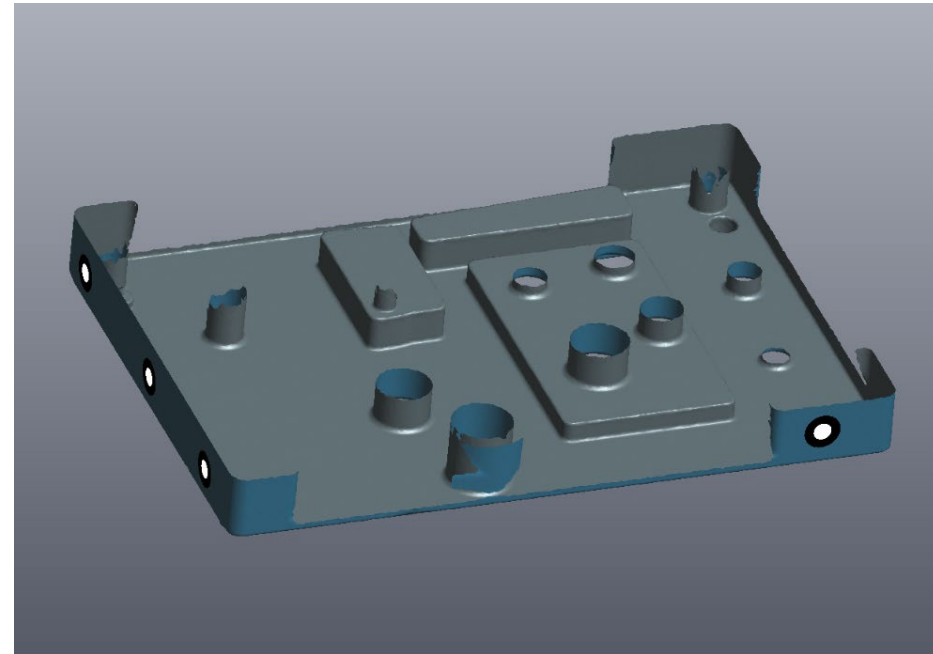
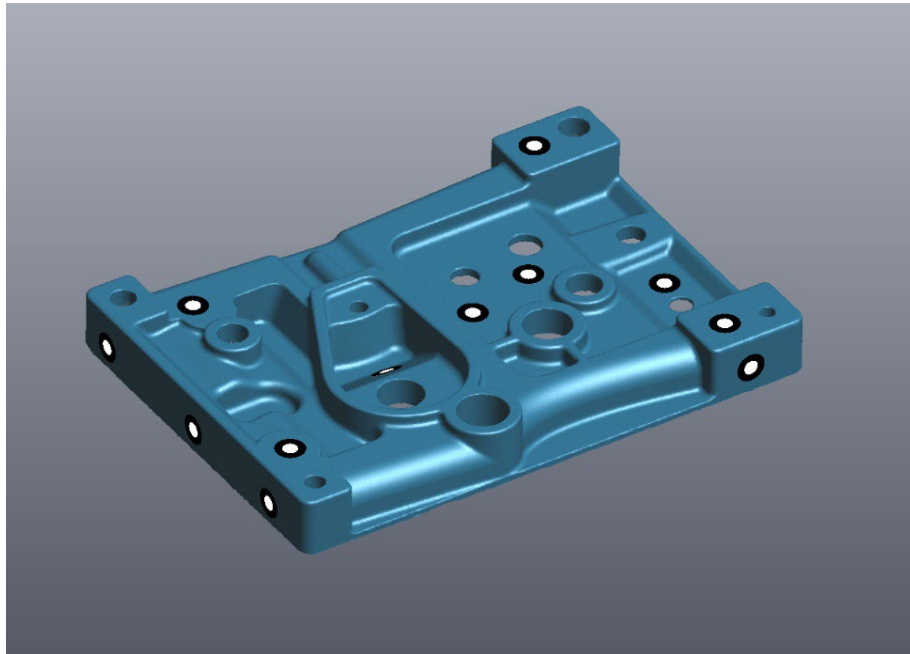




9. OTHER FUNCTIONS

Scan Data Merge

#2, To merge by common targets



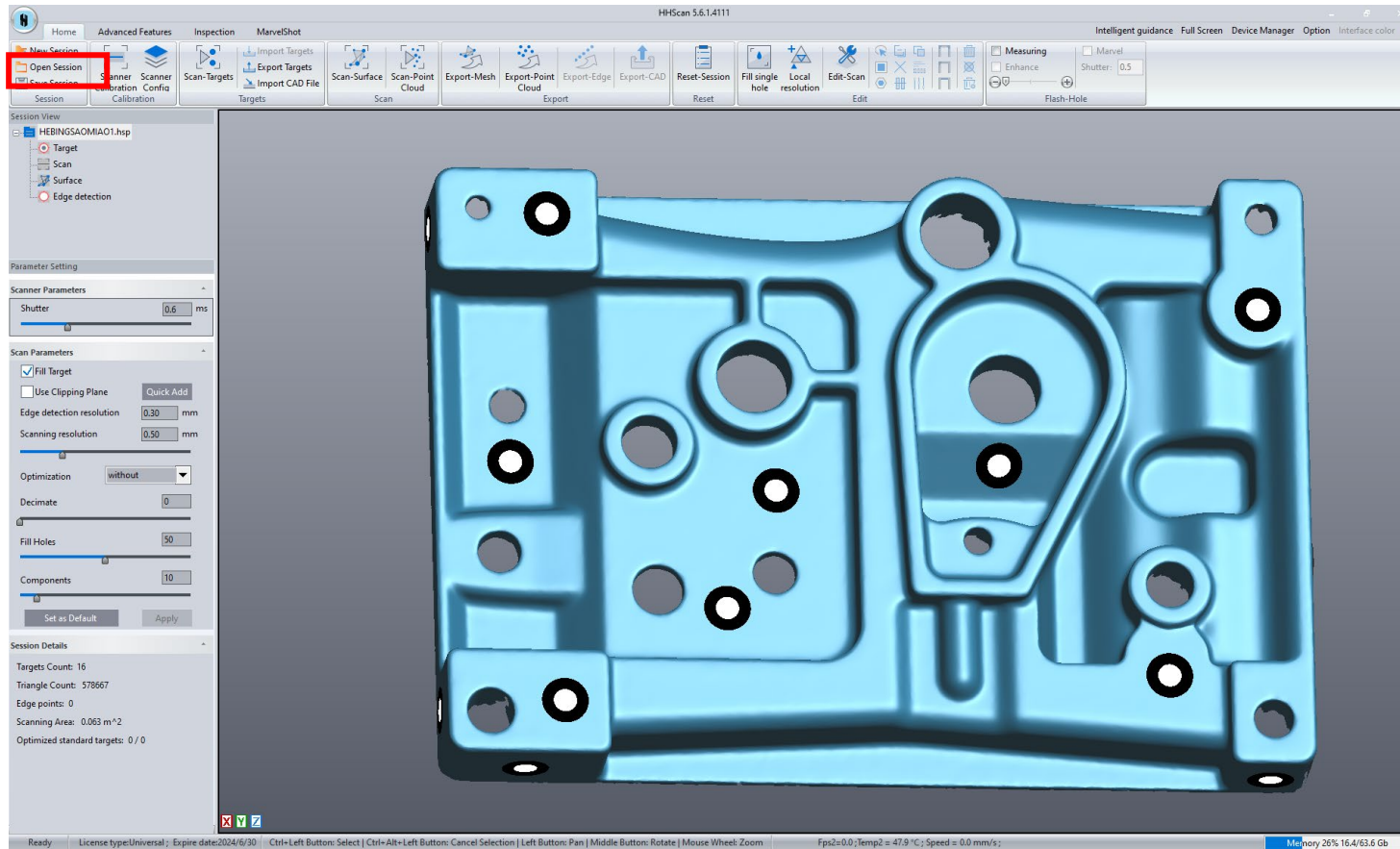
***Take below two scanning data as example to demonstrate how to merge by common targets.



