QUICK START GUIDE

Multi-Modes, Versatile, Metrology-Grade 3D Scanner

for ATLASCAN Max

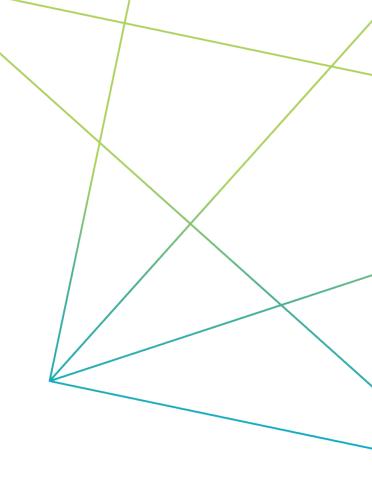
Apr. 21st, 2024

ATLASCAN Max



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- 2. PRODUCT INTRODUCTION
- 3. CALIBRATION
- 4. PREPARATION
- 5. <u>SCANNING PROCESS</u>
- 6. DATA SAVE
- 7. OTHER FUNCTIONS
- 8. BASIC TROUBLESHOOTING





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

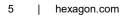
Calibration plate

- 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







Product Specification



Model	ATLASCA	AN Max						
Scanning Modes	Standard Mode	Fine Mode						
Measurement Rate	3,000,000 points/second	1,680,000 points/second						
Scanning Area	up to 600 x							
	26 blue laser lines for	standard scanning						
Laser Source	Single blue laser line fo	Single blue laser line for areas hard to reach						
	14 blue laser lines for fine scanning							
Light Class	Class II (E	ye Safe)						
Resolution	Up to 0.0)1mm						
Accuracy	Up to 0.0)2mm						
Volumetric Accuracy	0.02+0.04mm/m	-						
Volumetric Accuracy + Scale Bar	0.02+0.03mm/m	-						
Hole Accuracy	Up to 0.0)3mm						
Hole Volumetric Accuracy	0.03mm+0.	04mm/m						
Stand-off Distance	325mm	200mm						
Depth of field	450mm	200mm						
Depth of field @ Furthest range	550m	ım						
Connection Standard	USB	3.0						
Working Temperature	-10 - 4	0°C						
Working Humidity (Non-condensing)	10% - 90	0%RH						
Weight	1 K	G						
Dimensions	295mmx135r	nmx75mm						
Export format	.stl, .ply, .obj, .txt, .xyz, .	asc. etc.customizable						
Compatible Softwares	3D Systems (Geomagic Solution: (PolyWorks), Dassault Systems (PTC (Pro/ ENGINEER), Autodes Maya, Softimage), Siemens (NX	CATIA V5 and SolidWorks), k (Inventor, Alias, 3ds Max,						





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Workstation Configuration

Workstation Configuration Requirements	
CPU	Intel Core i7 12800HX or Higher Configuration
Graphics card	NVIDIA RTX A2000 or Higher Configuration
RAM	64GB DDR8 or higher
Operation system	WIN 10 or WIN 11
Data transmission requirements	USB3.0 (at least 2 ports)

***Notes:

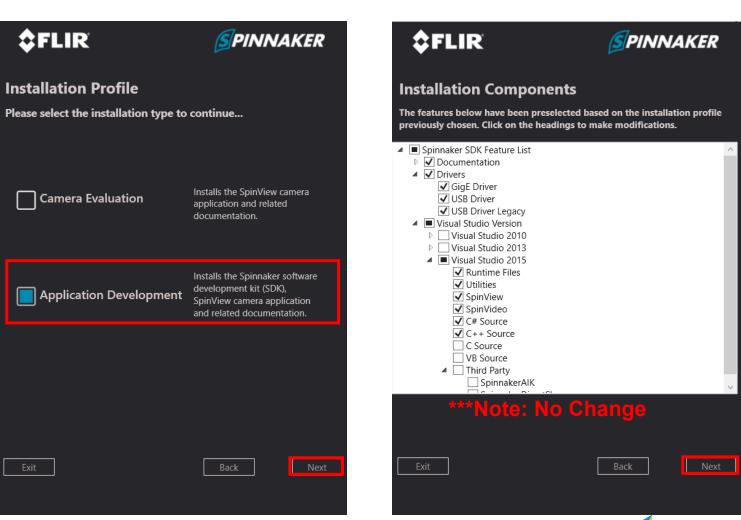
The graphics card driver must be NVIDIA official driver, you can download from NVIDIA official website, otherwise device may not work properly.

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



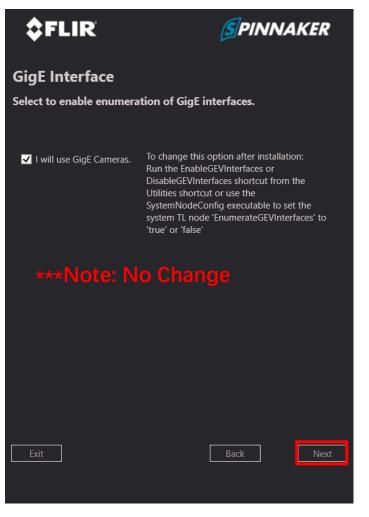
Camera Driver Setup

\$FLIR **S**PINNAKER **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. Grant of License: Subject to the terms of this agreement, you are hereby granted a limited, terminable, non-transferable, nonexclusive 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

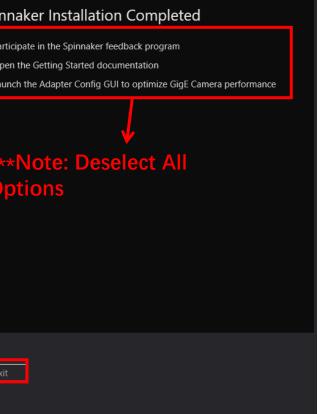




Camera Driver Setup



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	the installation. Click Back to review ur installation settings. Click Exit to	Spinnaker Installation Participate in the Spinnaker feed Open the Getting Started docur Launch the Adapter Config GUI ***Note: Dese Options	dback program mentation to optimize GigE Camera performance
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Exit	Back Install	Exit	

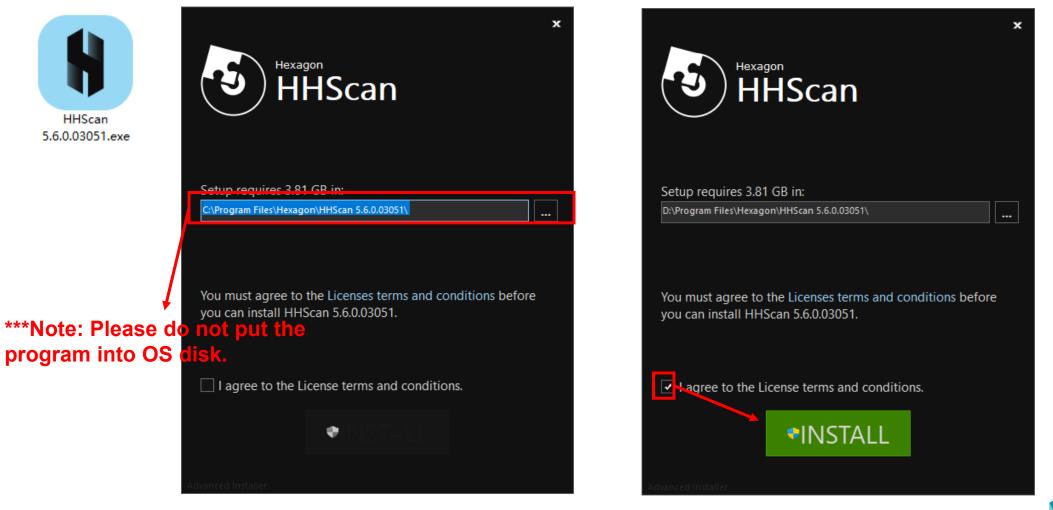




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2. PRODUCT INTRODUCTION

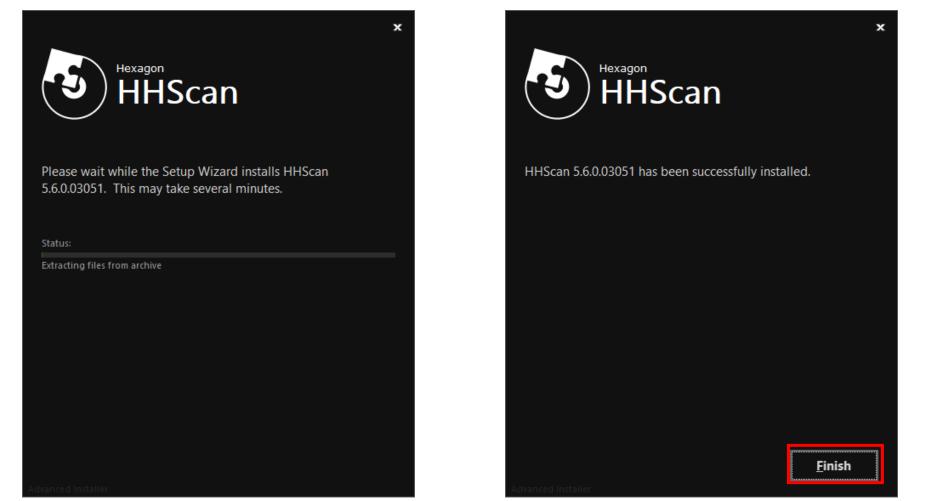
HHScan Software Setup



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2. PRODUCT INTRODUCTION

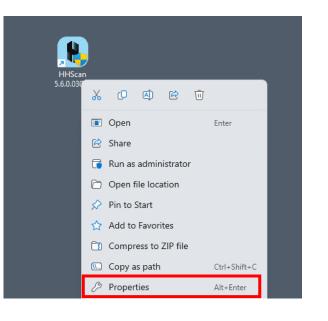
HHScan Software Setup







HHScan Software Setup



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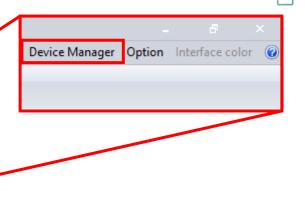
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Register this pro	ogram for restart		
Use legacy disp	olay ICC color mana	gement	
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Device Manager

