

**V1.5**

**3DMAKERPRO**

## **| Software Installation**

Operating System  
Requirement

How to download

How to Install

## **| Start page**

## **| Download the project**

## **| Import the project**

## **| Main interface**

Basic Data

Colorize

Gaussian Splatting

Panorama Stitching

## **| Edit**

Control point coordinates

Clip

Measurement

Start-to-end loop closure

Point cloud correction

## **| RTK**

Built-in GPS

Base station high  
accuracy

## **| Export the Model**



# **RayStudio**

Windows

# **MANUAL**

Download latest **RayStudio** from

<https://forum.jimumeta.com/home/help/download.html>



Get latest **Manual** from

<https://forum.jimumeta.com/home/help/support/manual/89ce7b9fff54351bd89dc31c66253f4.html>



# Software Installation

## Operating System Requirement

### Recommended Computer Configurations

Intel Core i7 , 64GB RAM , NVDIA4060 GPU 16G

### Minimum Computer Configurations

Intel Core i7 , 32GB RAM , NVDIA3060 GPU 12G

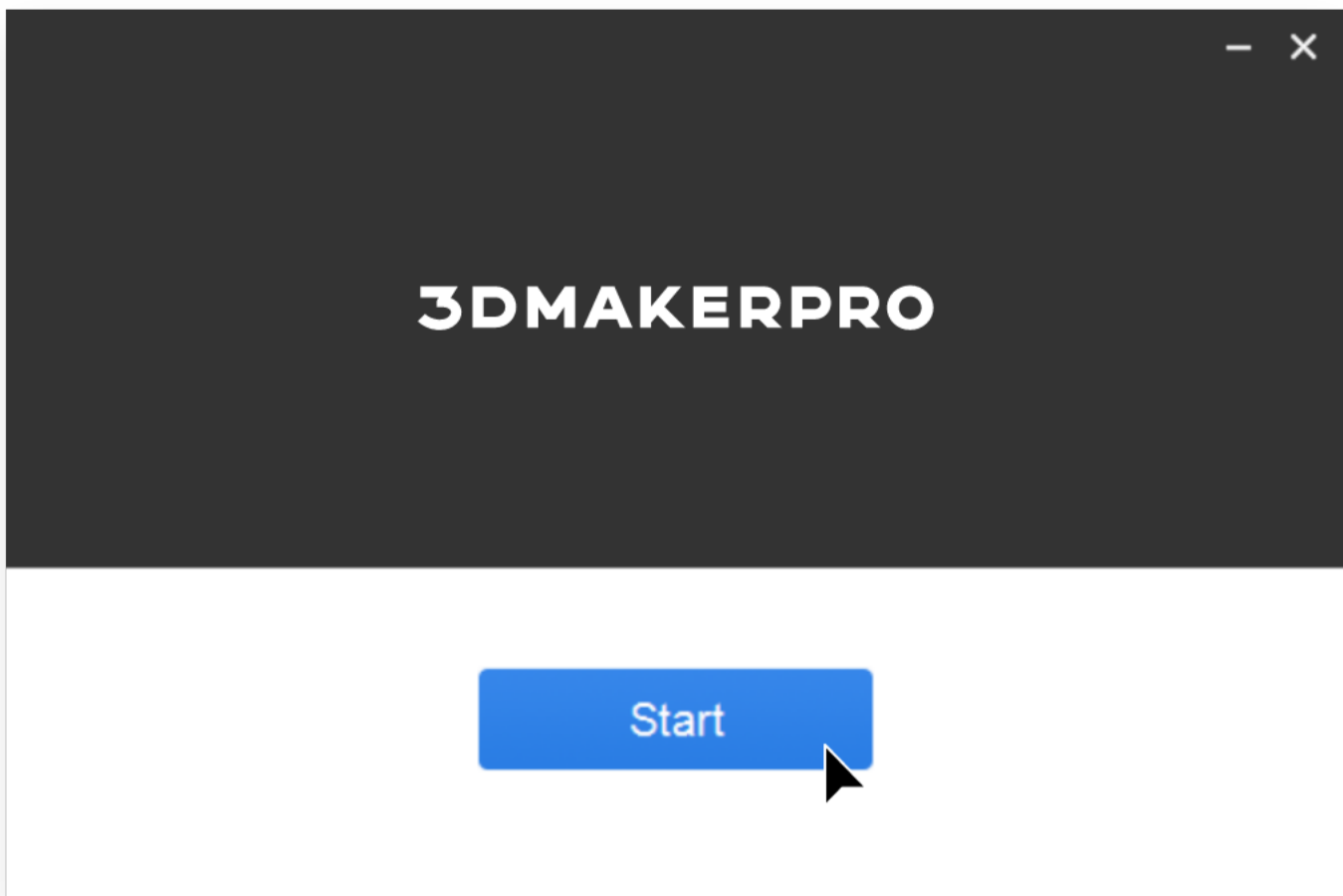
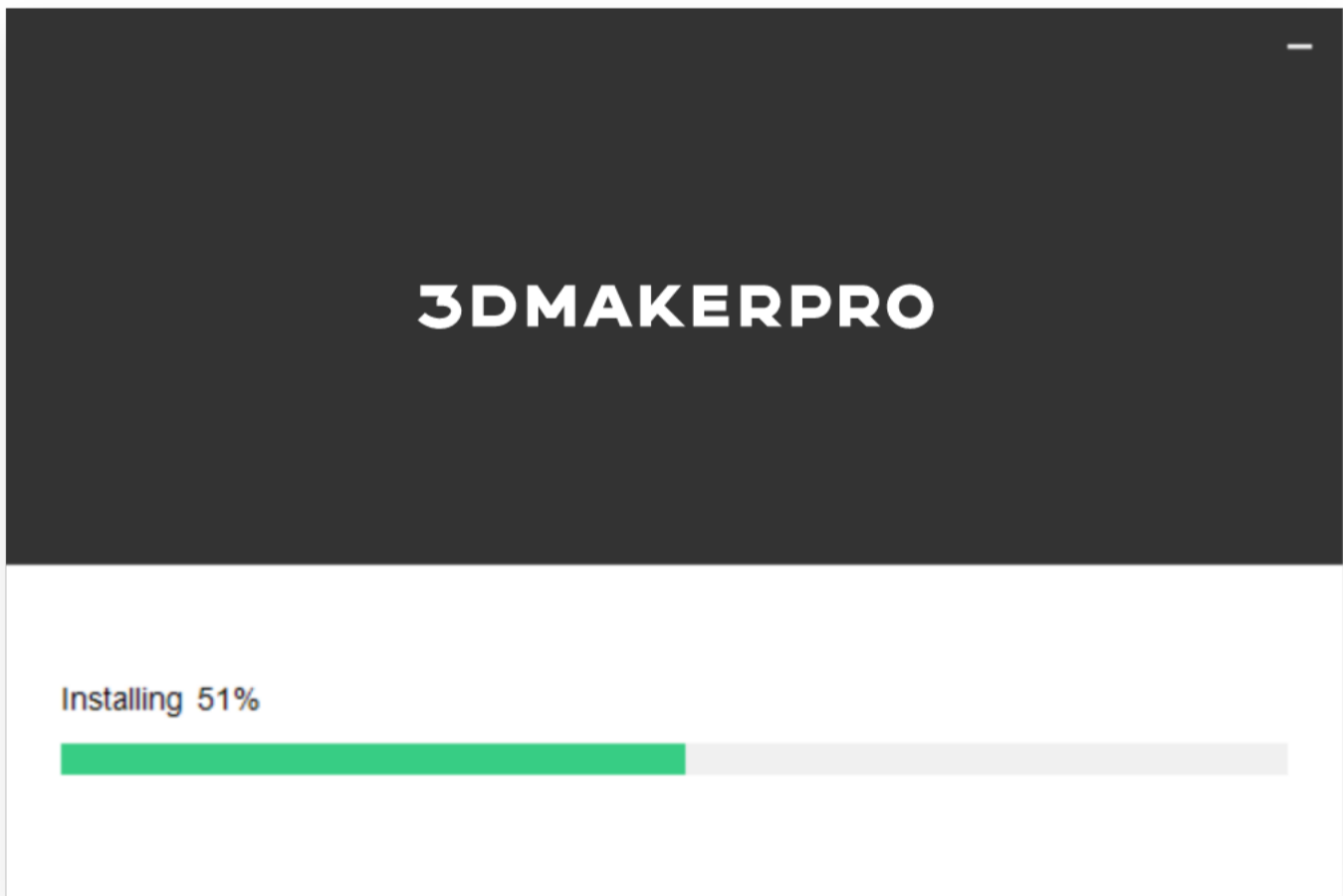
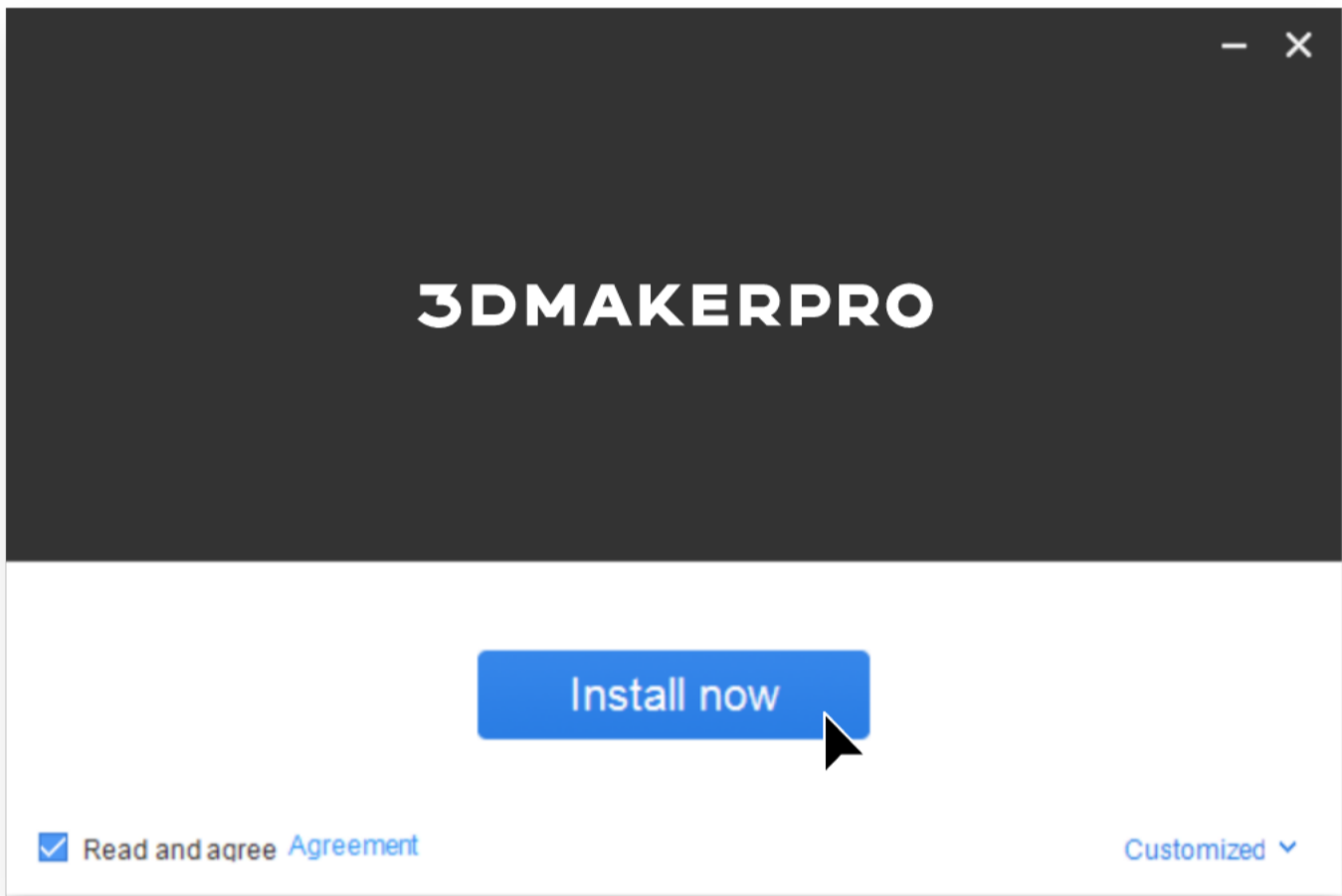
## How to download

You can acquire the application file by visiting our website.

## How to Install

### For Windows

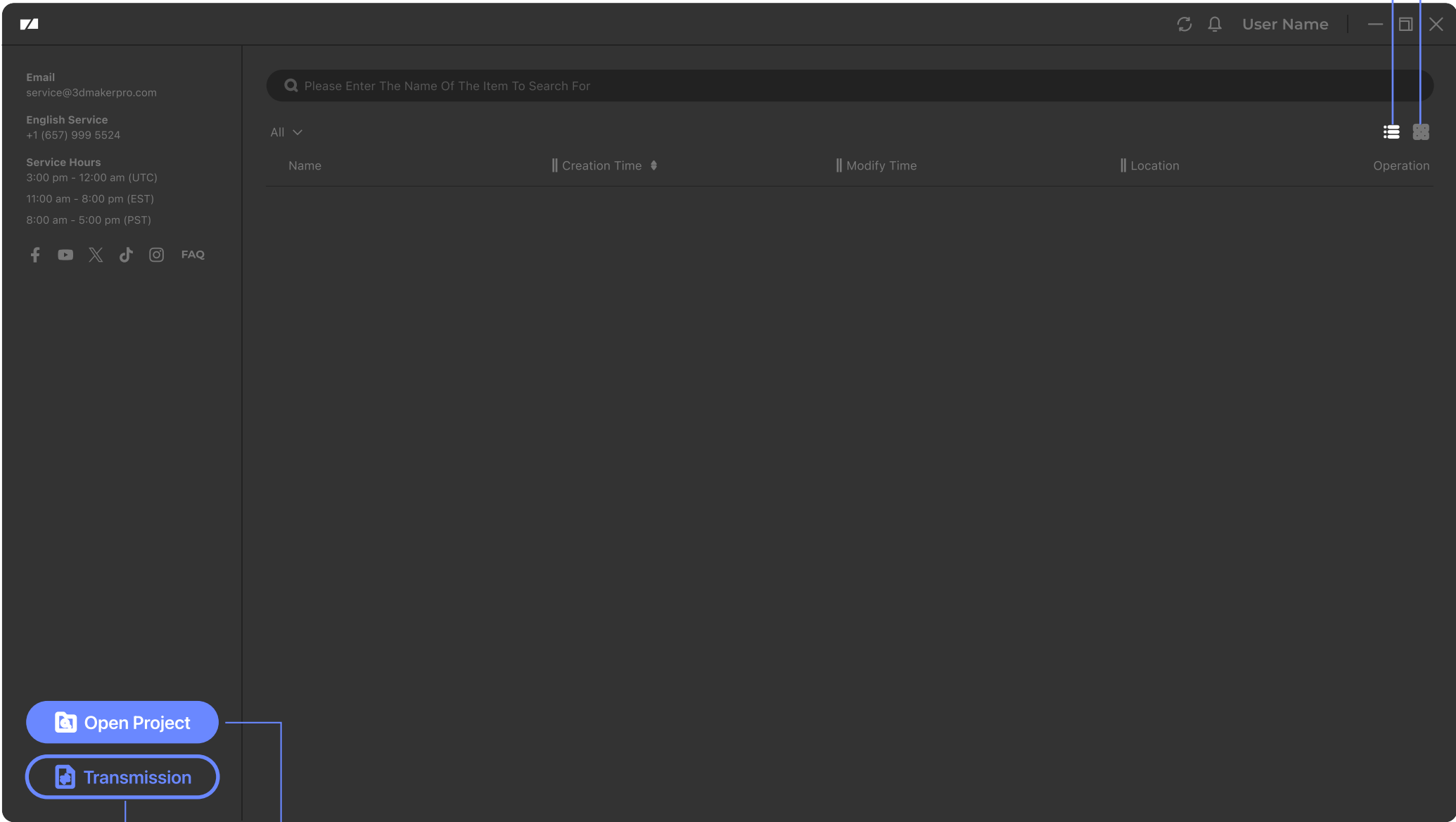
Click on the application file, follow the intallation wizard and click Next to install the software.



# Start page

View mode to display thumbnails on the home page

List mode to display more pieces of data



Open the relevant project engineering file

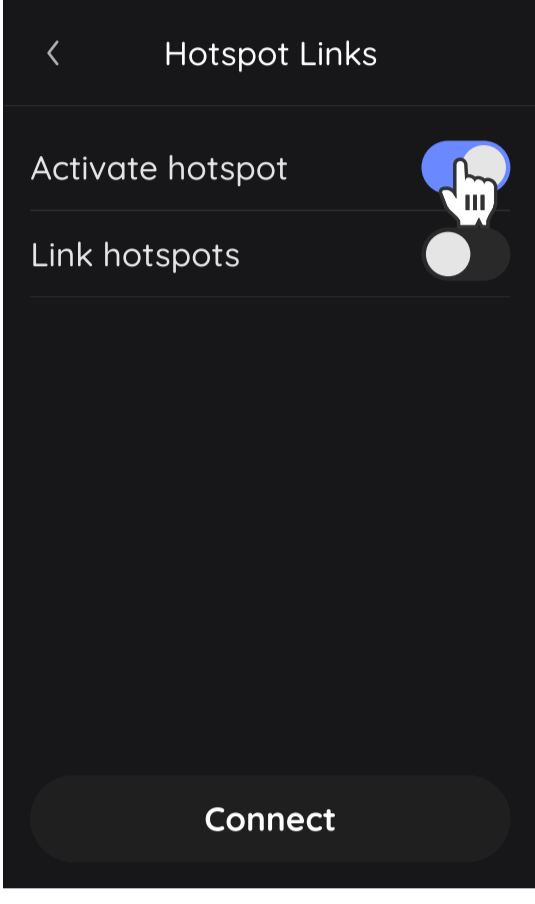
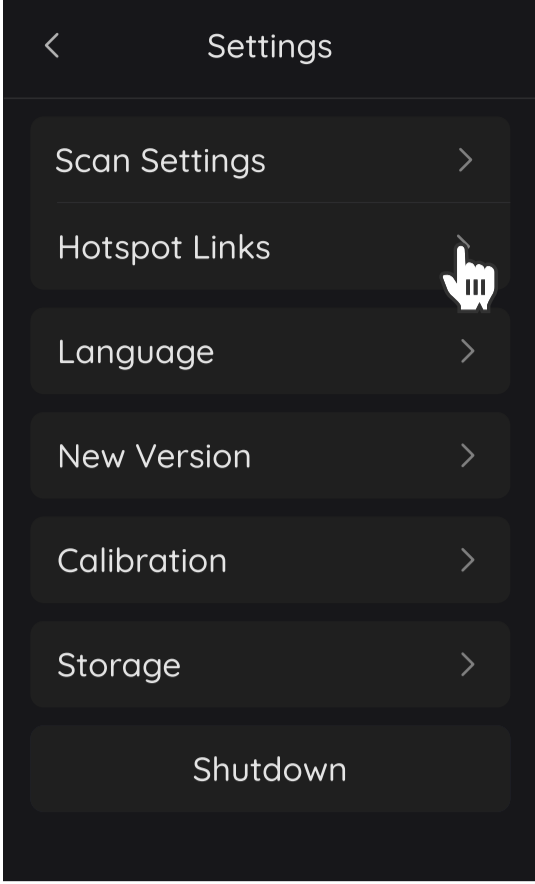
Data transmission

# Download the project

Currently, two download methods are supported. One is to use a USB flash drive and adapter to export the files from the device to a USB flash drive (for details, please refer to Exporting Models in Eagle Operation), and then save the files from the USB flash drive to the PC. The other is to connect the device WIFI through the PC and download the file directly.

The scanning data is downloaded via WIFI, and the specific operation is as follows

①Turn on the WIFI settings in your Eagle device:

