SCANTECH™

Tracking 3D Scanner

TrackScan Series

User Manual

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Introduction

Please read user manual before start.

After reading, keep it safely for next time review.

Basic Label

This manual will use the following labels to describe different significance, so please red carefully and make sure understand all of labels.

Danger	Fail to obey the announcement will cause dangerous situation or injuries and deaths.
Warning	Fail to obey the announcement may cause dangerous situation or injuries and deaths.
Caution	Fail to obey the announcement may cause minor injury.
Attention	Fail to obey the announcement may damage product or surrounding.

Safety Announcement

Notice	During scanning process, must obey announcement and use product correctly.

Please use it correctly

To avoid malfunction of the KSCAN series and to ensure proper use, please observe the following precautions.

Normal Announcement

Caution	➢ Before starting work, please confirm the function and performance of this product, and the equipment can operate normally. ➢ If the product malfunction, please turn off the power immediately for preventing other damage. ➢ Please don't change temperature suddenly during product use, otherwise condensation will cause equipment failure. ➢ Before using this product, please ensure that the power socket is well grounded to prevent leakage! ➢ use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure ➢ L'utilisation des commandes ou réglages ou l'exécution des procédures autres que celles spécifiées dans les présentes exigences peuvent être la cause d'une exposition à un rayonnement dangereux ➢ The stand can only be used in the following situations： open to maximum angle of maximum gear.

Attention	➢ For out of the working range, and modified products, the company does not guarantee its function and performance. ➢ When this product is combined with other equipment, it may not be able to satisfy the function and performance depending on the conditions of use and the environment. Therefore, please pay attention to it before use.

Operation Announcement

Warning	➢ Please choose the correct power supply voltage. Otherwise malfunction will cause failure or fire. ➢ Please do not disassemble or modify the unit. Otherwise malfunction will cause failure or fire.

Attention	➢ In order to use this product properly and safely, please try to avoid the following places, otherwise it may cause malfunction. ● high humidity or dust； ● Corrosive or flammable gas； ● Splashes of water, oil, chemicals； ● static electricity. ➢ Dirty dirt, water or oil stains may affect the use of the product and cause measurement deviations； ● When it is attached to the surface of the product glass: blow off the dirt with clean air. When the soil is dirty, wipe it off with a soft cloth dampened with alcohol. ● When it is attached to the surface of the object: please blow off the dirt with clean air or wipe off the dirt with a clean soft cloth. ➢ If the measuring object vibrates, it may cause a deviation in the measured value. ➢ After turning on the power, wait about 5-10 minutes before use. Since the circuit will not stabilize immediately after the power is turned on, the measured value may be deviated.

Accident Announcement

Attention	➢ Turn off the power immediately when the following phenomenon occurs. If you continue to use it, it may cause equipment failure. ● Water or foreign matter inside the device； ● The device is dropped, or the casing is damaged; ● The device emits smoke or an unusual smell.

Storage Announcement

Attention	➢ Do not wipe the product with a damp cloth, volatile oil, thinner, etc. Otherwise, the product may be discolored or deformed. When the soil is dirty, use a cotton cloth to remove the diluted neutral detergent, wring it out, wipe it, and then wipe it off with a soft cloth. ➢ Please try to avoid the following places for storage； ● high humidity or dust； ● Corrosive or flammable gas.

Notes on Regulations and Standards

Safety Announcement

The laser wavelengths of the TrackScan series are as follows:

Type	TrackScan Series
Blue wavelength	450nm
Red wavelength	660nm

According to the ICE60825-1, the laser grade of KSCAN series used is Class II.

Notes of Class II lasers is follows:

Warning

- If you do not control and adjust according to the procedures specified here, you may injure the human body (eyes, skin, etc.). Therefore, please be sure to observe the following items. About Class II laser products：
  - Please don't stare at laser and specular light；
  - Please do not intentionally point the laser towards people, especially the eyes；
  - Please pay attention to the reflected light path of the laser. The laser will be specular and diffuse. If there is danger of being reflected by the reflected light, please cover the reflected light with a baffle；
  - Do not use a concentrator, magnifying glass or microscope to observe the laser output within 100mm.
- This product does not have a mechanism to turn off the laser irradiation when disassembling. Please do not disassemble it.

System maintenance manual

SCANTECH products contain products containing precision optical components, be careful not to damage their internal components and calibration system. Always place the appliance in a protective case when handling and store it at dry, dust-free room temperature. It is recommended that all temporarily unused equipment and accessories be placed in the protective case.

Before starting a project, make sure that the work environment is clean and organized and that the cables are securely placed.

Devices should always be stored in an environment that:

Storage temperature: 5 to 55 degrees C

Operating temperature: -10 to 40 degrees C

Humidity: Relative humidity 10 to 90% (no condensation).

Warning: Do not open any components using SCANTECH technology.

Daily use

- Always use the equipment in a clean, dry environment
- Avoid direct sunlight on optical components
- Avoid splashing water, oil and other substances onto the equipment.
- Do not immerse the device in water
- Avoid equipment drops and impacts
- Do not bring foreign objects into the device
- When the connector is not in use, cover it.
- When folding the cable, the bending radius must not be less than 5 cm.
- Do not squeeze or trample the cable.
- The device can only be used with the supplied original power supply.

Metal and plastic parts

Clean the device with a small amount of water or soap in a soft cotton cloth.

Note: Do not use solvents to clean the device.

Optical components

By injecting dry air, remove all particles that may scratch the objective and light source

Clean the objective and light source with a damp cloth, such as a frictionless optical or microfibre rag.

Warning: Do not use non-professional tools for optical wipes to avoid irreversible damage to the device.

User calibration board tool

The user calibration plate should be stored in a protective case.

Do not place anything on the housing.

By injecting dry air, remove all particles that may scratch the calibration plate.

Clean the calibration plate with a damp cloth, such as a frictionless optical mirror cloth or a microfibre rag.

Other products

Do not place anything on the housing except for custom foam fillers. Do not touch the reflected target point. If one of the target points is damaged, the entire user calibration plate must be replaced. Clean dirty reflective target points:

1. Find the target point for dust or dirt.

2. Dip the cotton swab into a diluted soap (do not use alcohol).

3. Gently wipe the target point (do not wipe the target point hard).

4. Place the microfibre towel or paper towel on the target point and gently dry the target point (do not wipe the target point hard).

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1 Introduction to Tracking 3D Scanners

The camera of the TrackScan 3D scanner can obtain the laser projected onto the scanned object, the laser deforms with the shape of the object, and as the camera is accurately calibrated in advance, it is possible to calculate the linear 3D information projected by the laser line; The tracker obtains the exact spatial position of the TrackScan 3D scanner in real time through reflective marker point tracking technology; Using the linear 3D information obtained in step 1 and the spatial relative position of the scanner in step 2, the 3D information of the position through which the laser passes is continuously acquired as the scanner moves, creating continuous 3D data. The common focal length of the scanner is called the reference distance, and the common focal length range is called the depth of field. Red light reference distance is 300mm, depth of field is 200mm; blue light reference distance is 370mm, depth of field is 260mm.

2 Precautions before using

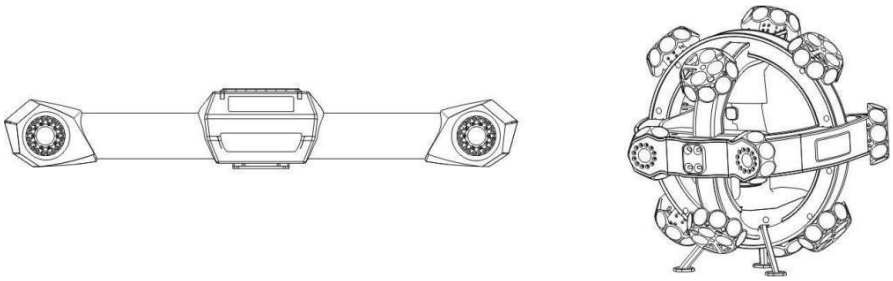
This chapter provides a brief description of the scanner's product configuration, product structure and device connection.