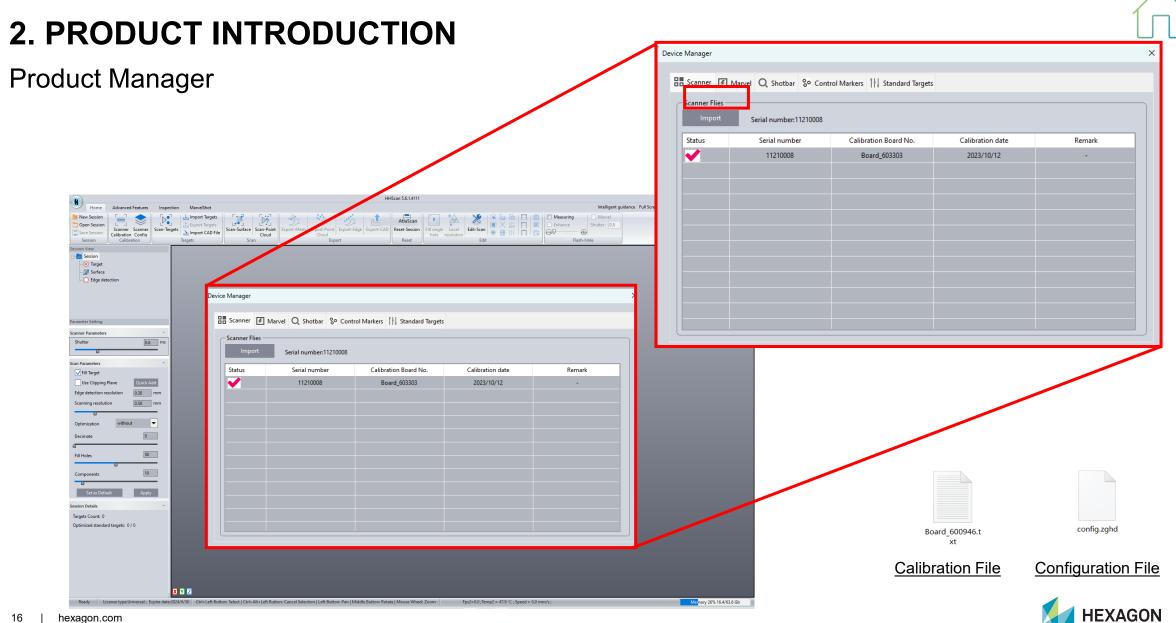
DEVICE ACTIVIATION

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

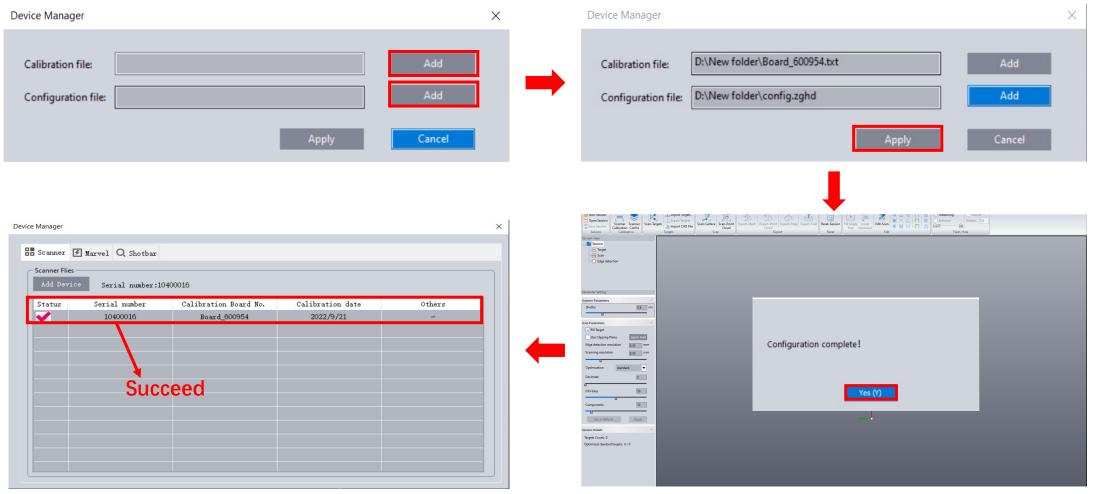
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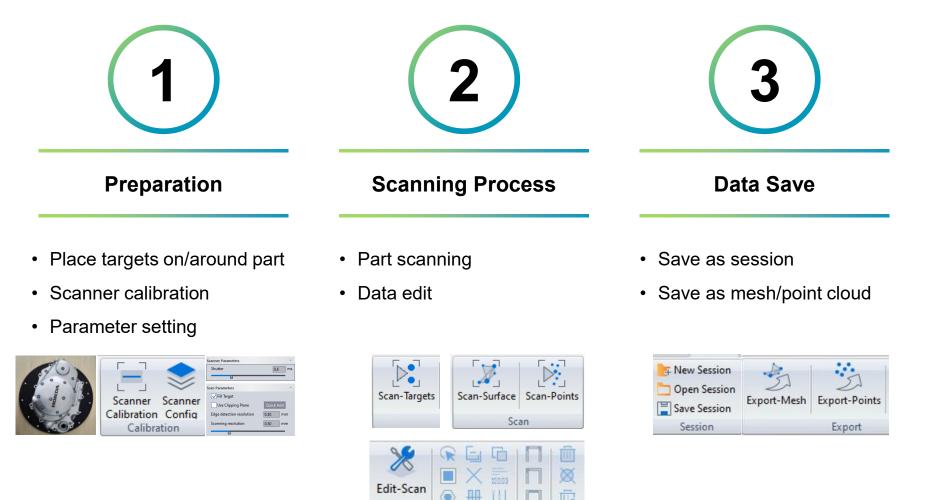
Product Manager







Typical Workflow



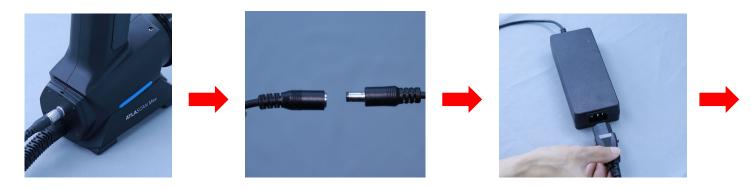
Edit



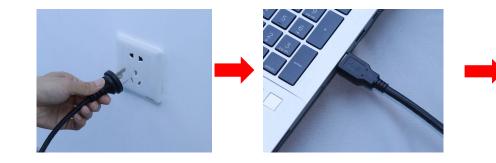
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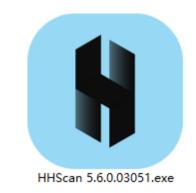
Device Connection

- 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.







Device Connection

Connect power cable as below



> Pull out the metal sleeve and then disconnect the cable





Push Buttons

1. Central Button

- Single press: Start/Pause Scanning
- Double press: Scanning mode switch

2. Left/Right Button

- Click Left Button: Zoom in or Increase shutter
- Click Right Button: Zoom out or Decrease shutter

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





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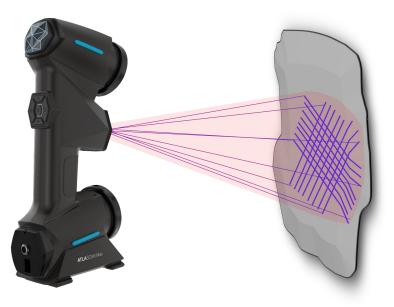
2. PRODUCT INTRODUCTION

Working Principle

- 1. Automatic surface generation;
- 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;

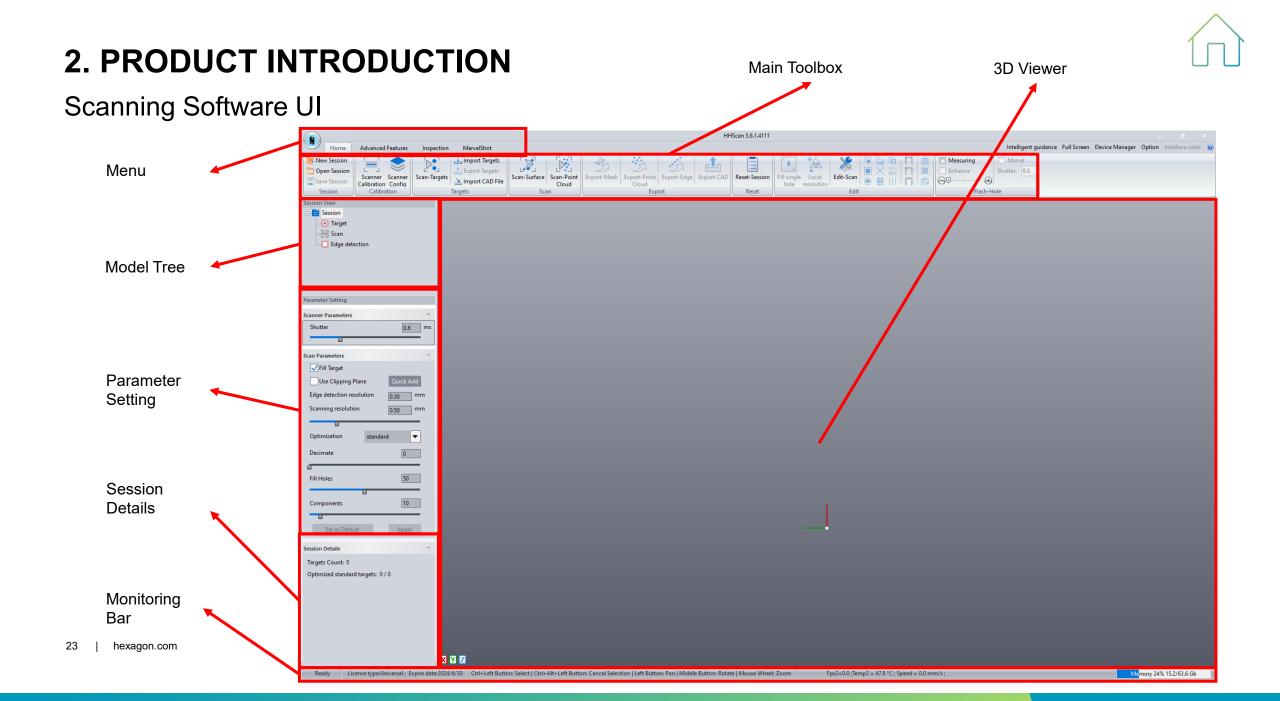
Tips:

- The visibility of laser lines projected on the part is a key to the success of data acquisition.
- ✓ The visibility of laser lines is affected by color and material type.
 - High reflectivity part will have mirror effect, which makes it difficult to catch laser lines;
 - Black color absorbs light and makes laser lines difficult to detect;
- 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.

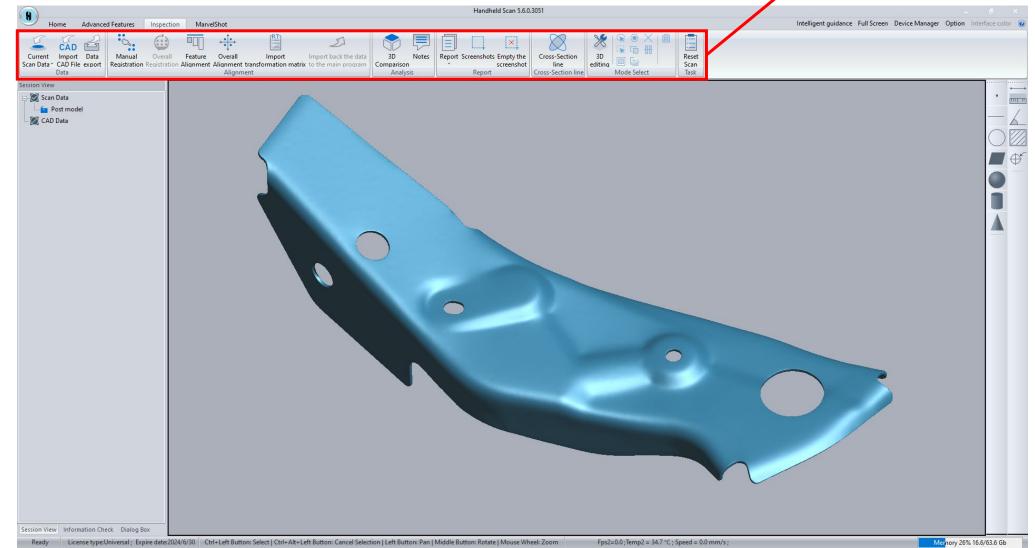








Scanning Software UI



Measurement Tool Bar

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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.



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.

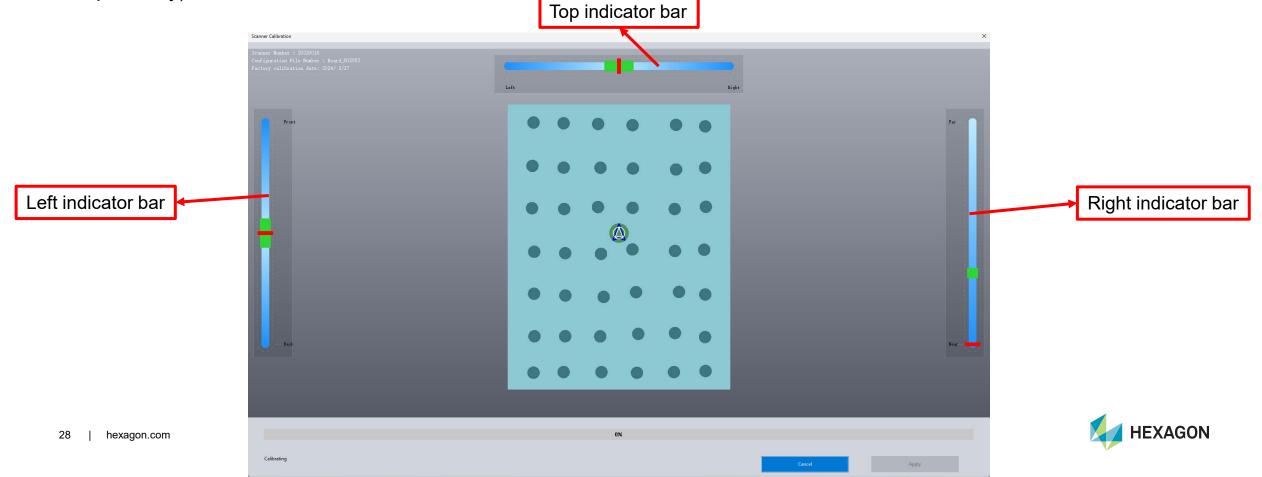






Scanner Calibration

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).

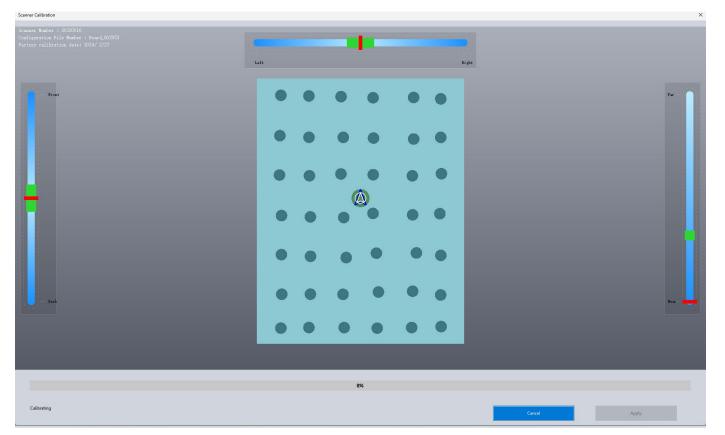


Scanner Calibration

• 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.





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





TRY IT BY YOURSELF





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.





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.