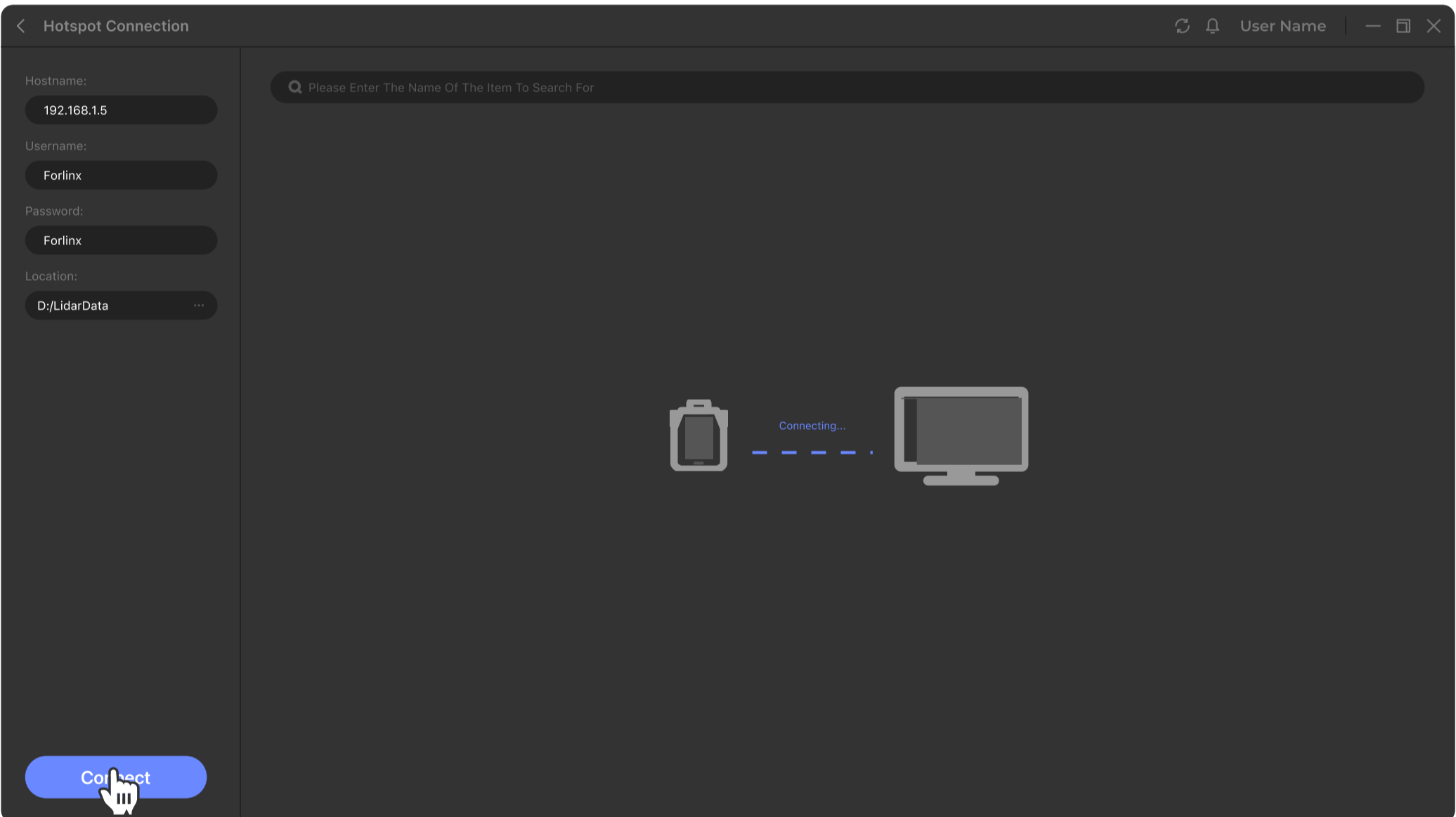
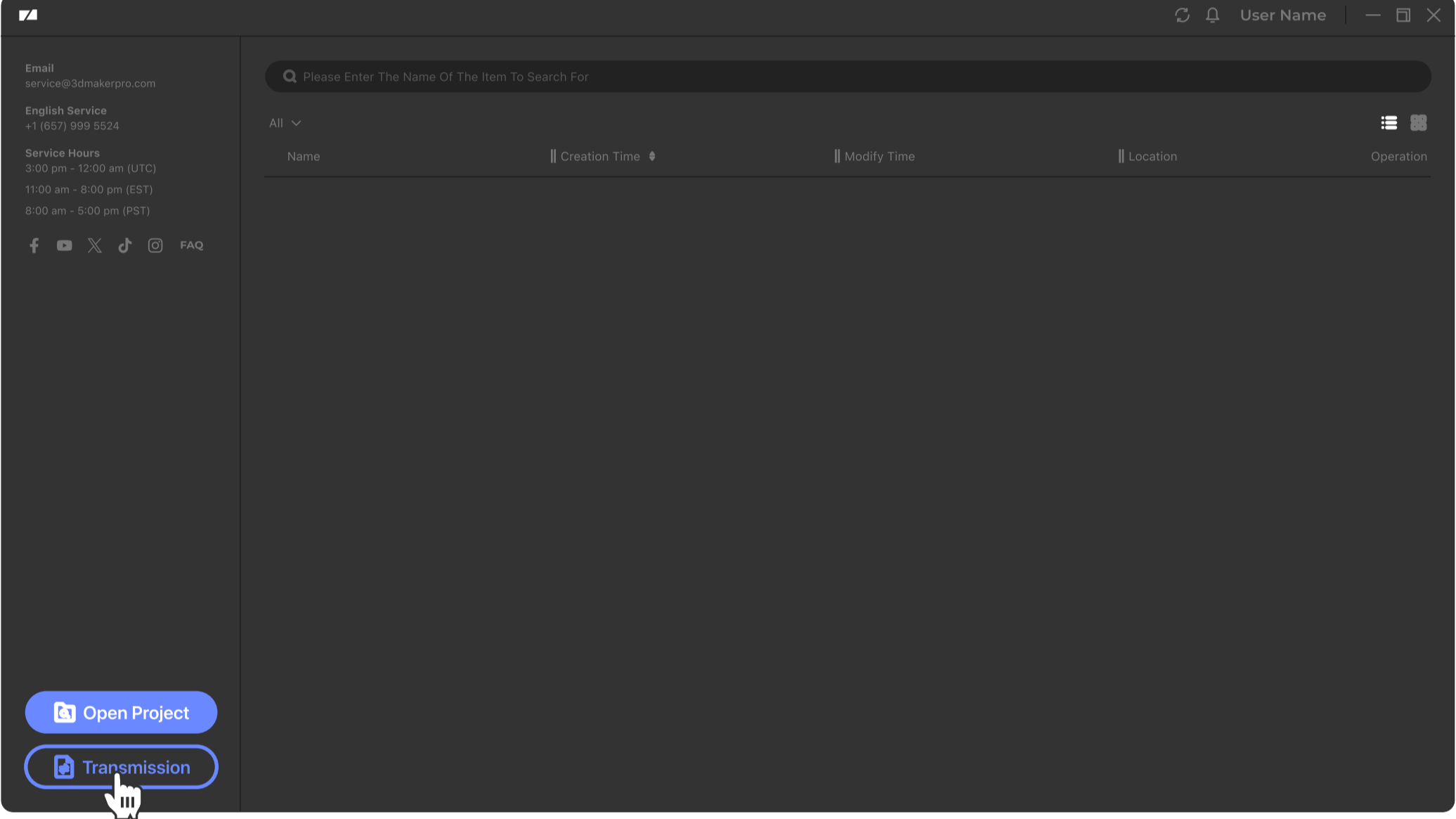



②Turn on the network connection on the PC, find the device WIFI, and connect.

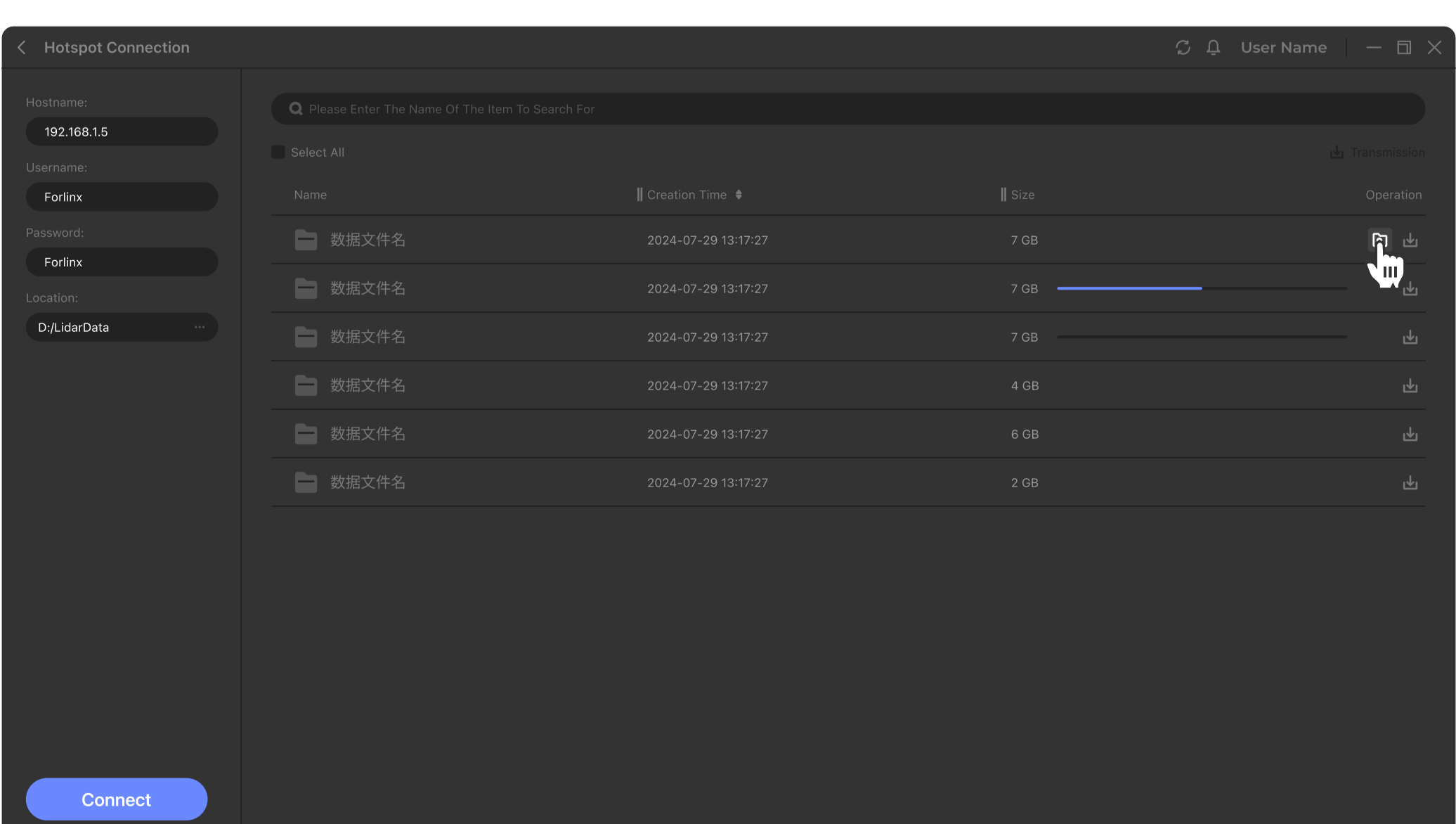
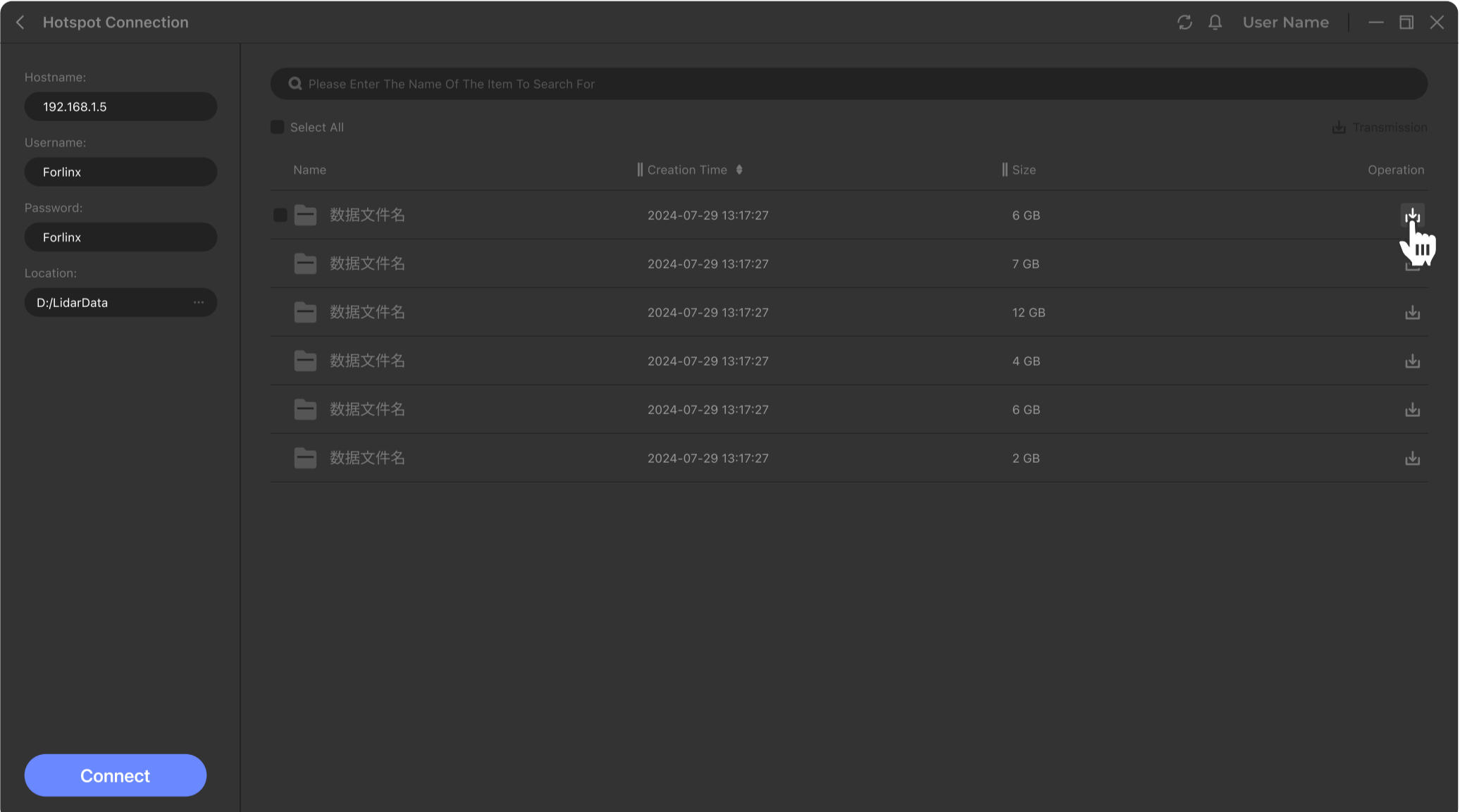
WIFI name: Rayzoom G100 / Rayzoom G200

Password: 12345678

③On the start page of the software, enter the data transfer page and click Connect. After the connection is successful, the scanned files inside the device are displayed:



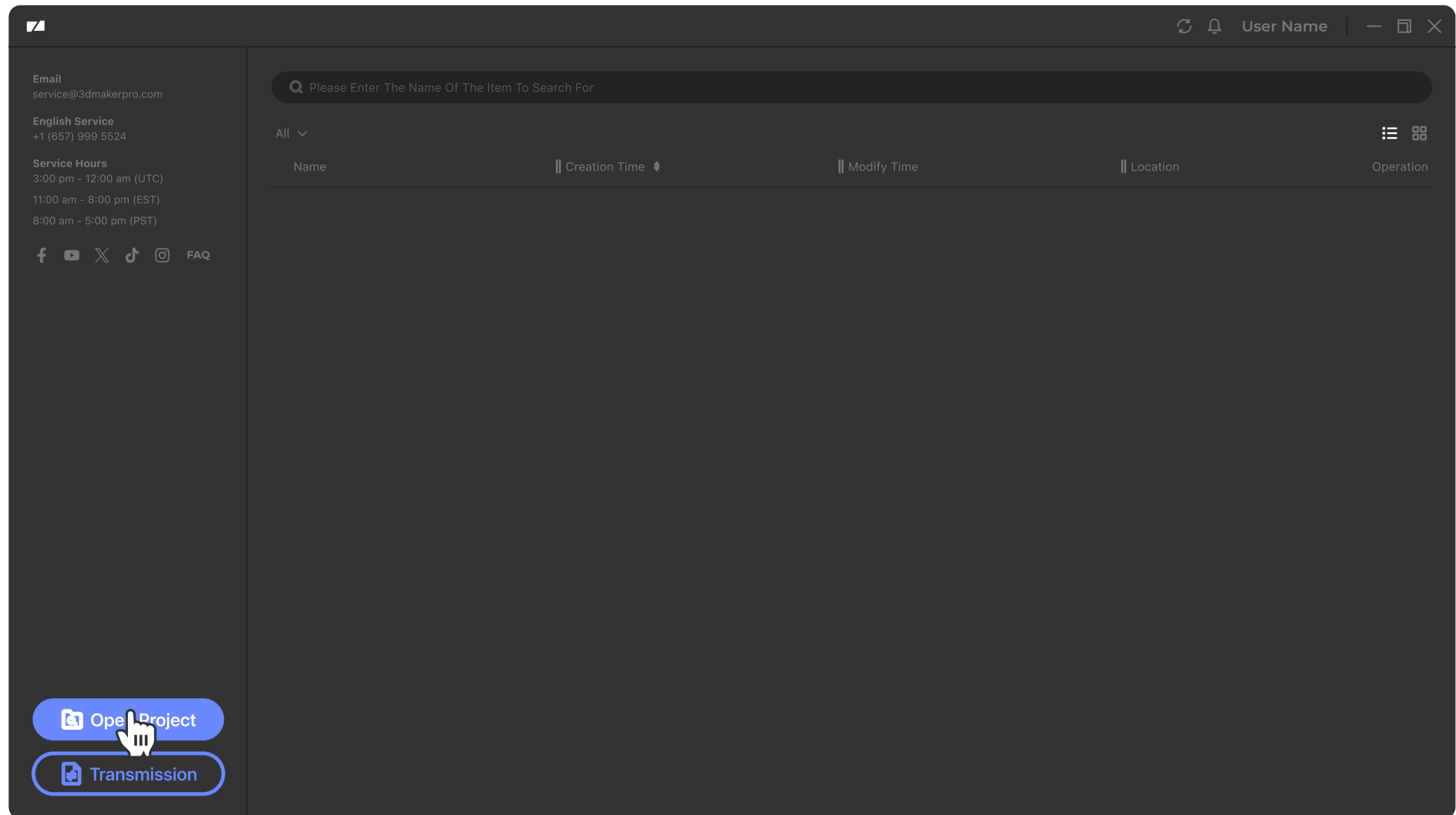
④You can click the  on the right side of the file to download it, and click  to open the folder after the downloaded file is downloaded:



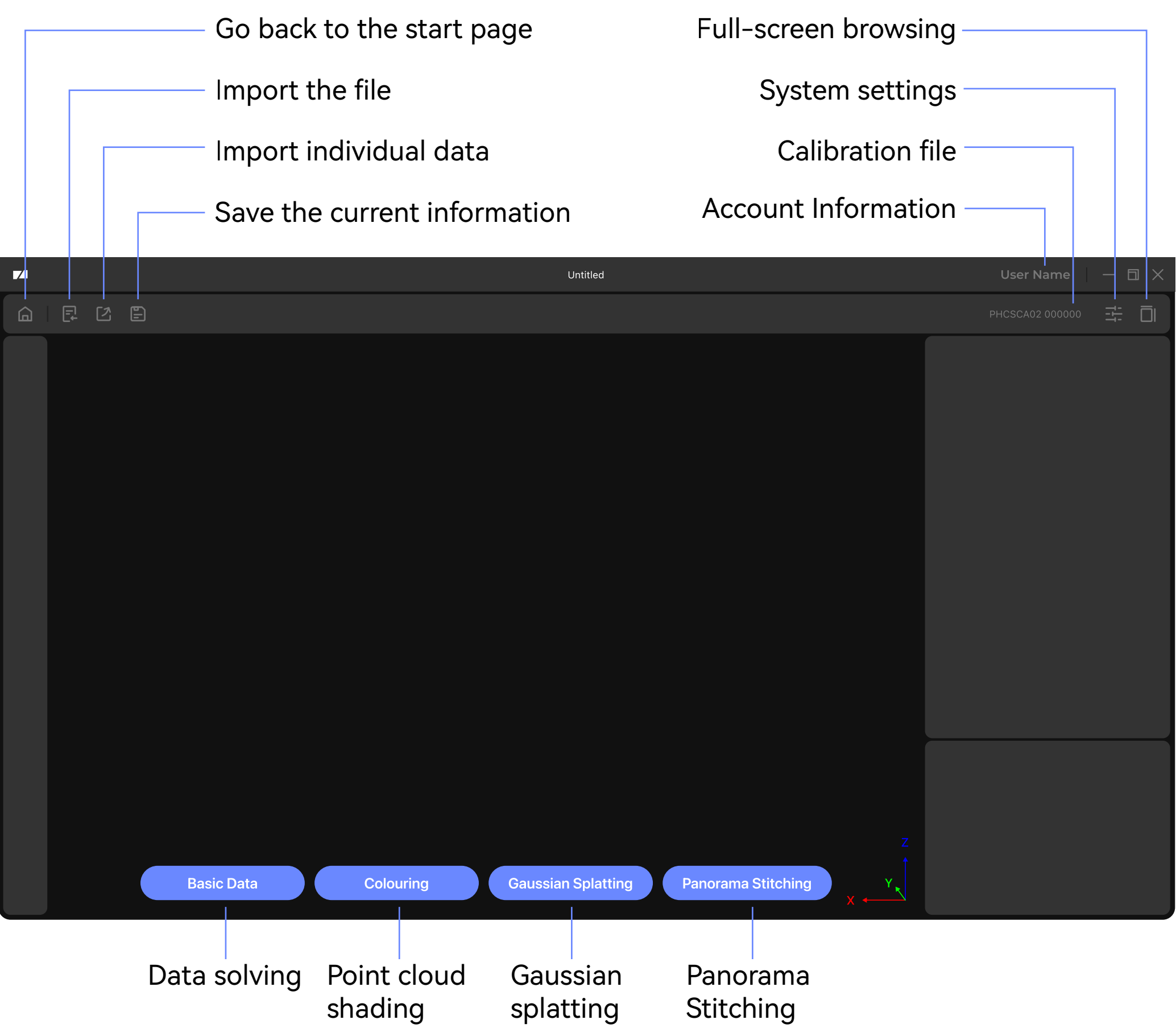
\*If data transmission does not work properly after clicking the link, please try enabling the local PC location service and then connect again.

# Import the project

You need to open the local scanned file before you can process the file.

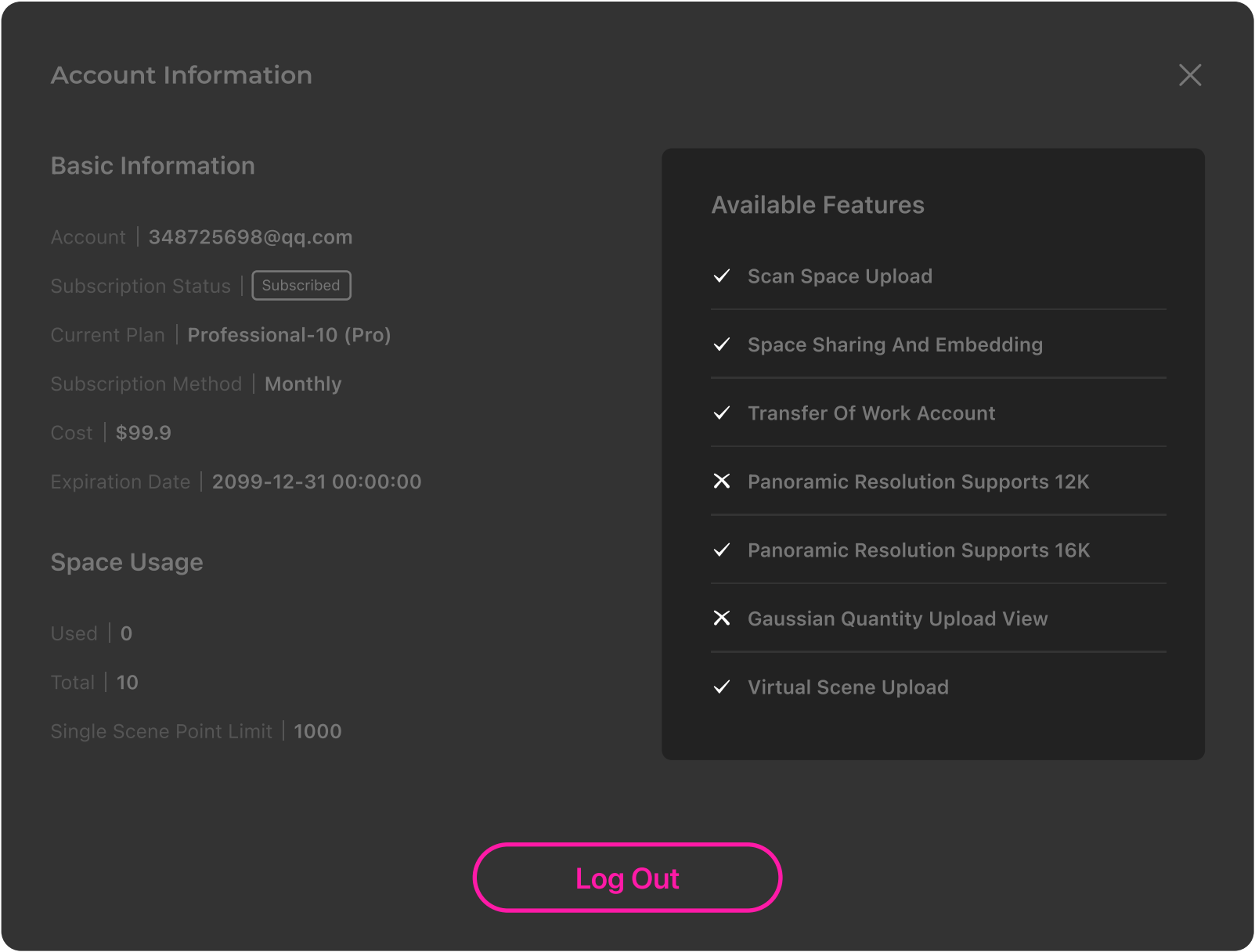


# Main interface



## Account Information

In the account information, you can view the basic information of the current account and the related services you have purchased.