2.1 Product configuration

The following is a brief introduction to relevant product names and other information. The specific configuration,please refer to the packing list.

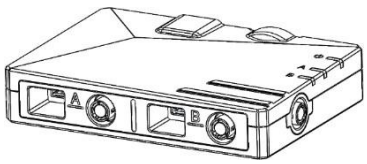
Product introductions:

（1） TrackScan tracking 3D scanner: as shown in Figure 2-1.



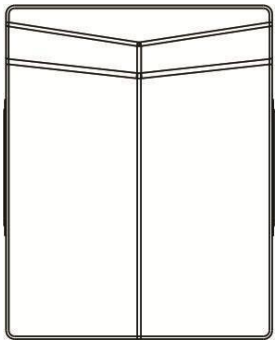
2- 1 Tracking 3D Scanner

（2） Relay box：The relay box connects the scanner and the tracker to synchronize and transmit data, and provides power supply for the tracker and the scanner. A and B logo each contains a set of interfaces: power cable and data cable. It can be connected to the scanner and tracker respectively. The power interface connects to the power adapter, and the data port connects to the computer for data transmission. As shown in Figure 2-2.



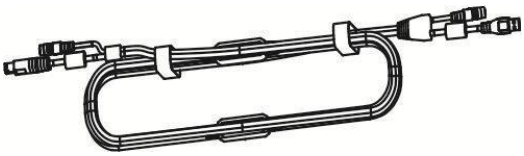
2- 2 Relay Box

（3） Calibration Board：It is mainly used to calibrate the camera parameters. In order to ensure good data quality, camera calibration is performed using a quick calibration plate before the scanner is started or when temperature changes or poor scan data quality occurs. As shown in Figure 2-3.



2- 3 Calibration Board

（4） Power data cables: respectively as a tracker and scanner connected to the relay box cable. One cable: Type A interface with the power supply interface to connect the relay box, Type B interface with the power supply interface to connect the scanner. Another cable: Type A interface and power interface to connect the relay box, Type B interface and power interface to connect the tracker. As shown in Figure 2-4.

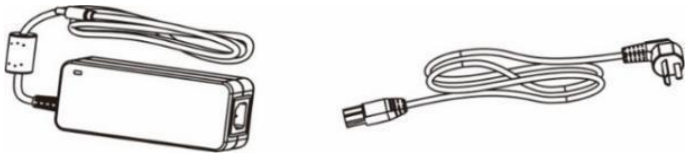


2- 4 Power Data Cable

（5） USB Cable：Type A interface connects to PC and transmits scan data to PC; Type B interface connects to relay box. As shown in Figure 2-5.

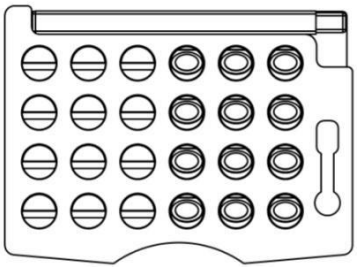
2- 5 USB Cable

（6） Power adapter: Connects to relay box to provide external power. As shown in Figure 2-6.



2- 6 Power Adapter

（7） Mark point box：Totally have 24pcs transfer mark points.As shown in Figure2-7。

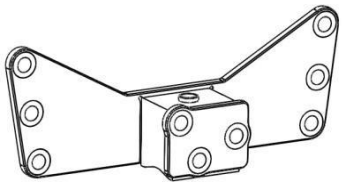


2- 7 markpoint

（8） Probe：The probe for TrakScan,As shown in Figure2-8。

2- 8 Probe

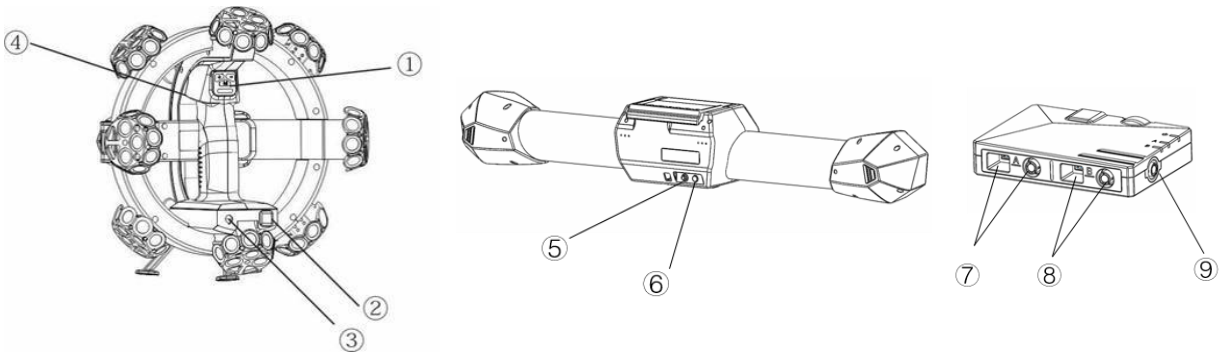
（9） Probe base：The Probe base is used for Probe calibration,as shown in Figure2-9。



2- 9 Probe base

2.2 Product Structure

（1） The product structure is shown in Figure 2-8.



2- 7 Product Structure

①-Back button; ②-Data cable Type B interface; ③-Data cable power interface；

④-Front Button； ⑤-Data cable Type B interface; ⑥-Data cable power interface；

⑦-Data cable power interface+Type A interface；

⑧-Data cable power interface+Type A interface； ⑨-Power interface

（2） The names and functions of some structural components are detailed in Table 2-1.

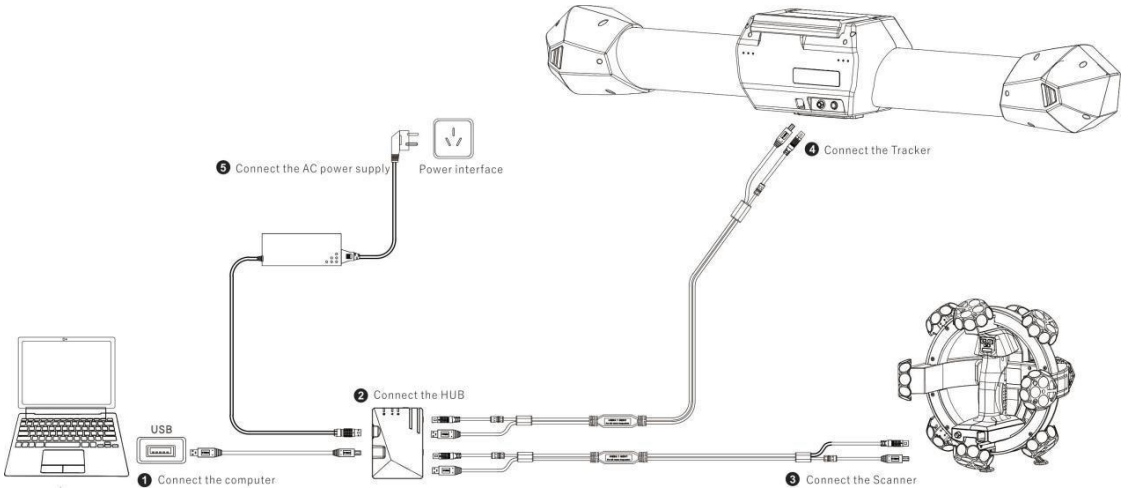
Table 2- 1 Names and descriptions of some components

Name	Functions	
④-Front Button	P22: Click to turn on/off the scanner, double click to switch laser lines in the order of multiple red, parallel blue and single red. P42: Click to turn on/off the scanner, double click to switch laser lines in the order of multiple blue, parallel blue and single red.	
①-back button	M button	Switchable menu key functions in order to adjust the zoom ratio, adjust the laser exposure parameters and operate the view；
	+ button	①Under the Adjust Zoom function: Zoom in View； ②Under the function of adjusting the laser exposure parameters: each press the exposure parameters increase by 0.5ms；
	- button	①Under the Adjust Zoom function: Zoom out View； ②Under the function of adjusting the laser exposure parameters: each press the exposure parameters decrease by 0.5ms；

Attention	The function of all keys in the back button only works when the scanning software is running.