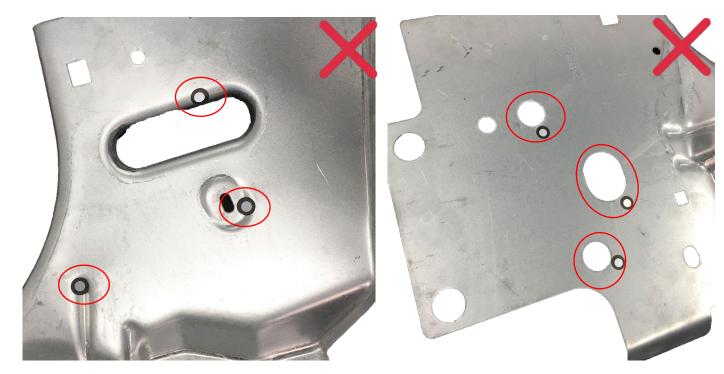




Target Placement

PLEASE DO NOT

- Place targets on a surface with high curving rate
- Place targets on obvious features of the part
- Place targets near the edge/detail (< 4 mm)
- 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

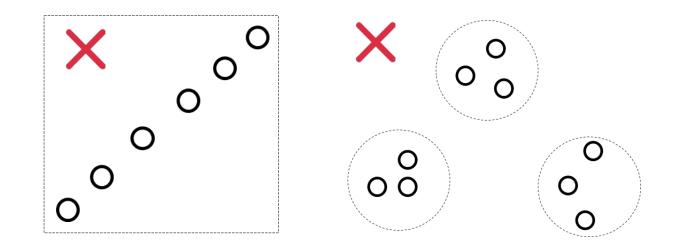




Target Placement

PLEASE DO NOT

- Place targets in crowded groups
- Place targets neatly in one line (unable to make accurate triangulation)



Wrong Example



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4. PREPARATION

Parts Preparation

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



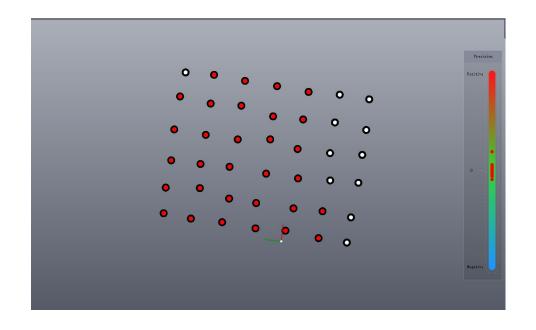


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4. PREPARATION

Target Scanning

F New Session		Import Targets				
Dpen Session		Export Targets				
Save Session	Scanner Scanner Calibration Config	Scan-Targets 🚵 Import CAD File				
Session	Calibration	Targets				



- 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.

Target Scan Edge detection	Parameter Setting	→	Black Circle Black Circle Magnetic Black Circle	 Magnetic Black Circle
	Scanner Parameters			
	Target ^			
39 hexagon.com	Black Circle			HEXAGON



TRY IT BY YOURSELF





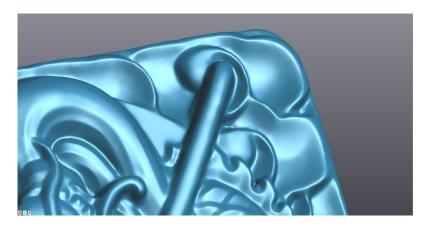


Scanning Mode

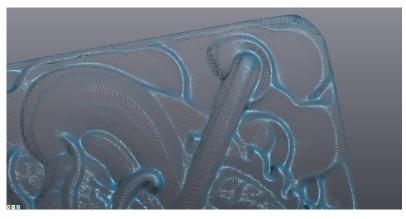
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Session	Calibration	1	Targets	Scan Export				Reset			Edi	t		

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

Mesh Presentation

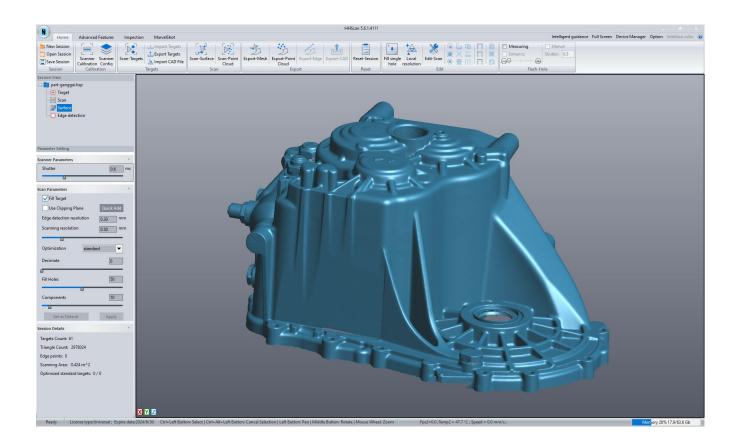


Point Cloud Presentation





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; To scan point cloud is collect surface data and export point cloud.



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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: <u>0.1ms-10ms</u>
- The general scan setting shutter is from <u>0.4ms to 3ms</u>.
- 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.

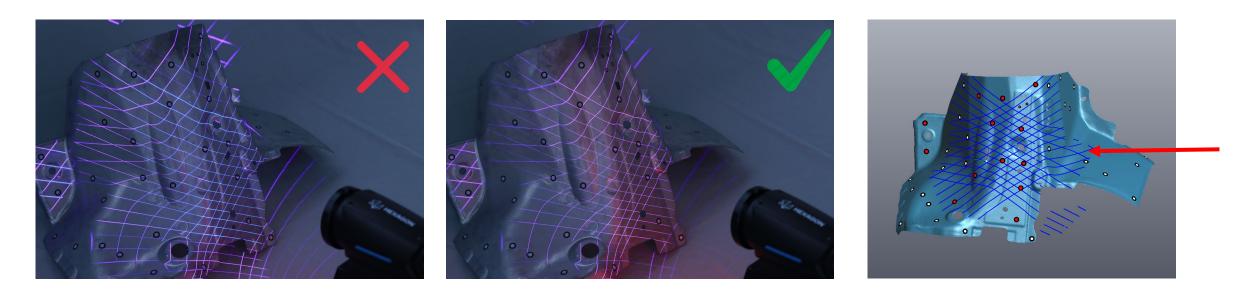
Parameter Setting	
canner Parameters	*
Shutter	0.6 ms
can Parameters	*
✓ Fill Target	
Use Clipping Plane	Quick Add
Edge detection resolution	0.30 mm
Scanning resolution	0.50 mm
Optimization standa	ard 🔻
Decimate	
	0
Eill Holes	50
Components	10
Set as Default	Apply
	H

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).





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5. SCANNING PROCESS

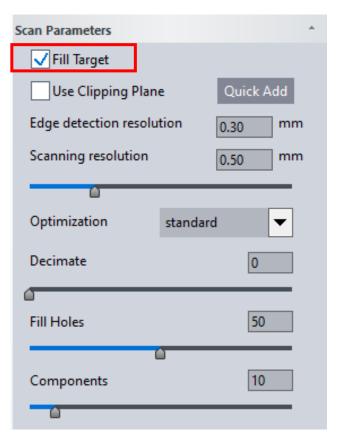
Parameters Setting

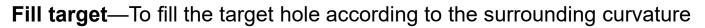
- **1. Fill target:** To fill target hole according to the surrounding curvature
- 2. Use Clipping Plane: To save the data above the clipping plane and delete the data below the clipping plane
- **3. Optimization:** To improve the surface quality of the curvature section and smooth the surface data- (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)
- Components: Automatically eliminate noisy data (value varies from 0 to 100, the bigger the value sets, the larger data will be eliminated).

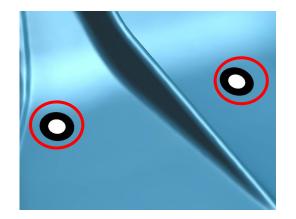
Parameter Setting	
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Shutter	0.6 ms
Scan Parameters	*
✓ Fill Target	
Use Clipping Plane	Quick Add
Edge detection resolution	0.30 mm
Scanning resolution	0.50 mm
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Decimate	
	0
Fill Holes	50
Components	10
Set as Default	Apply
	HEXAGON



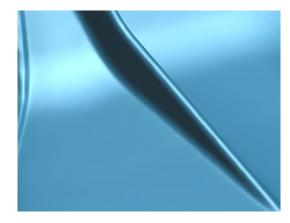
Fill target Setting



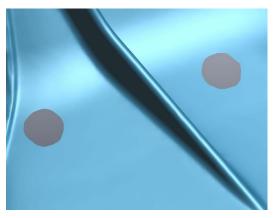




Scanning With targets



Select Fill target Option



Deselect Fill target Option



Clipping Plane Setting

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

STEP ONE: Scan targets to capture the targets data.

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Scanning resolution 0.50 mm	°°°°°	
Decimate 0	• • •	
Fill Holes 50	° ° • • • •	
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Optimized standard targets: 0 / 0	• • • •	
	•	
X ¥ Z		
Ready License type:Universal ; Expire date:2024/6/30 Ctrl+Left Button:	Select Ctri+Alt+Left Button: Cancel Selection Left Button: Pan Middle Button: Rotate Mouse Wheel: Zoom Fps2=0.0; Temp2 = 47.7°C; Speed = 0.0 mm/s;	Momory 24% 15.5/63.6 Gb

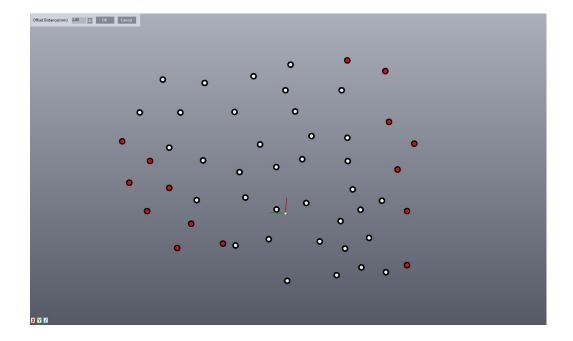
STEP TWO: Click "Quick Add"

Parameter	Setting	1							
Scanner P	aramet	ers			*				
Shutter				0.6	ms				
	ú								
Scan Para	meters				*				
√ Fill	Target								
🗸 Use	Clippir	ng Plan	e	Quick Add					
NO.	Α	В	С	D					
Edge d	etectior	tion	0.30 mi	m					
Scannir	ng resol	ution		0.50 mm					

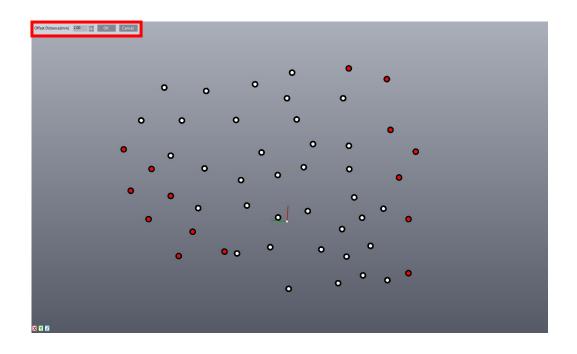


Clipping Plane Setting

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).

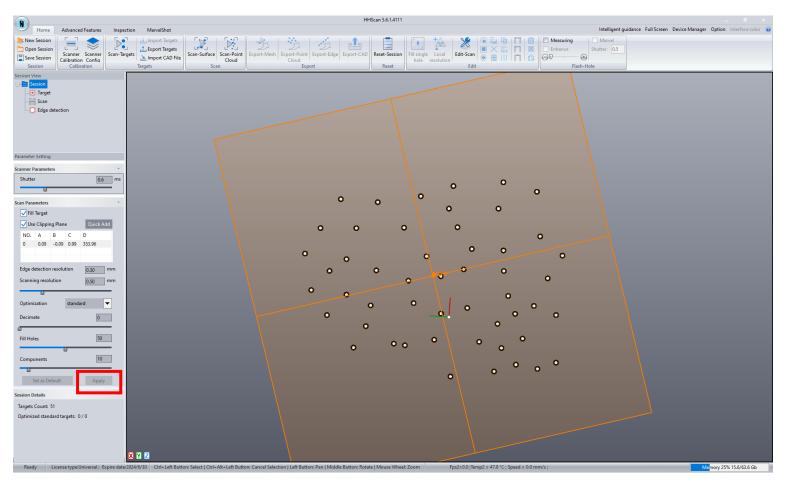






Clipping Plane Setting

STEP FIVE: Click "Apply".