# Basic Date

①Click on "Basic Date"



②Select the action you want to take:

Settle scan data

Reduce or eliminate unwanted noise in the signal

On the premise of maintaining the shape and geometric features of the original point cloud, the redundant data points should be deleted as much as possible

For more information about RTK, see the RTK section

Basic Data

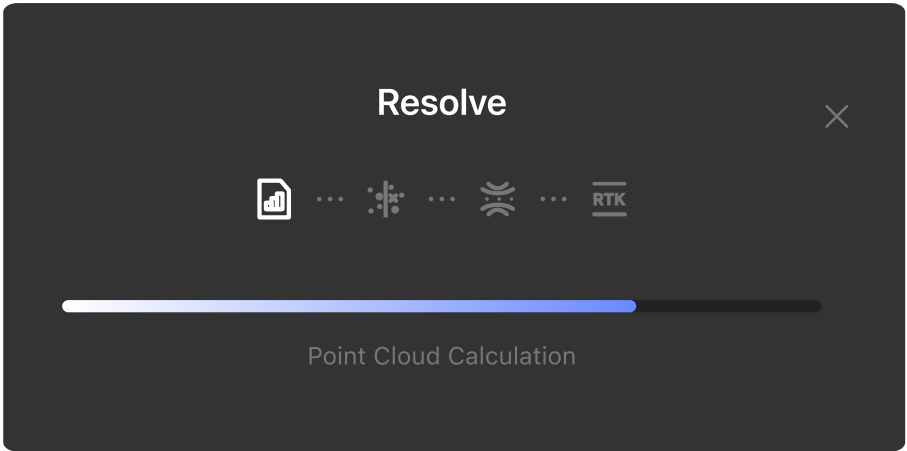
Point Cloud Solving



Point Cloud Filtering

Point Cloud Thinning

Real-Time Kinematic

Start



③After processing, some data is hidden by default, you can click  in the data list, and the icon changes to  to indicate data display.

Solved point cloud data

Shooting the course of the trajectory

Data Management

Recalculate PointCloud

filtering Result

Simplification Result

recalculate\_result.amap

recalculate\_pose.csv

filter\_result.amap

sampling\_result.amap

eye icon

eye icon

eye icon

eye icon

If you select "Point Cloud Filtering" at the time of settlement, the filtered data will be generated

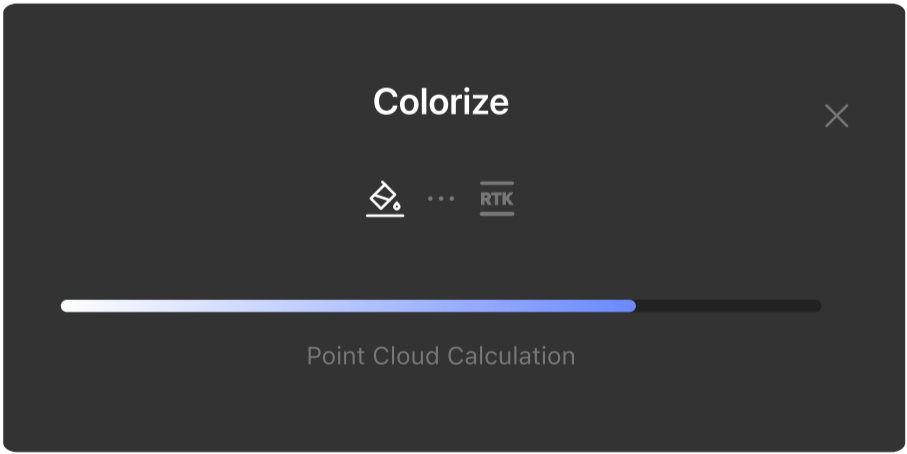
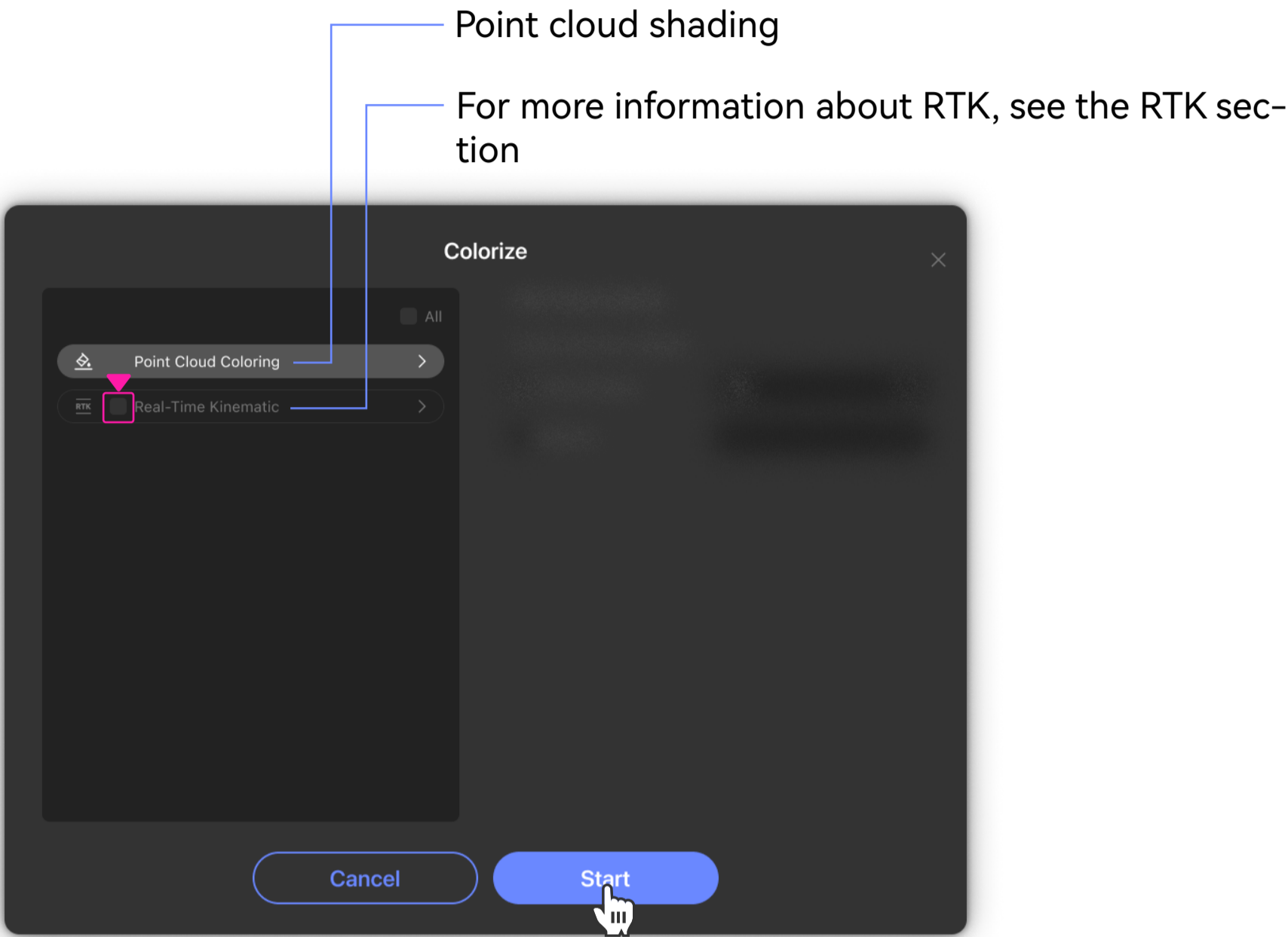
If you select "Point Cloud Thinning" at checkout, the thinned data will be generated

# Colorize

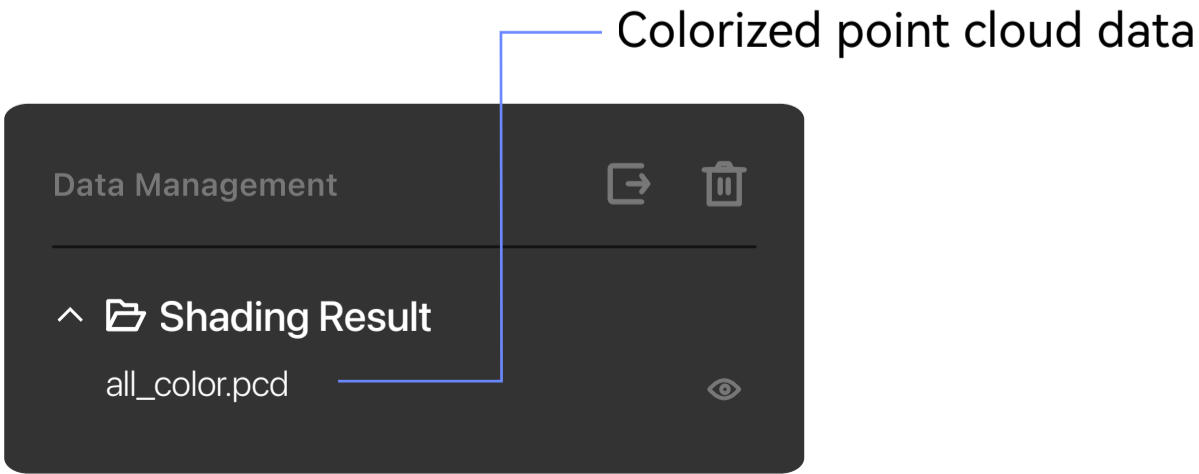
①Click on "Colorize"



②Select the action you want to take:



③The processing results can be viewed in the data list:



# Gaussian Splatting

①Click on "Gaussian Splatting"



②Select the processing scenario (the processing time is longer, please be patient):

Select the corresponding scanning scenario

Select the image processing mode, the high-quality processing speed is slow, and the high-speed processing speed is fast, and the effect is average

Select the GPU size allocated by the system to the current software, if no other large processes are occupied, we recommend that you select 12 GB or 16 GB. If the scan data is too large, 8G may fail.

Gaussian Splatting

Scene

Indoor

Open Version

Open

Image Quality

High Quality

High Speed

GPU

6g

8g

12g

No Scene Generation

CPU: i7 显卡: 4060(NVIDIA) 内存: 32G

Cancel

Process

Gaussian Splatting

Scene

Indoor

Open Version

Open

Image Quality

High Quality

High Speed

GPU

8g

12g

16g

Cancel

Process

③In the upper right corner of the preview image, you can choose to preview, download, and upload:

Gaussian Splatting

Scene

Indoor

Open Version

Open

Image Quality

High Quality

High Speed

GPU

8g

12g

16g

Preview

Export

Upload

Cancel

Process

To prevent data loss or better preservation, upload the current Gaussian splash data to the cloud (the user needs to log in and the current user has purchased VIP permissions)

Export the current Gaussian splash data, there is no download permission in guest mode, ordinary users can download the watermarked data, and VIP users can download the original data

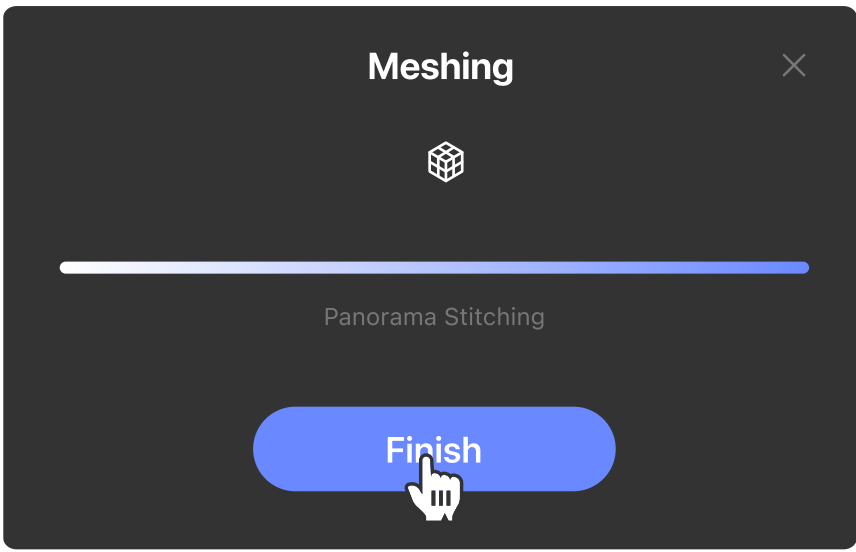
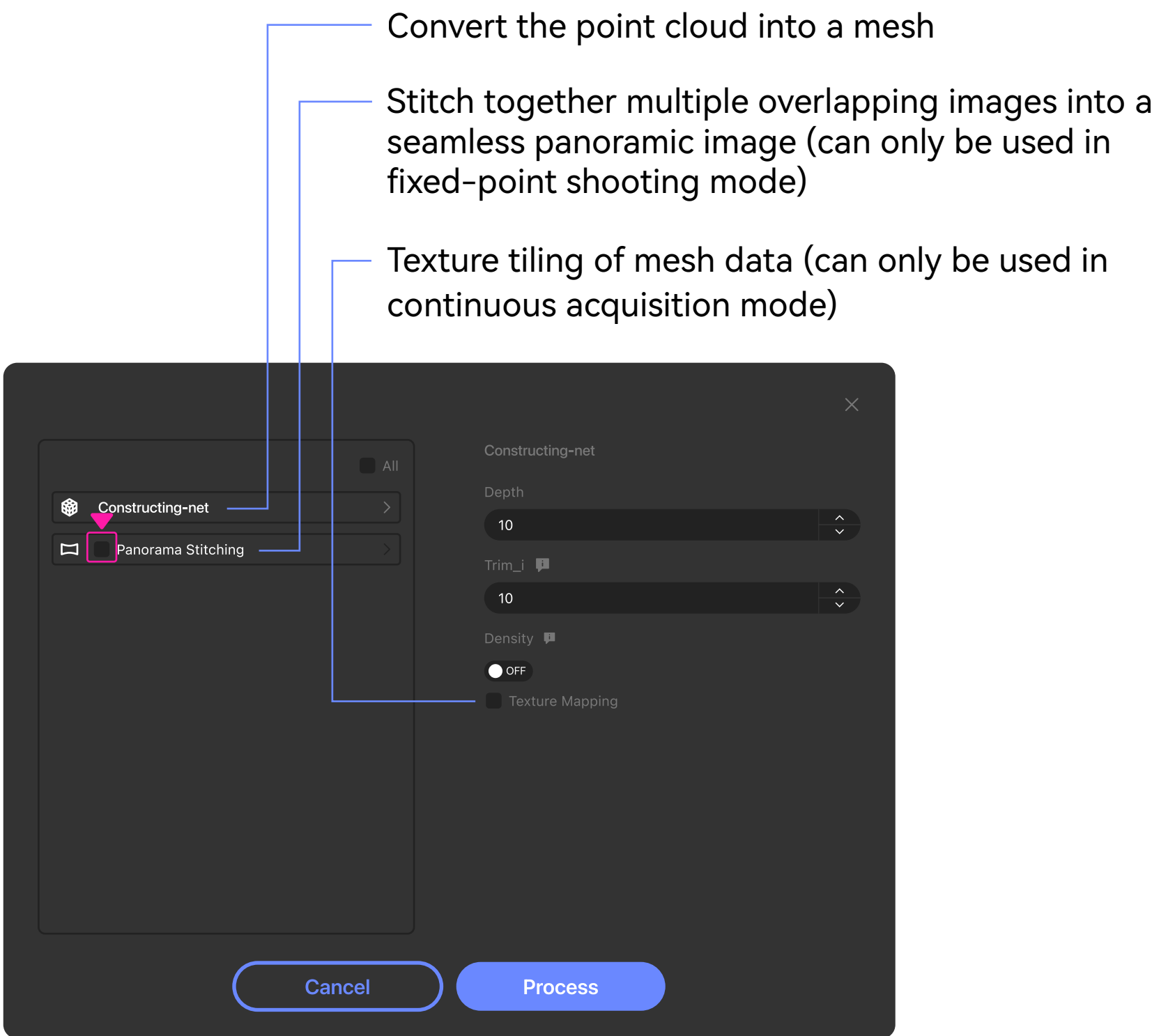
You can enter the preview page to view the current processing result

# Panorama Stitching

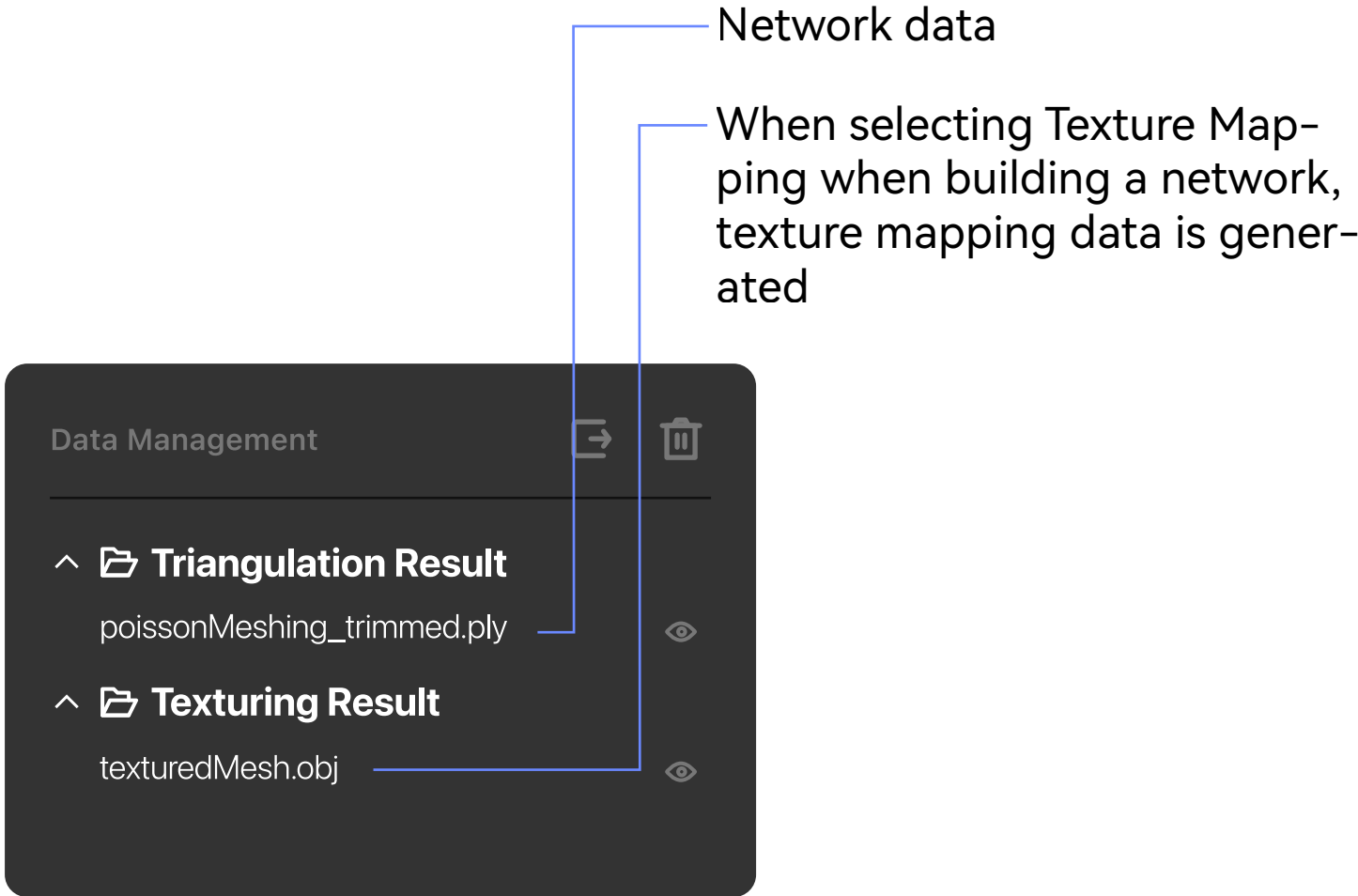
①Click on "Panorama Stitching"



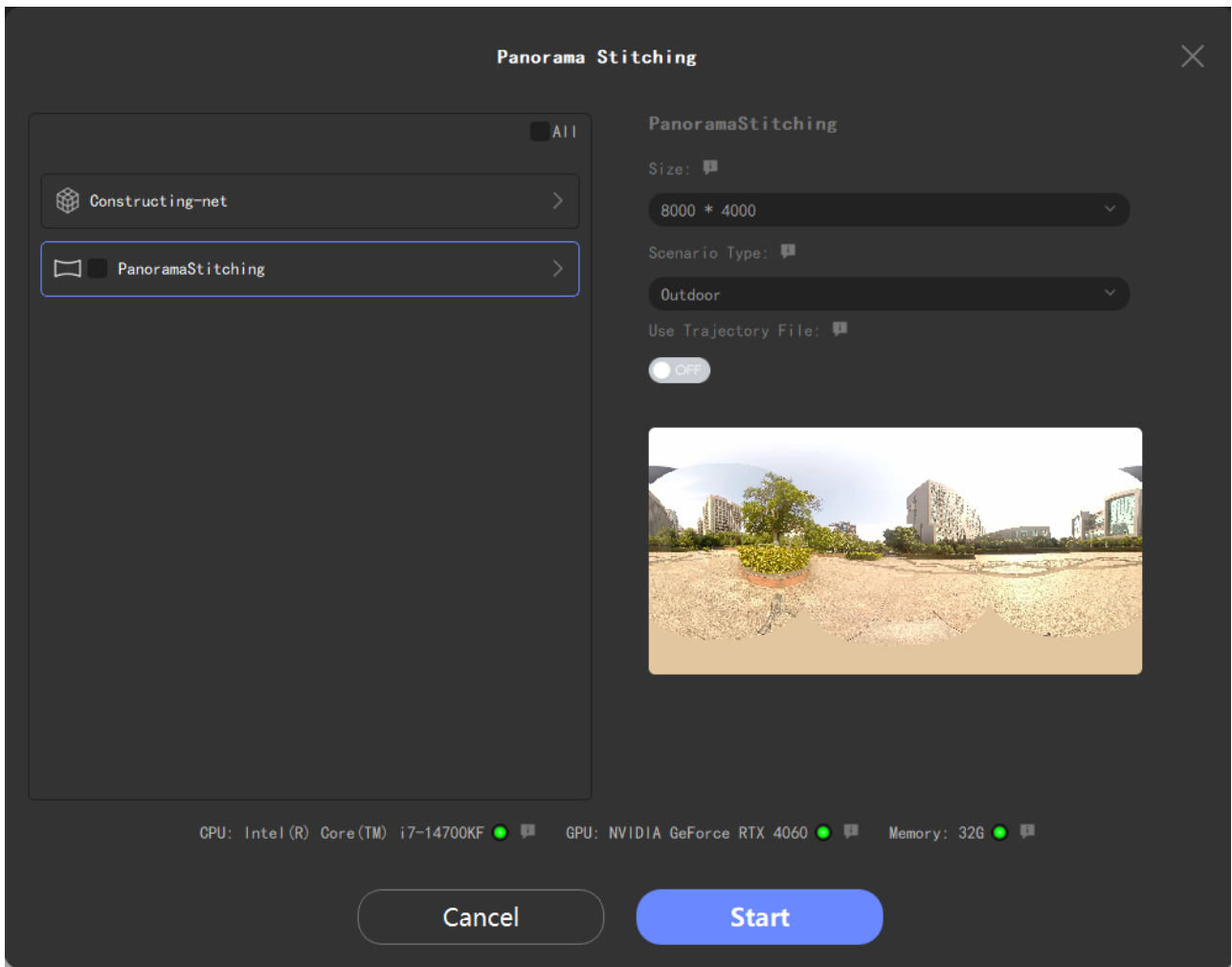
②Select the action you want to take:



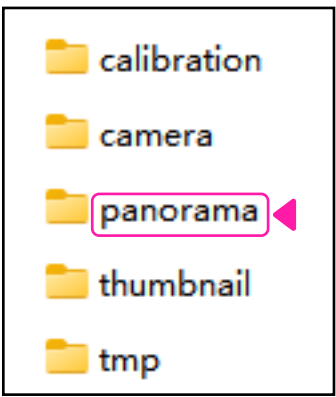
③The results of the network construction process can be viewed in the data list.