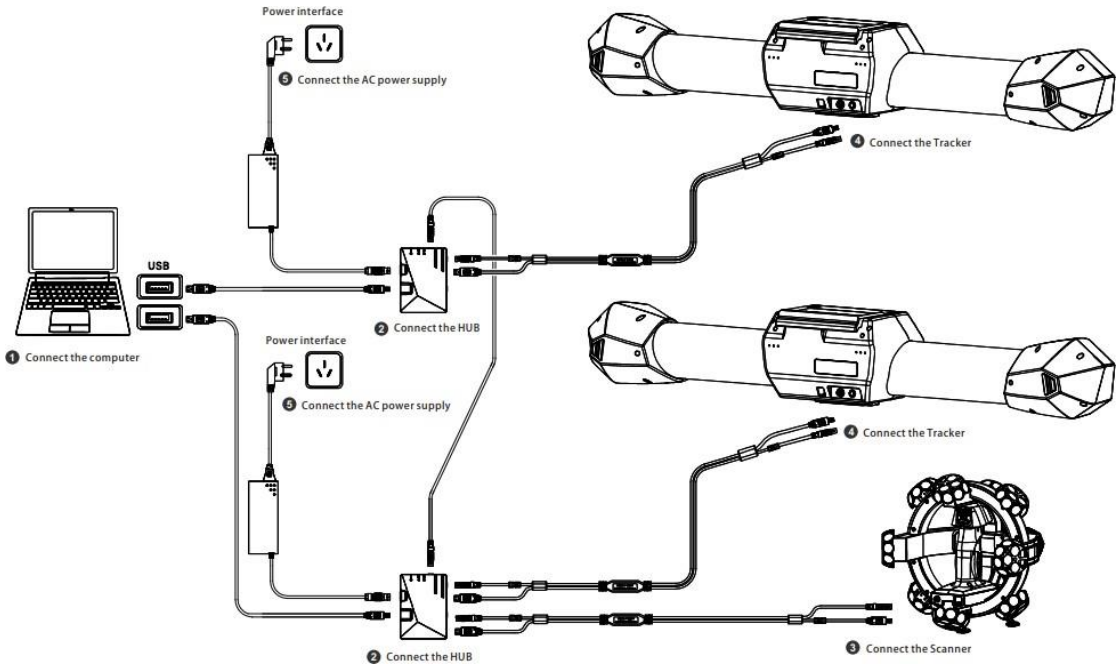
2.3 Tracker and Scanner connection

1) Device connection includes connecting the tracking device power+data cable to the relay box and the scanner device power+data cable to the relay box. The power adapter is connected to the relay box and the USB cable of the relay box is connected to the computer. The connection cable includes the power adapter connection cable, the power data cable, and the USB cable. The power adapter provides power to the repeater box. The USB cable is connected to the Type B port of the repeater box and the USB 3.0 port of the computer at both ends. As shown in Figure 2-8.



2- 8 Tracker and Scanner Connection

2)Cascading connection, as shown in Figure 2-9 (Optioanl)



2- 9 Tracker Cascading Connection

3 Software Installation

This product requires the installation of the scanning software TViewer, the following is a description of the required operating environment and installation steps for the software.

3.1 Computer configuration requirements

Scanning software for real-time processing of scanning data transmitted in real time during the scanning process, the selection of the appropriate hardware configuration can effectively improve the efficiency of the entire scanning system. About the configuration requirements of the computer parameters for the installation of scanning software. As shown in sheet 3-1.

3- 1 Computer Configuration Requirements

Name	Recommended configuration	Minimum Configuration
CPU	I7 ， 8cores 16threads	I7，6cores 12threads
Ram	32G	
Graphics Memory	4G	
Interface	USB3.0	
Operation System	Win10	

Software installation package TrackScanVX.XX.exe that needs to be installed before using the device.

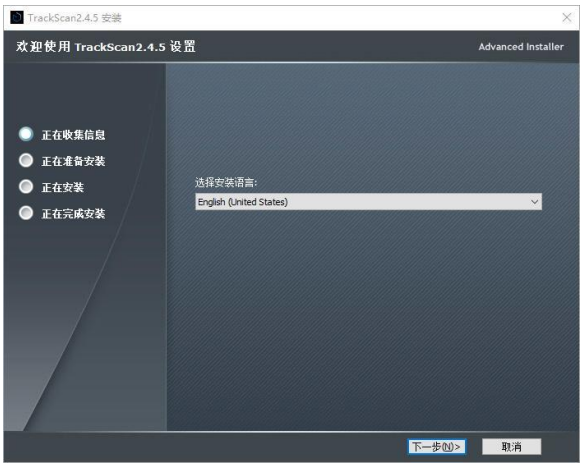
Notice	TrackScanVX.XX.exe in VX.XX for the software installation package version number, later may be due to software upgrades and version number changes, such as changes, without notice. EN is the language version corresponding to the installation package (English).

Attention	①Please close all anti-virus software before software installation; ②All software installations require administrator privileges.

3.2 Scanning software installation

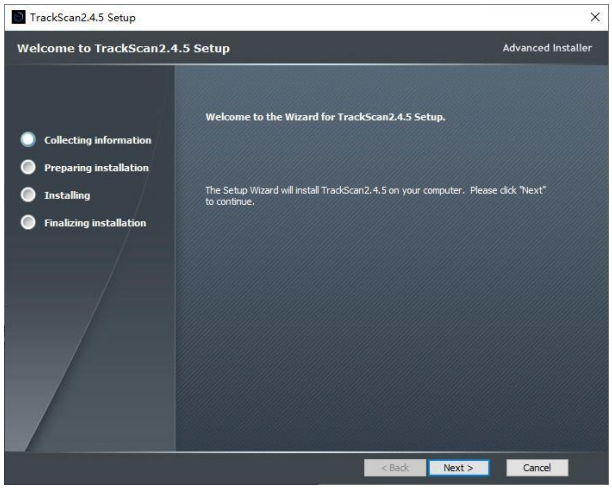
This section will scan the software TrackScanVX.XX.exe.installation package to install the computer steps to explain, here mainly to install to the Windows 10 system as an example to explain.

（1） Right-click on the TrackScanVX.XX.exe. installation package, select Run as administrator, click on "Next". As shown in Figure 3-1.



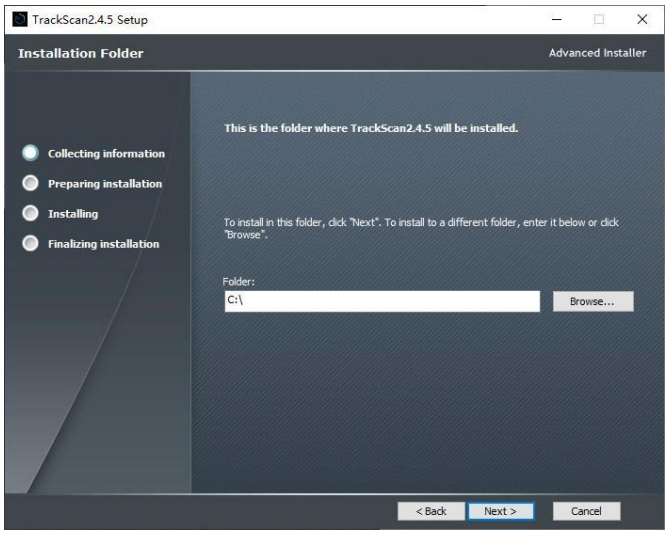
3- 1 TrackScanVX.XX Installation Steps

（2）Select the installation directory and click "Next". As shown in Figure 3-2。



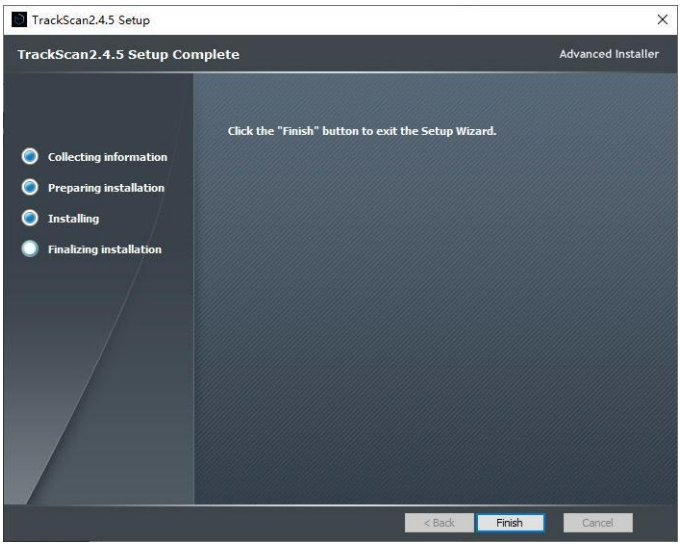
3- 2 TrackScanVX.XX Installation Steps

（3） Click "Install". As shown in Figure 3-3.