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:

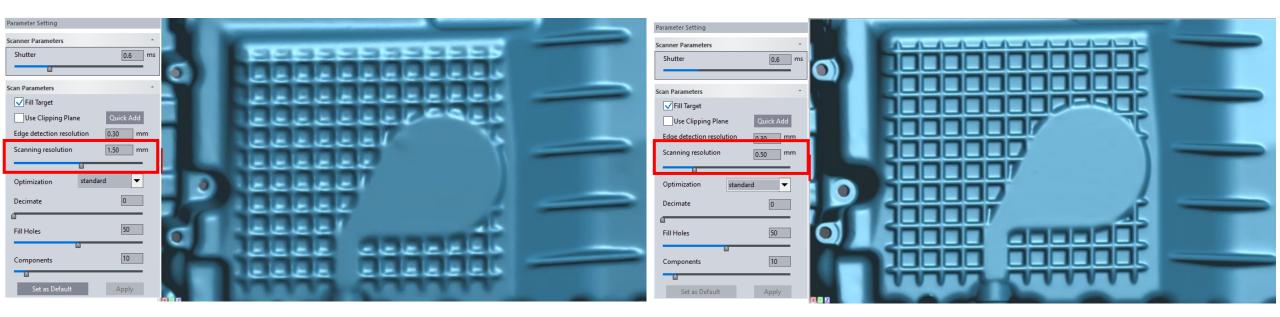
- 1. Metal Sheet Part: 0.2mm-1mm
- 2. Carved, Cultural Relics: 0.2mm-0.5mm
- 3. General Mechanical Parts 0.2mm-0.8mm

Deve meter Catting	
Parameter Setting	
Scanner Parameters	<u> </u>
Shutter	0.6 ms
Scan Parameters	*
✓ Fill Target	
Use Clipping Plane	Quick Add
Edge detection resolution	0.30 mm
Scanning resolution	0.50 mm
Optimization stand	lard 🔻
	lard <
Optimization stand Decimate	0
Optimization stand	
Optimization stand Decimate Fill Holes	0



Scanning Resolution

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



Resolution: 1.5mm

Resolution: 0.5mm



$\widehat{\square}$

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

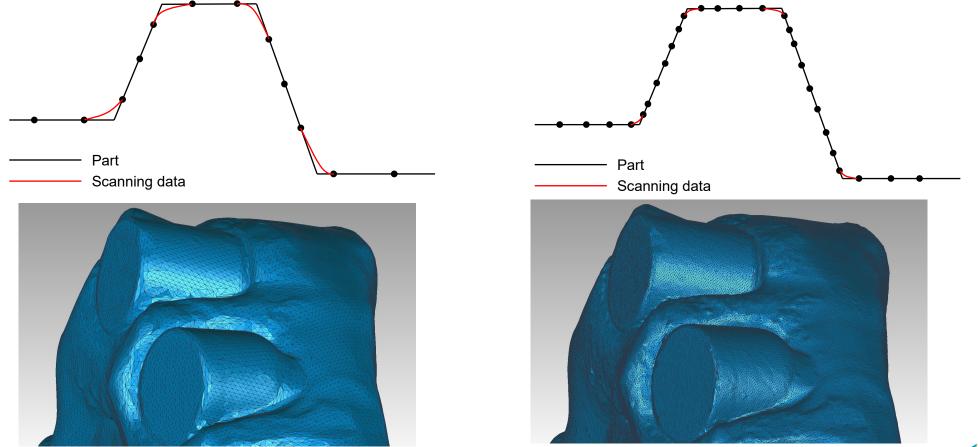






Resolution & Accuracy

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

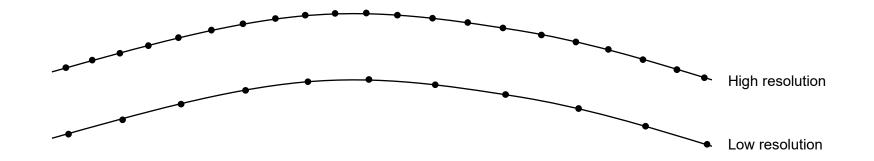






Resolution & Accuracy

> Low resolution does not necessarily mean low accuracy.



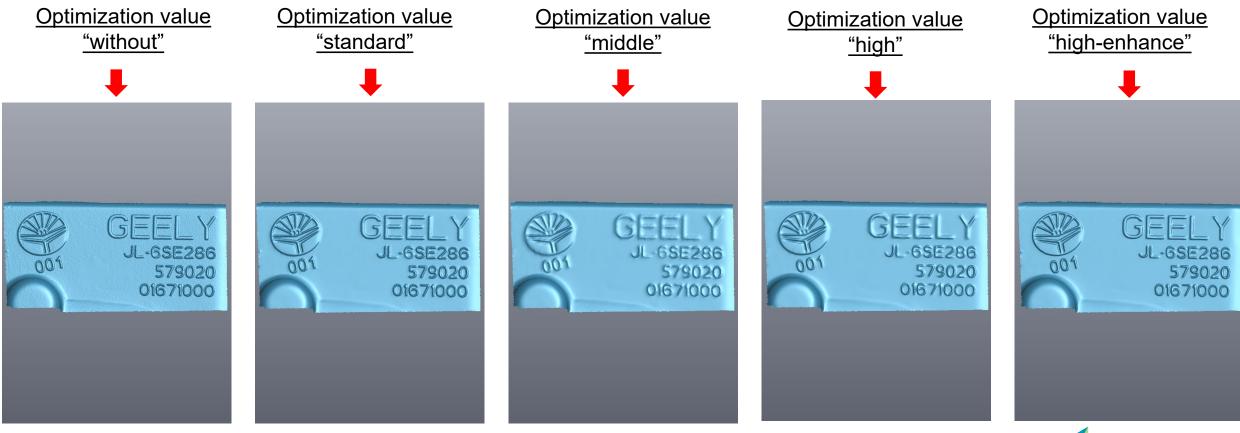


$\widehat{\square}$

5. SCANNING PROCESS

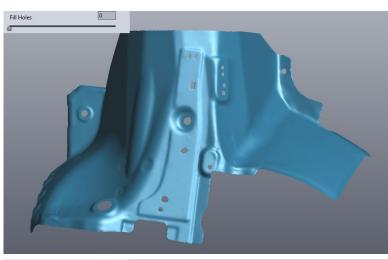
Optimization Setting

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





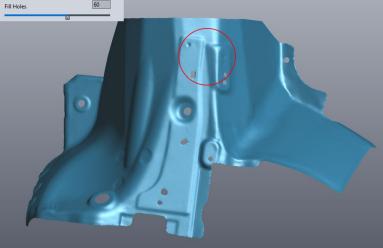
File Holes

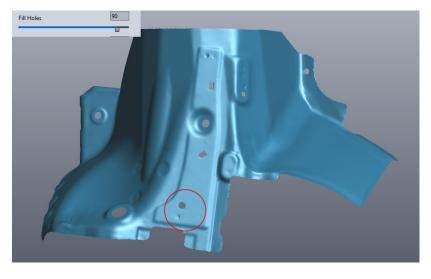


Fill Holes—To fill the small holes that are not scanned completely.

Tips:

Setting range: 0 to 100. The value represents the hole size that will be filled. The default value is "50", which will fill Ø5mm holes.







$\widehat{\Box}$

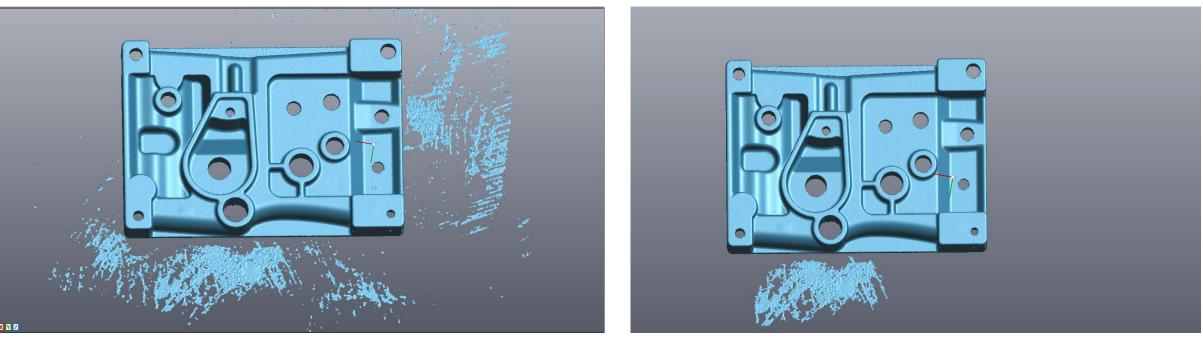
5. SCANNING PROCESS

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".





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





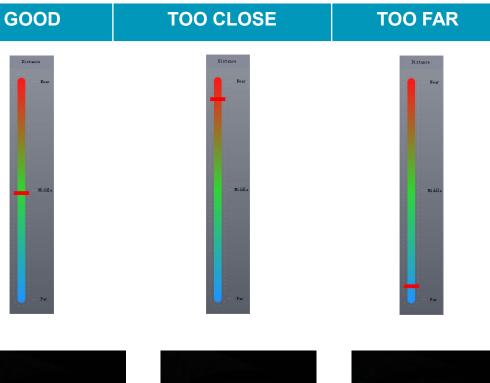


Scanner Indicator

- The scanner is too close or too far away from the part 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 part 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.









61 | hexagon.com



Data Acquisition

- First "Scan-targets" to collect the targets
- Second "Scan-Surface" or "Scan-Points"



Press scan button to scan





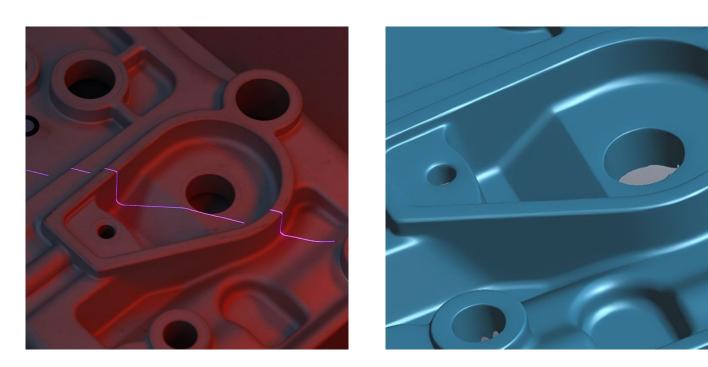




Data Acquisition

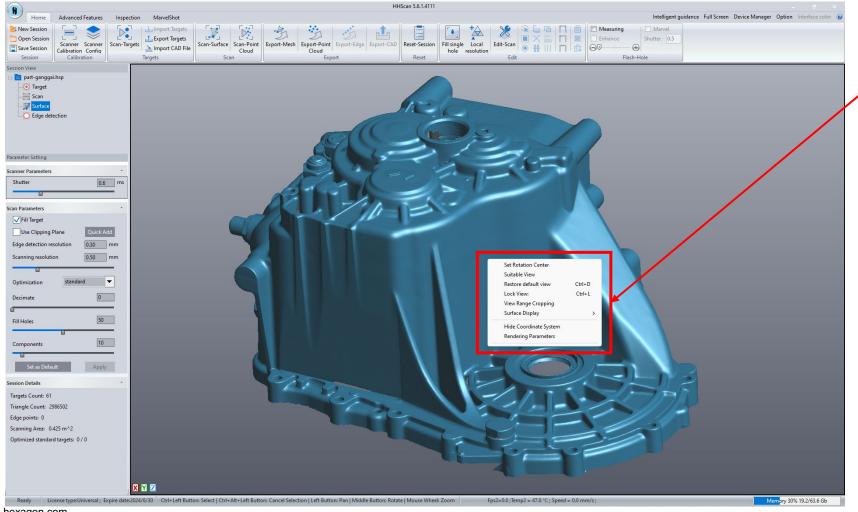
Tips:

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.





Data Acquisition



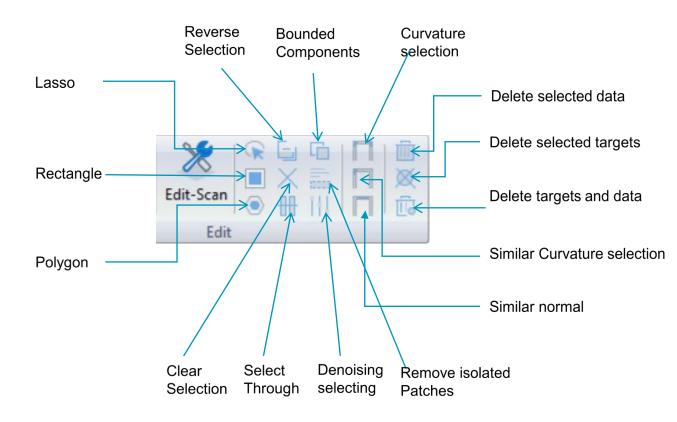
Tips: ✓ Right click to show the sub-menu





Data Edit

		HHScan 5.6.1.4111													
Home	Advanced Features	Inspection	MarvelShot												
📴 New Session			上 Import Targets			A	-1					+	*	♀ ⊡	
🛅 Open Session			📩 Export Targets		Ľ	21	21	21					~~		$\square \boxtimes$
Save Session	Scanner Scanner	Scan-Targets	Import CAD File	Scan-Surface		Export-Mesh		Export-Edge	Export-CAD	Reset-Session	Fill single		Edit-Scan		
Jave Jession	Calibration Config		import CAD The		Cloud		Cloud				hole	resolution			
Session	Calibration	Т	argets	Scan Export			Reset			Edit					







Data Edit Operation

			HHScan 5.6.1.4111											
Home	Advanced Features	Inspection	MarvelShot											
📴 New Session			上 Import Targets			A						+	🖌 👷 🖓 🖓 🖓 🖓	Ē
🛅 Open Session	∟ 」 ≫	Ľ	📩 Export Targets	L 📲 🗌		21	21	21			L _			\boxtimes
Save Session	Scanner Scanner Calibration Config	Scan-Targets	놀 Import CAD File	Scan-Surface	Scan-Point Cloud	Export-Mesh	Export-Point Cloud	Export-Edge	Export-CAD	Reset-Session	Fill single hole	e Local resolution	Edit-Scan 💿 🌐 🔢 🔲	111
Session	Calibration		Targets	Sca	Scan Export			ort		Reset	noic	resolution	Edit	

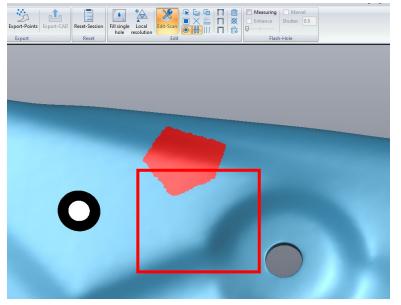
STEP ONE: Click "Edit-Scan"



STEP TWO: Choose "Lasso", "Rectangle" or "Polygon".