9. OTHER FUNCTIONS

Scan Data Merge

STEP ONE: Click “Open Session”, to import first session scanning data

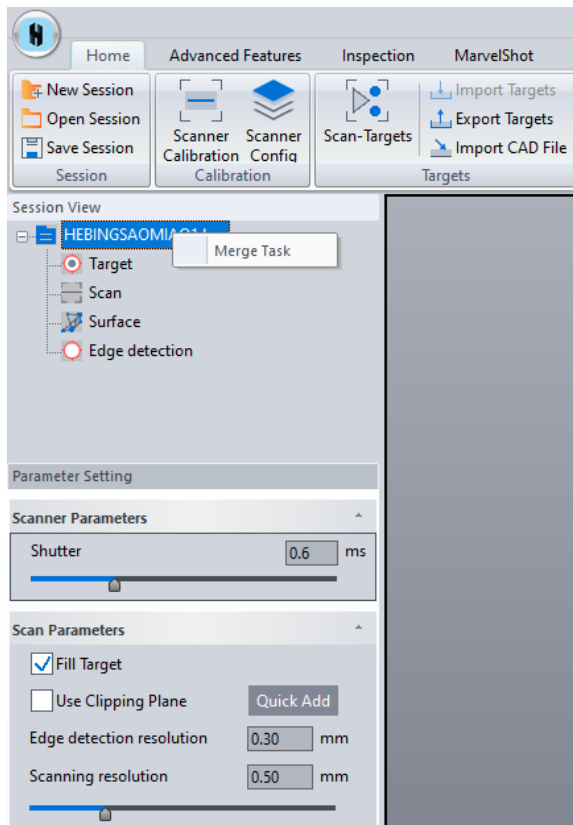




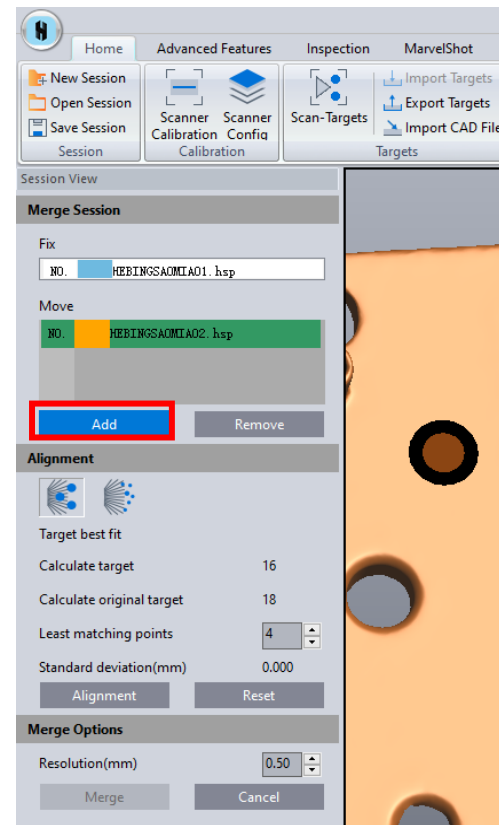
9. OTHER FUNCTIONS

Scan Data Merge

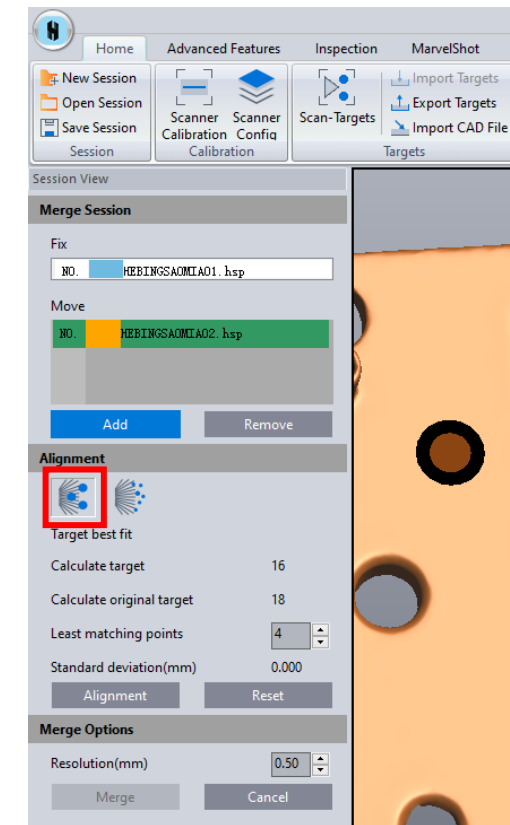
STEP TWO: To right-click on the session and select “Merge Task”



STEP THREE: To import second session scanning data



STEP FOUR: To select “Mesh best fit”



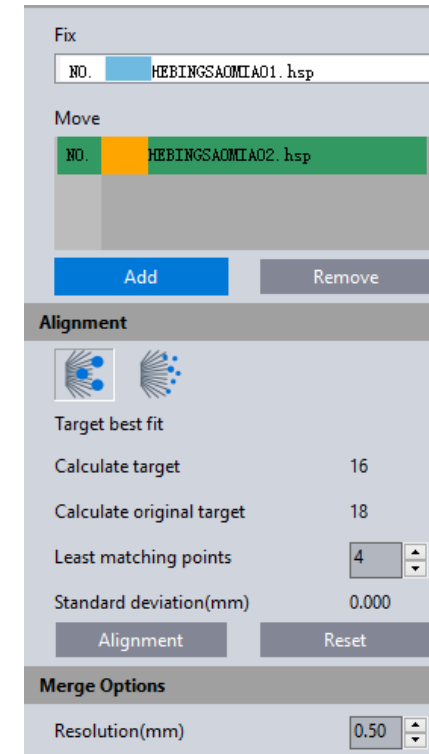
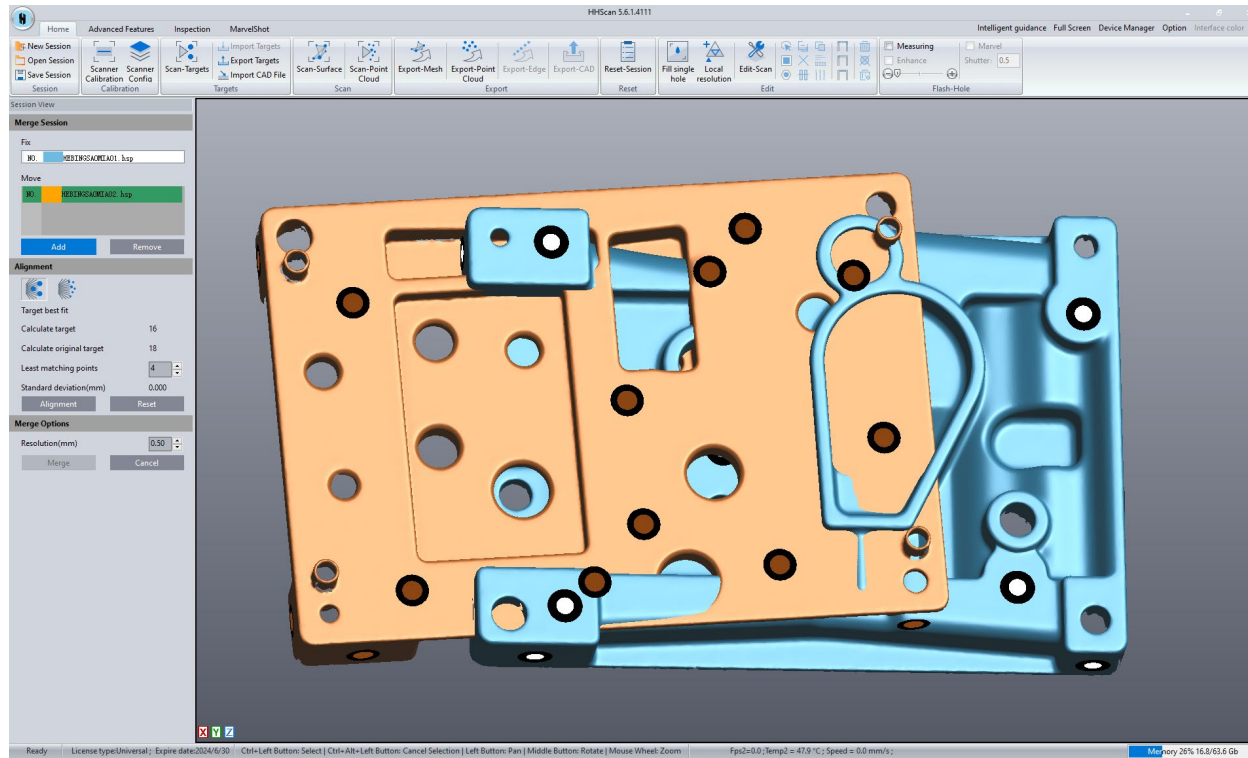


9. OTHER FUNCTIONS

Scan Data Merge

STEP FIVE: Based on the numbers of common targets to set the minimum match targets (Min. targets number should be more than 4), it is recommended to set 6 or more

STEP SIX: Click “Alignment”