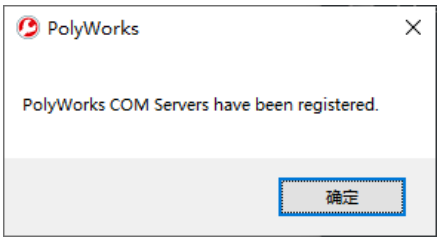


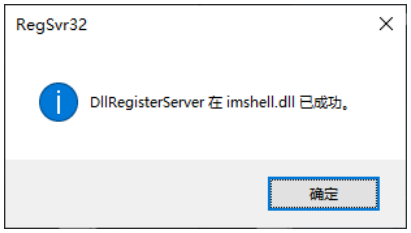
3- 3 TrackScanVX.XX Installation Steps

（4） When the installation is finished,Click finish end the process.If you have installed the polyworks,it will show such tip as below,As shown in Figure 3-4.



3- 4 TrackScanVX.XX Installation Steps





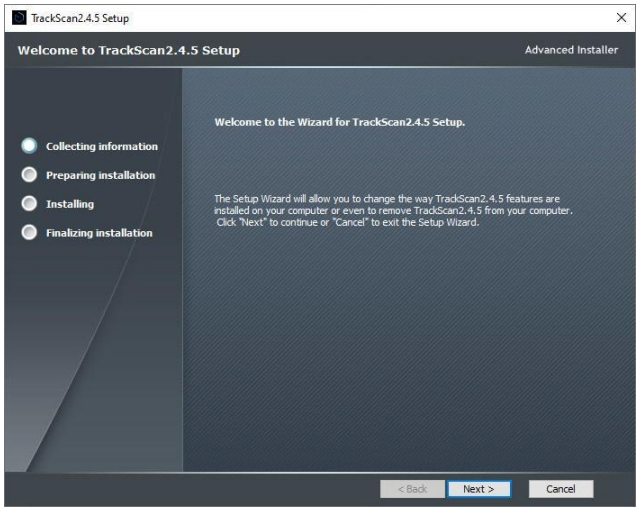
（5） After clicking "Finish", a shortcut will be automatically created on the desktop.

3.3 Software Uninstallation

If you want to uninstall or re-install the software, you can enter the software name in the Start menu to enter the uninstall procedure; go to "Control Panel - Uninstall a Program" on your computer and select the appropriate software to uninstall. As shown in Figure 3-12.

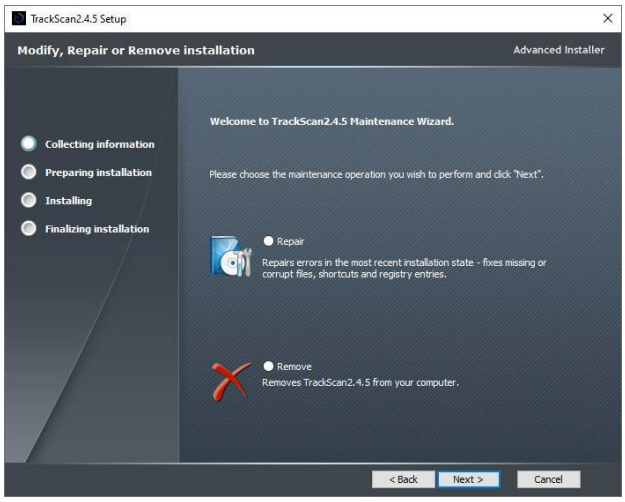
3- 5 Software Uninstallation

（1） Click the SW,shows as below:



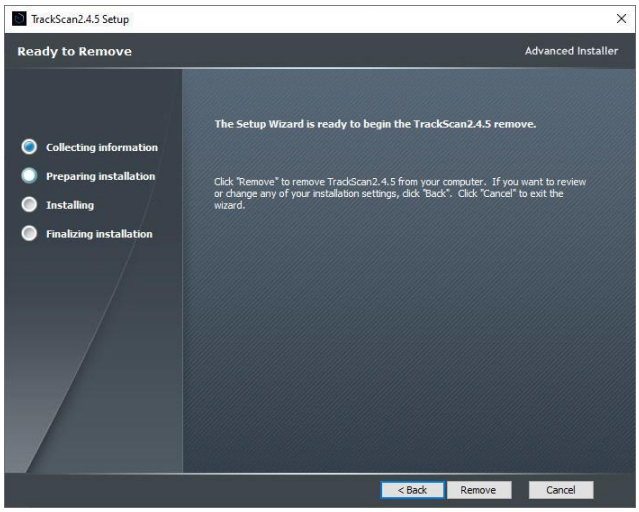
3- 6 Software Uninstallation

（2） choose“repair”or“remove”，and click next。



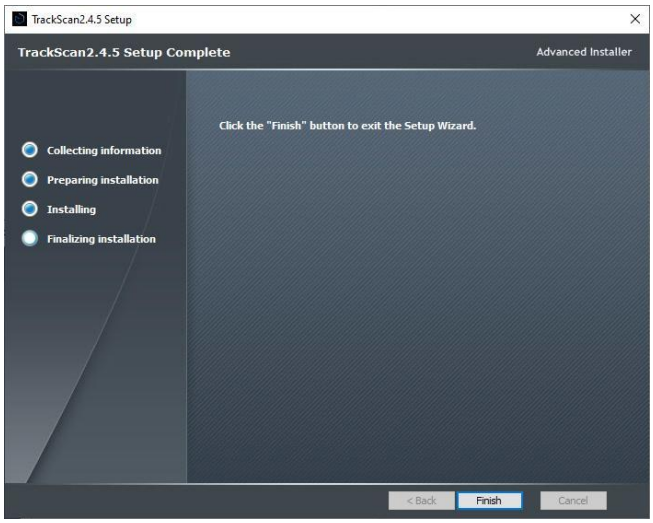
3- 7 Software Uninstallation

（3） Click remove，and click next。



3- 8 Software Uninstallation

（4） ） Afther the setup finished,it will shows as below,then click finished,the SW installed successfully.