④The panoramic stitching can be viewed in the current window:



The photos generated by the panorama stitching are available in the local project file:



# Edit

Adjustments can be made to the point cloud and mesh data.

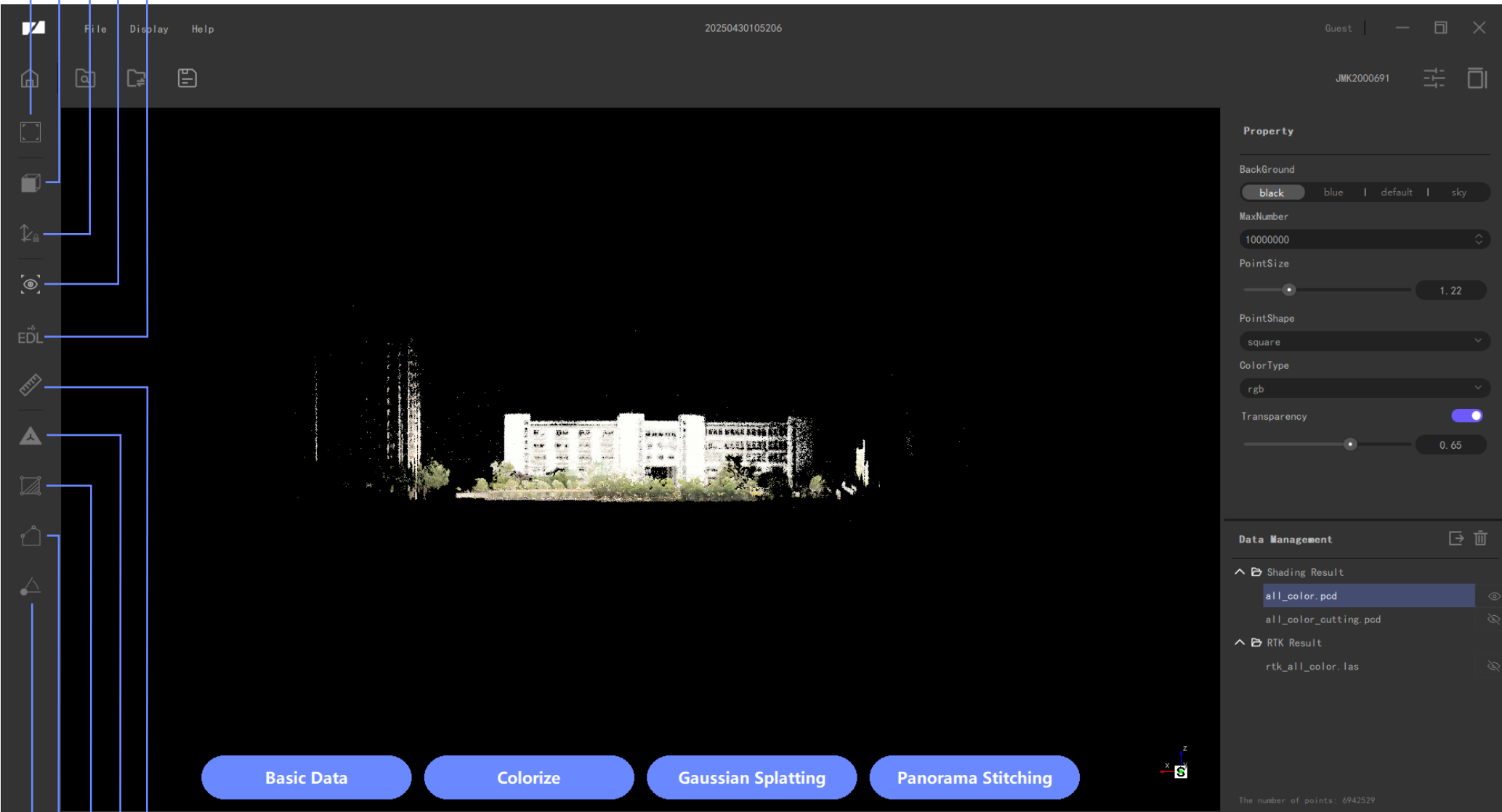
Reset camera perspective: The angle of view will be readjusted, and the point cloud data will be restored to the original top view, which will be displayed in the center.

You can view the front view, rear view, left view, right view, top view, and bottom view

Axis Lock: You can lock the X, Y, and Z axes. Once locked, transformations cannot be applied in that direction.

Enter/exit the first view: The first view mainly imitates the perspective of the human eye observing the 3D world, so that the point cloud data presentation is more in line with reality, and the effect of near and far is small

EDL: Enhances the display of feature information in point cloud data



Measurement: Point measurement, linear measurement, and volume measurement can be performed

Control point coordinates: Fill in the actual UTM coordinates of three or more points to calculate the position of all scanned point clouds in the world coordinate system

Clip: You can delete point cloud data inside or outside the box selection by selecting the point

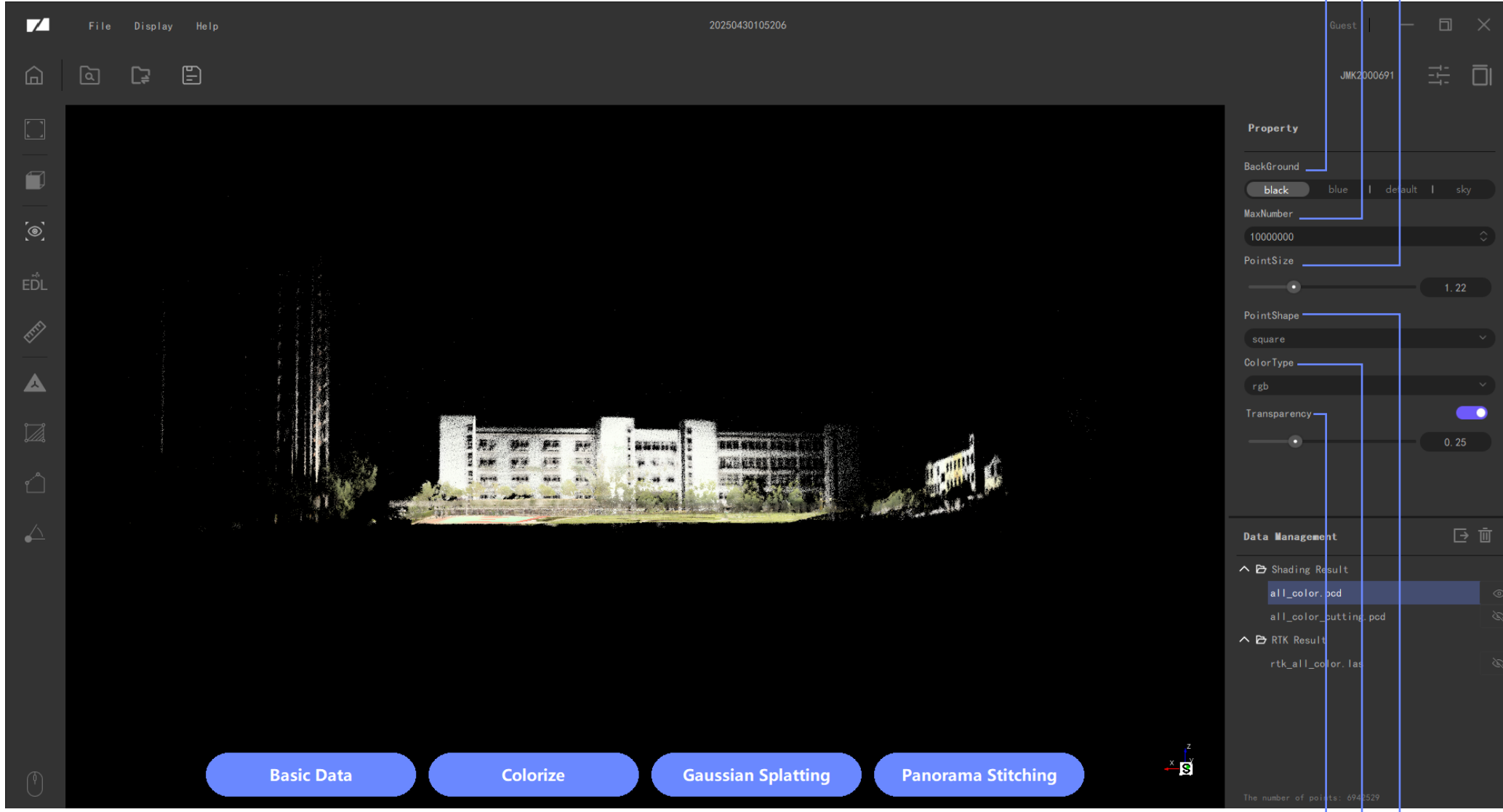
Start-to-end loop closure: When the starting point and end point of the scanning path are at the same location, and the point clouds at the overlapping places do not match, you can verify the single-frame point cloud data of the starting and ending points to calculate more accurate data

Point cloud correction: Adjust the position and angle of the point cloud

Adjusts the size of the point cloud displayed in the current window

The maximum number of point clouds after processing does not exceed the numeric value

The background color can be toggled according to the scene



Adjust the transparency of the point cloud data displayed in the current window, 0 is the minimum, 1 is the maximum, the smaller the value, the point cloud will show a more transparent effect

RGB is selected, and the point cloud is displayed in actual color; Select Elevation, and the point cloud color value can be used to represent the terrain; Select Intensity, and the point cloud will be displayed from the perspective of weak and strong or pale and solid hue

The shape of the point cloud, the square color is more obvious, and the round point cloud is more convenient to observe the scanning sparsity

Control point coordinates

You can change the position of the scanned point cloud in the world coordinate system by inputting the locations of at least three points .

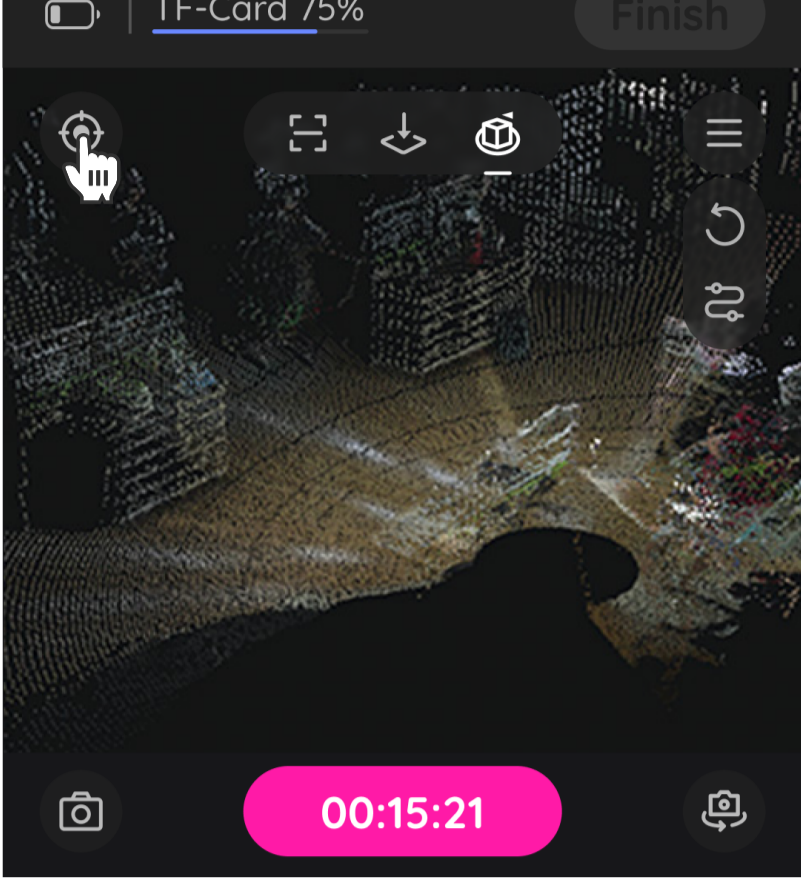
Prerequisites

You first need to obtain the actual UTM coordinate information of the relevant point cloud in the world coordinate system.

- While scanning to add marker points, use other auxiliary devices (such as an RTK measuring instrument) to obtain the actual UTM coordinate information of the points.
- By selecting point clouds at the same location, obtain the actual UTM coordinate information of that location in the world coordinate system. The method of obtaining this information varies across different software and is for reference only (using Google Earth Pro as an example).

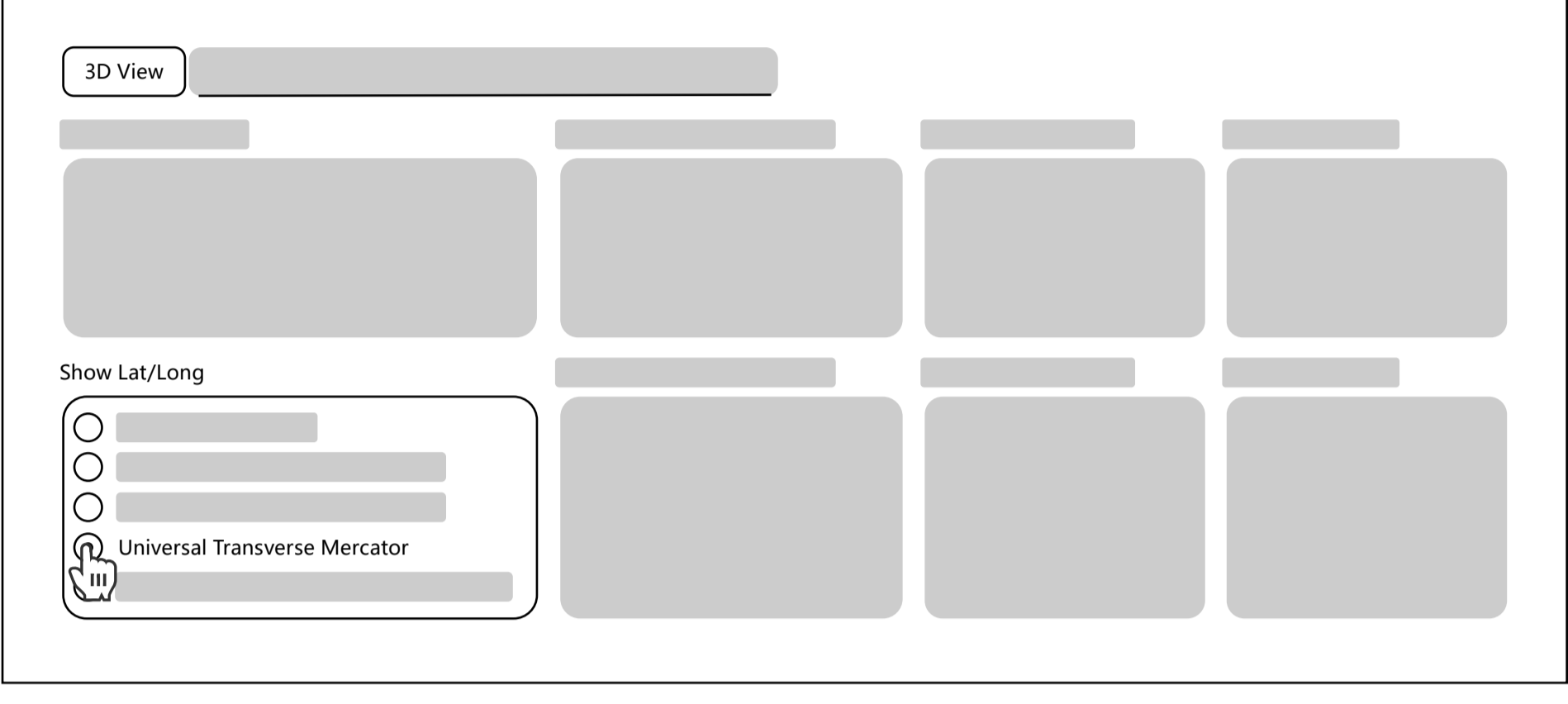
1. During scanning, you can manually add marker points (taking JMK5 as an example); clicking once will automatically record the current position.

\*When scanning and adding reference points, you can simultaneously obtain the actual UTM coordinate information of those points using devices such as an RTK survey instrument at the same locations, making the data more accurate.



2. If there are no other auxiliary tools such as an RTK measuring instrument, it can be obtained through the world coordinate system (taking Google Earth Pro as an example).

a. Configure the UTM in "Tools > Options..."

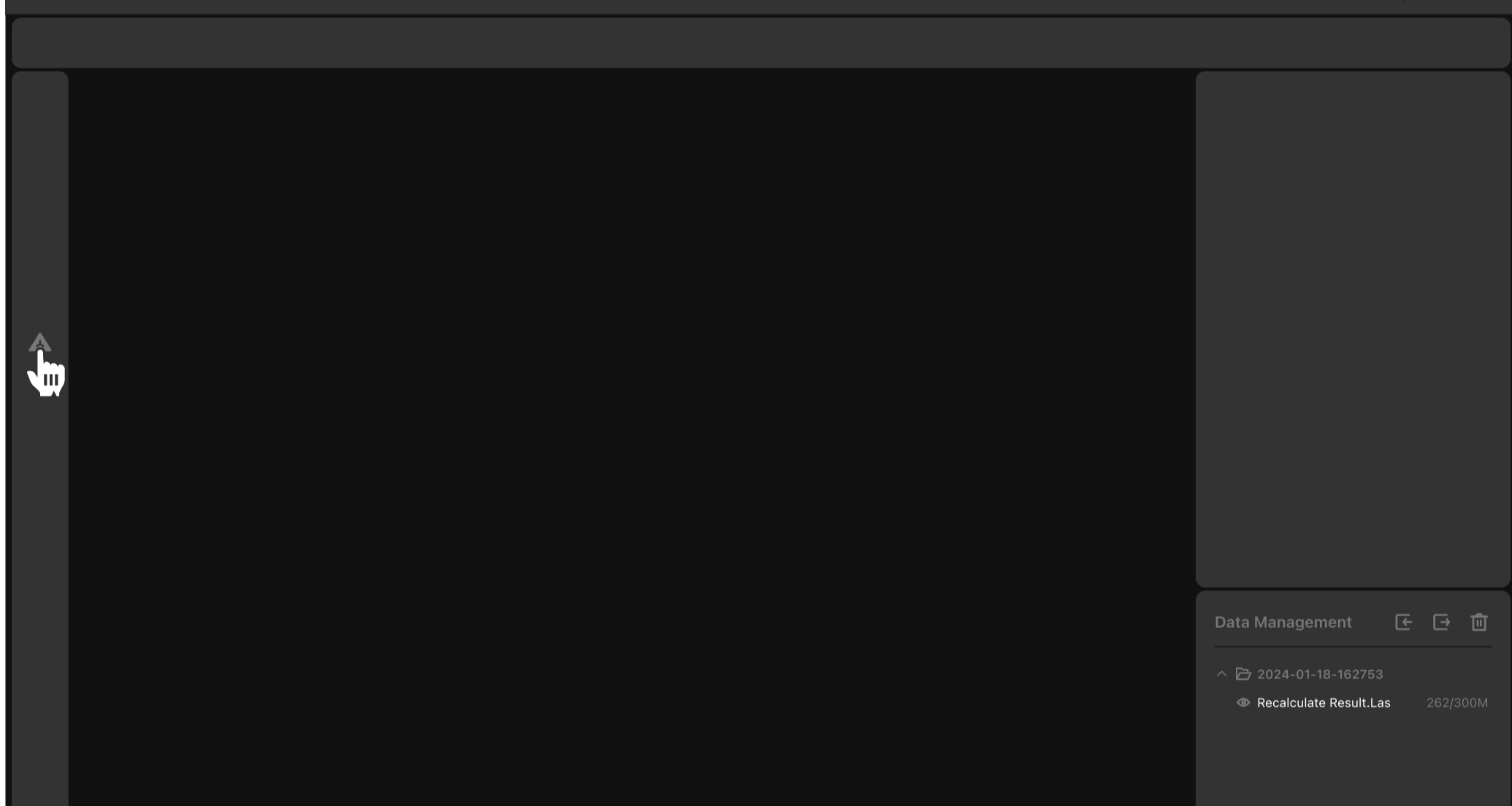


b. Place the mouse over a point with feature points (or over a point with markers added during shooting) to obtain the actual UTM coordinate information of the corresponding point. You need to obtain information from at least three feature points.



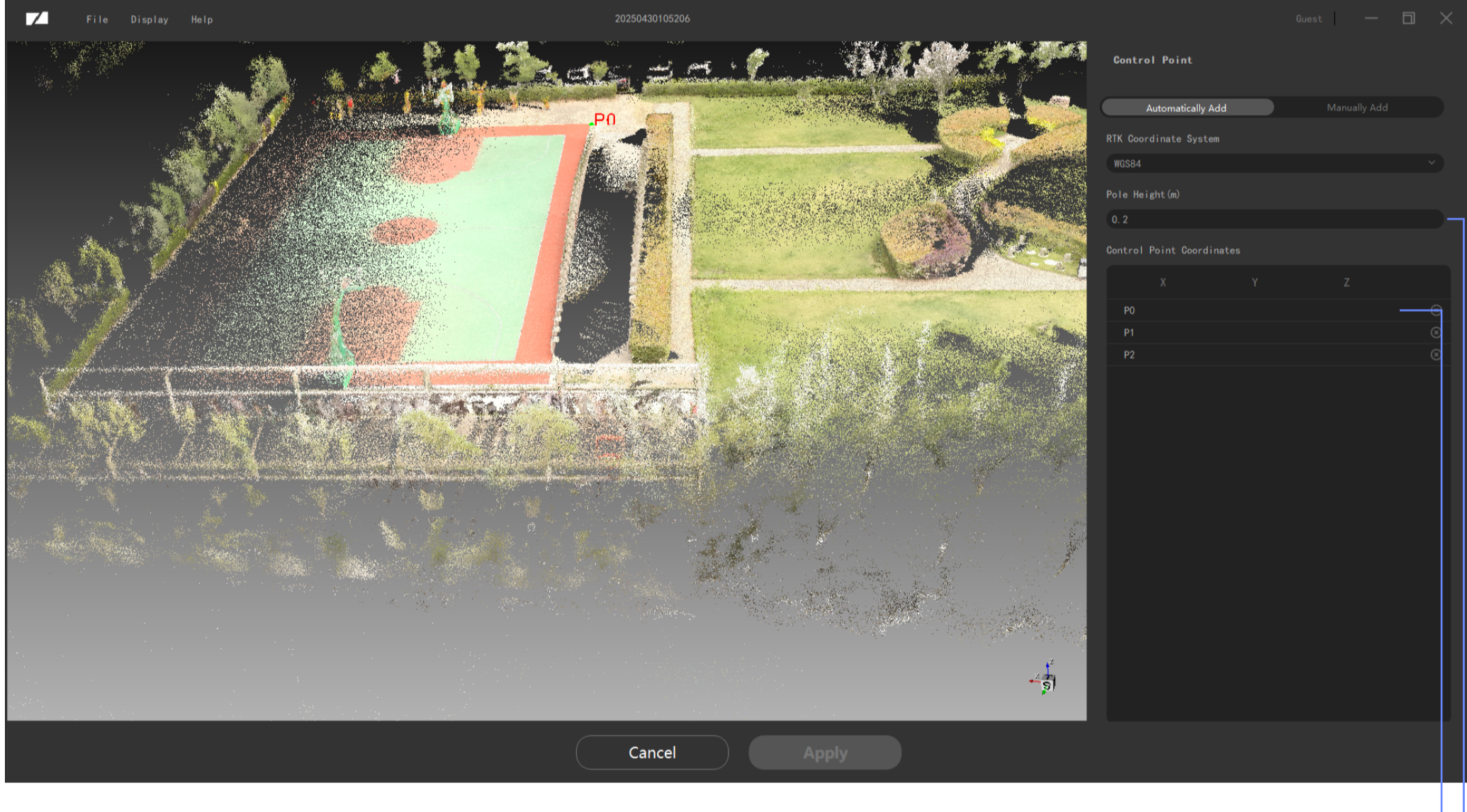
Procedure

① Click ▲ under filtering, thinning, or point cloud coloring data (colored data requires data settlement before the marker points added during scanning can be obtained) to enter the operation interface (using colored data as an example).