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

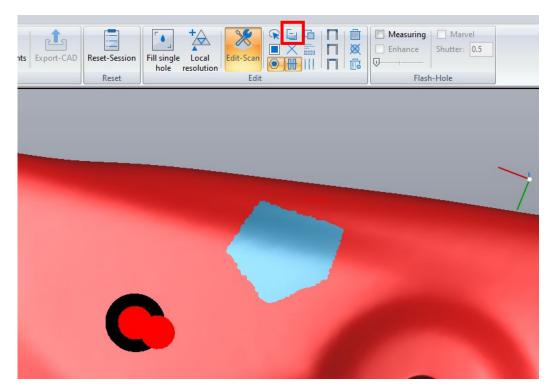




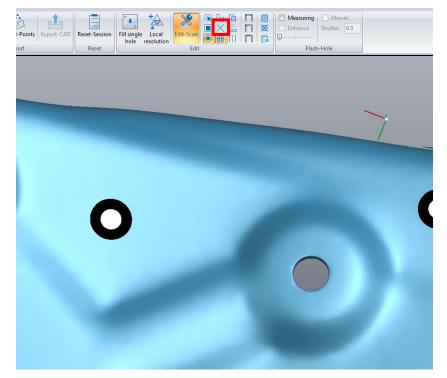
\bigcirc

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:

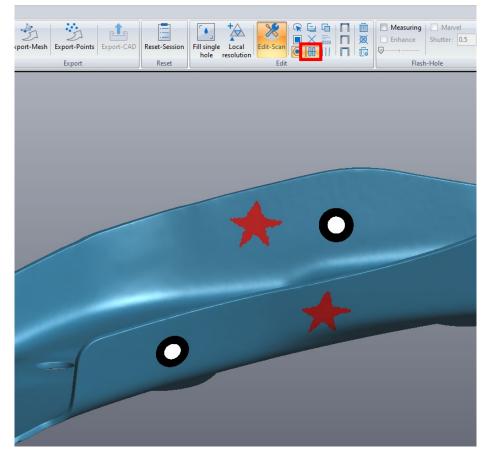
In the process of selecting data, the computer has a calculation time. During this time, please do not click on the computer, wait until it's been selected and deleted.



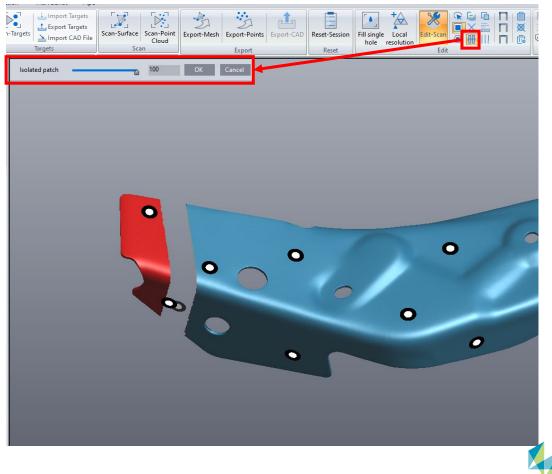


Data Edit Operation

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.

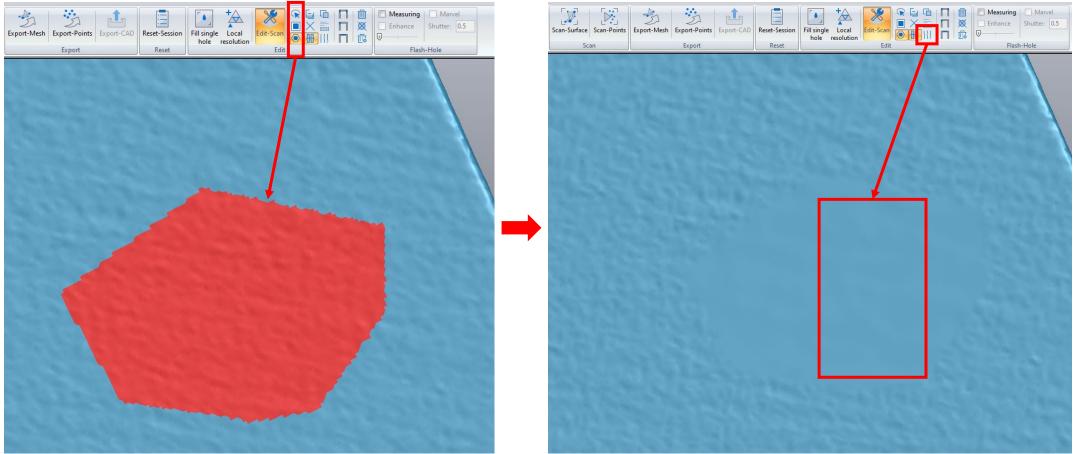






Data Edit Operation

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





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Data Edit Operation

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

0

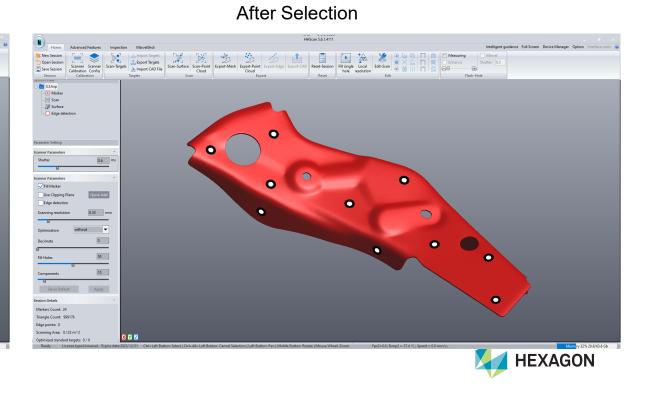
0

0

0



Before Selection





XYZ

ing Area: 0.123 m²

0.6 m

0.30 mm

50

10

Apply

nout 💌

O.3.hsp
 O.3.hsp
 O.Marker
 Scan
 Scan

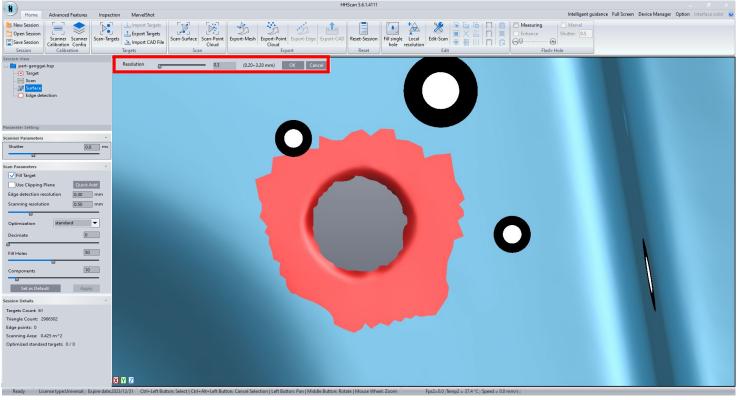


Data Edit Operation

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



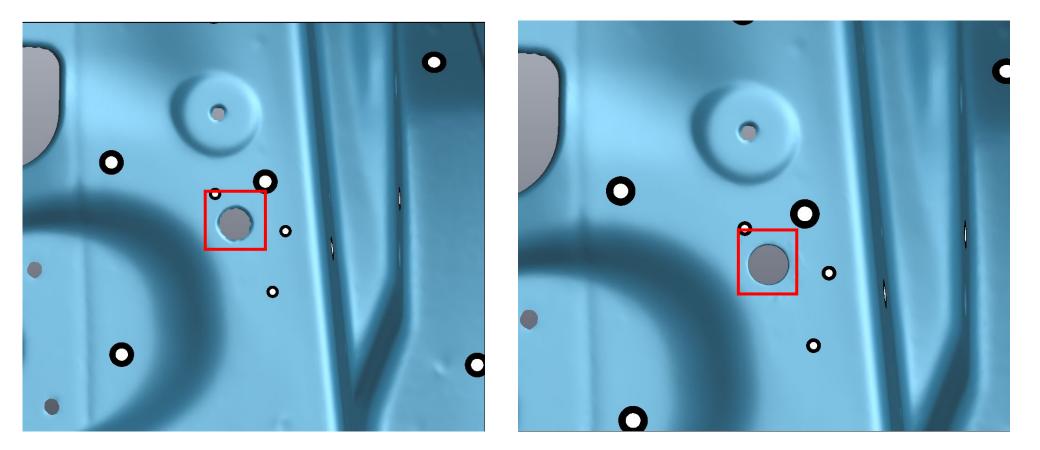




Data Edit Operation

Before Selection

After Selection



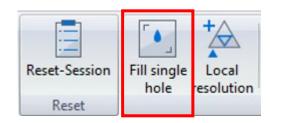


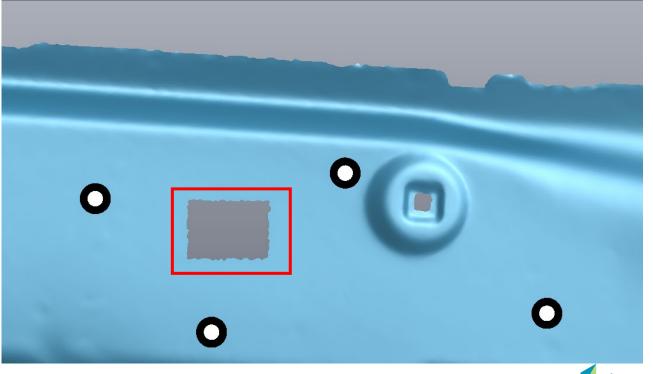


Data Edit Operation

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.







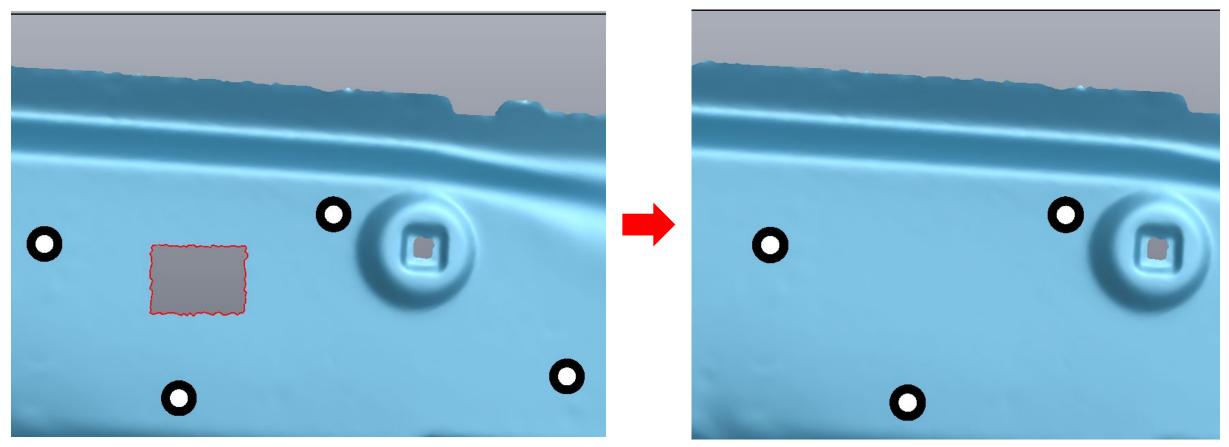
5. SCANNING PROCESS

Data Edit Operation

Before Selection



After Selection







TRY IT BY YOURSELF

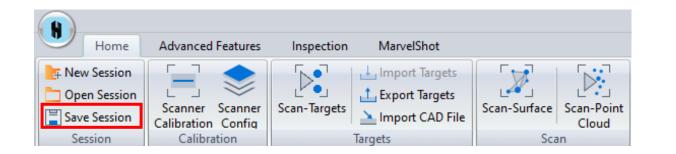


6. DATA SAVE



6. DATA SAVE





Session:

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

HScanProject.hsp

HScanPoj File(*.hsp)

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



6. DATA SAVE



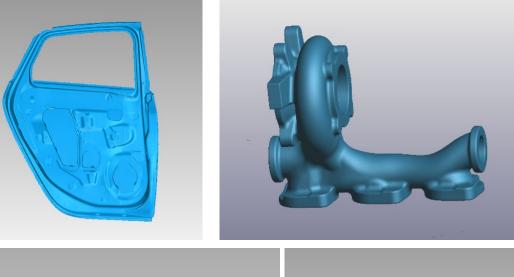
Home	Advanced Features	Inspection	MarvelShot					
New Session			↓ Import Targets			A		
Open Session		Ľ	📩 Export Targets	L 🕰 🗌		21	21	
Save Session	Scanner Scanner Calibration Config	Scan-Targets	놀 Import CAD File	Scan-Surface	Scan-Point Cloud	Export-Mesh	Export-Point Cloud	Export-Edge Export-(
Session	Calibration		Targets	Sca	in		Exp	ort

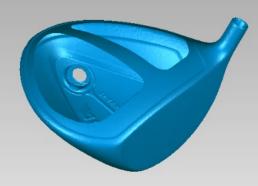
Export mesh format as .obj; .stl; .ply; etc.