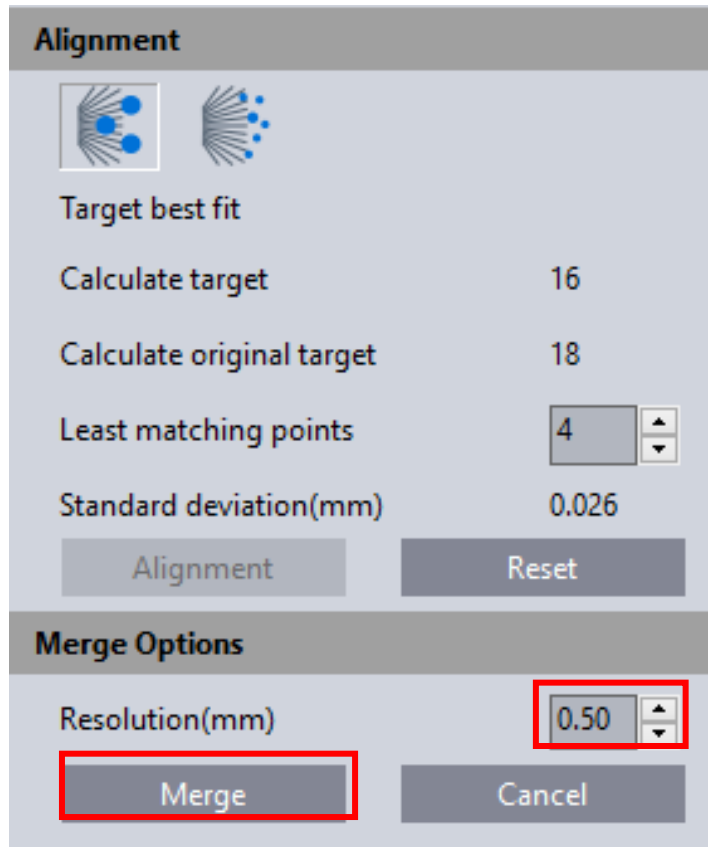




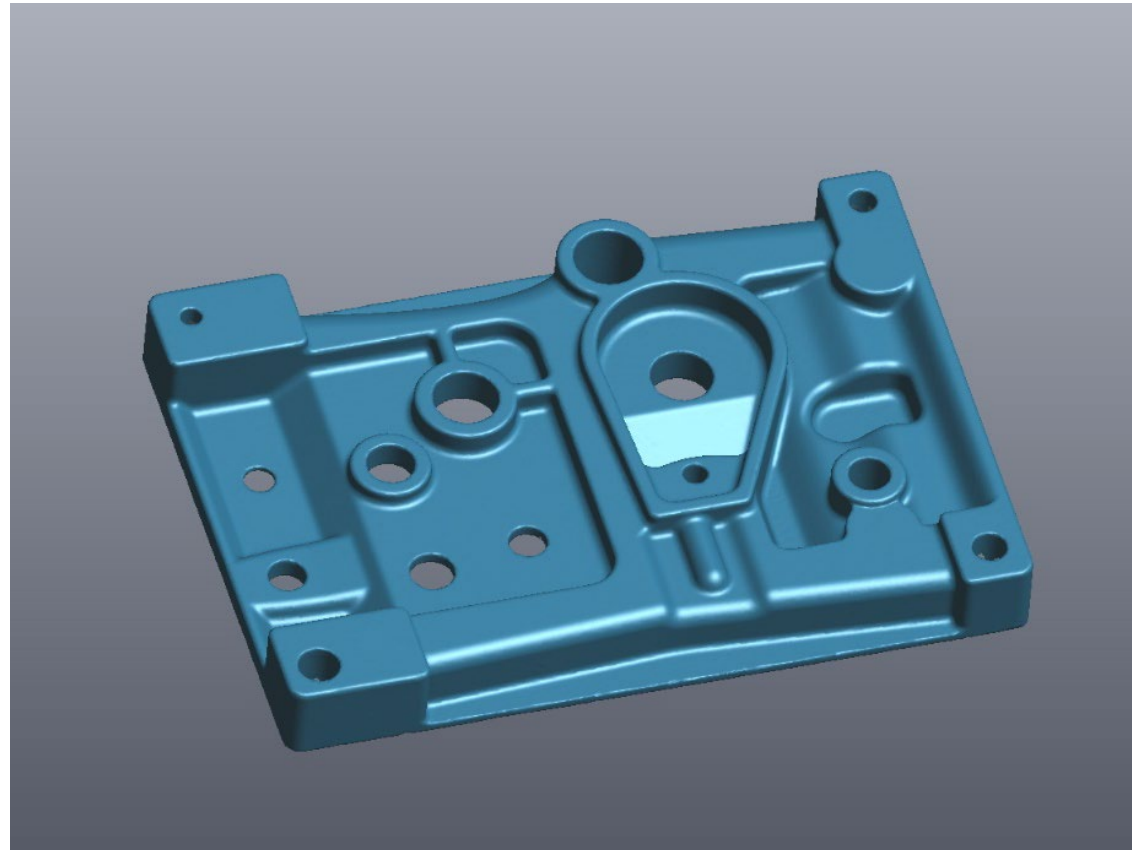
9. OTHER FUNCTIONS

Scan Data Merge

STEP SEVEN: Input the resolution you want to set and click "Merge"



STEP EIGHT: To wait for data processing and show merged result





9. OTHER FUNCTIONS

Fine Scanning Mode

STEP ONE: To double-click start key to switch to fine scanning mode (5 parallel laser lines)

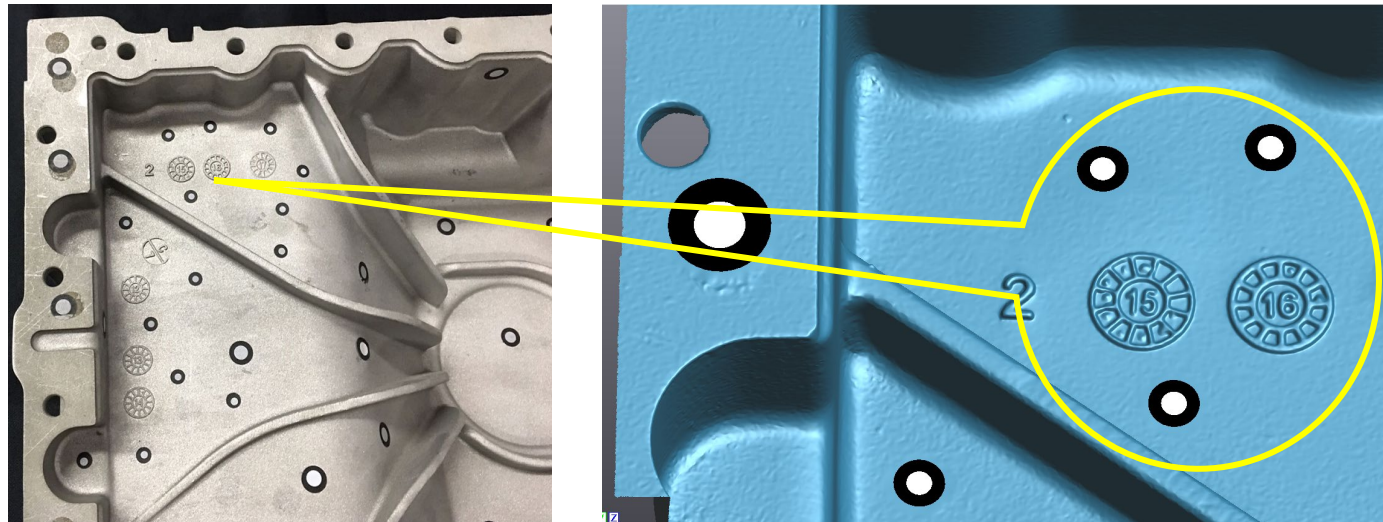
Tips: Please note stand-off distance of fine scanning mode is 150mm, the depth of field is up to 550mm, and the effective working range is 75mm to 225mm, which is much closer to object than that of stand scanning mode.

STEP TWO: To place targets (size of 6mm or 3mm) on the surface of object.

Tips: 3mm targets are better for fine scanning mode.

STEP THREE: To scan under fine scanning mode.

Tips: The longer you scan, the more details you will get and the larger file it will generate.

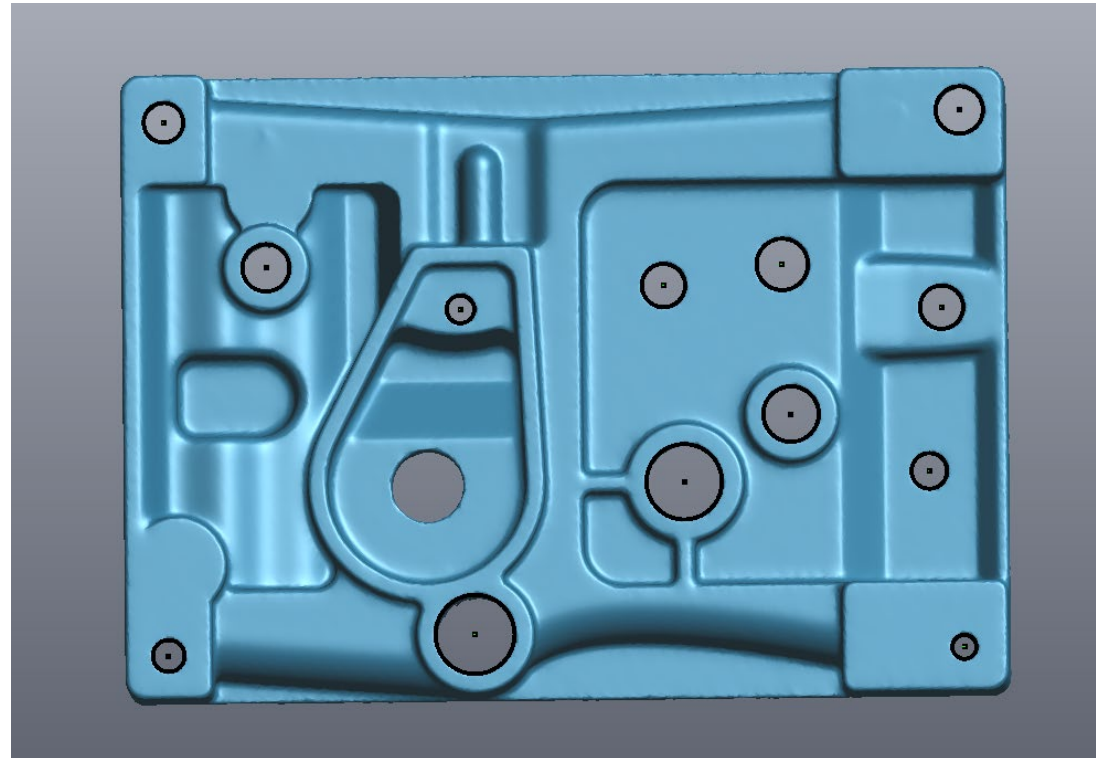




9. OTHER FUNCTIONS

Hole Flash Capture

- To capture hole coordination and data in second
- To capture surface mesh simultaneously of circle boundary to improve accuracy



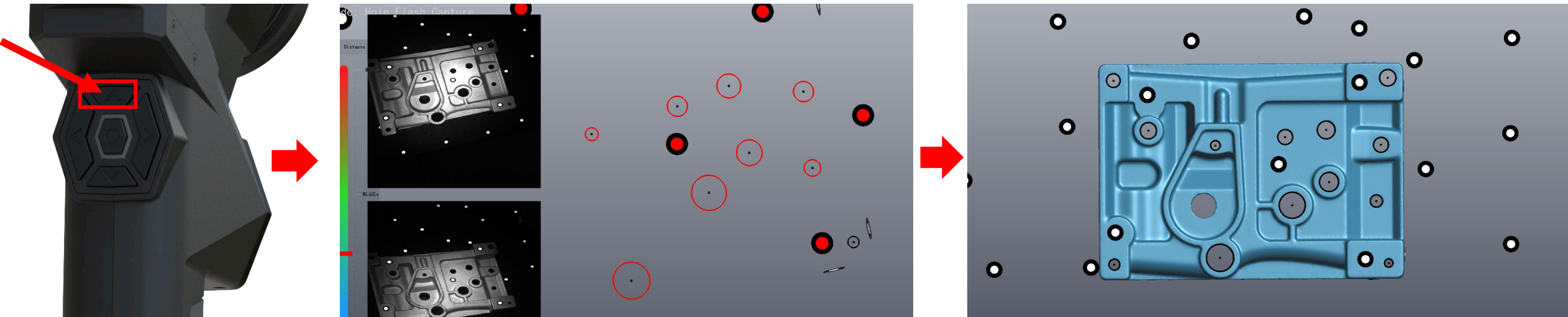


9. OTHER FUNCTIONS

Hole Flash Capture

STEP ONE: to select “measuring” before scanning (it also can be selected during scanning), press twice (see below) to switch to measuring hole mode

Tips: If you do not select “measuring” before scanning, it will start a new group of scanning, details see *OTHER FUNCTIONS-Scan Data Merge, STEP FIVE.*