②The coordinates of control points can be calculated either by manually selecting special points or by the points added during shooting.

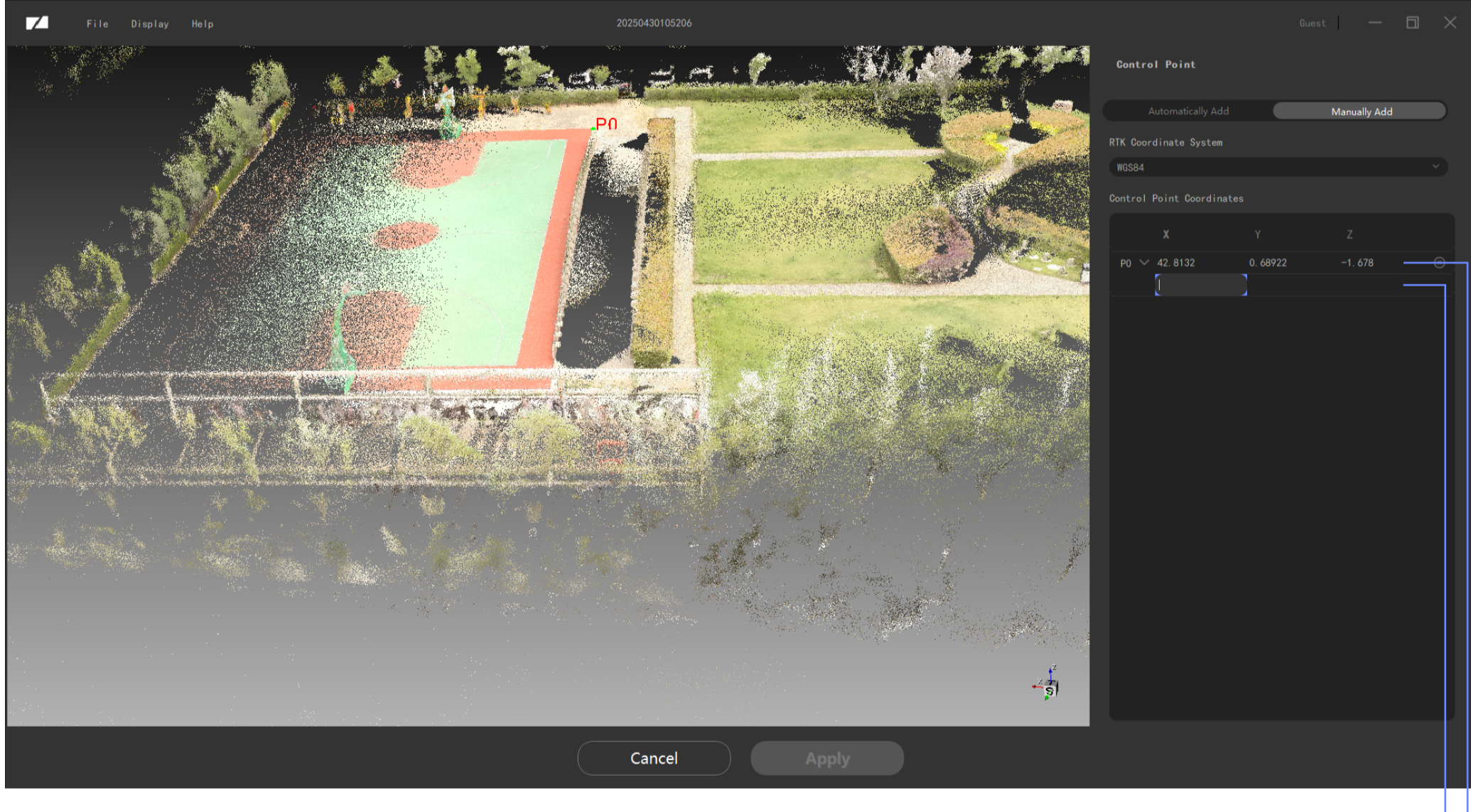
- Added points during shooting: Mark points have already been added during shooting. Enter the actual UTM coordinates of the point cloud at the point cloud position (fill in the obtained actual location information from left to right).



Actual UTM coordinates of the point cloud

Height of the equipment from the ground during shooting

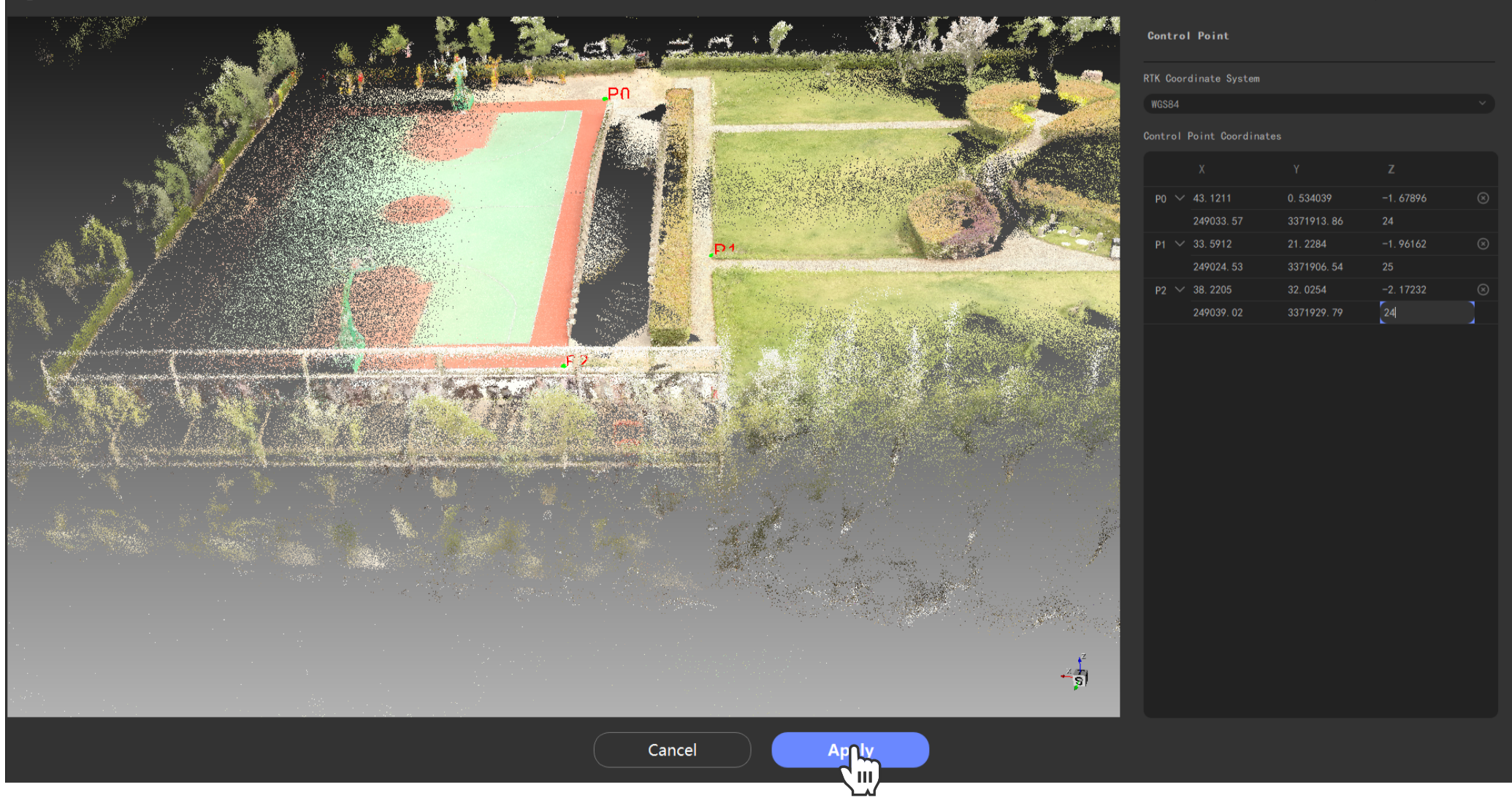
- Manually select special points: Double-click on the feature point cloud with acquired actual coordinate information, and you can directly input the actual UTM coordinates of the point cloud below the original data (fill in the obtained actual location information from left to right).



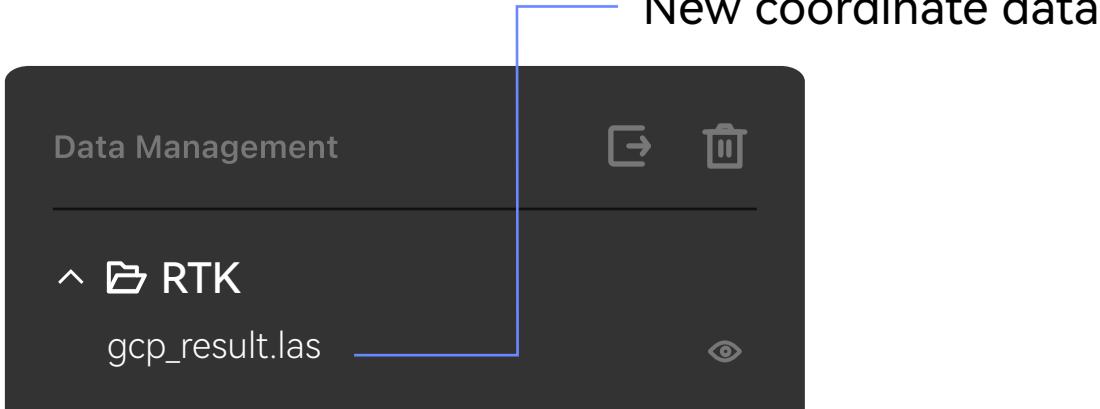
Actual UTM coordinates of the point cloud

Initial point cloud coordinate information

③At least input the positions of 3 point clouds, and after completing the input, you can confirm to generate new coordinate data.

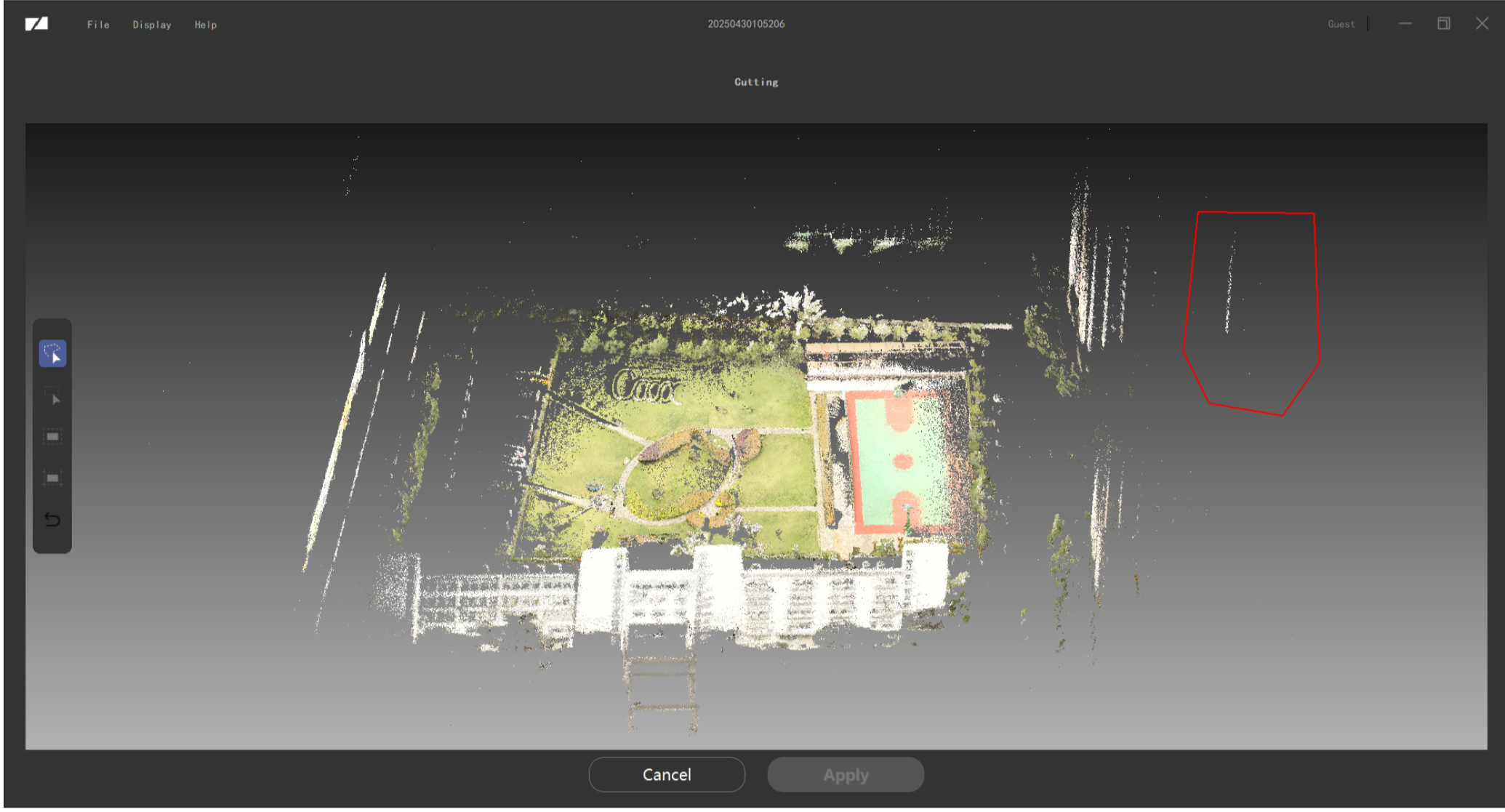
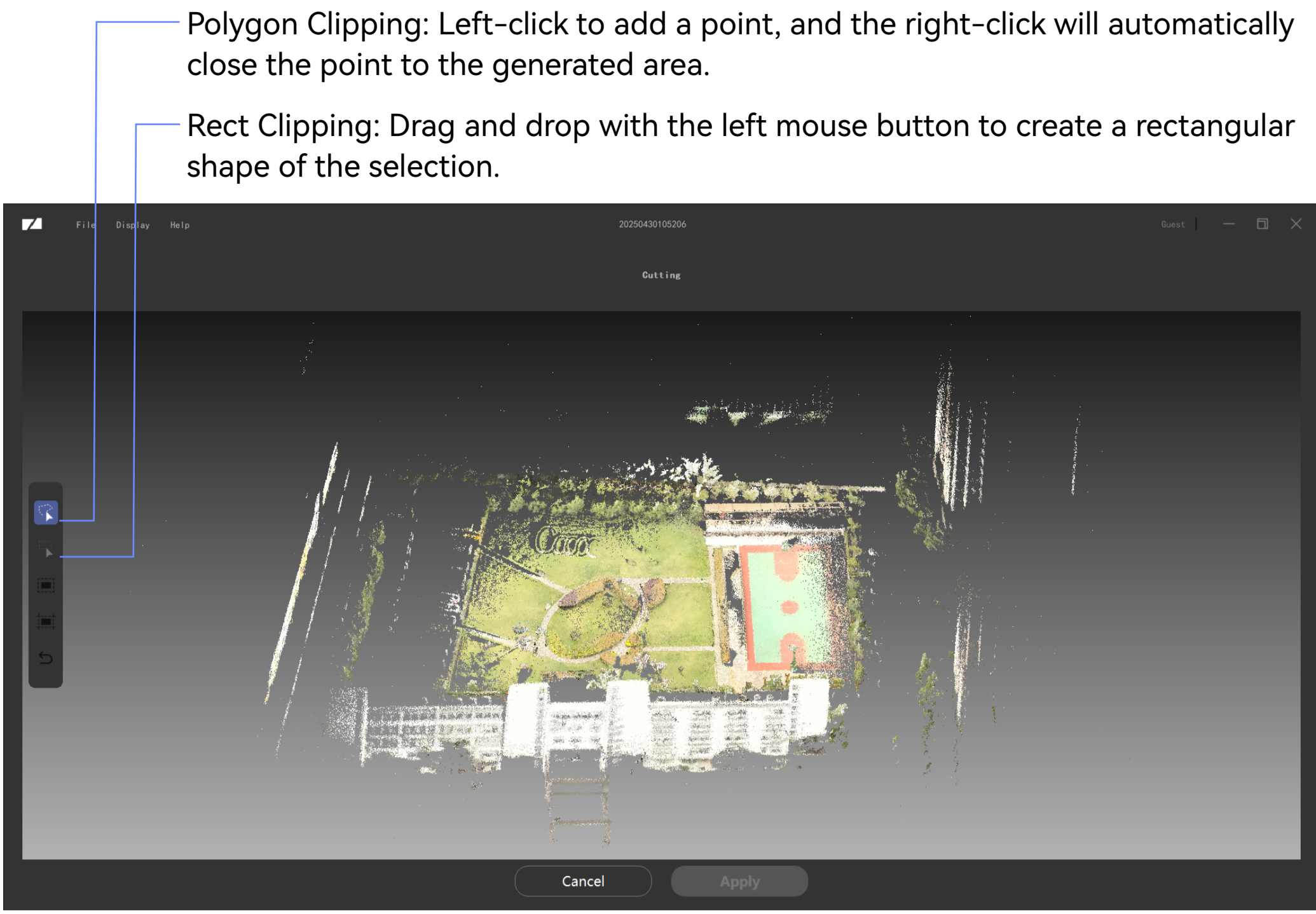


④ The processing results can be viewed in the data list:

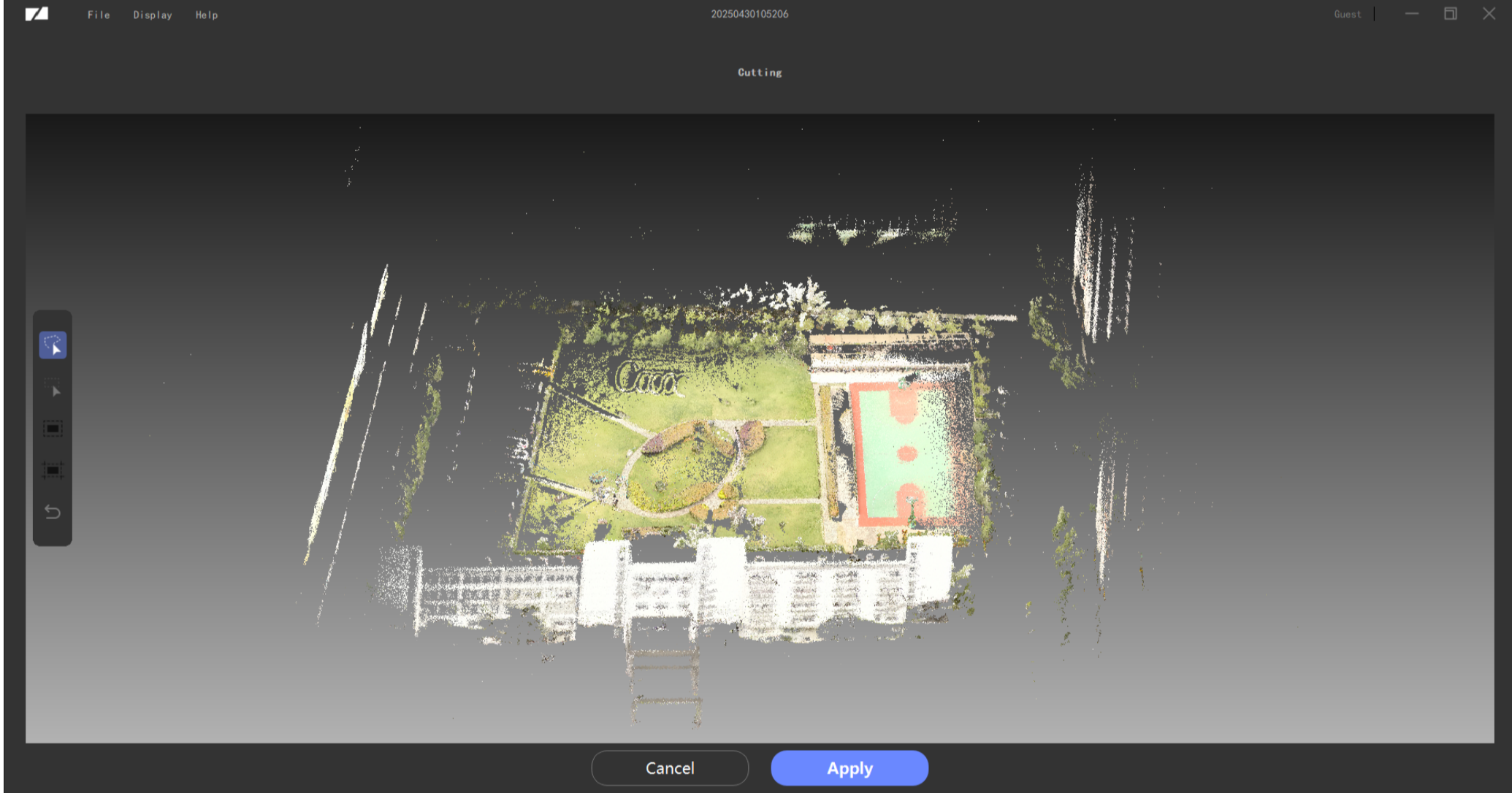


Clip

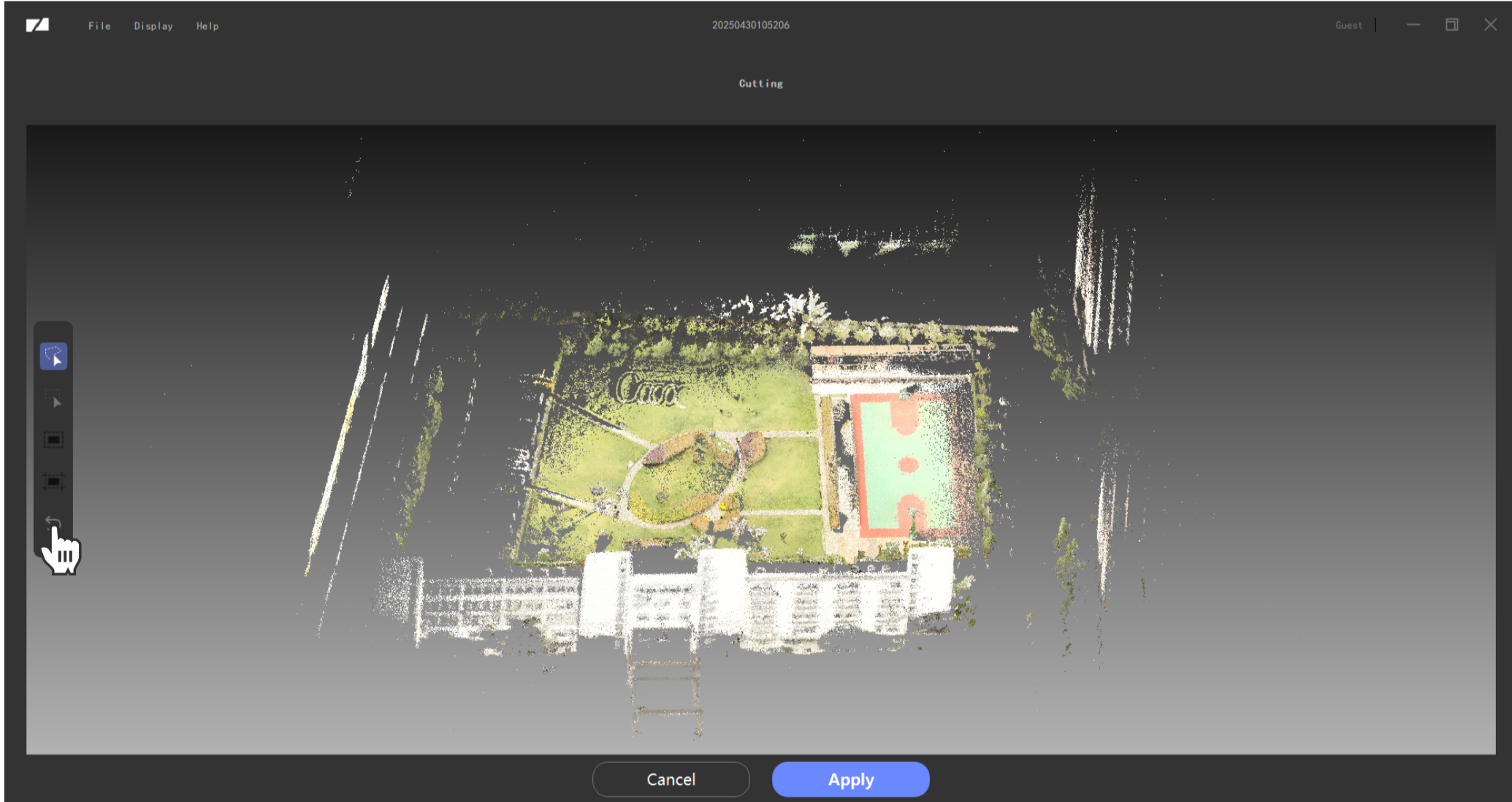
① Select the point cloud data to be processed through polygon cropping or rectangular cropping (take polygon cropping as an example)



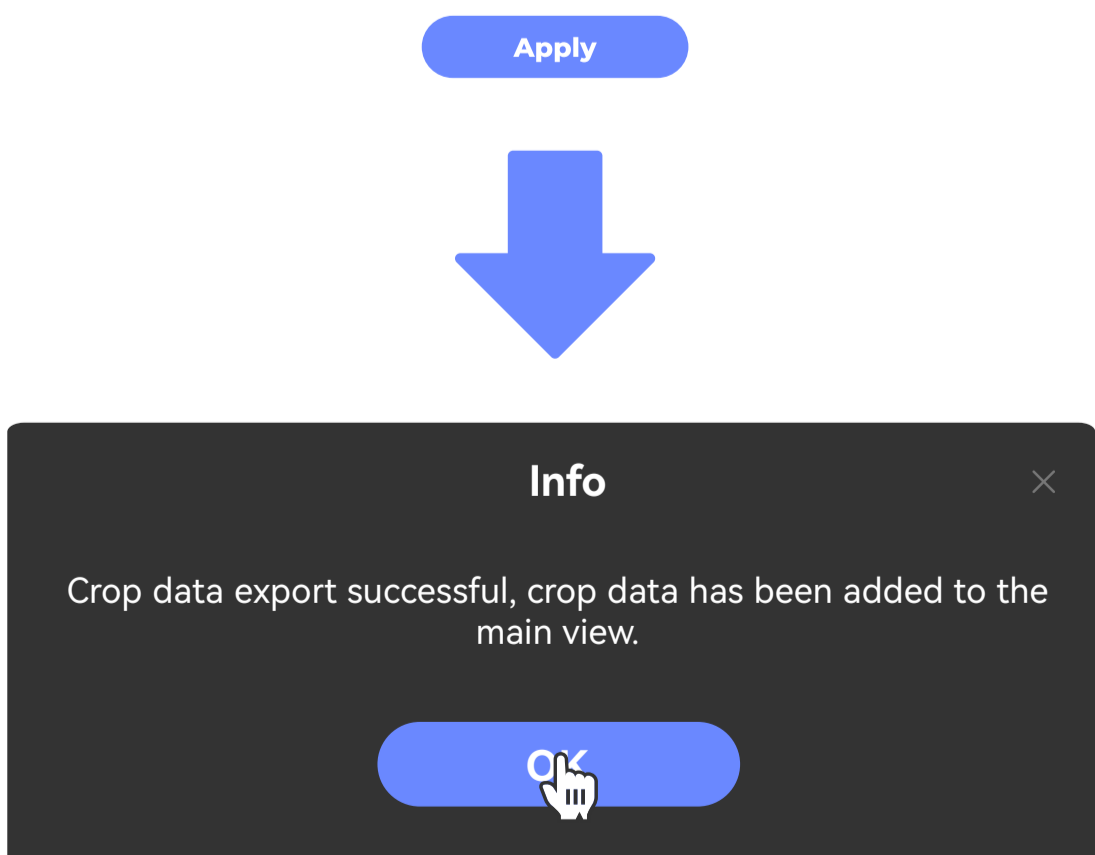
② You can choose to delete the point cloud data in or out of the box selection (take deleting the data in the box selection as an example)



Optional: ③ The deleted data can be revoked



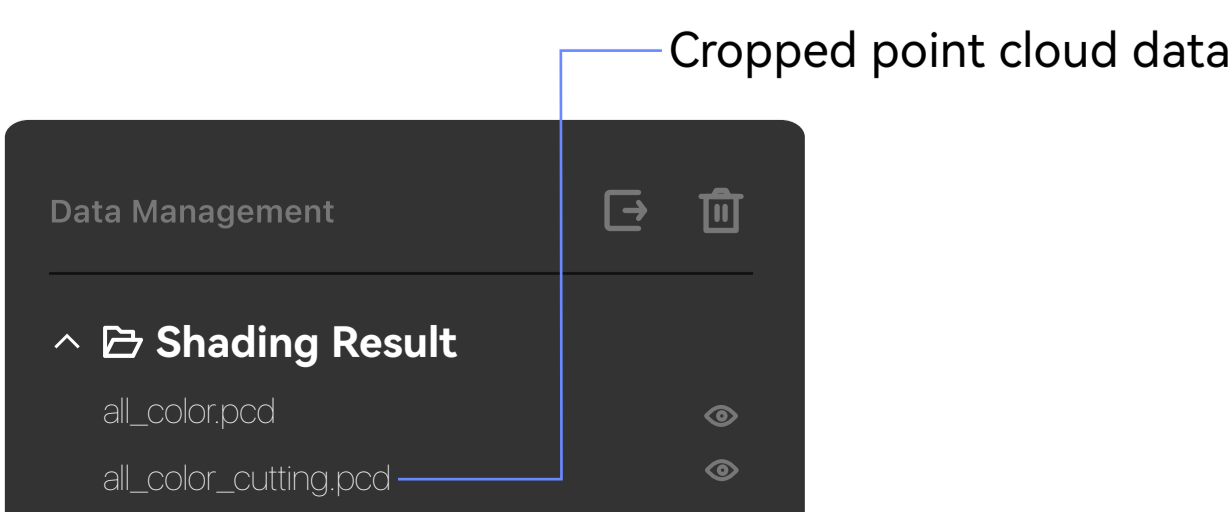
④ If you keep the current cropping data, you can click "Apply" to generate a new cropping data



⑤ Click "Cancel" to exit the cropping interface



⑥ The cropped data can be viewed in the data list:

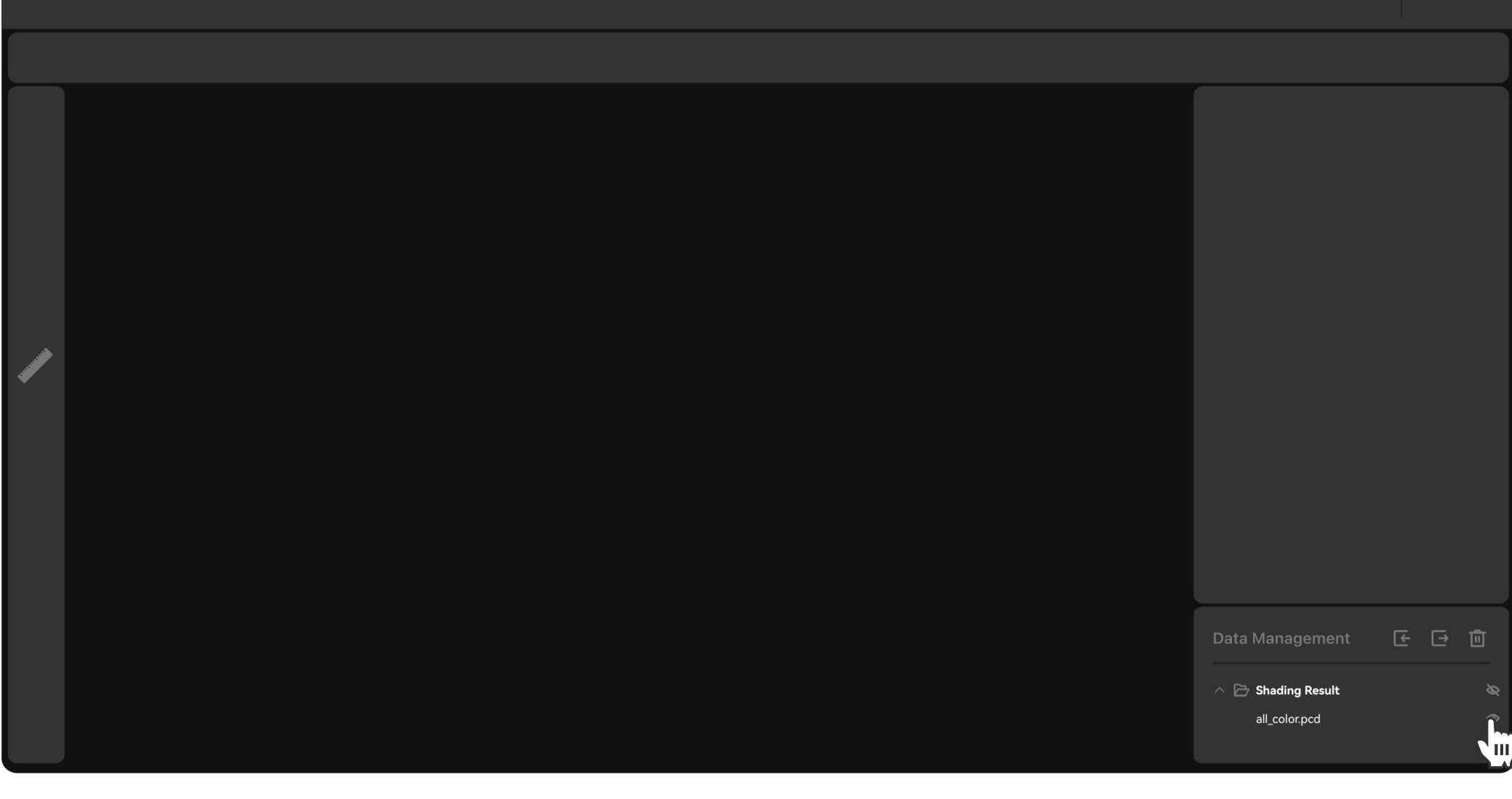


Measurement

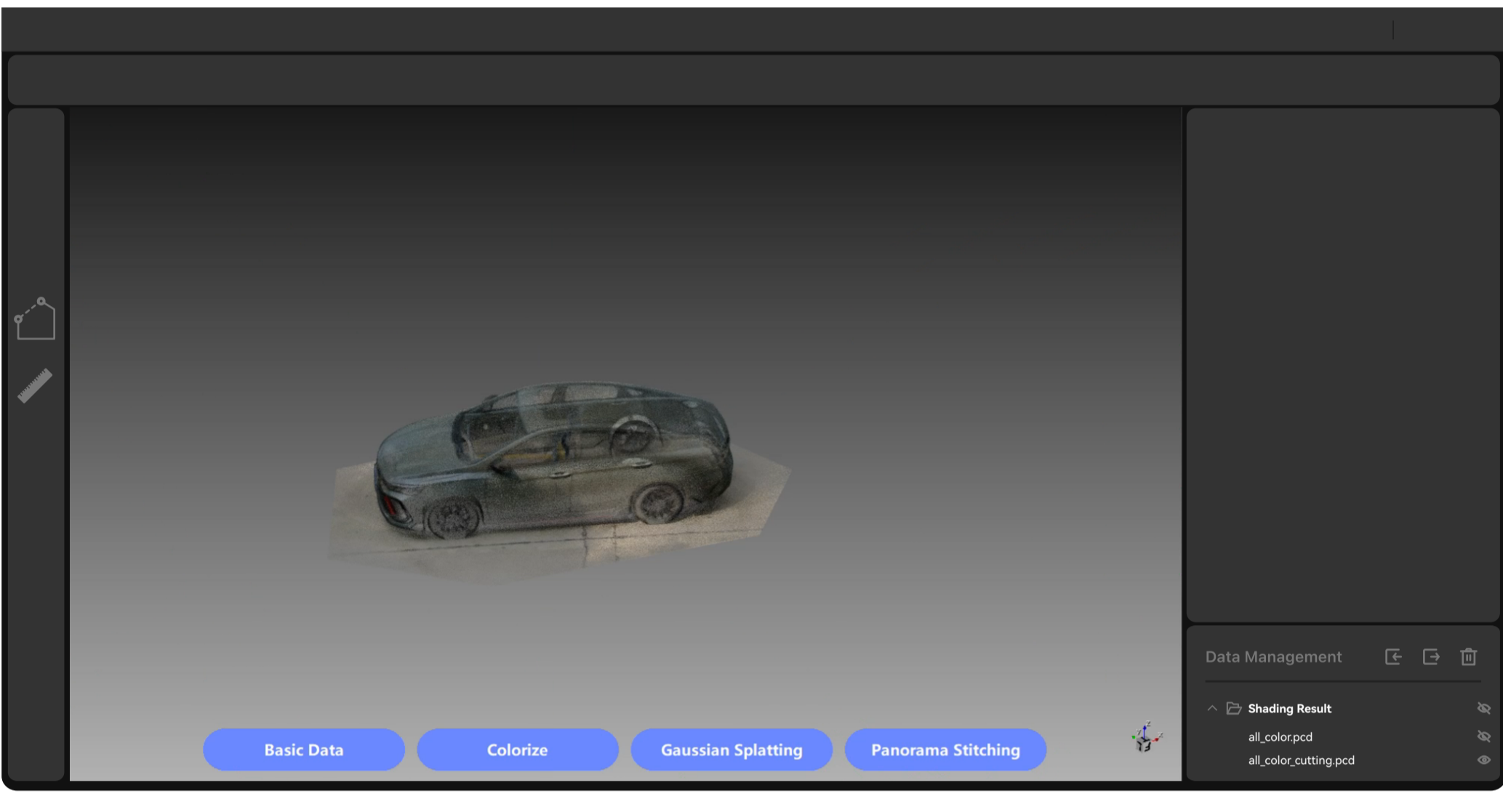
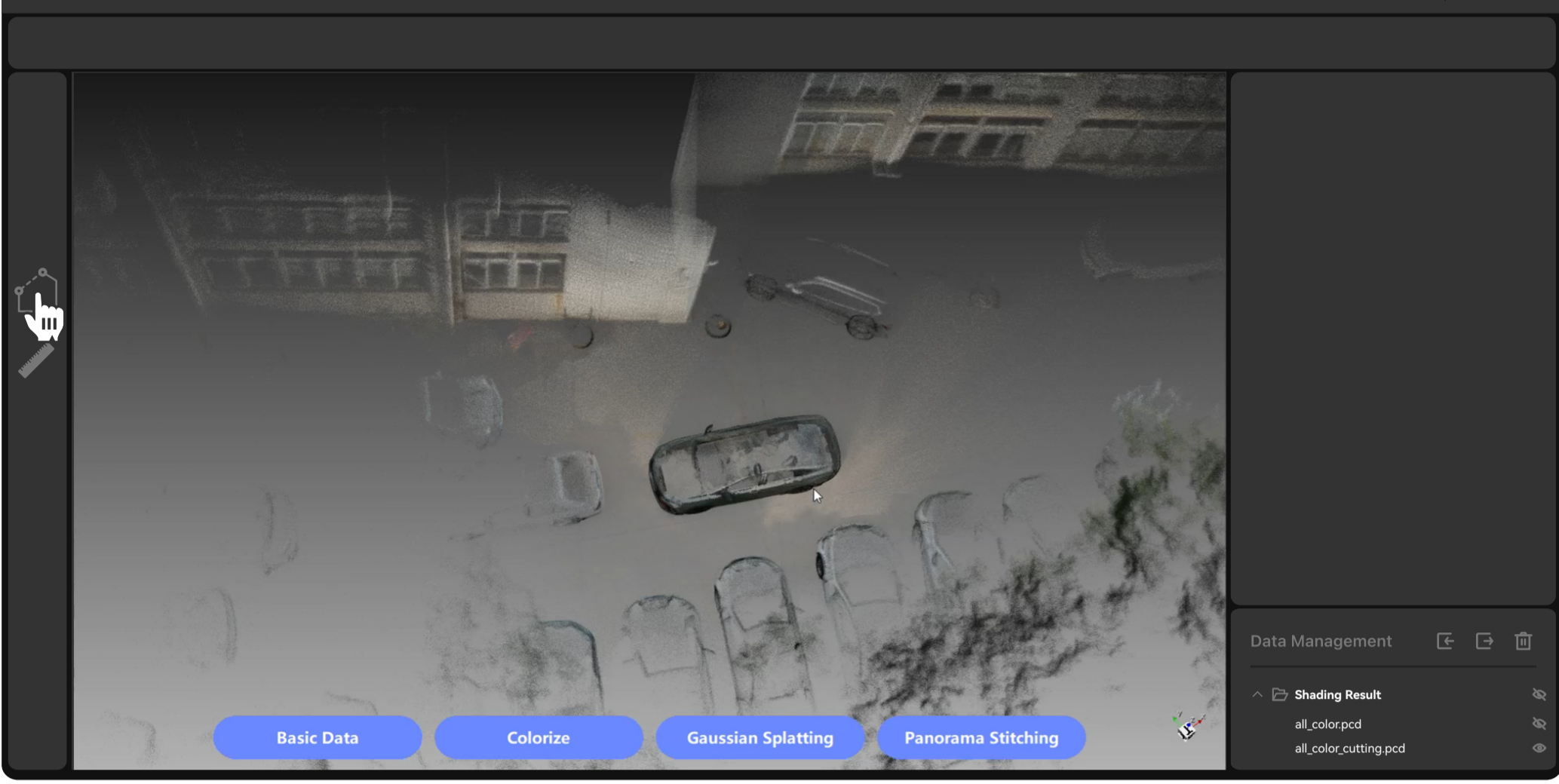
The measurements include point measurement, linear measurement, and volume measurement. Point measurement refers to displaying the relative coordinates of the selected point; linear measurement refers to measuring the distance between two points; volume measurement refers to selecting a point cloud and automatically calculating the volume of the selected point cloud.

Prerequisites

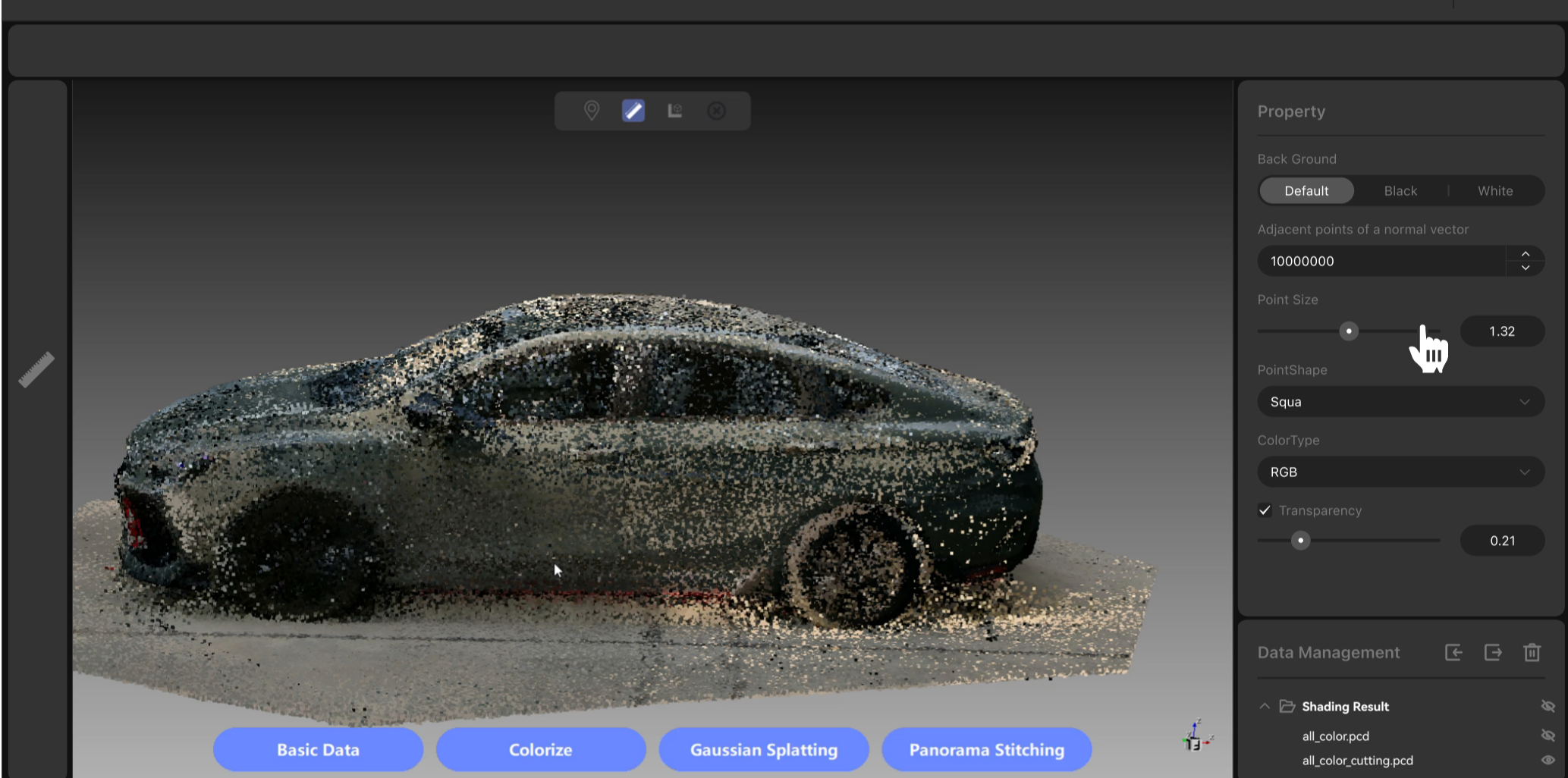
1. First, open the colored point cloud data, do not display other data.