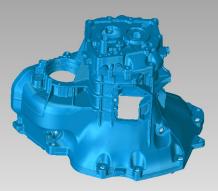
Mesh.stl	~
Export (binary) Mesh File(*.stl)	V
Export Mesh File(*.obj)	
Export (ASSCII) Mesh File(*.stl)	
Export (binary) Mesh File(*.stl)	
Export (ASSCII) Mesh File(*.ply)	
Export (binary) Mesh File(*.ply)	

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

Points.txt	~
Export txt File(*.txt)	~
Export txt File(*.txt)	
Export txt File(*.asc)	
Export CSV FileExport txt File	











TRY IT BY YOURSELF



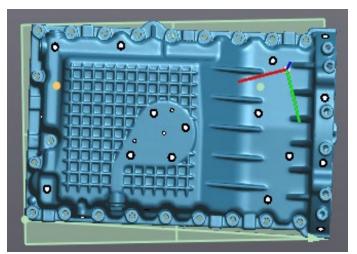


7. OTHER FUNCTIONS

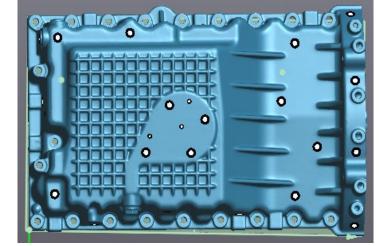
Inspection Module

Handheld Sc	5.6.0.3051 _ # ×
Home Advanced Features Inspection MarvelShot	Intelligent guidance Full Screen Device Manager Option Interface color
CAD Can C	the Cross-Section 3D Reset
View	
Scan Data	·
CAD Data	

- 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

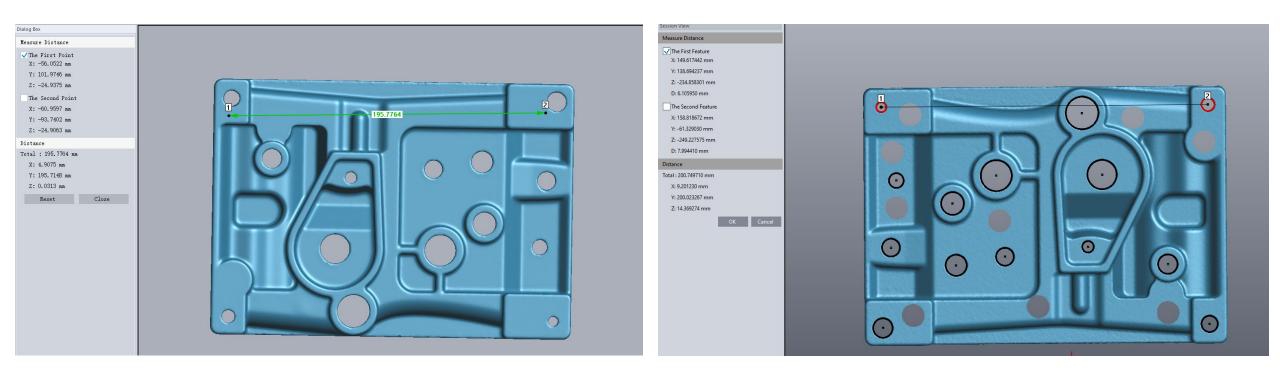


Inspection Module

Distance between two points



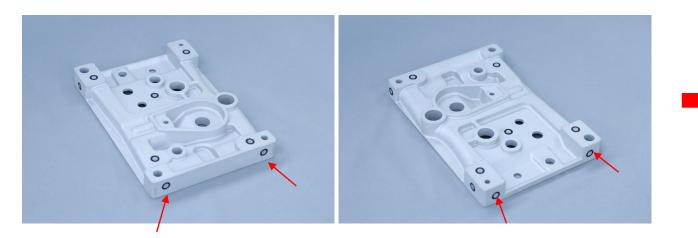
Distance between two features





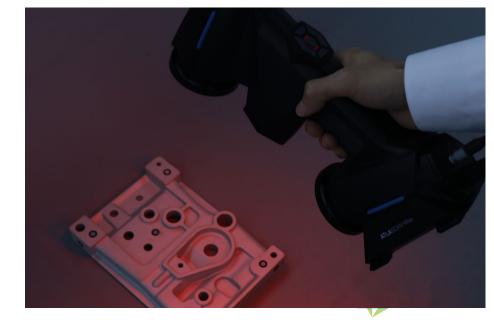
New Group Scanning

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



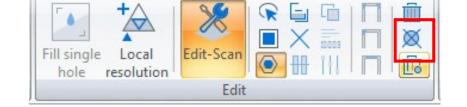
SETP TWO: Click "Scan-Targets" to collect the Targets

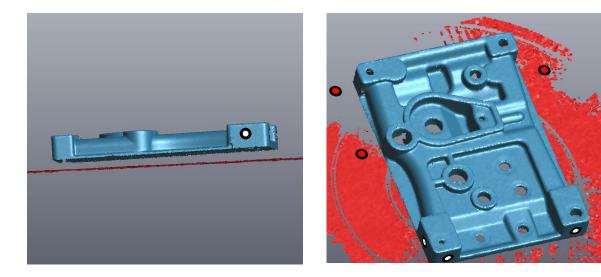




New Group Scanning

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





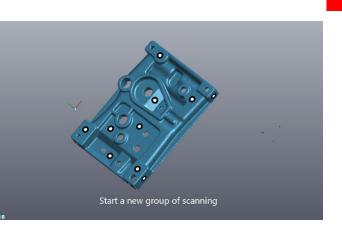
New Group Scanning

STEP FIVE: Click "Scan-Targets" double click the top button of the scanner to start a new group of scanning.

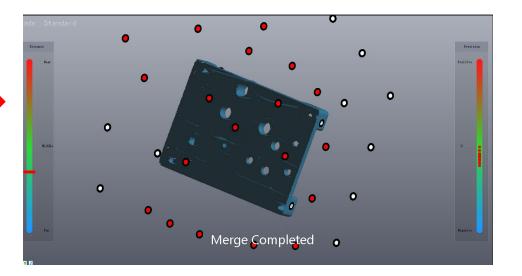


"Press twice"





STEP SIX: Scan the Targets from front and the sides, then Merge completely.

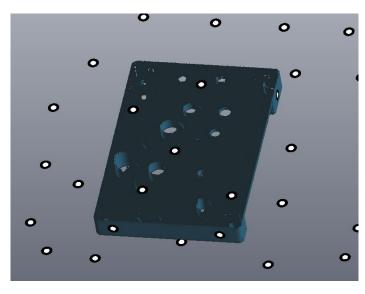




New Group Scanning

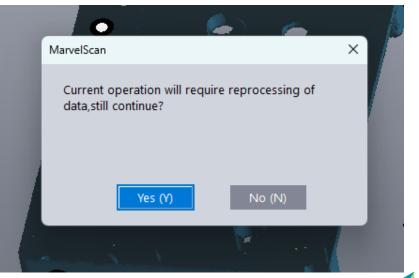
STEP SEVEN: Click "Scan-Targets" again to calculate the newly added Targets.





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









$\widehat{\Box}$

7. OTHER FUNCTIONS

New Group Scanning

STEP TEN: Continue scanning to complete the data collection.



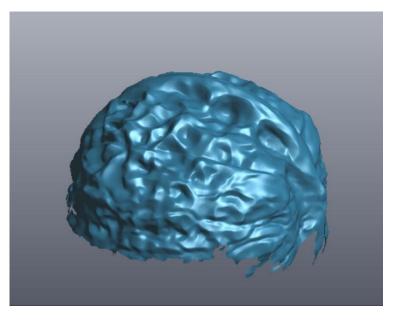


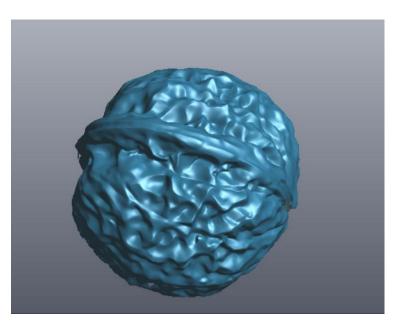
7. OTHER FUNCTIONS

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





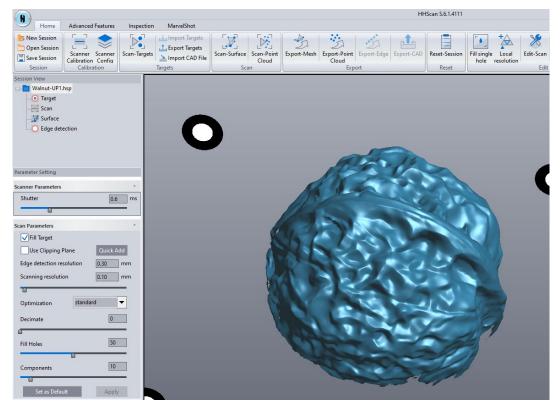
***<u>Take below two scan data as example to demonstrate how to merge by data in common surface.</u>



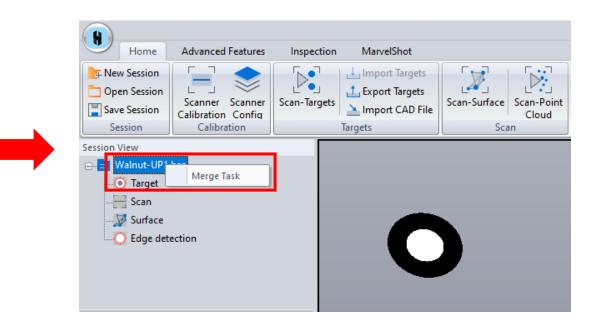
Scan Data Merge

#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"



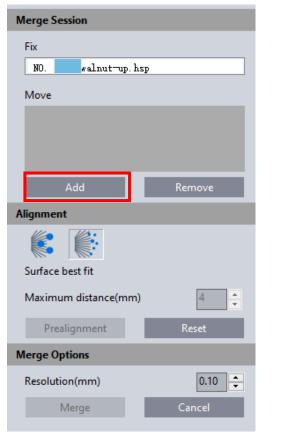




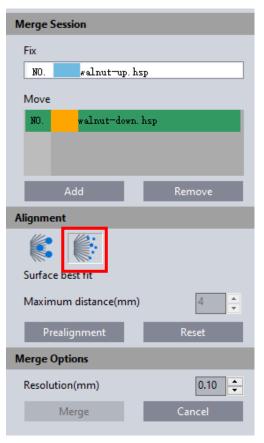


Scan Data Merge

STEP THREE: To import second session scanning data



STEP FOUR: To select "Mesh best fit"



STEP FIVE: To select "Pre-Align"

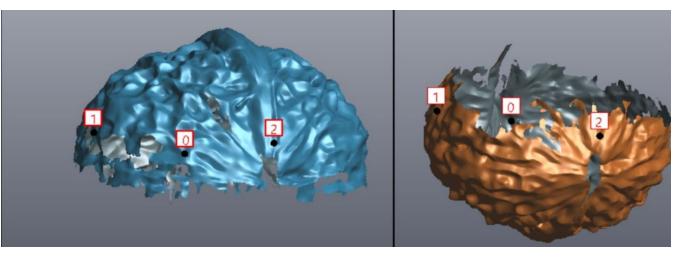
Merge Session	
Fix	
NO. walnut-up.hs	p
Move	
NO. walnut-down.h	ısp
Add	Remove
Alignment	
Surface best fit	
Maximum distance(mm)	4
Prealignment	Reset
Merge Options	
Resolution(mm)	0.10 韋
Merge	Cancel
2	





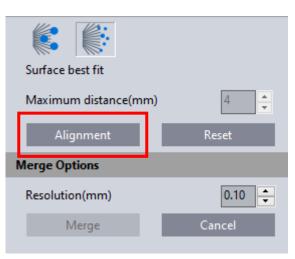
Scan Data Merge

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;





Scan Data Merge

There are 1 Sessions, processing the NO.1 Session.

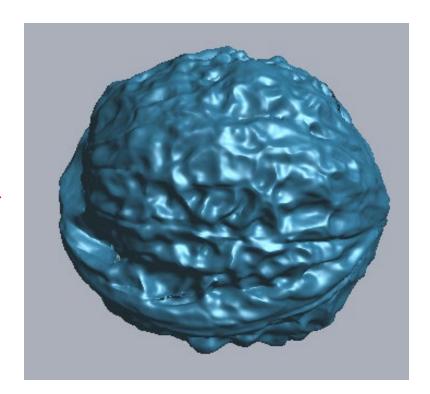
Progress

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

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	0 0	

lerge S	ession			
Fix				
NO.	∦alnut−up. h	sp]
Move				
NO.	walnut-down	hsp		
	Add		Remove	
lignme	ent			
Surfac	e best fit			
Maxim	num distance(mm))	4	
A	lignment		Reset	
Merge (Options			
Resolu	tion(mm)		0.10	
	Merge		Cancel	

STEP NINE: Click "Merge"STEP TEN: Complete merged
scanning data



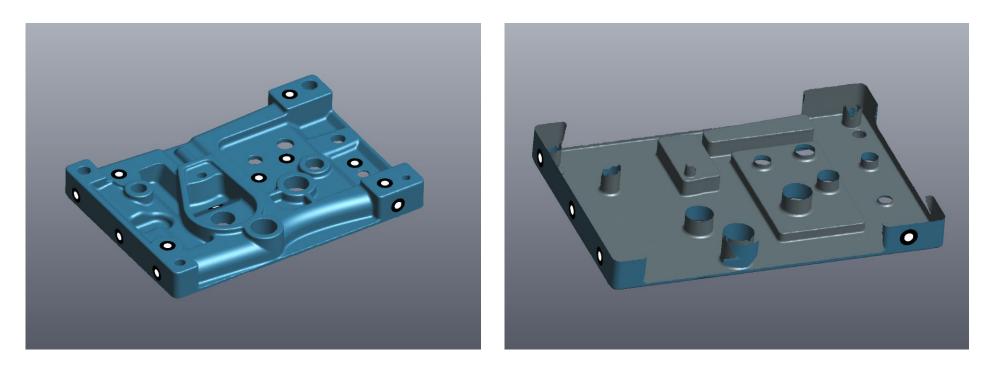


 $\widehat{\Box}$



Scan Data Merge

#2, To merge by common Targets



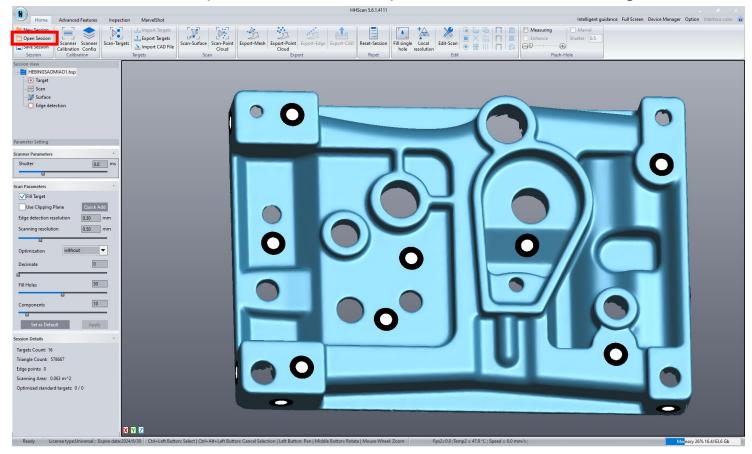
***<u>Take below two scanning data as example to demonstrate how to merge by common Targets.</u>