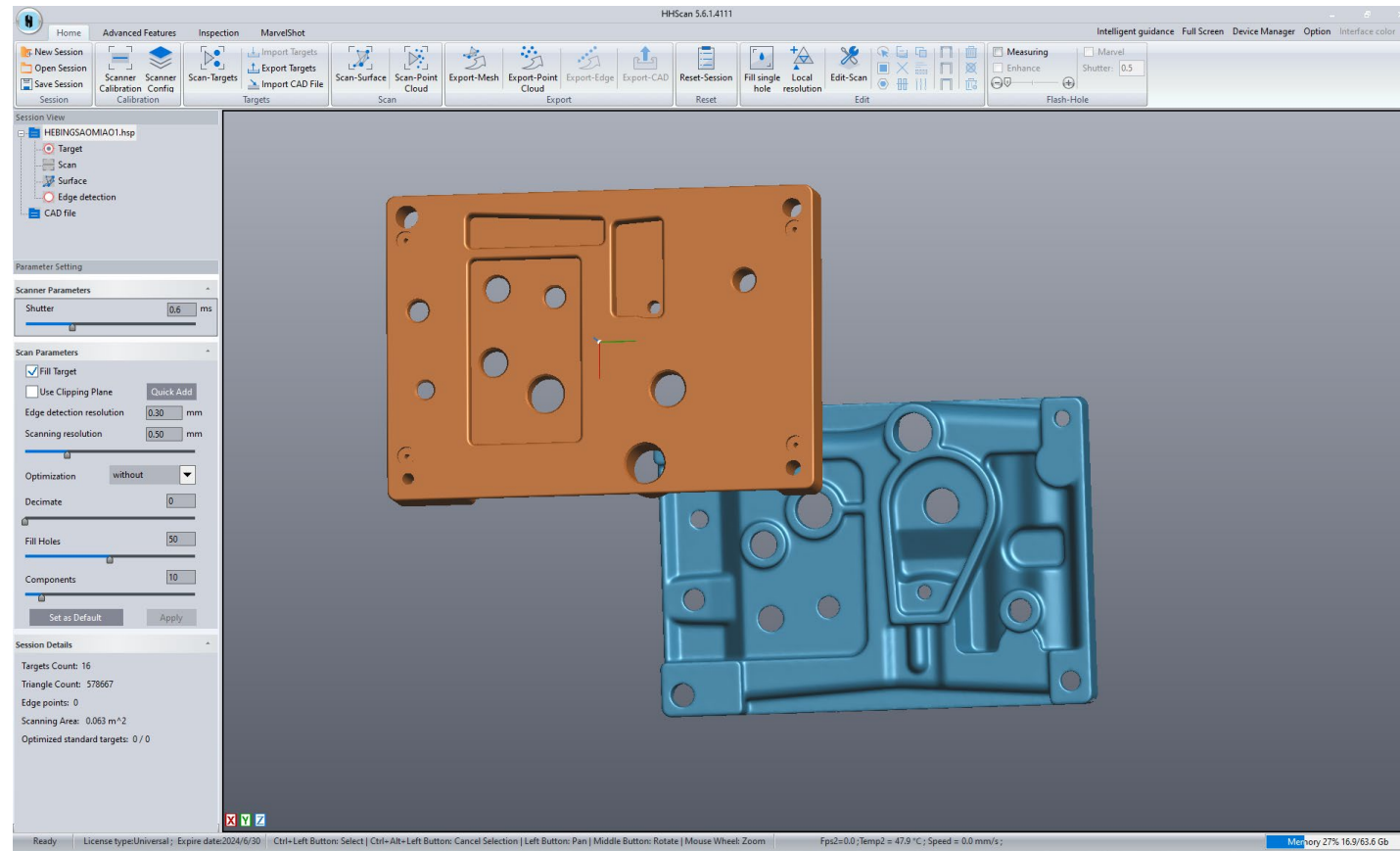




9. OTHER FUNCTIONS

Hole Flash Capture

STEP TWO: To import CAD model into scanning software



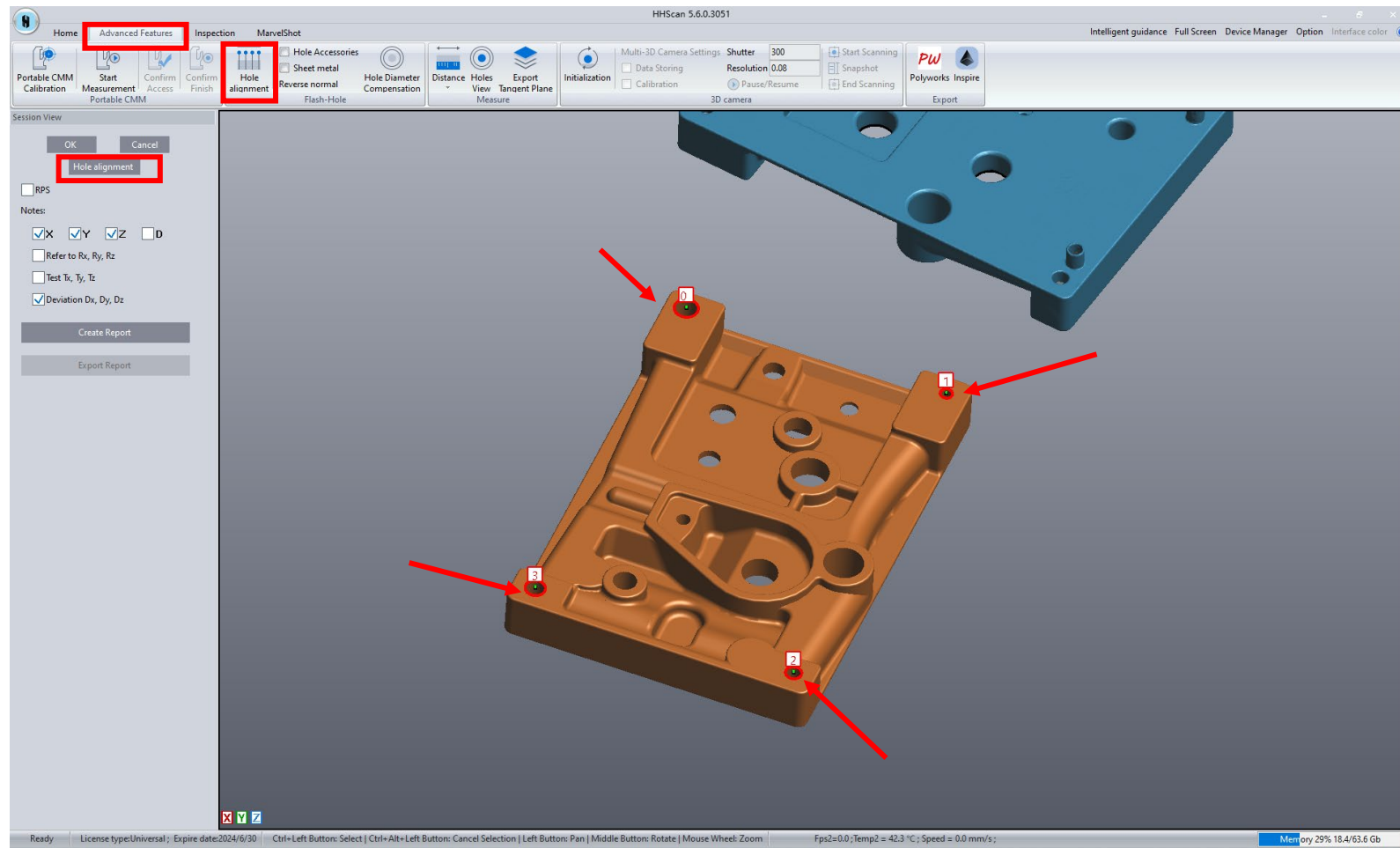


9. OTHER FUNCTIONS

Hole Flash Capture

STEP THREE: After importing CAD model and then click “hole alignment” to align two models

Tips: To select 3 or more holes on CAD model and select holes from scanning side and align them based on the hole position.