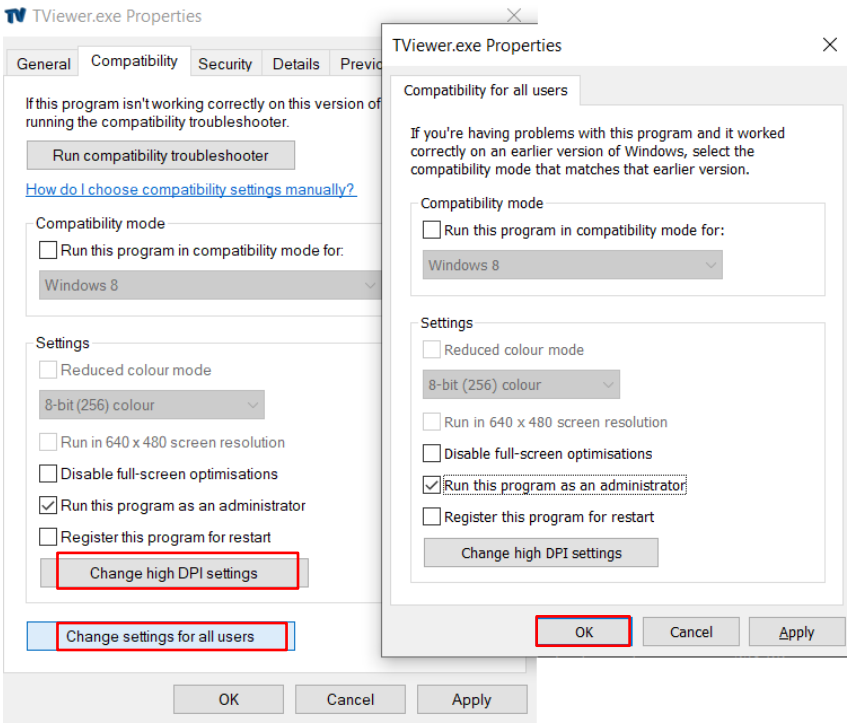


3- 9 Software Uninstallation

3.4 Software operating environment settings

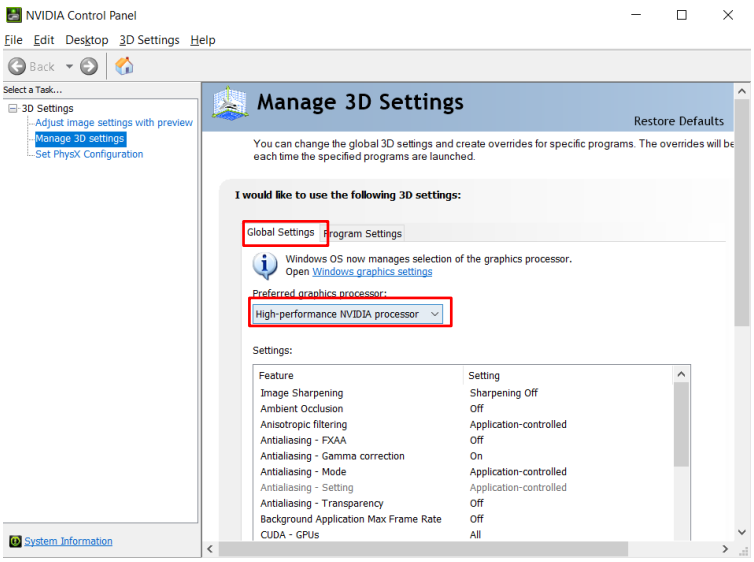
After the installation, in order to ensure the use for software, you need to set the permissions for the software: run the scanning software with administrator privileges, set the scanning software to run with the graphics card.

To grant administrator privileges: right-click the software icon, click "Properties", select the "Compatibility" tab in the properties window, check the "Run this program as administrator", and then click the "Change all user settings" button. Click "Change all user settings", check "Run this program as administrator" again in the pop-up dialog window, and then click "OK" (Figure 3-13). Do the same for the "Scanner/LowPartSW/scansense_console.exe" program in the software directory to give administrator privileges.



3- 5 Give administrator privileges to run the setup

Select the graphics card to run: Right click on the desktop, select "NVIDIA Control Panel" in the menu, in the NVIDIA Control Panel, select "Manage 3D Settings" - " Program Settings" - "Preferred Graphics Processor for this Program" - select "High Performance NVIDIA Processor" (if this option is not available, just skip it) - "Add" – "TViewer.exe" - "Apply ". As shown in Figure 3- 14.



3- 6 Software graphics card runs

3.5 Manage configurations file

Configure TViewer before first time use: right click on the TViewer icon, click on "Open file location", inside the "LowPartSW" folder, replace it with the “SET” folder inside the USB stick.

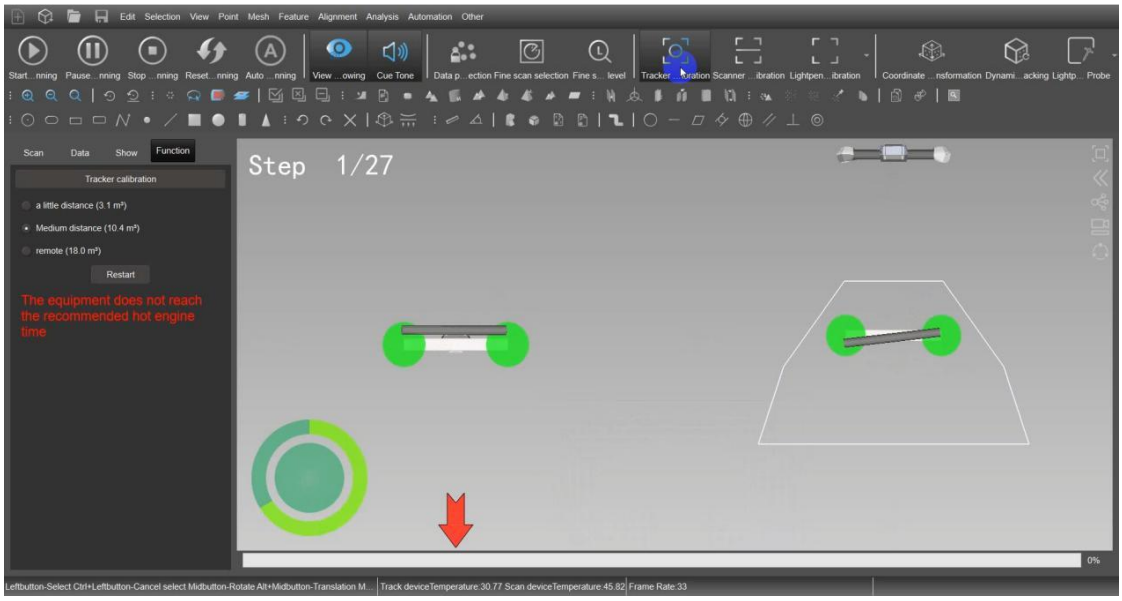
4 Basic scanning process

The quick operation process includes: tracker calibration, scanner calibration and scanning of laser patch (points).

4.1 Calibration

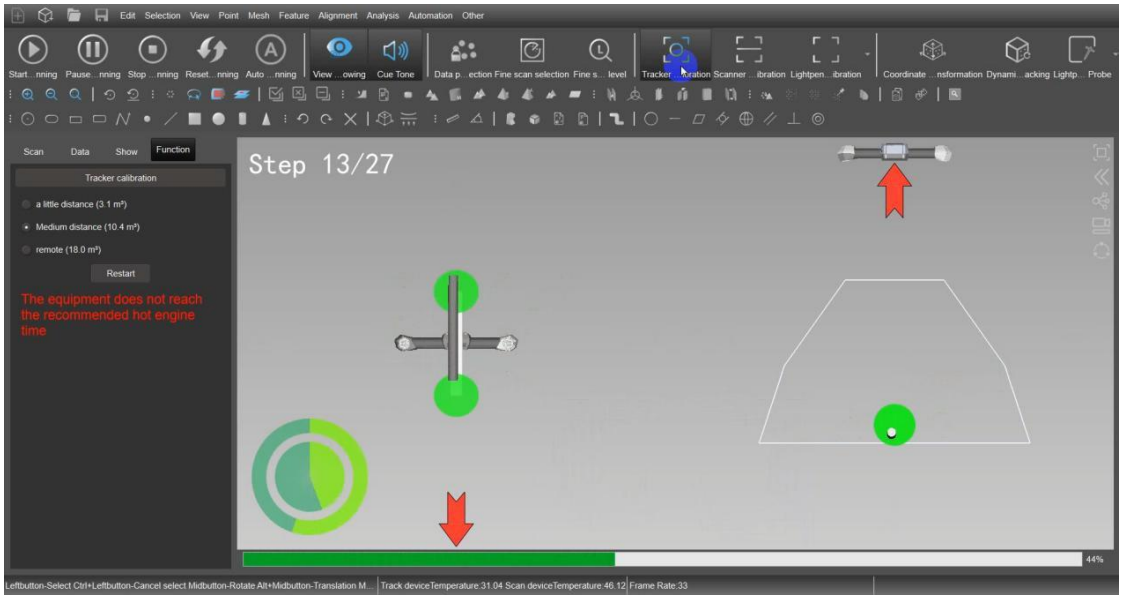
（1） Click on the tracker calibration and place the matching calibration bar into the tracking area (the bar is placed horizontally with the plane facing forward, as in picture 4-1), the arrow in the image shows the direction of the bar movement, align the grey bar with the white one until they turn green and move the bar position.