Scan Data Merge

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







Scan Data Merge

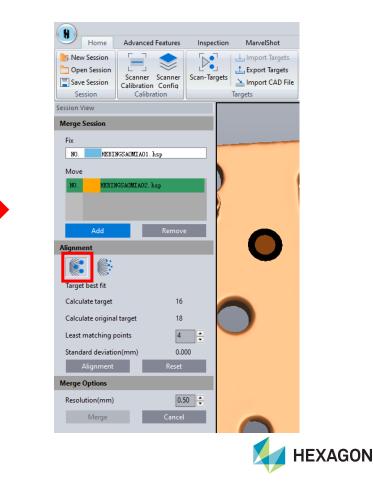
STEP TWO: To right-click on the session and select "Merge Task"

Home	Advanced Features	Inspection	MarvelShot
 New Session Open Session Save Session Session 	Scanner Scanner Calibration Config Calibration	Scan-Targets	L Import Targets L Export Targets Import CAD File Targets
Session View			
HEBINGSAO	Merge Task		
Scanner Parameters			
Shutter	0.6	ms	
Scan Parameters			
Fill Target Use Clipping P Edge detection res Scanning resolutio	solution 0.30	dd mm mm	

STEP THREE: To import second session scanning data

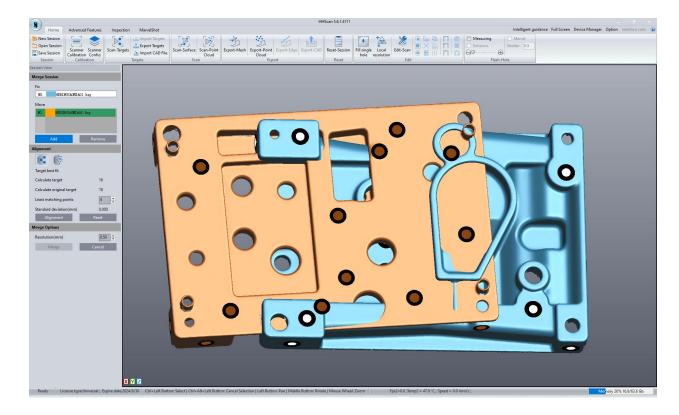
☐ Open Session Scanner Scanner Session Config Calibration Config Calibration Config	Home Advanc	ed Features	Inspection	MarvelShot
Fix NO. HEBINGSAOMIAOI. hsp Move NO. HEBINGSAOMIAO2. hsp Add Remove Alignment Calculate target 16 Calculate target 18 Least matching points 4 Standard deviation(mm) 0.000 Alignment Reset	Session Session Calibrati	on Config	-	L Import Targe L Export Target L Import CAD I Targets
Fix NO. HEBINGSAONTAOL hsp Move NO Add Remove Alignment Calculate target 16 Calculate target 18 Least matching points 4 Standard deviation(mm) 0.000 Alignment Reset	ew			
NO. KEBINGSADATAOI. hsp Move NO. HEBINGSADATAOI. hsp Add Remove Add Remove Add <td>ession</td> <td></td> <td></td> <td></td>	ession			
Move NOVE NO KEELINGSACHLAD2. hsp Add Remove Alignment Add Remove Alignment Calculate target 16 Calculate target 18 Least matching points 4 Standard deviation(mm) 0.000 Alignment Reset			_ _	
NO HERINGSACRILAC2. hsp Add Remove Alignment Aignet Alignment Remove	REBINGSAUMIAU	hsp		
Add Remove Alignment Image: Constraint of the section o	WERTNESSOUTAG	hen		
Alignment Image: Standard deviation(mm) Alignment	TEDINGSRONE ROZ			
Alignment Alignment Image: Standard deviation(mm) Alignment			1	
Target best fit Calculate target 16 Calculate original target 18 Lesst matching points 4 Standard deviation(mm) 0.000 Alignment Reset	Add	Remove		
Calculate target 16 Calculate original target 18 Least matching points 4 Standard deviation(mm) 0.000 Alignment Reset	nt			
Calculate target 16 Calculate original target 18 Least matching points 4 Standard deviation(mm) 0.000 Alignment Reset				
Calculate original target 18 Least matching points 4 Standard deviation(mm) 0.000 Alignment Reset	best fit			
Least matching points 4 Standard deviation(mm) 0.000 Alignment Reset	ite target	16		
Standard deviation(mm) 0.000 Alignment Reset	te original target	18		
Alignment Reset	natching points	4	E	
	rd deviation(mm)	0.000		
Merge Options	lignment	Reset		
	ptions			
Resolution(mm) 0.50	tion(mm)	0.50	÷	
Merge Cancel	Merge	Cancel		

STEP FOUR: To select "Mesh best fit"

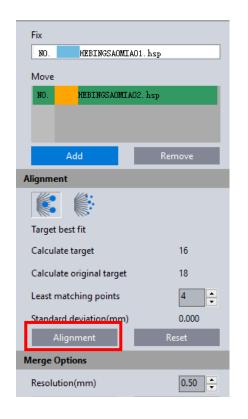


Scan Data Merge

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



STEP SIX: Click "Alignment"





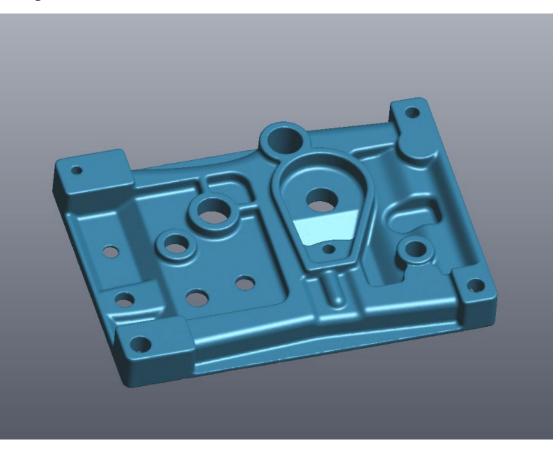


Scan Data Merge

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

Alignment	
Target best fit	
Calculate target	16
Calculate original target	18
Least matching points	4
Standard deviation(mm)	0.026
Alignment	Reset
Merge Options	
Resolution(mm)	0.50 🜲
Merge	Cancel

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





Fine Scanning Mode

7. OTHER FUNCTIONS

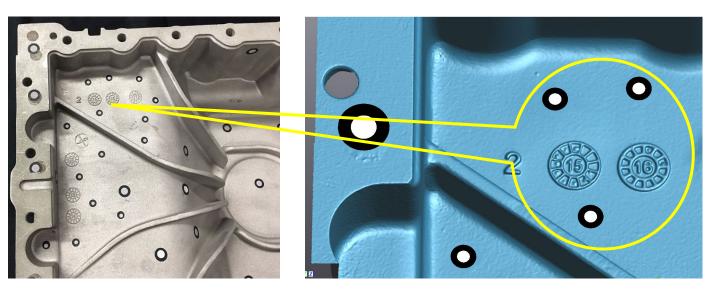
STEP ONE: To double-click start key to switch to fine scanning mode (14 laser lines) **Tips:** Please note stand-off distance of fine scanning mode is 200mm, the depth of field is up to 450mm, and the effective working range is 100mm to 300mm, which is much closer to object than that of stand scanning 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 the fine scanning mode;

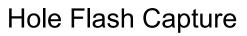
Tips: The longer you scan, the more details you will get and the larger file it will generate.





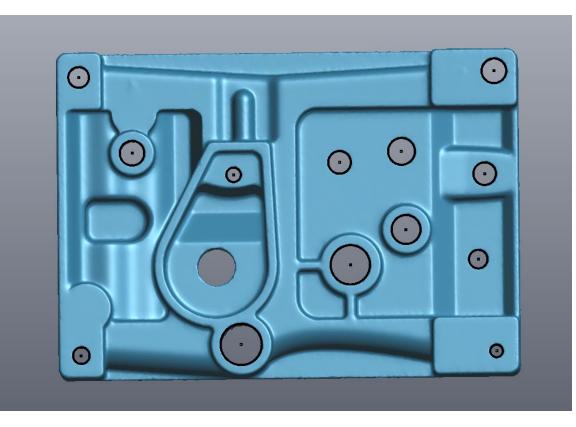






Hole Flash Capture Technology

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



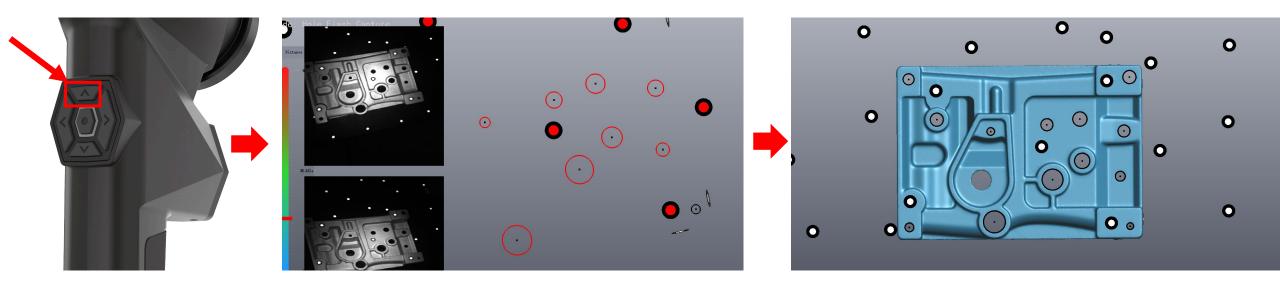


98

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-Multiple Data Splicing, STEP FIVE.*

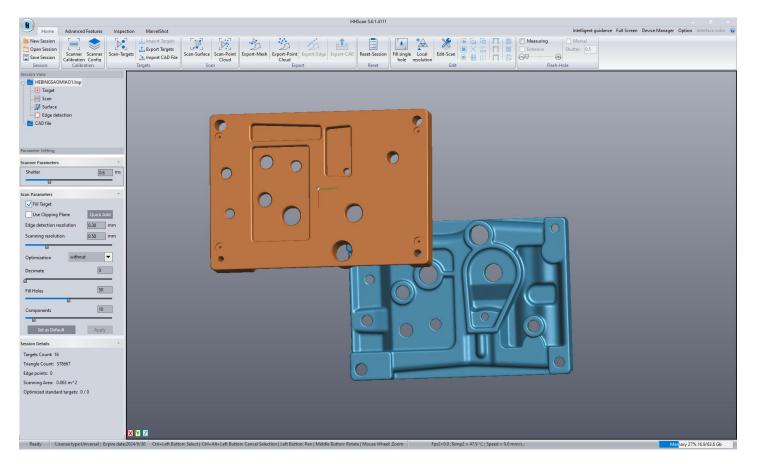






Hole Flash Capture

STEP TWO: To import CAD model into scanning software

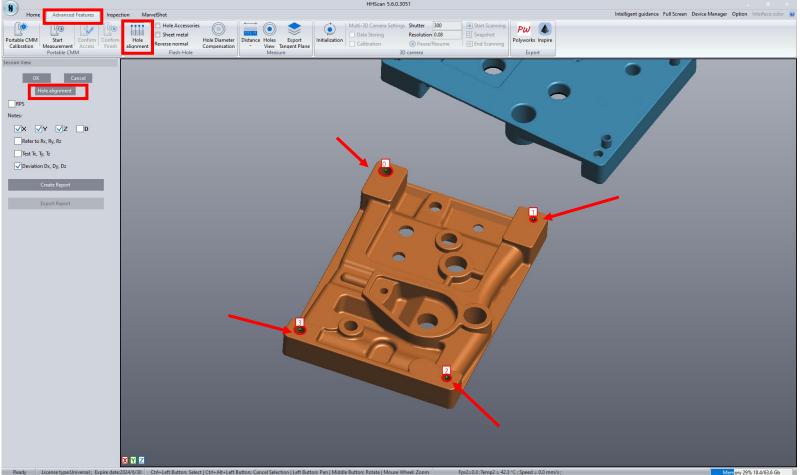




7. OTHER FUNCTIONS

Hole Flash Capture

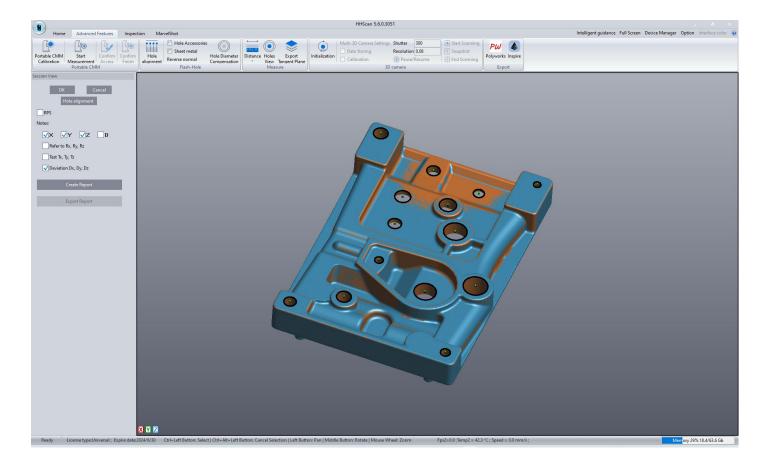
STEP THREE: After importing CAD model and then click "hole alignment" to align two models **Tips:** To select 3 or more holes on CAD model and select holes from scanning side and align them based on the holt position.