2. It is recommended to use the point cloud clipping function to cut off the point clouds outside the measured object (for detailed operation, please refer to the point cloud clipping section).

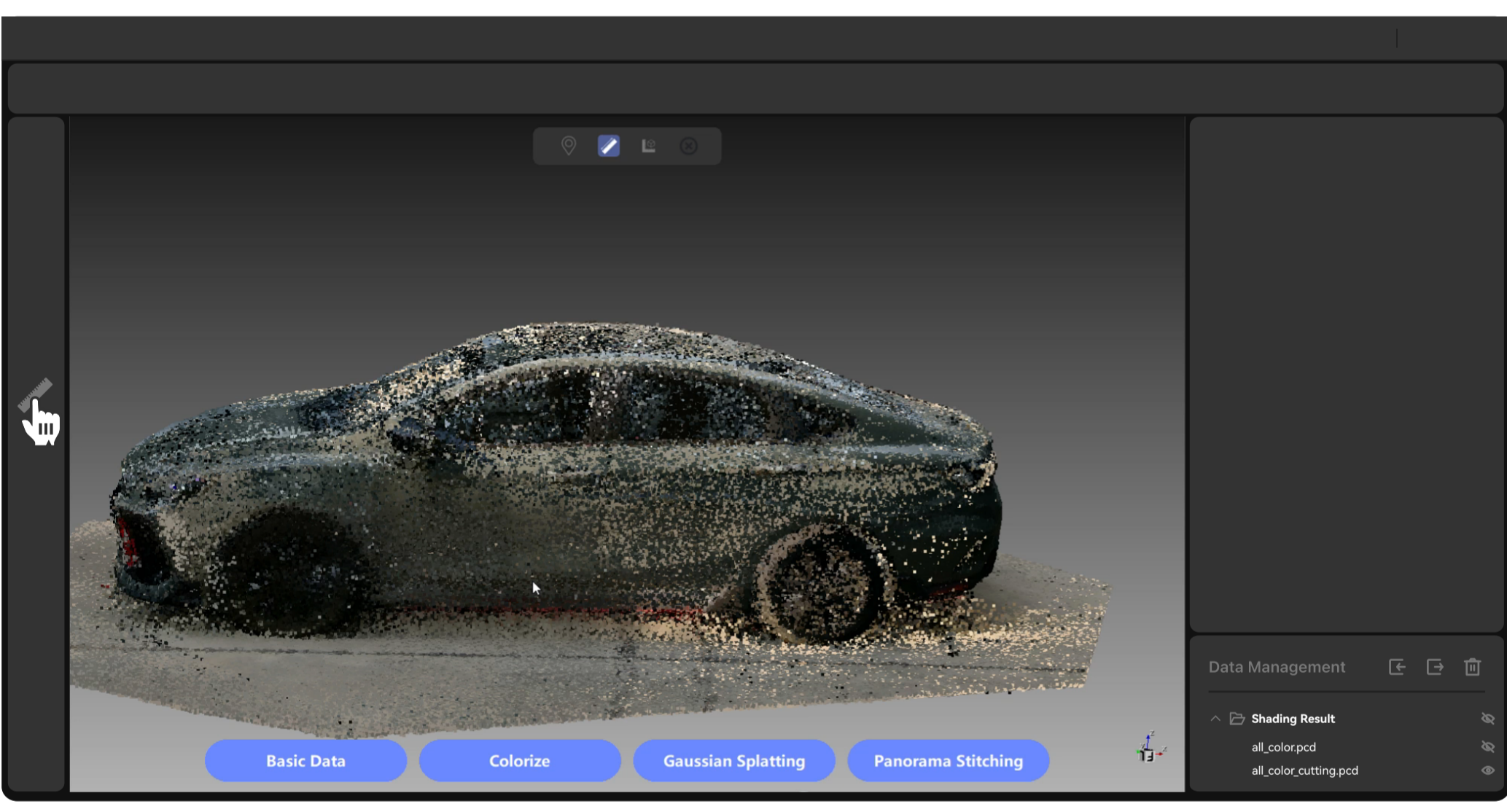


3. According to the scanning scene, the point cloud size in the attribute bar can be appropriately increased to facilitate point selection (to avoid incorrect selections or selecting points behind the point cloud).



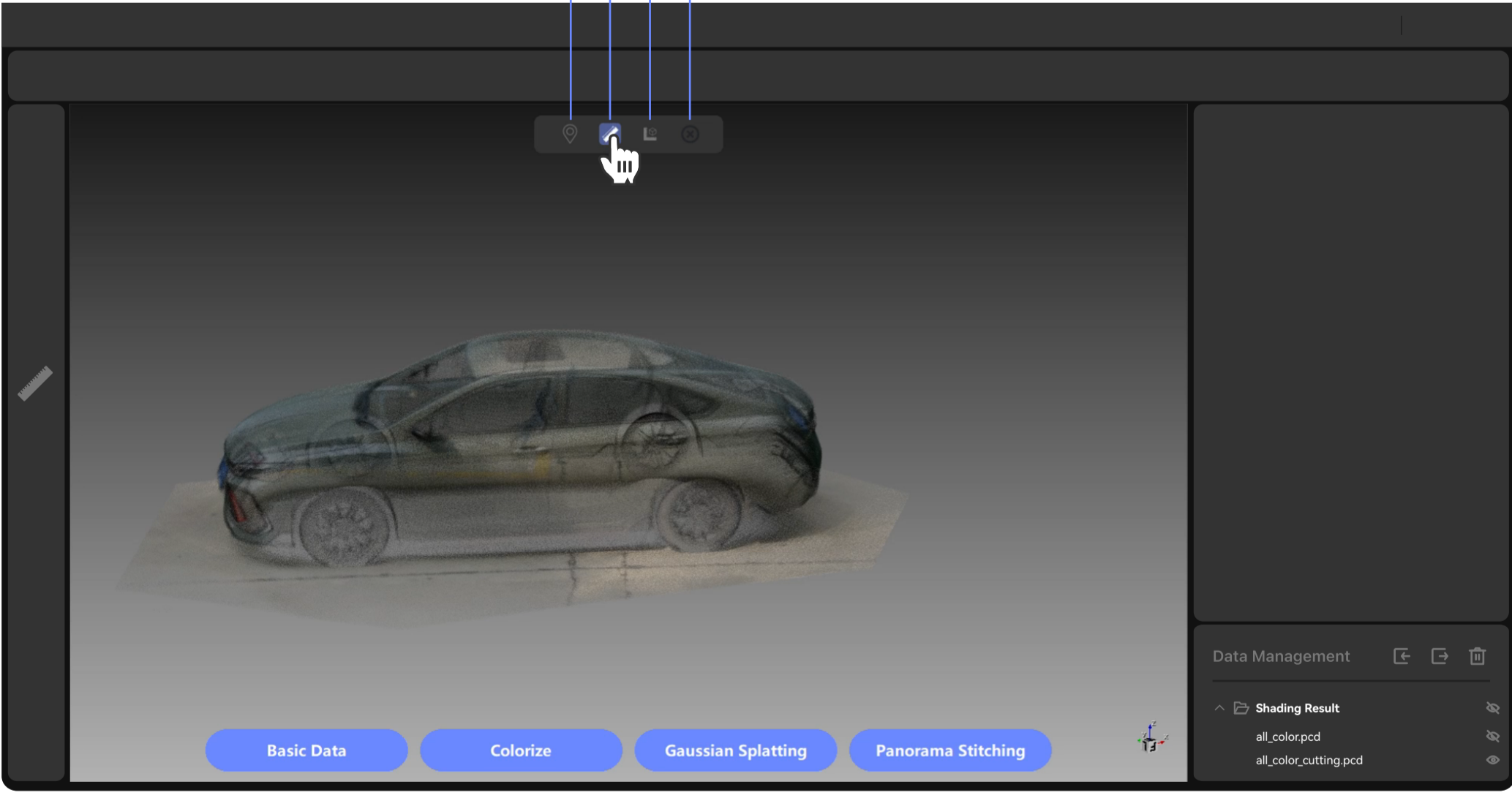
Procedure

① Click  under the point cloud coloring data to enter the operation interface (using coloring data as an example)

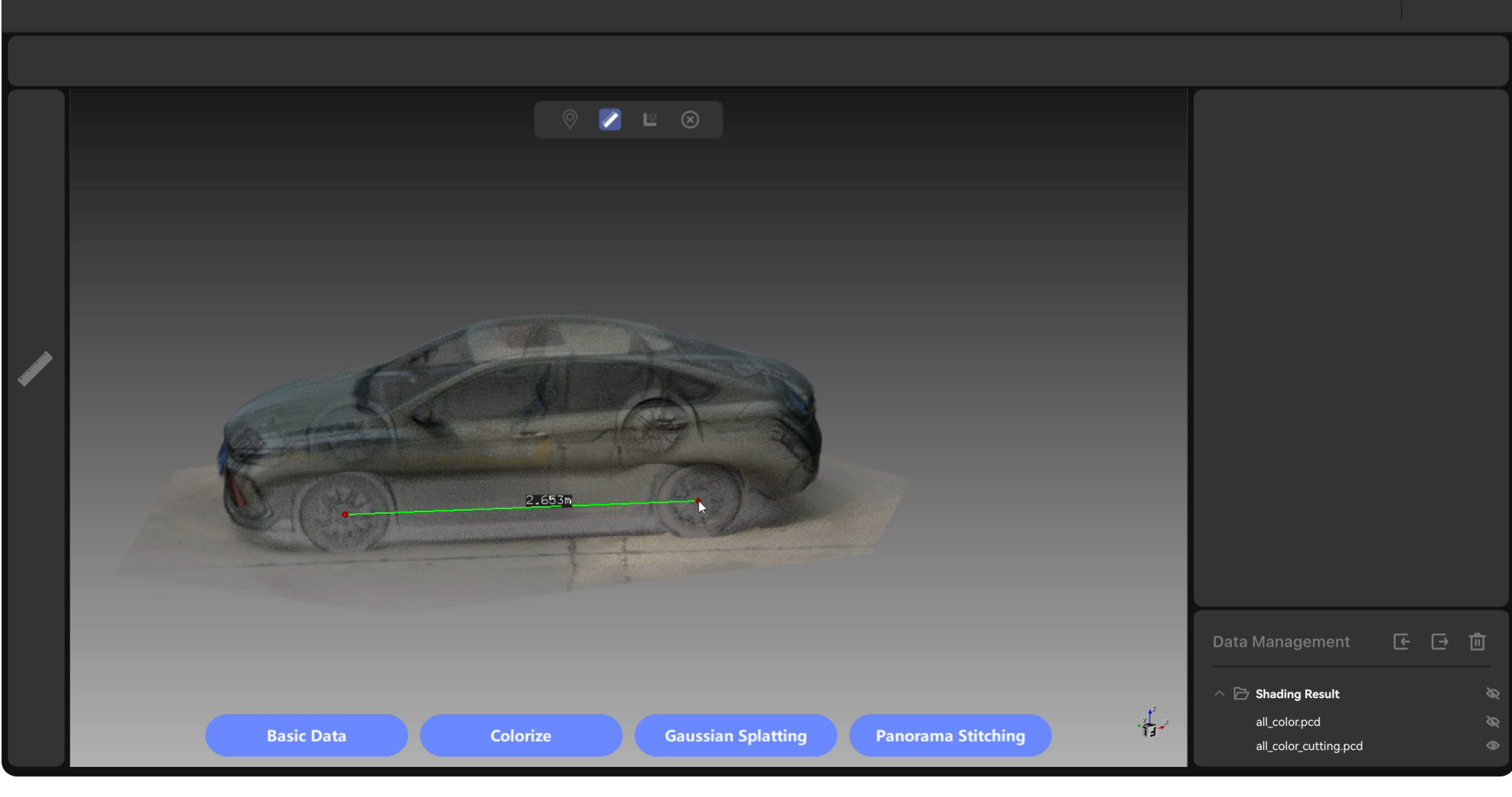


②Choose the measurement method according to actual needs. The operation takes linear measurement and volume measurement as examples.

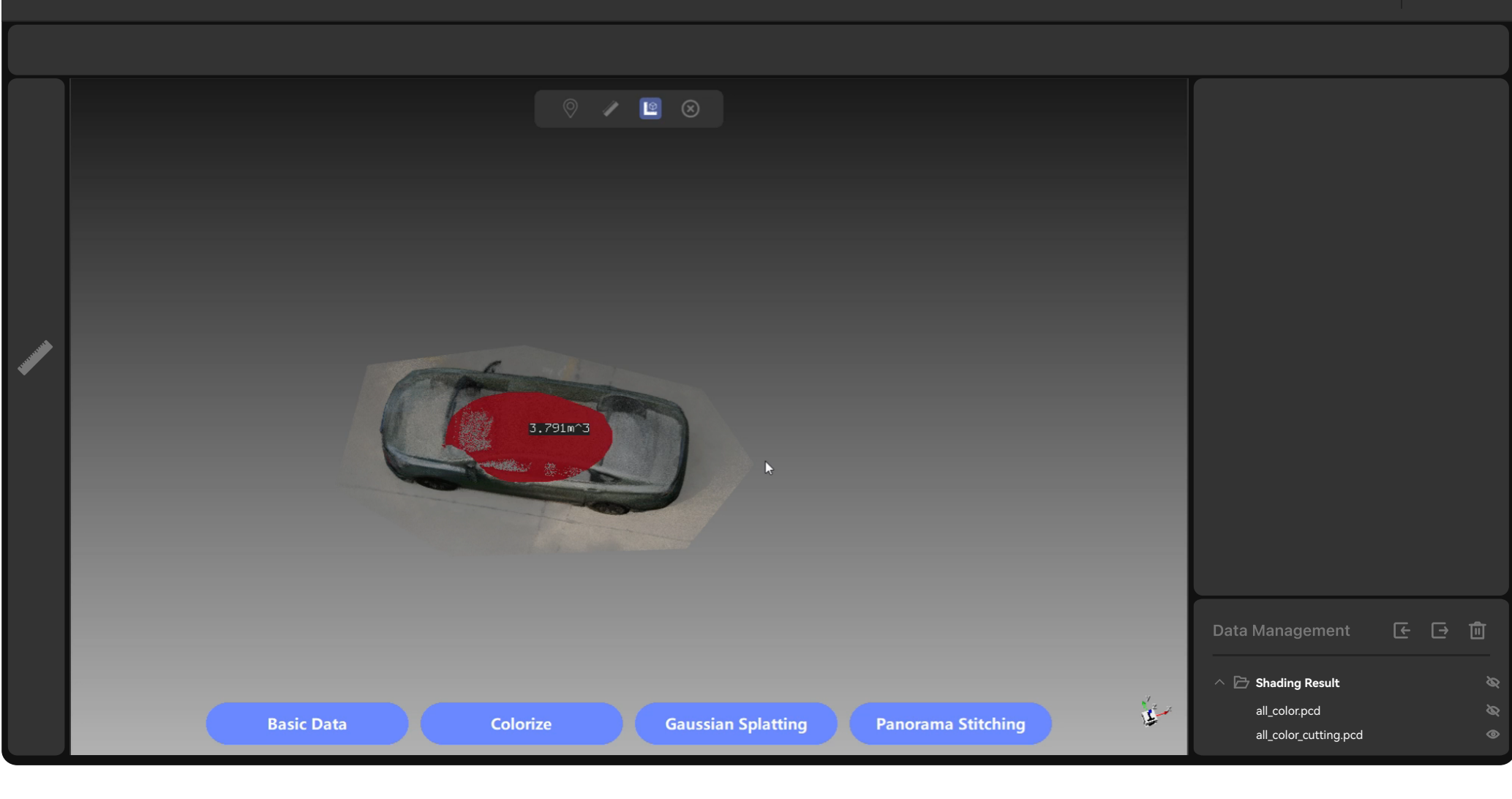
- Point measurement, you can get the coordinates of the point by left-clicking the mouse.
- Linear Measurement: Left-click to add points (at least 2 points), automatically generating the linear distance between the two corresponding points.
- Volume measurement: Hold down the Ctrl key and drag the left mouse button to lasso select, automatically generating the point cloud volume of the selected area.
- Clear: Clear all current measurement operations



Linear measurement



Volume measurement

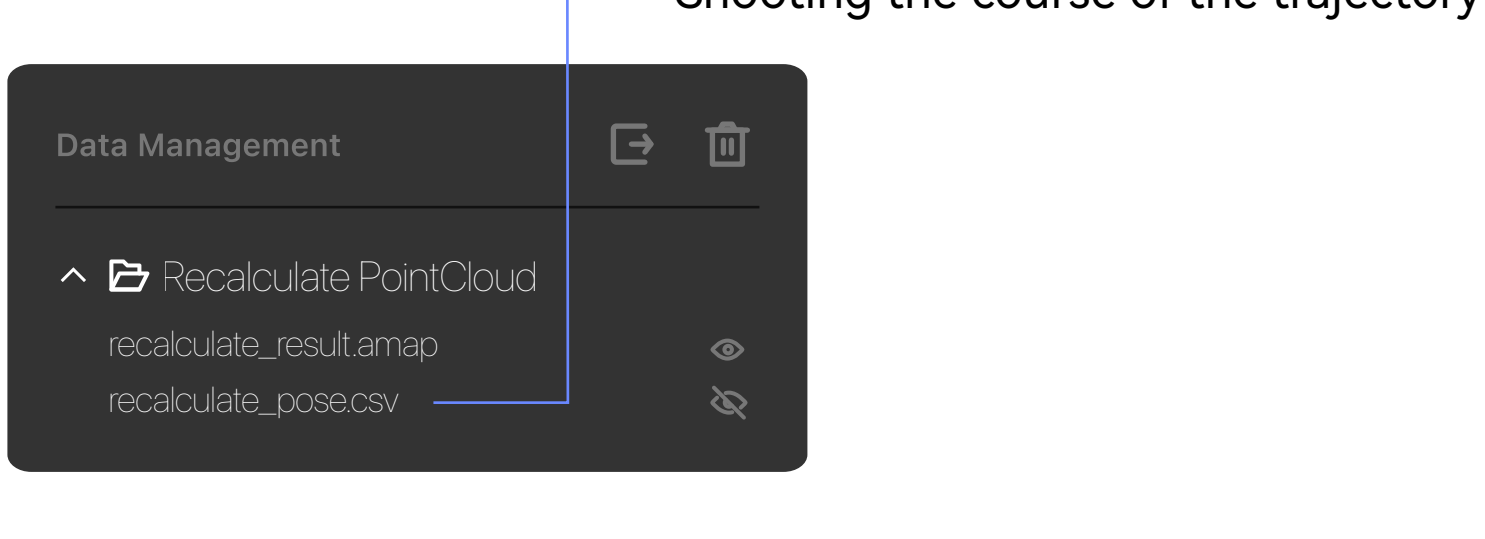


Start-to-end loop closure

Obtain more accurate data by verifying the single-frame point cloud data at the start and end points of the same location. Before performing this operation, it is necessary to perform data calculation to obtain the trajectory and route of the shooting process.