There are three distance of the calibration can be choosed in the left navigation.



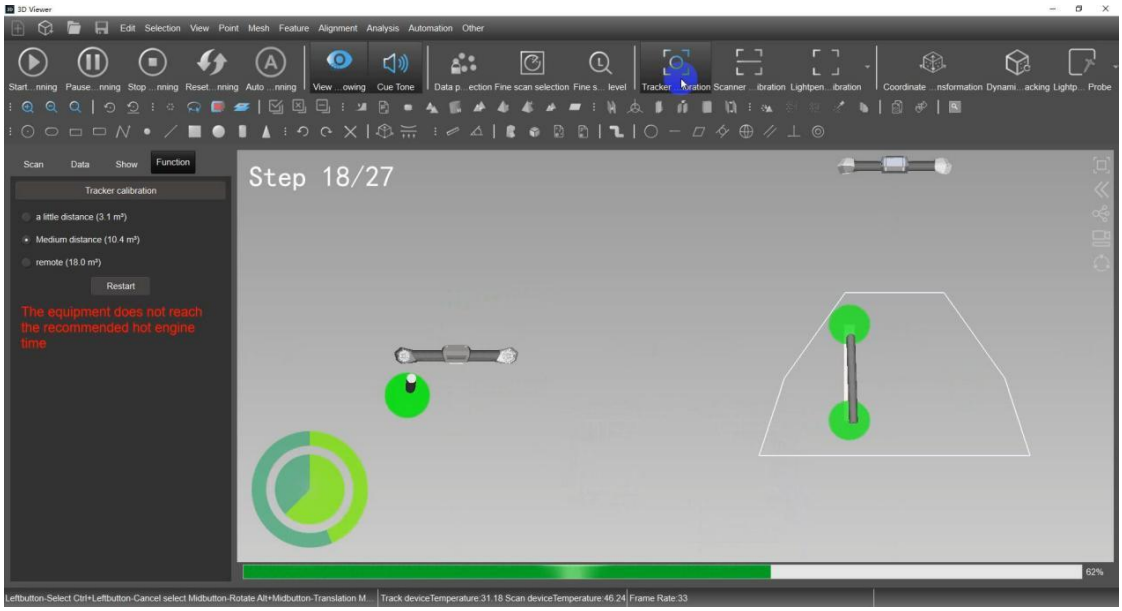
4- 1 Tracker calibration

（2） In step 13, the calibration bar is set vertically (refer to the calibration interface video) for calibration, as shown in Figure 4-2.



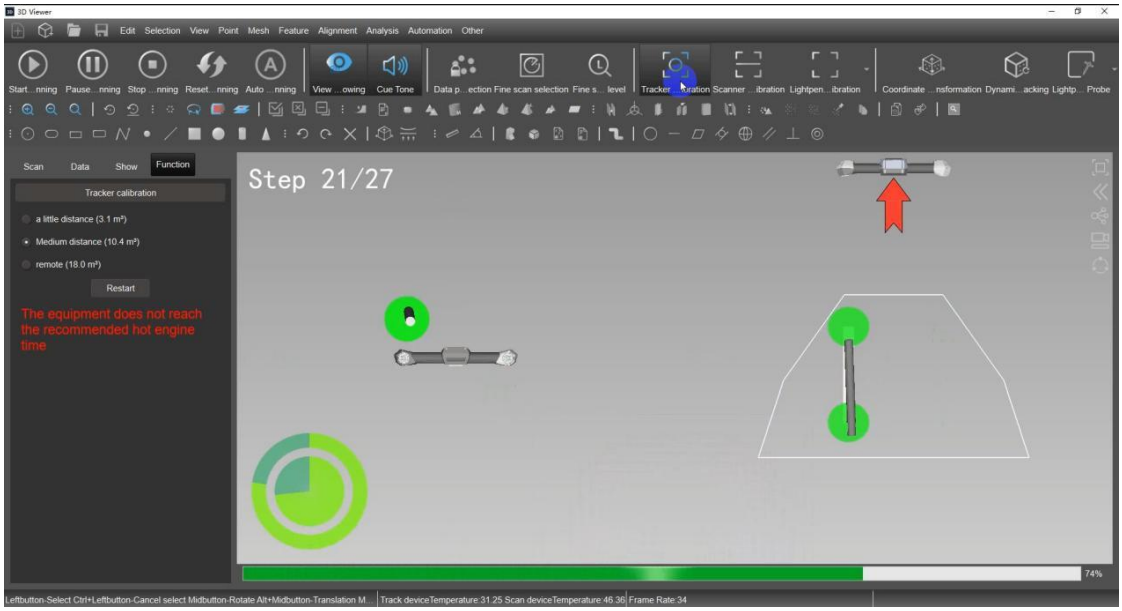
4- 2 Tracker calibration

（3） In step 18 change the attitude of the calibration bar (refer to the calibration interface video, picture 4-3), point the tilt side up towards the tracker and start the calibration.



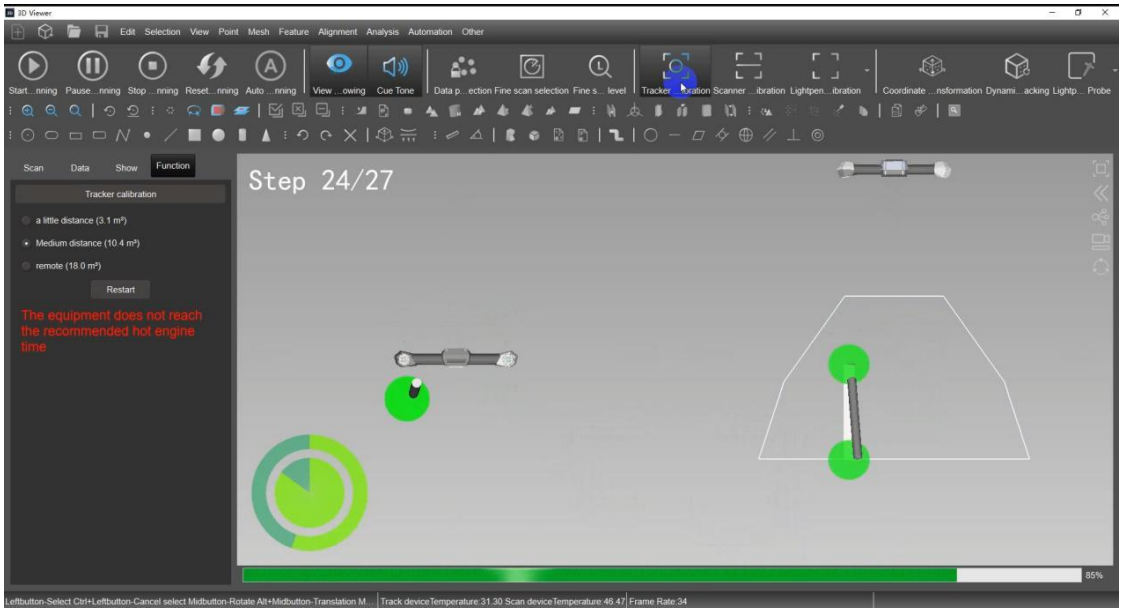
4- 3 Tracker calibration

(4) In step 21, change the attitude of the calibration bar (refer to the calibration interface video, picture 4-4) and start the calibration with the tilt side facing the tracker.