Hole Flash Capture

Alignment Result

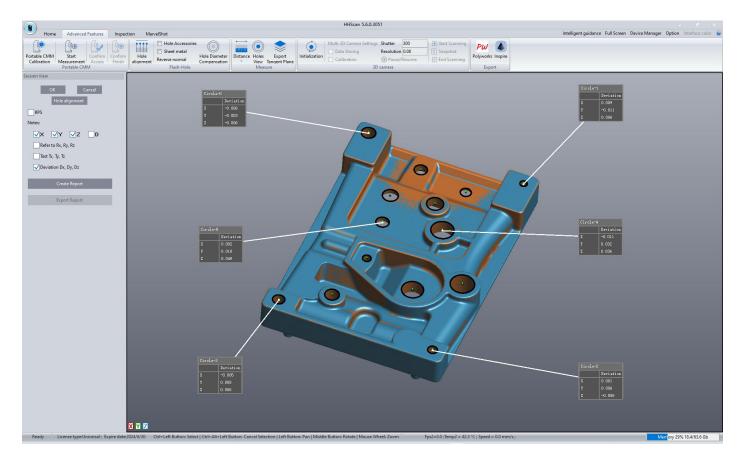






Hole Flash Capture

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



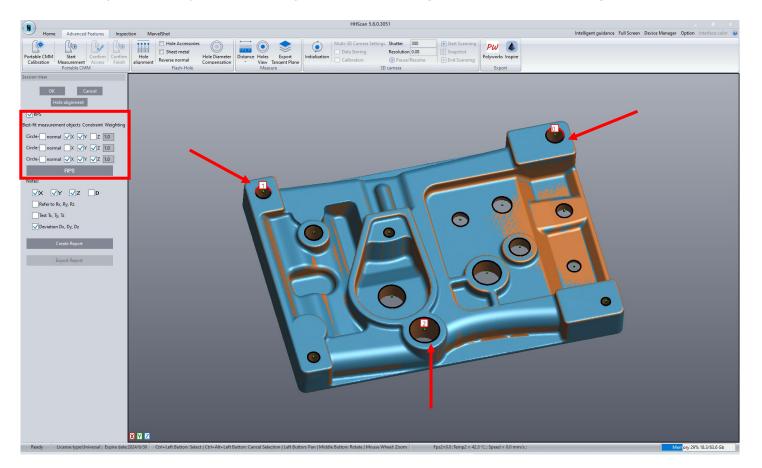




Hole Flash Capture

Extra functions: RPS alignment

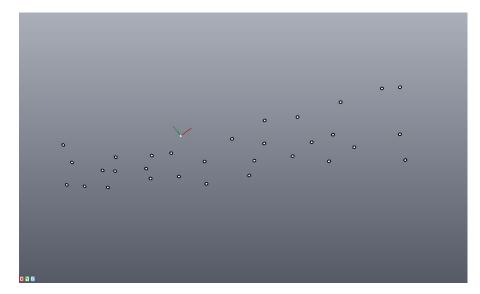
After hole alignment, you can select "use alignment RPS" and then select 3 holes for RPS alignment, set orientation of selected holes (select x,y,z of circle), and click Alignment RPS to align.





Edge Detection

STEP ONE: Scan all the targets on the object



Scanner Parameters Shutter 0.6 ms Ű Scan Parameters Fill Target Use Clipping Plane Quick Add Edge detection resolution 0.30 mm Scanning resolution 0.50 mm

	Shutter			0.6		ms
50	an Parameters					*
	✓ Fill Target					
	Use Clipping Plan	e	Qu	ick Ac	ld	
	Edge detection resolu	tion	0.30		mn	n
	Scanning resolution		0.50		mn	n
	6				-	
	Optimization	withou	ıt	•	•	
	Decimate			0		
1					-	
	Fill Holes			50		
	(-	
	Components			10		
	<u> </u>				_	_
	Set as Default		A	pply		

STEP TWO: Choose the resolution for edge detection and apply

Tips: default resolution for edge detection is 0.3mm which is suitable for most scanning scenarios.



Scanner Parameters

Edge Detection

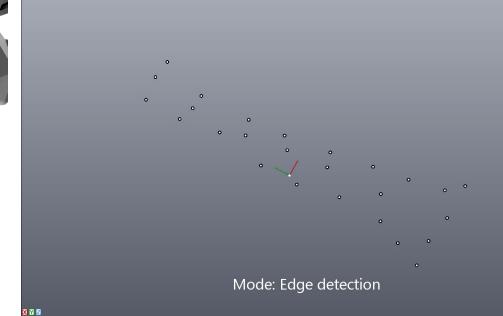
STEP THREE: Click on "Scan Surface" enter scanning interface as below



STEP FOUR: Press the bottom-push button twice to enter "edge detection" mode





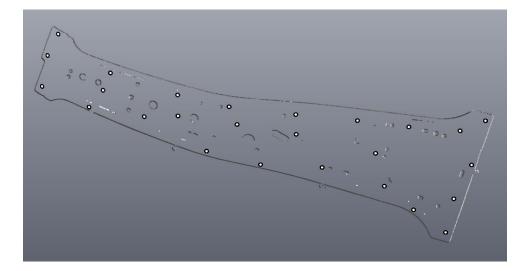




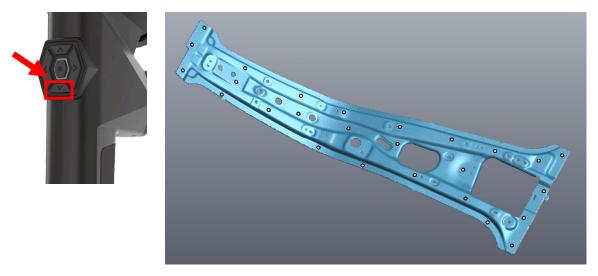


Edge Detection

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 again and switch back to scan surface, so you can continue to scan the surface data.

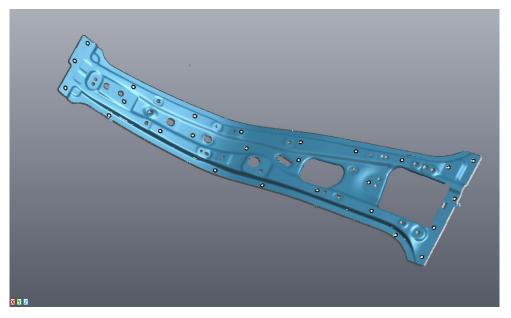




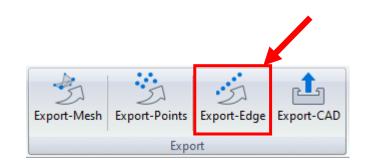
Edge Detection

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





Software Installation

Installation Tips:

- <u>Do not install</u> 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 (<u>Win10 OS or Win11 OS</u>);
 - e.g.: to change the BIOS Settings system for certain workstation.
- VC Library (<u>Win7 OS</u>);
 - e.g.: To install library file for certain workstation.









Software Troubleshooting

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

STEP TWO: To click "check device"

STEP ONE: To click "option"

Intelligent guidance	Full Screen	Device Manager	Option	nterface color	0
Marvel					
tter: 0.5					
itter: 0.5					

Option	×
🗄 Option 🔅 System Settings 📝 Shortcut key 📿 Device Inspection 🗟 Firmware updat	e
Option Current language: English Vnit Millimeter	
Mode Default Automated Scanning Module	
Wireless scanning module	
Save Ca	ncel

STEP THREE: To click "update" to show the diagnosis

Op	tion						×
	B Option	🕸 System	n Settings	📕 Shortcut key	Q Device Inspect	tion 🔕 Firmware upda	te
		atus:	Abnorma	il Rate param: 1		Update]
	Abnorn			nt connection error	1		
	- Soluti 1, Try to		equipment	t (USB cable, power	cord) again.		
						Save Ca	ancel





Software Troubleshooting

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

STEP ONE: To click "option"

			8	
Full Screen	Device Manager	Option	nterface color	0
	Full Screen	Full Screen Device Manager	Full Screen Device Manager Option	5 Full Screen Device Manager Option nterface color

STEP TWO: Choose unit (Millimeter or Inch).

Option	\times
Option System Settings Shortcut key Q Device Inspection Firmware update Option Current language: English Unit Millimeter	
□ Factory default parameters Mode ✓ Default □ Automated Scanning Module □ Wireless scanning module	
Save Cancel	

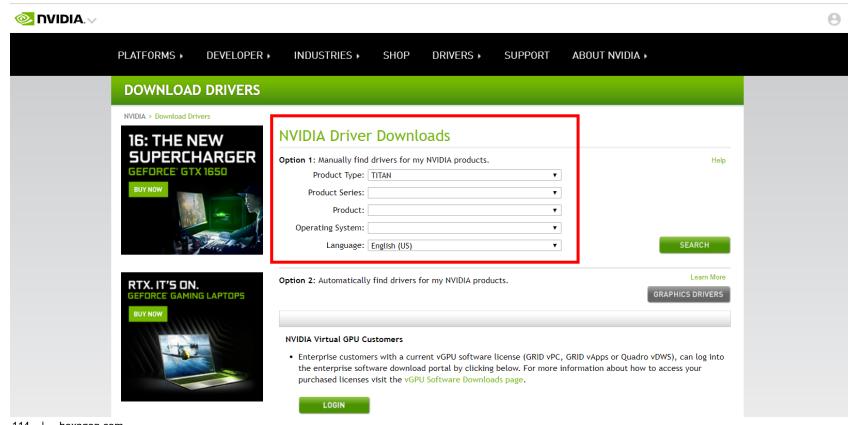




Software Troubleshooting

<u>Troubleshooting #3</u>: 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.



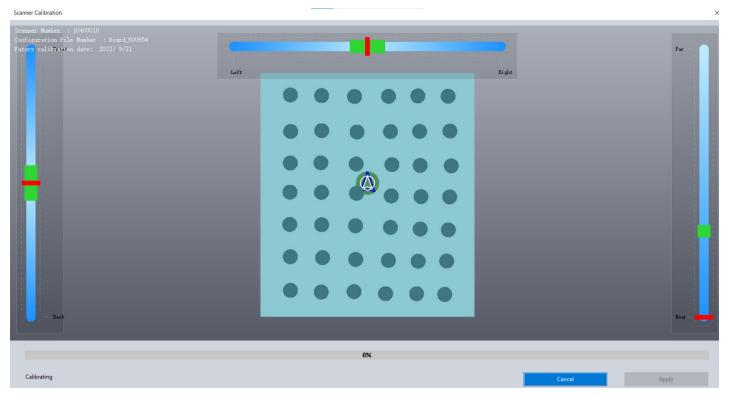


8. BASIC TROUBLESHOOTING

Scanner Troubleshooting

<u>**Troubleshooting #4**</u>: 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).

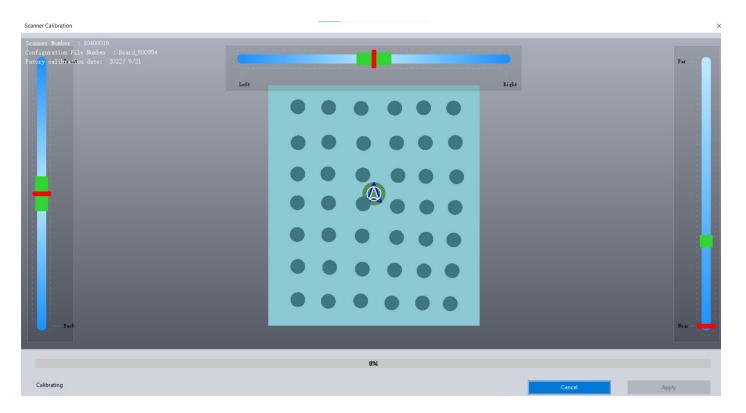




8. BASIC TROUBLESHOOTING

Software Troubleshooting

<u>Troubleshooting #5</u>: Scanner is connected properly, while the Targets are blinking, and FPS is not stable during scanning **Solution:** To recalibrate the scanner.







8. 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.

Parameter Setting
Scanner Parameters *
Shutter 0.6 ms
<u> </u>
Scan Parameters *
✓ Fill Target
Use Clipping Plane Quick Add
Edge detection resolution 0.30 mm
Scanning resolution 0.50 mm
Optimization without 💌
Decimate 0
Fill Holes 50
Components 10
Set as Default Apply







TRY IT BY YOURSELF



Questions, please contact your local Hexagon representative.

THANK YOU