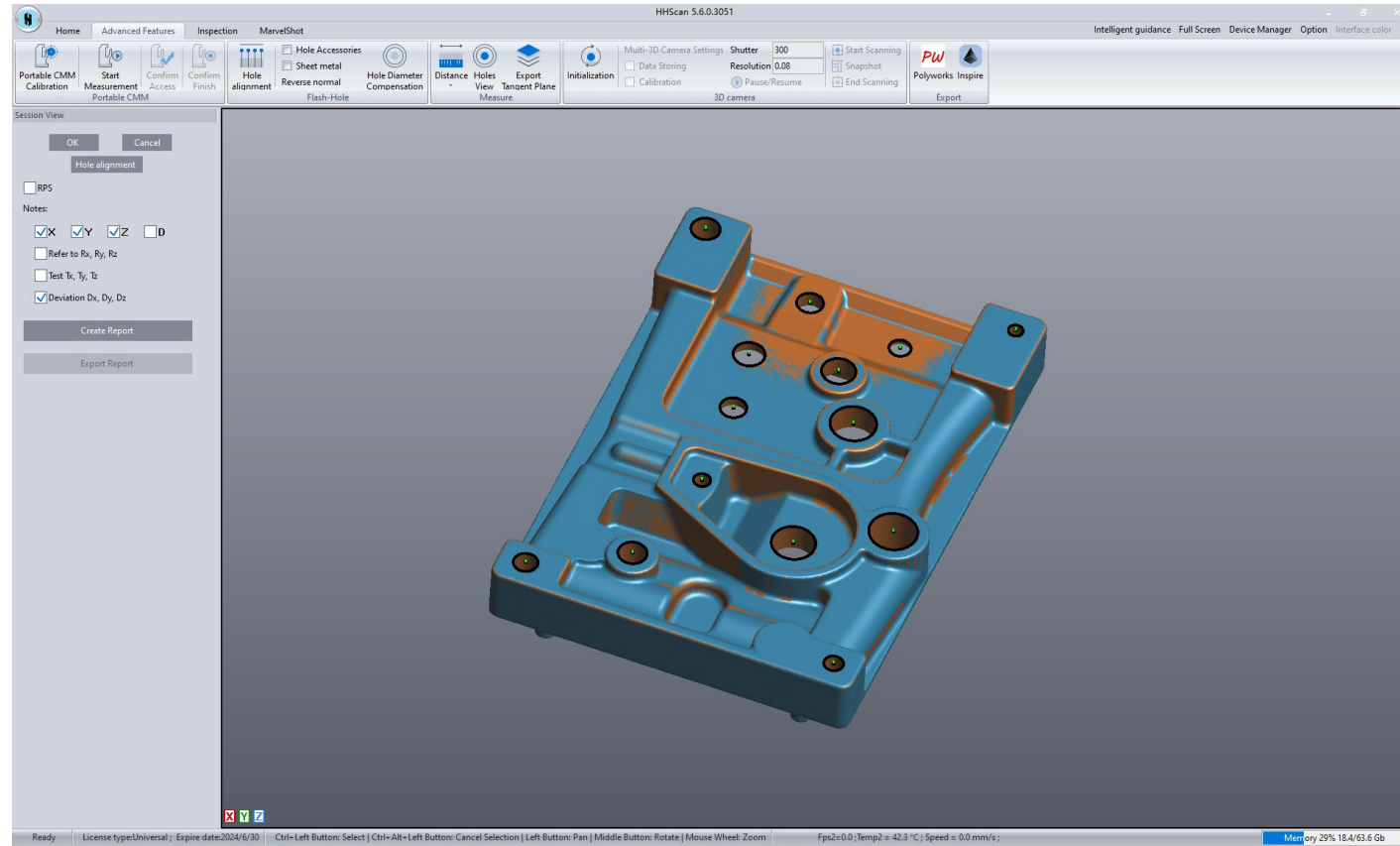




9. OTHER FUNCTIONS

Hole Flash Capture

Alignment Result

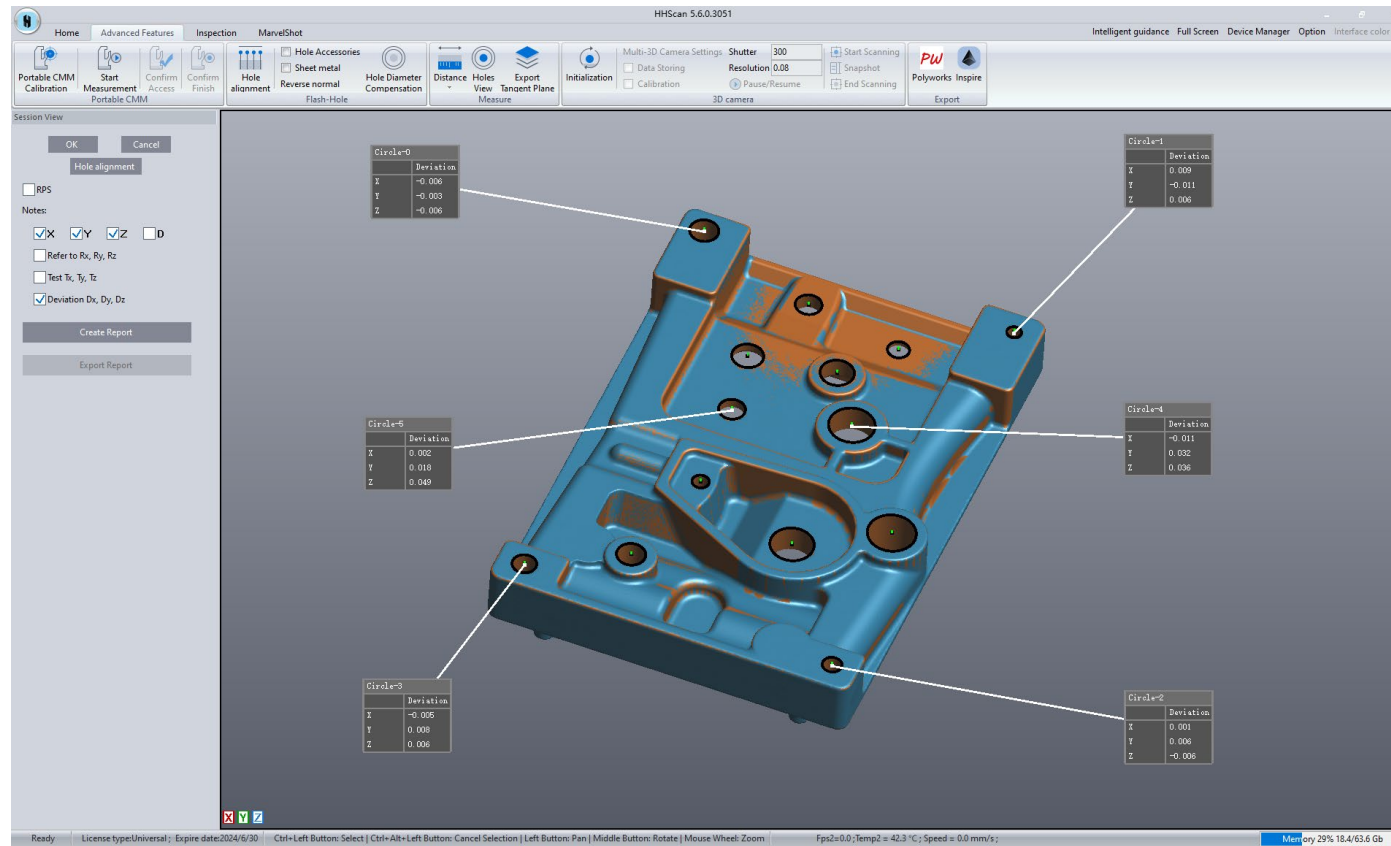




9. OTHER FUNCTIONS

Hole Flash Capture

STEP FOUR: After alignment, you can check the hole deviation by clicking left button on the hole for inspection. You also can drag the annotation on the right button and customize annotation column



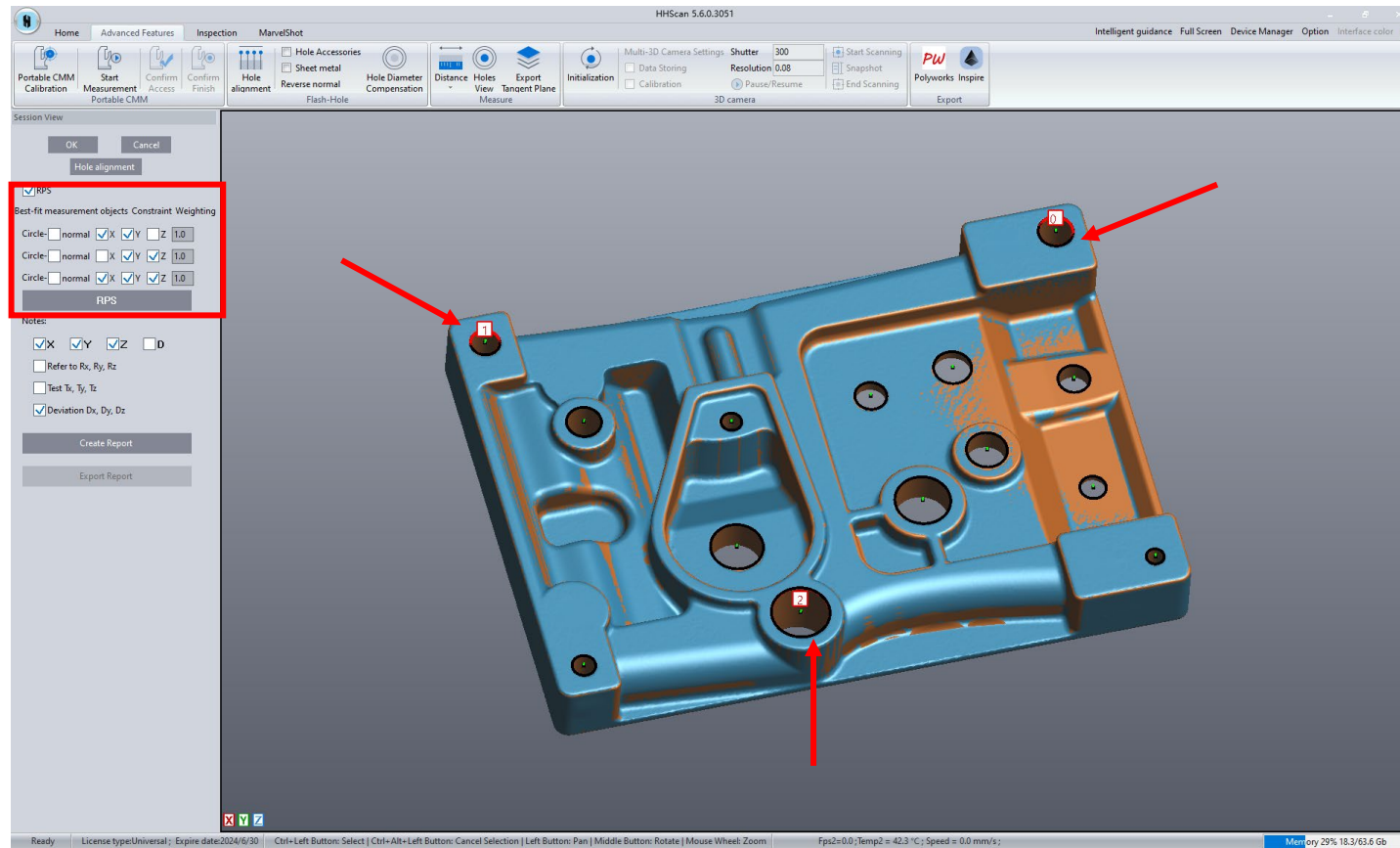


9. OTHER FUNCTIONS

Hole Flash Capture

Extra functions: RPS alignment

After hole alignment, you can select "use alignment RPS" and then select 3 holes for RPS alignment, set orientation of selected holes (select x,y,z of circle), and click Alignment RPS to align.