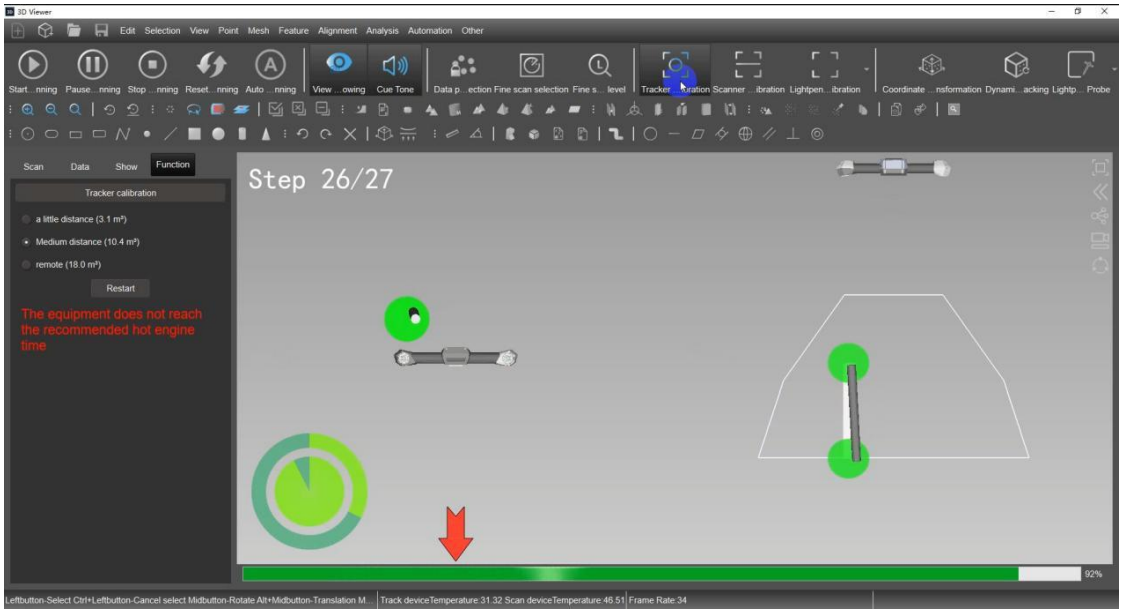
4- 4 Tracker calibration

(4) In step 24 change the attitude of the calibration bar (refer to the calibration interface video, picture 4-5), point the tilt side up towards the tracker and start the calibration.



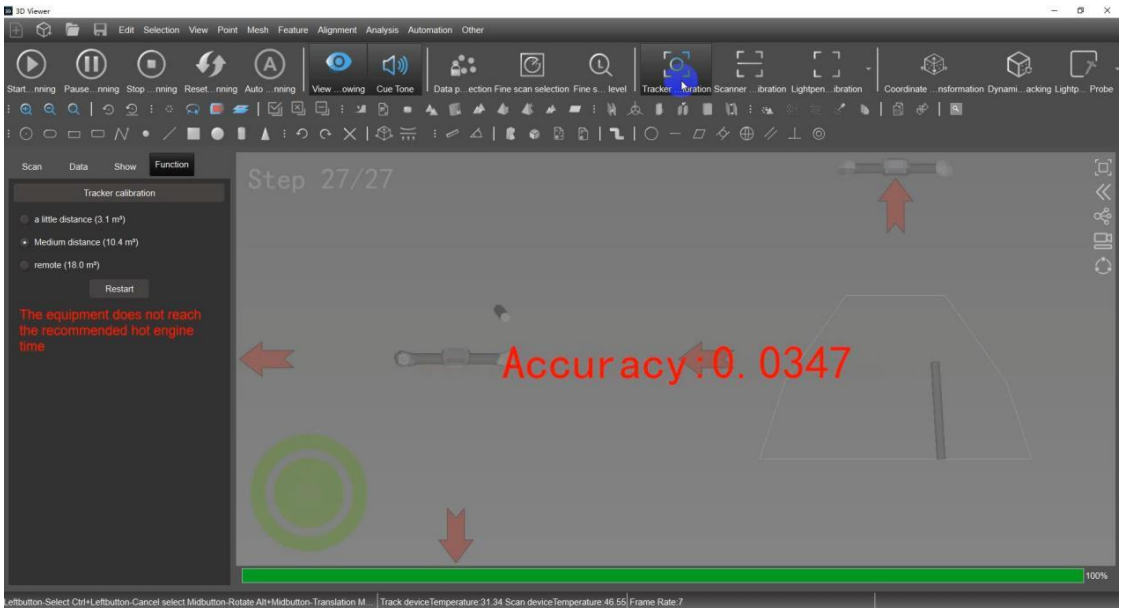
4- 5 Tracker calibration

(6) In step 26, change the attitude of the calibration bar (refer to the calibration interface video, picture 4-6), point the tilt side down towards the tracker and start the calibration.



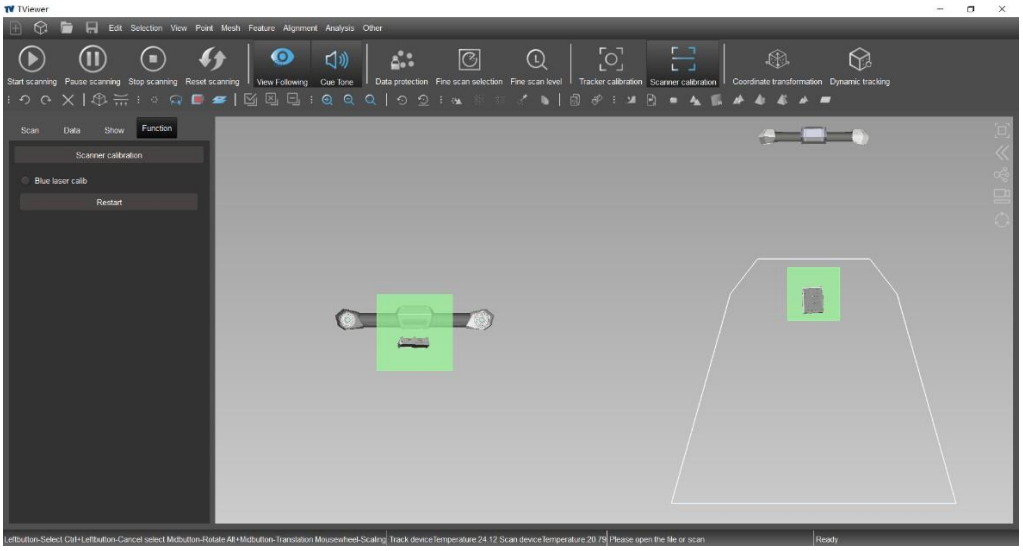
4- 6 Tracker calibration

（5） The display shows the calibration accuracy when the calibration is complete, as shown in Figure 4-7.



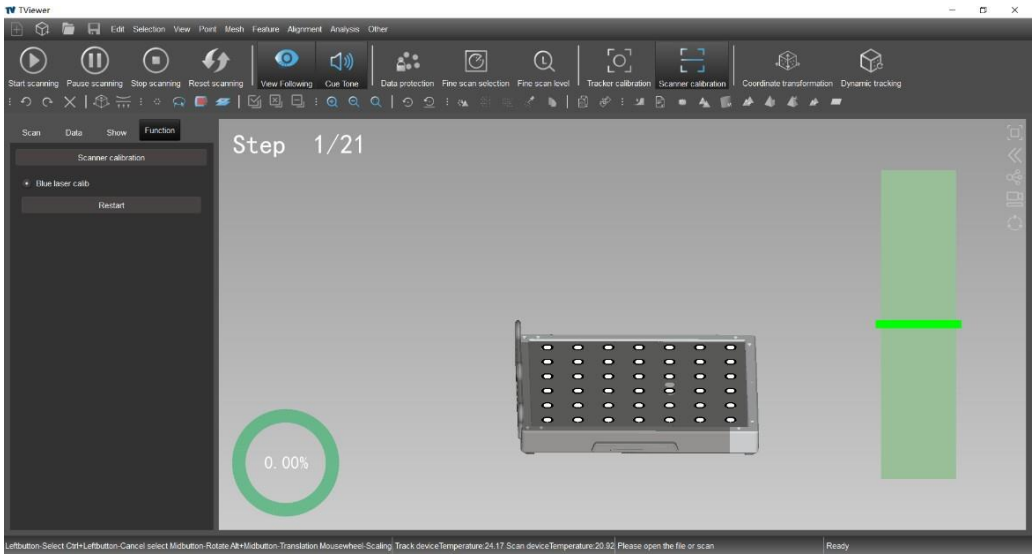
4- 7 Tracker calibration

（6） Open the Fast Calibration Board, put the board in the direction of the arrow, place the board steadily in the tracking range and move it to the software specified position until the block turns green (Figure 4-8).



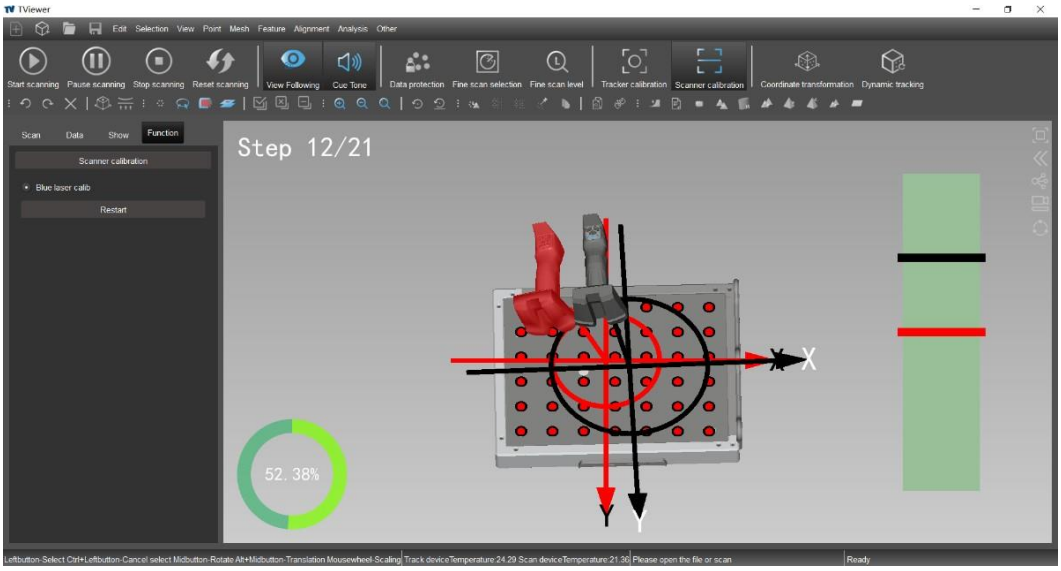
4- 8 Scanner calibration

（7） Click on Red Calibration or Blue Calibration in the interface to enter the scanner calibration interface, the red calibration interface is shown in Picture 4-9 and has 28 steps. When calibrating please note the video prompts for the scanner angle.



4- 9 Scanner calibration

（8） When calibrating, place the scanner according to the position in the software, align the grey scanner with the orange one (as in picture 4-10) until the orange colour turns green, indicating that the step is passed, and after 22 steps, the blue light calibration is finish.

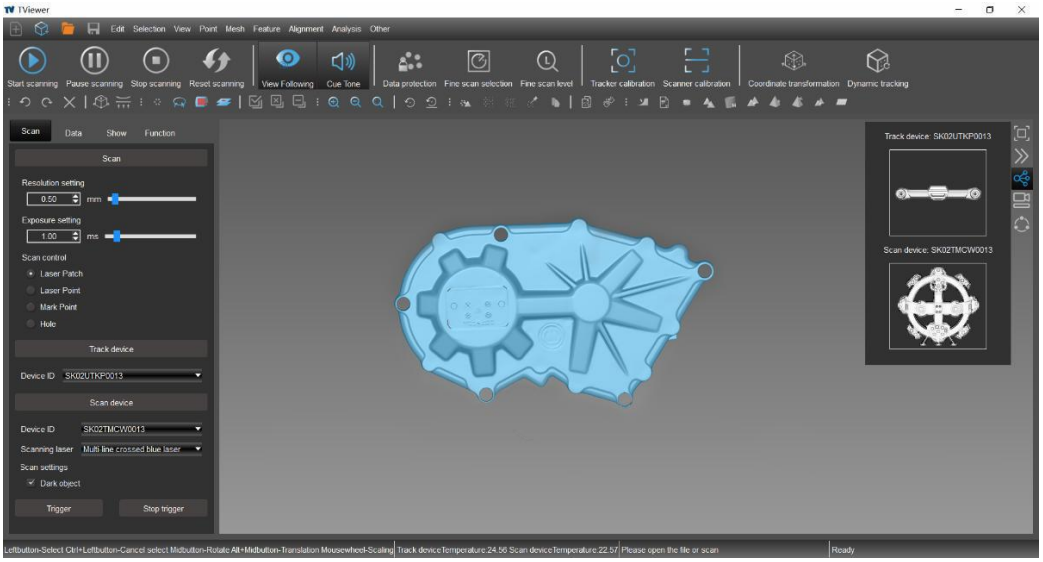


4- 10 Scanner calibration

4.2 Scanning laser patch (points)

Befre scanning the laser patch (point), set parameters such as, resolution, exposure, scanning control etc.

When scanning, watch the angle of the scanner (in the tracking range) and the distance between the scanner and the part, move the scanner steady and use the laser to collect the complete data. When the data processing is complete, the scan is finished.



4-11 Scanning laser patch data

5 Cautions

(1) Do not disconnect the power supply of the equipment during use;

(2) he device must be connected with the USB3.0 port;

(3) The device must be directly connected to the port on the pc and don't insert into a USB hub;

(4) If the computer is installed with protection software (Norton, Computer Manager, Windows Defender, etc.), will cause some unexpect stuttering;

(5) Do not unplug the dongle during using of the software.

Manufacturer's Name: SCANTECH (HANGZHOU) CO., LTD

Product name: AirGo

Trade Mark: SCANTECH

Model number: Airgo Power, Airgo Pro, Airgo ProII

Operating Temperature: 0℃ to 40℃

Remark:5150-5250MHz indoor use only.

This device in compliance with the essential requirements and other relevant provisions of

Directive 2014/53/EU. All essential radio test suites have been carried out.

Function	Operation Frequency	Modulation	Max RF Output
2.4G WIFI	WiFi: IEEE 802.11b/g/n 20: 2412-2472MHz/ 13 channel IEEE 802.11n 40: 2422-2462MHz/ 9 channel	DSSS, OFDM, CCK	9.72dBm
5G WIFI	IEEE 802.11a/n/ac(20M): 5725MHz ~5850MHz/ 5 channel IEEE 802.11n/ac(40M): 5725MHz ~5850MHz/ 2 channel IEEE 802.11ac(80M): 5725MHz ~5850MHz/ 1 channel IEEE 802.11a/n/ac(20M): 5150MHz ~5250MHz/ 4 channel IEEE 802.11n/ac(40M): 5150MHz ~5250MHz/ 2 channel IEEE 802.11ac(80M): 5150MHz ~5250MHz/ 1 channel	DSSS, OFDM	10.75dBm

The host manufacturer has the responsibility that the host device should be compliance with all essential requirement of RED. This restriction will be applied in all member states.

The simplified EU declaration of conformity referred to in Article 10(10) shall be provided as follows: Hereby. Advanced Technologies SRL declares that the radio equipment type Tablet PC is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: www.nst-it.com.

BE	BG	CZ	DK	DE
EE	IE	EL	ES	FR
HR	IT	CY	LV	LT
LU	HU	MT	NL	AT
PL	PT	RO	SI	SK
FI	SE	UK		

Use careful with the earphone maybe possible excessive sound pressure from earphones and headphones can cause hearing loss.

FCC WARNING

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different
from that to which the receiver is connected.

-- Consult the dealer or an experienced radio/TV technician for help.

To maintain compliance with FCC’s RF Exposure guidelines, This equipment should be installed and operated with minimum 20cm distance between the radiator and your body: Use only the supplied antenna.

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https:// www.3d-scantech.com