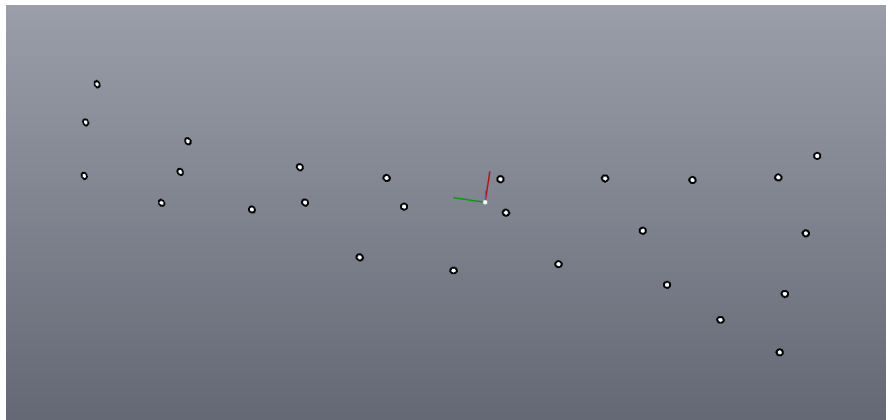




9. OTHER FUNCTIONS

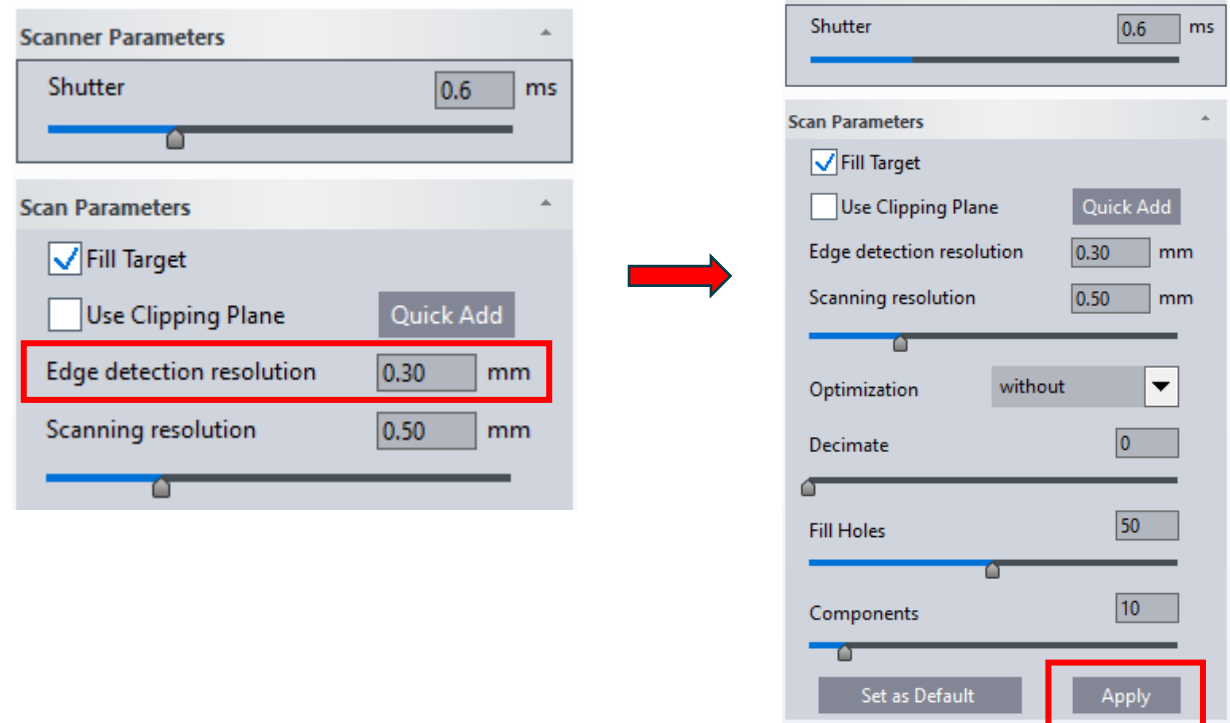
Edge Detection

STEP ONE: Scan all the targets on the object



STEP TWO: Select the “Edge detection”, the “scanning resolution” will change to “edge detection resolution” automatically as below

Tip: The edge detection resolution default value is 0.3mm

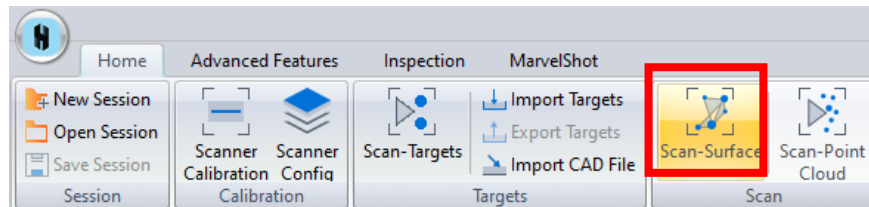




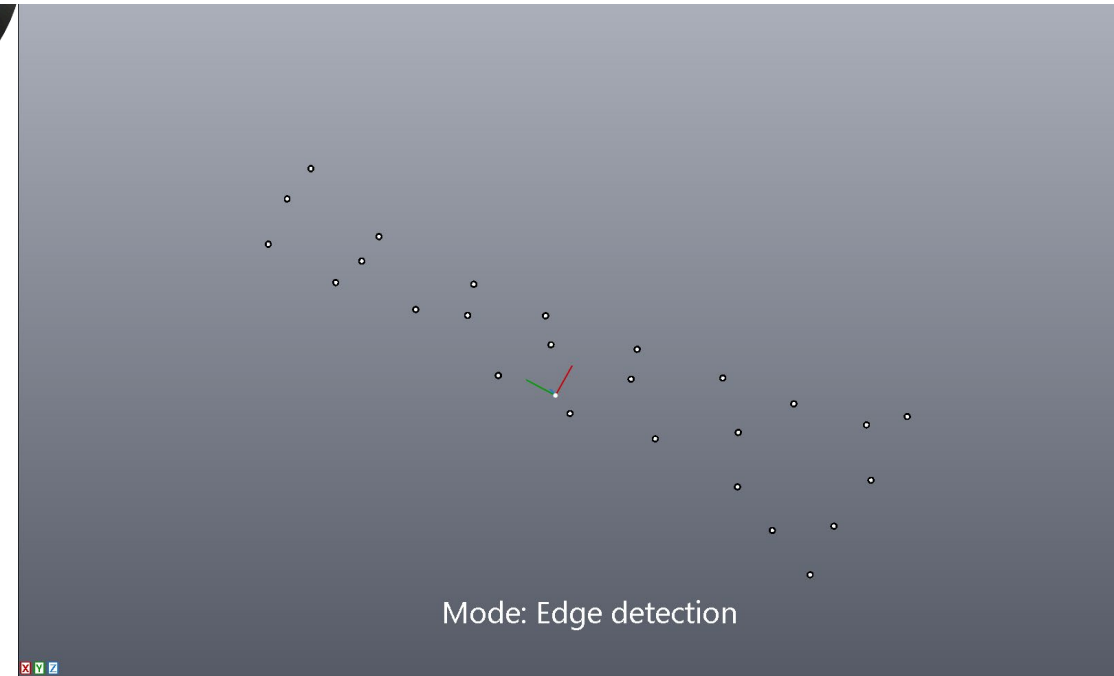
9. OTHER FUNCTIONS

Edge Detection

STEP THREE: Click on “Scan Surface” enter scanning interface as below



STEP FOUR: and push the bottom-push button twice enter the “edge detection” mode

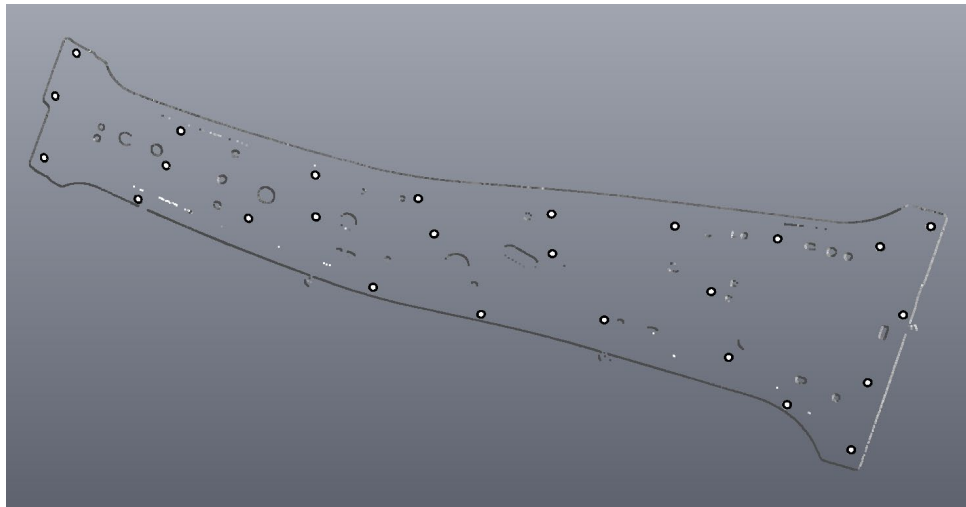




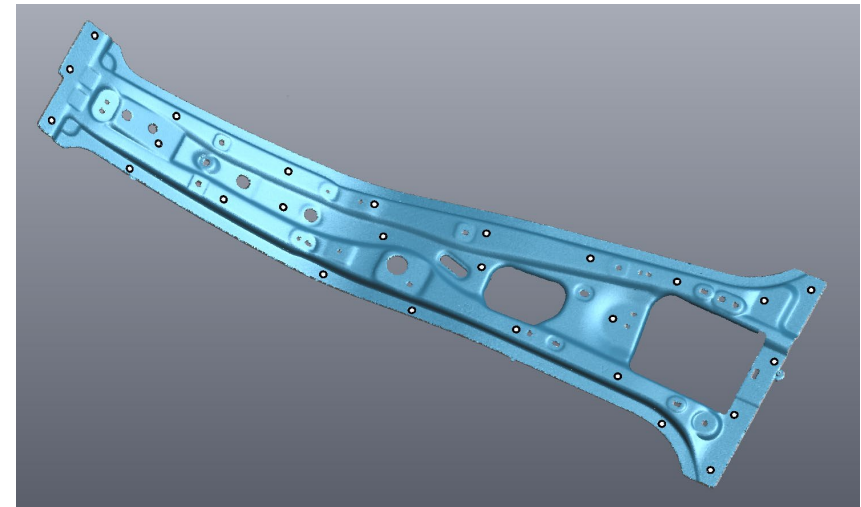
9. OTHER FUNCTIONS

Edge Detection

STEP SIX: Move scanner gently to collect the points cloud of the edge



STEP SEVEN: After collecting the edge detection data, press bottom push-button switch to scan surface, so you can continue to scan the surface data

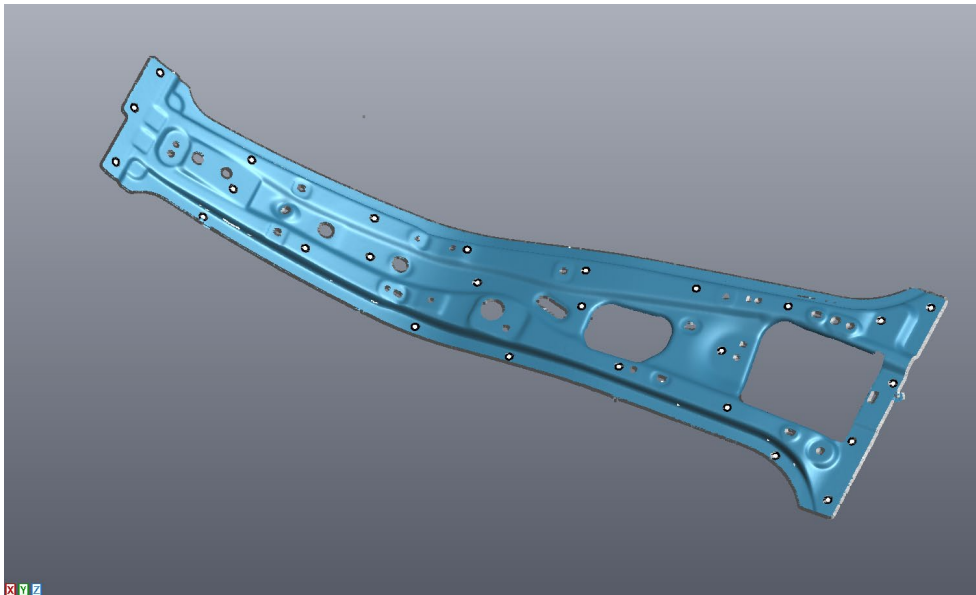




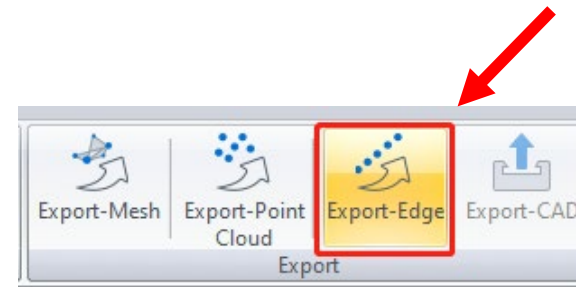
9. OTHER FUNCTIONS

Edge Detection

STEP EIGHT: After the scan is completed, press the space button on the keyboard to post-processing data



STEP NINE: Click on “Export-Edge” to export the edge data.





“ TRY IT BY YOURSELF

10. BASIC TROUBLESHOOTING

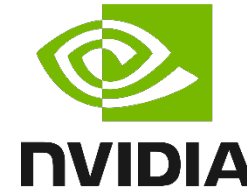


10. BASIC TROUBLESHOOTING

Software Installation

Installation Tips:

- Do not install any anti-virus software in your workstation;
e.g.: Avira, panda etc.
- Computer configuration;
e.g.: Nvidia graphics card is necessary, Portable workstation, RAM 32GB or above.
- Driver signature (Win10 OS or Win11 OS);
e.g.: to change the BIOS Settings system for certain workstation.
- VC Library (Win7 OS);
e.g.: To install library file for certain workstation.





10. BASIC TROUBLESHOOTING

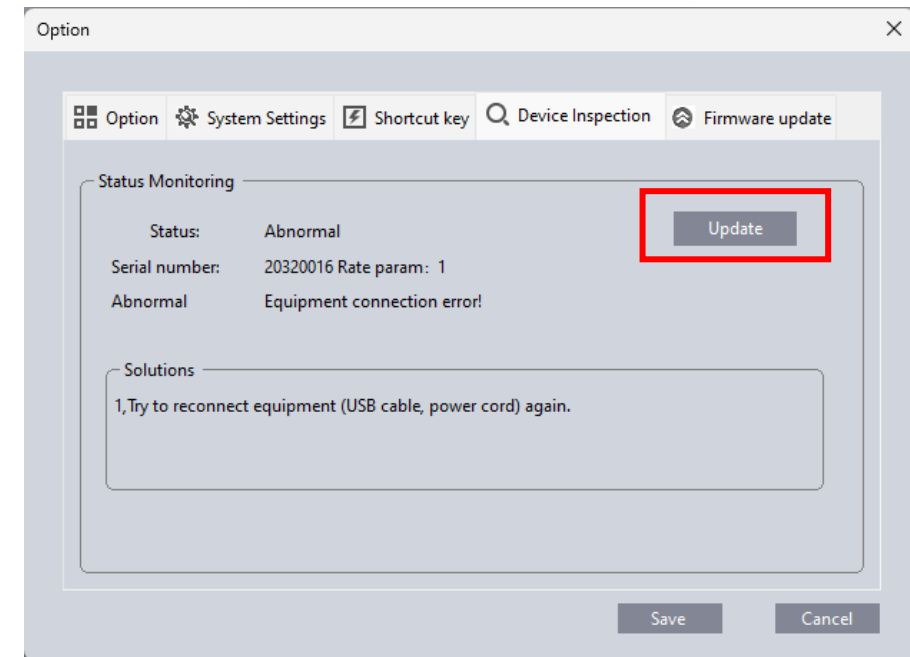
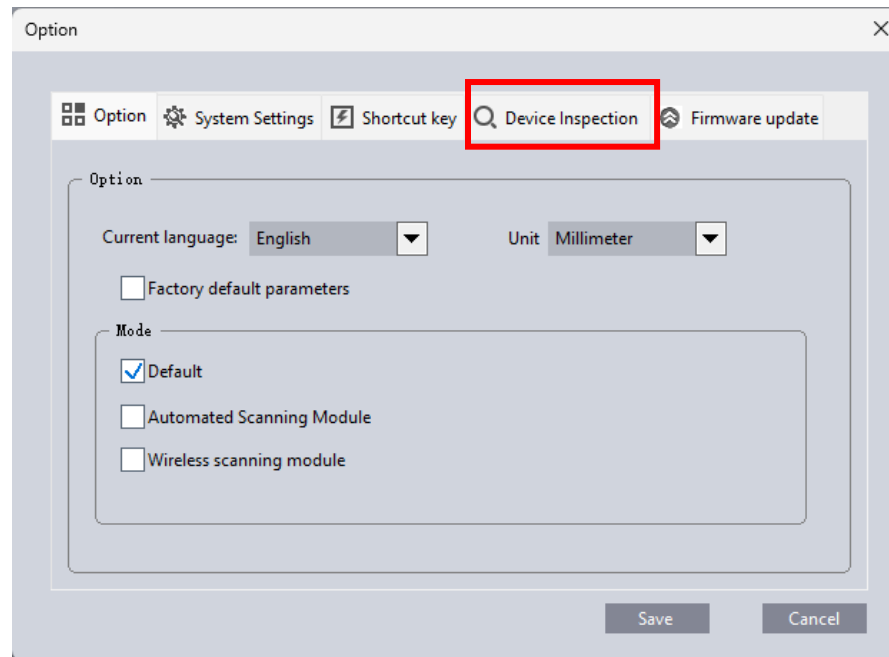
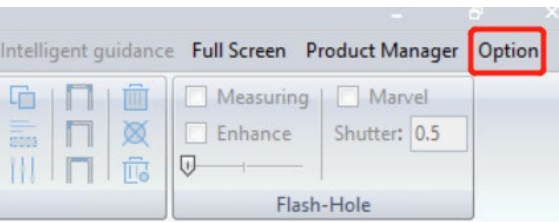
Software Troubleshooting

Troubleshooting #1 : Scanner cannot be connected with workstation after sound equipment check, and scan button is gray and cannot work;

STEP ONE: To click “option”

STEP TWO: To click “check device”

STEP THREE: To click “update” to show the diagnosis



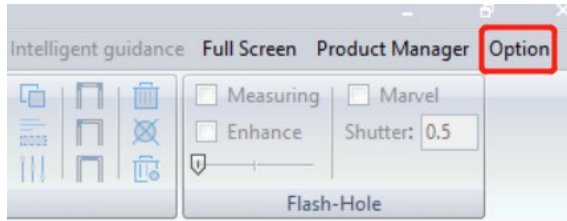


10. BASIC TROUBLESHOOTING

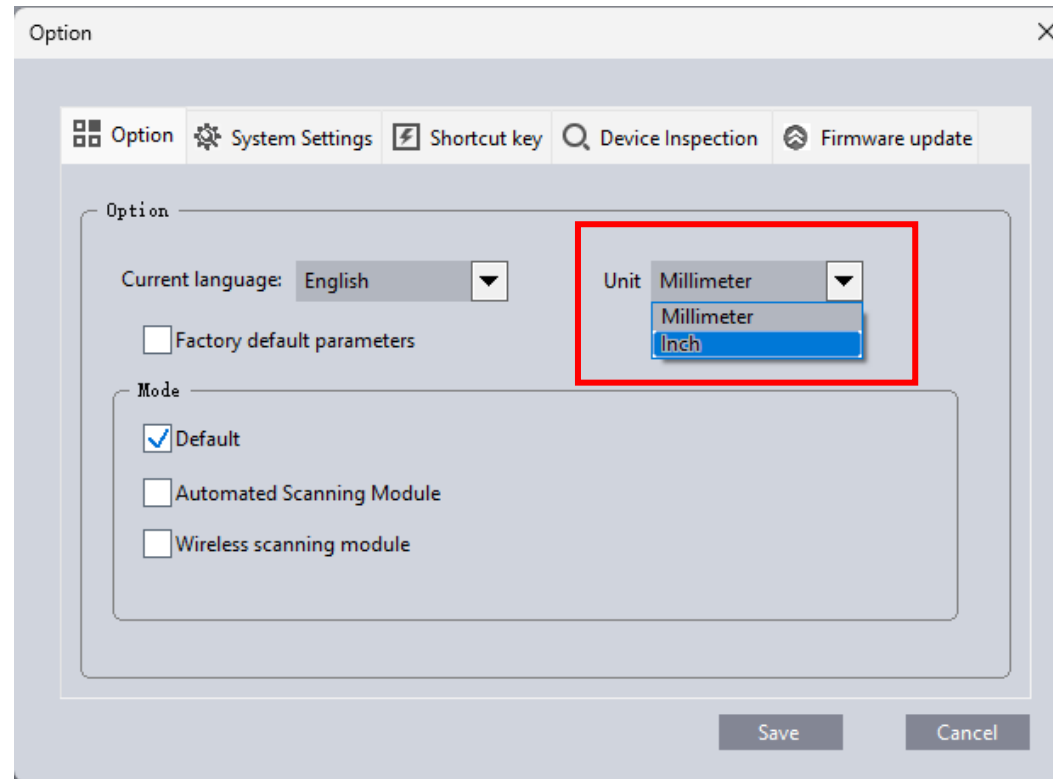
Software Troubleshooting

Troubleshooting #2: Unit switch function (including scanning software, detection module, photogrammetry, bending module)

STEP ONE: To click “option”



STEP TWO: Choose unit (Millimeter or Inch).





10. BASIC TROUBLESHOOTING

Software Troubleshooting

Troubleshooting #3: No data can be scanned, and scanner cannot be calibrated after complete connection

Solution: Update the latest Nvidia graphics driver according to the computer graphics model.

DOWNLOAD DRIVERS

NVIDIA > Download Drivers

NVIDIA Driver Downloads

Option 1: Manually find drivers for my NVIDIA products. [Help](#)

Product Type:

Product Series:

Product:

Operating System:

Language:

Option 2: Automatically find drivers for my NVIDIA products. [Learn More](#)

NVIDIA Virtual GPU Customers

- Enterprise customers with a current vGPU software license (GRID vPC, GRID vApps or Quadro vDWS), can log into the enterprise software download portal by clicking below. For more information about how to access your purchased licenses visit the [vGPU Software Downloads page](#).

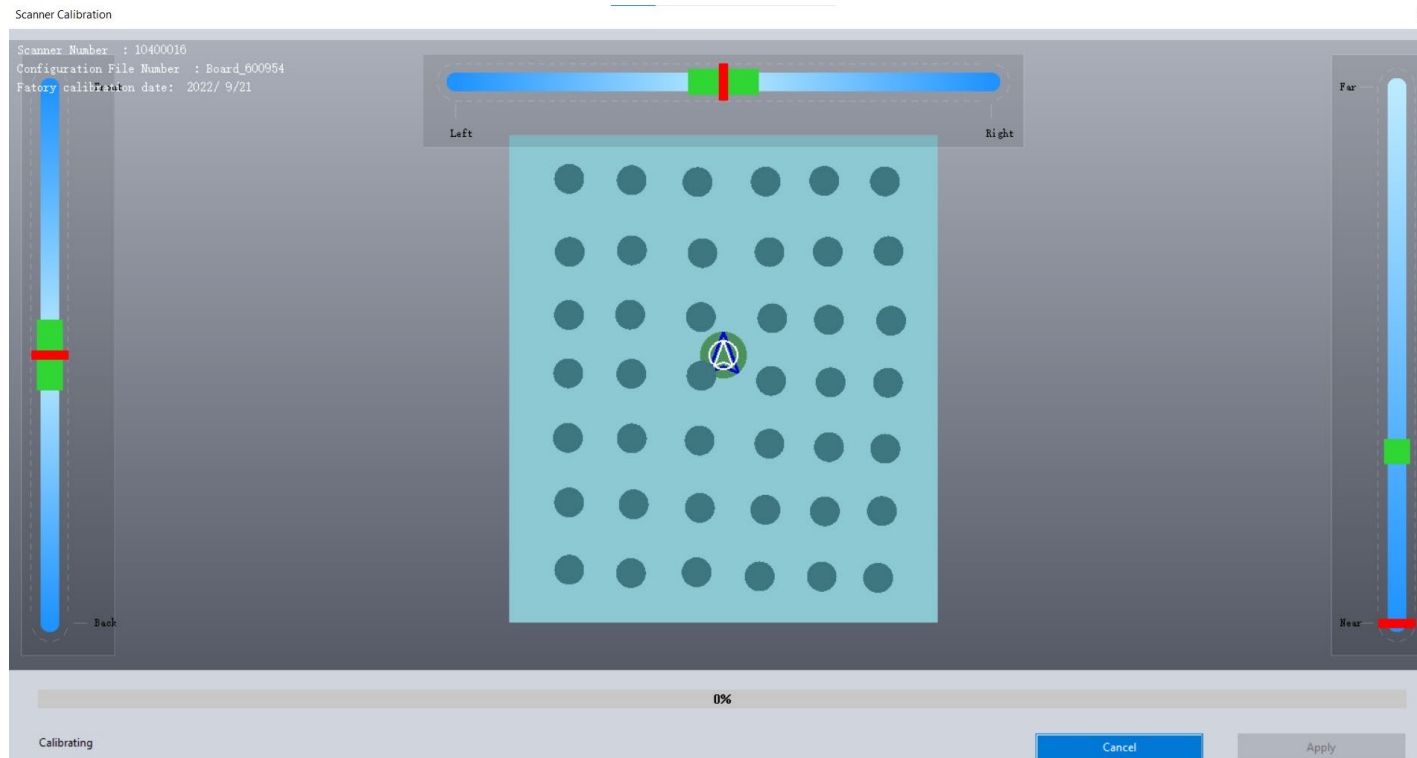


10. BASIC TROUBLESHOOTING

Scanner Troubleshooting

Troubleshooting #4 : Scanner is connected properly, while laser line is incomplete

Solution: Temperature or transportation effects, you need to calibrate again (warm up for 3-5 mins).



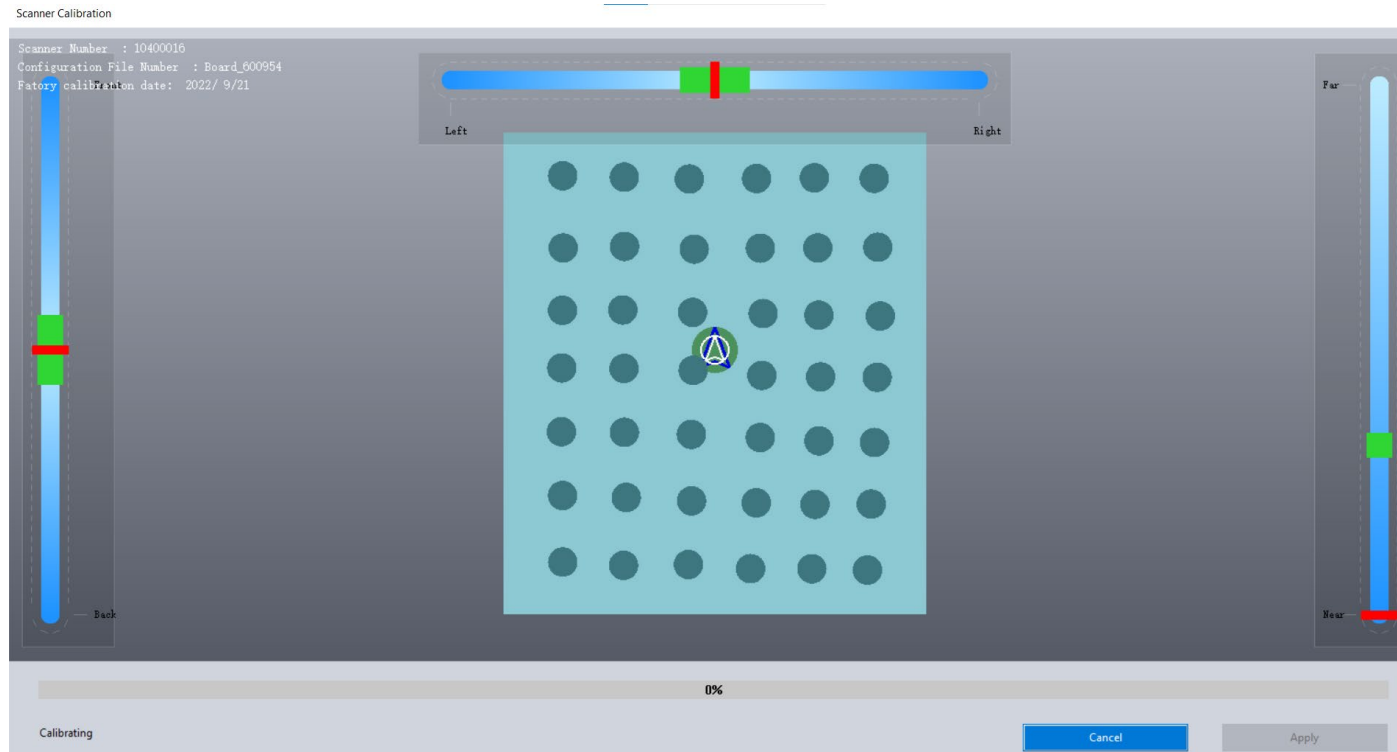


10. BASIC TROUBLESHOOTING

Software Troubleshooting

Troubleshooting #5 : Scanner is connected properly, while targets are blinking, and FPS is not stable during scanning

Solution: To recalibrate the scanner.



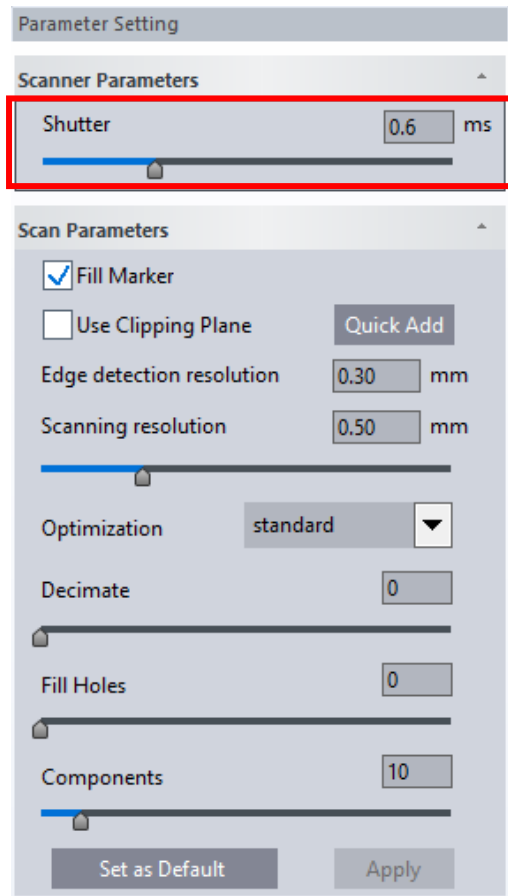


10. BASIC TROUBLESHOOTING

Software Troubleshooting

Troubleshooting #5 : You cannot scan too black or shiny object

Solution: #1, Increase shutter and decrease resolution. #2, Spray the matting agent.





“ TRY IT BY YOURSELF

Questions, please contact your local
Hexagon representative.

THANK YOU