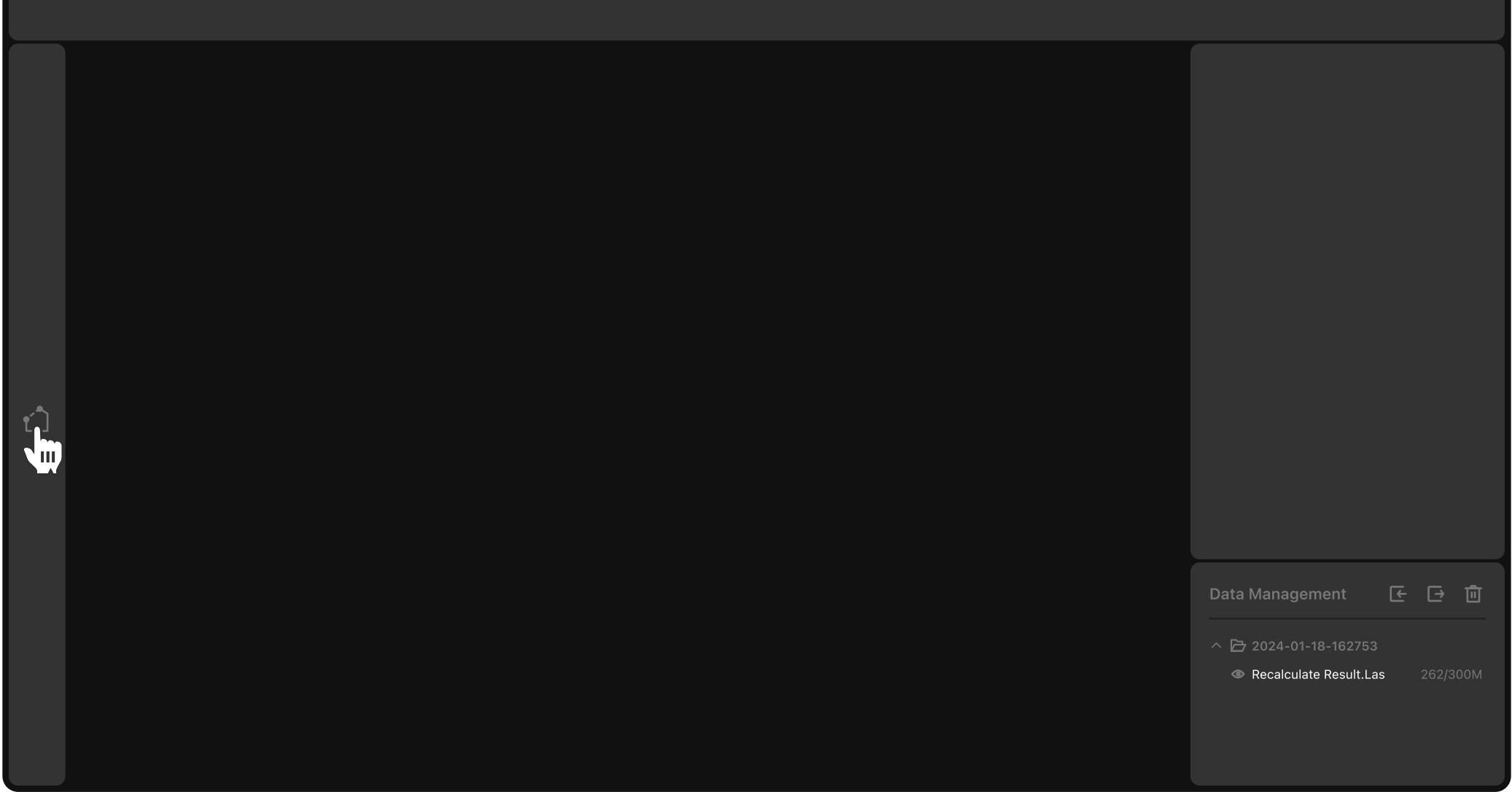
Prerequisites

It is necessary to perform data calculation to obtain the trajectory route file of the shooting

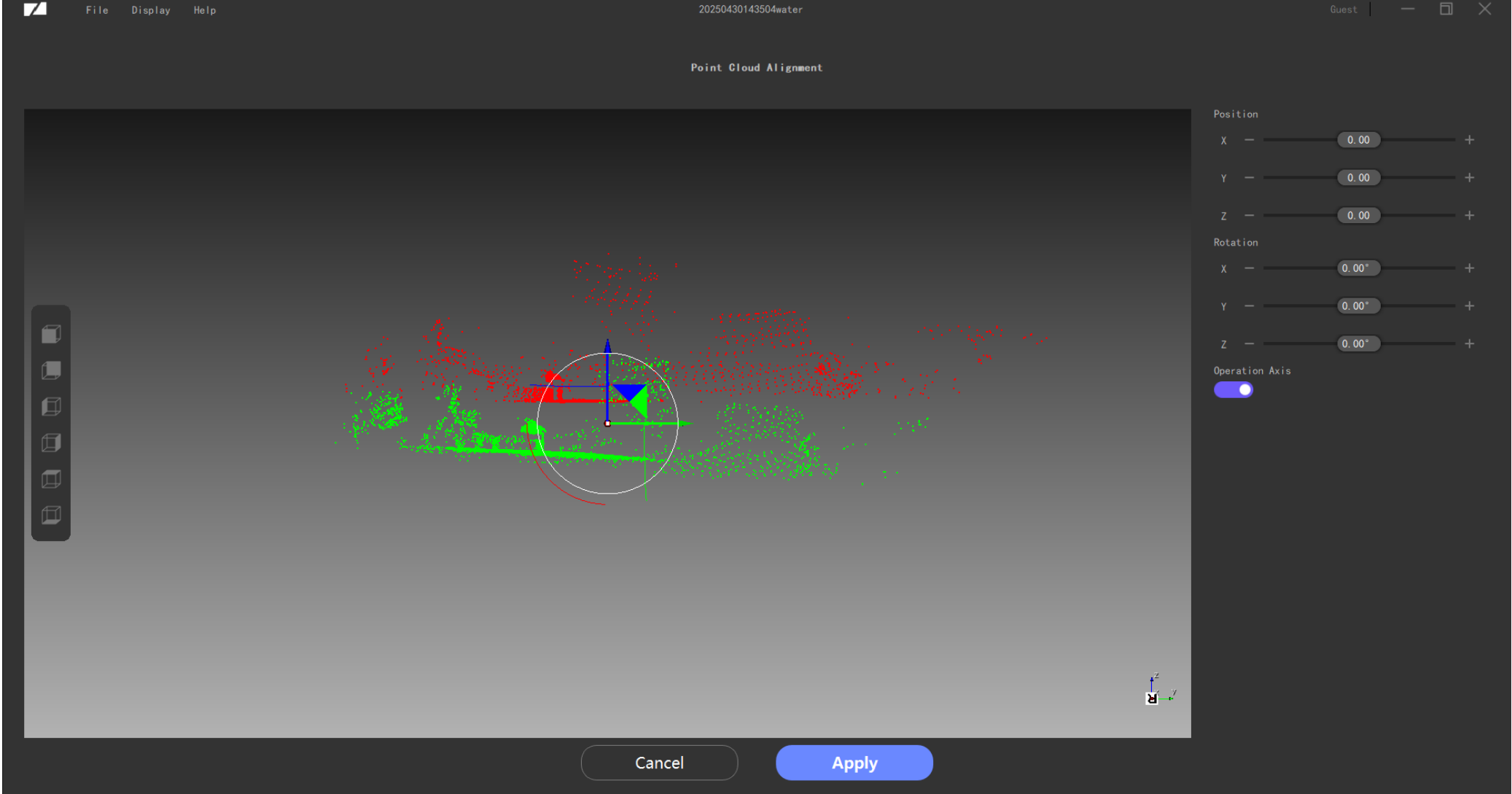
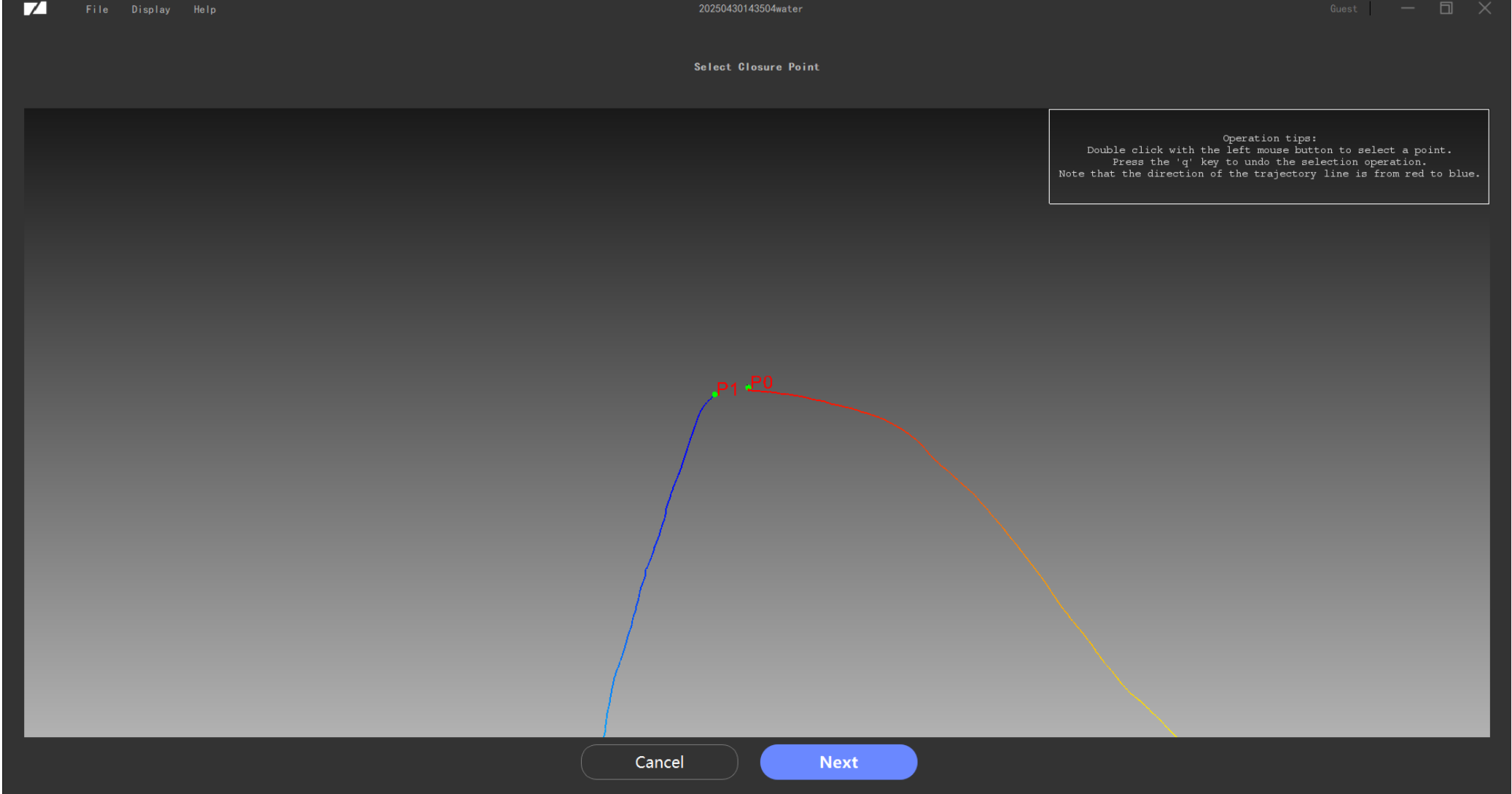
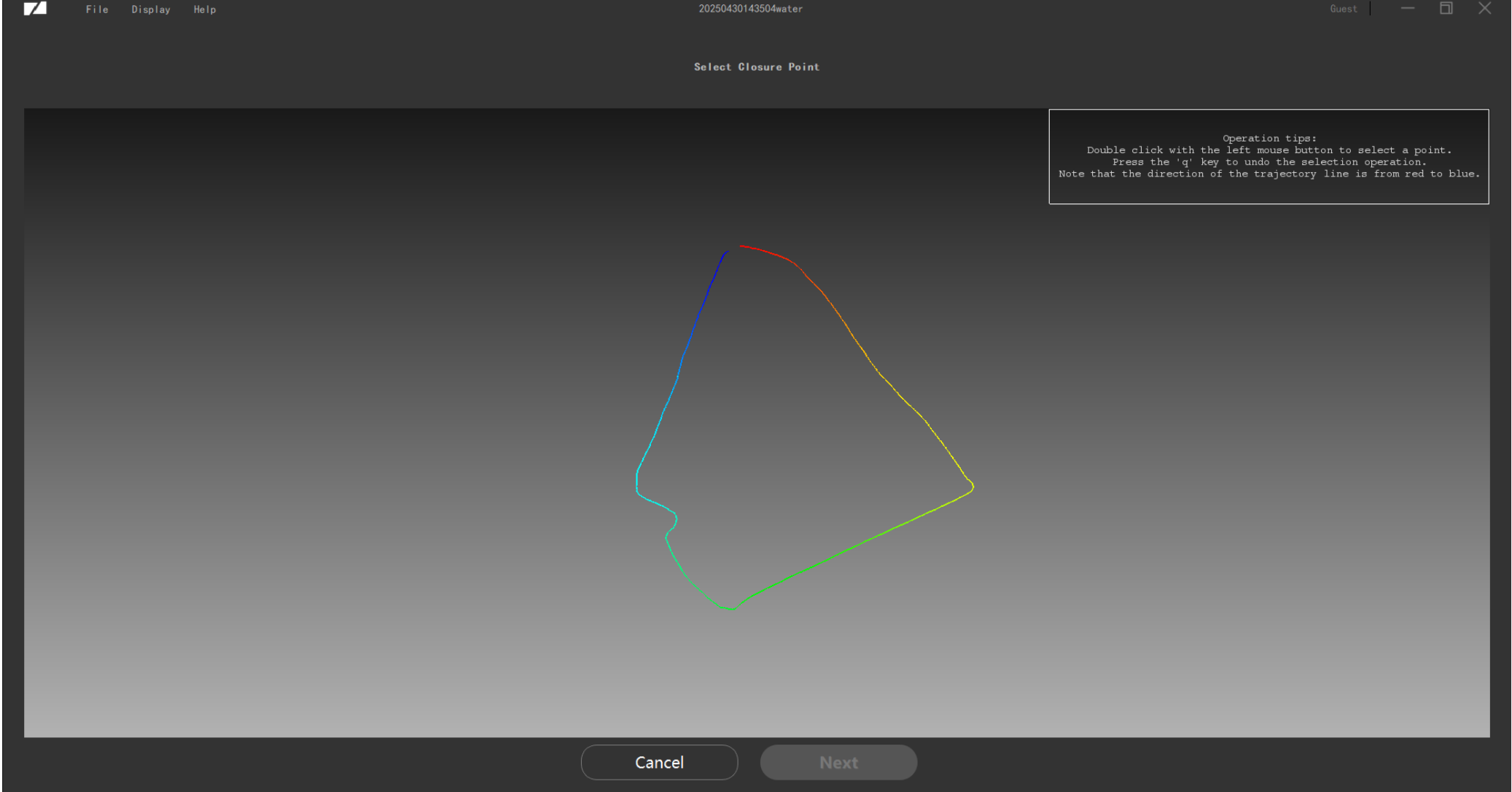


Procedure

① Click under filtering, thinning, or point cloud coloring data to enter the operation interface (take coloring data as an example) .

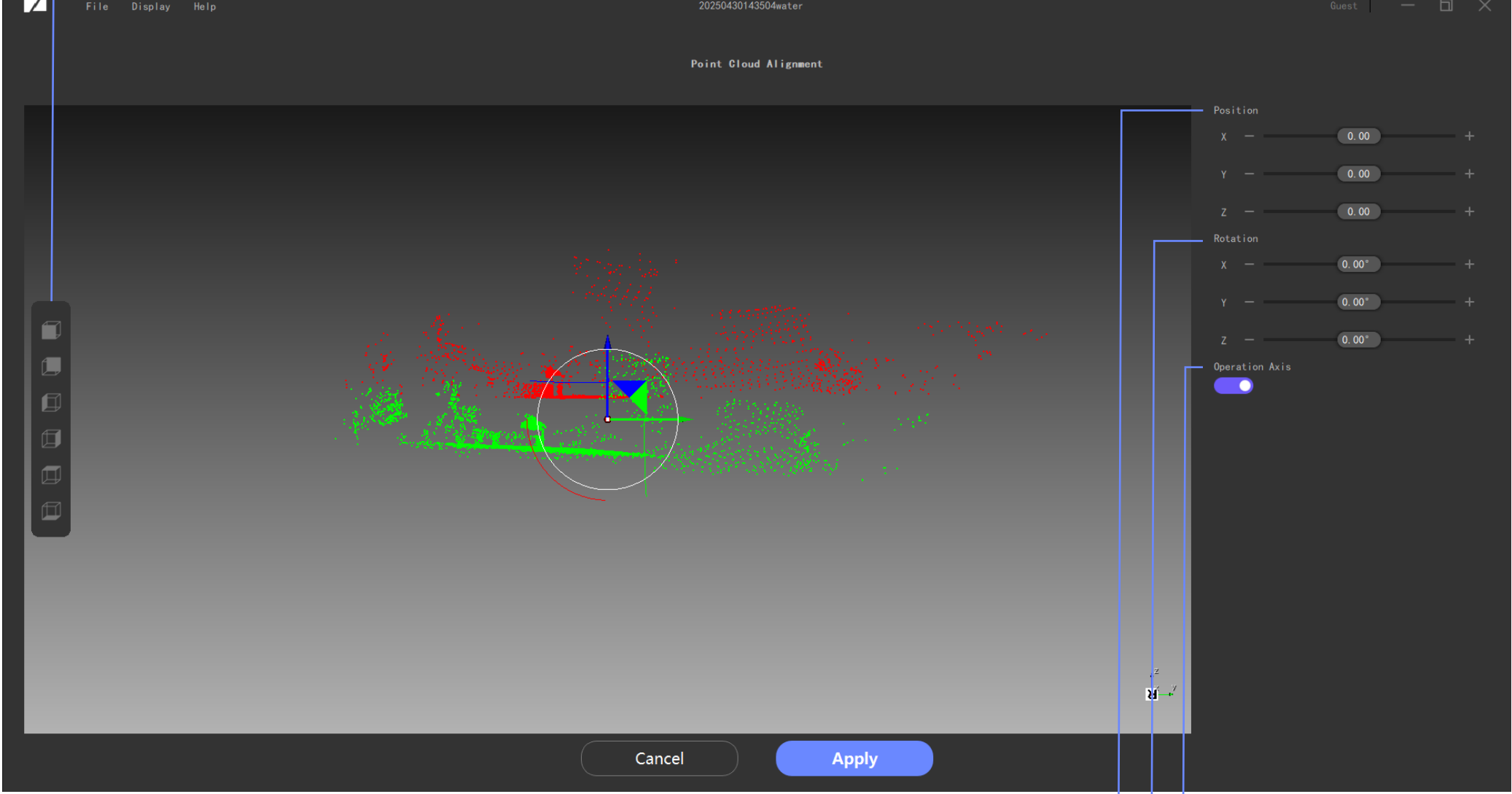


②Double-click the selected start and end points (click "Q" to unselect the points), and click "Next" to get the point cloud data of a single frame of the start and end points.

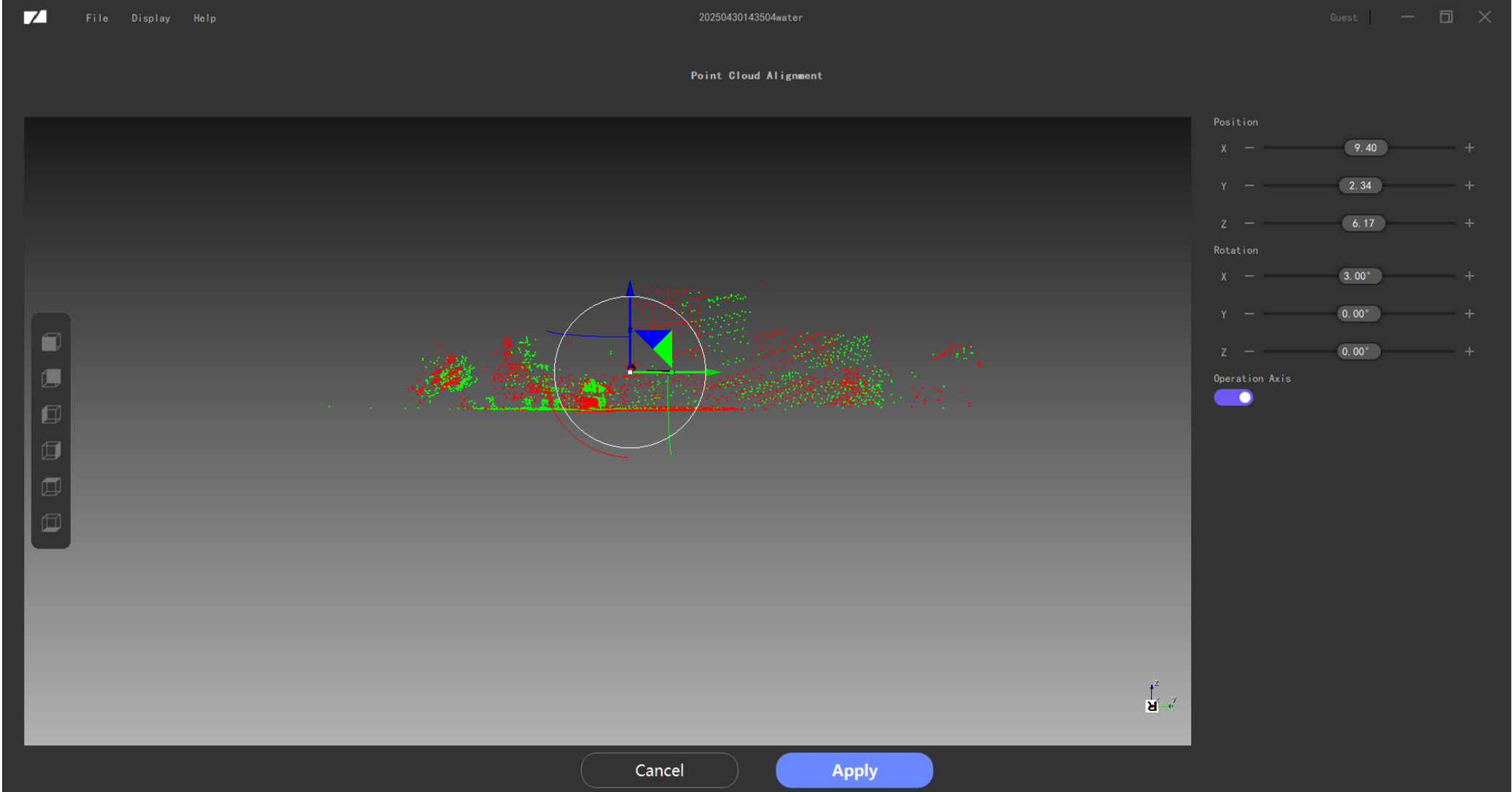


③ You can adjust the position of the green point cloud data so that the point cloud data of the two points are roughly consistent.

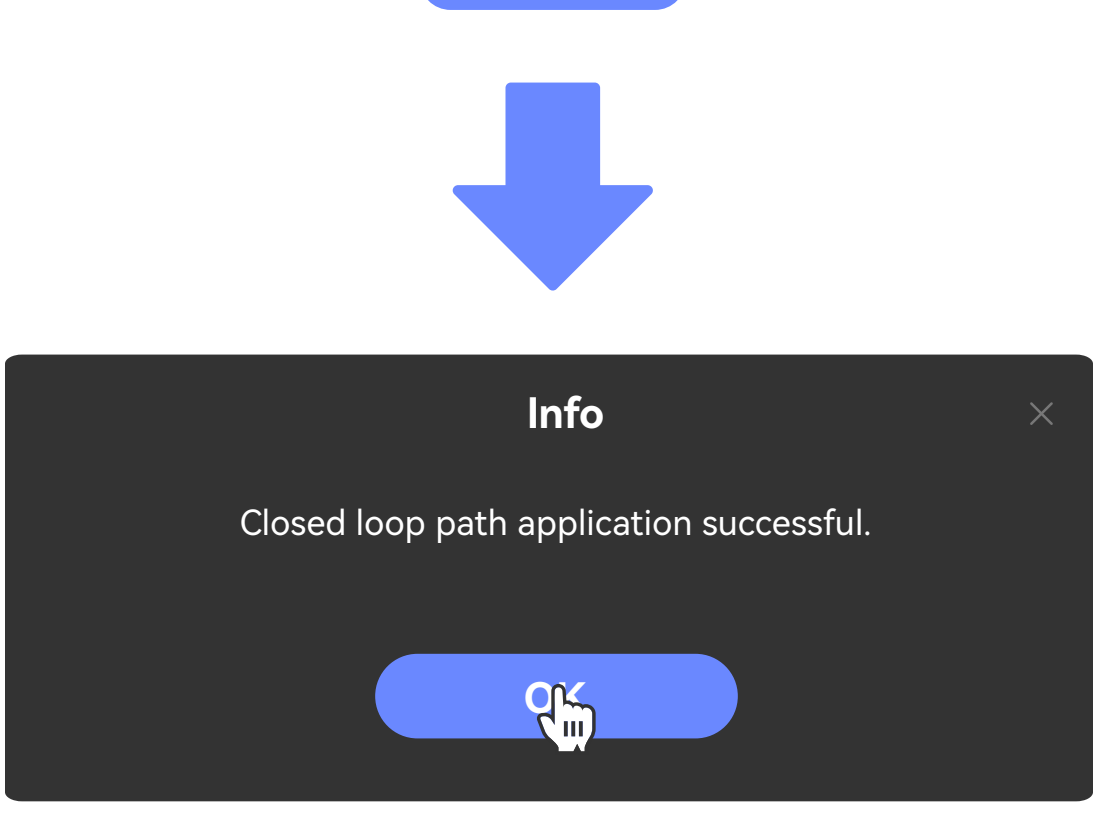
Six views, adjust the current point cloud perspective position. It is easier to see the agreement between the current two frames of the point cloud by trying to see the top view.



When enabled, a circular coordinate system with X, Y, and Z axes appears in the point cloud image, and the position can be changed by directly dragging the coordinate system



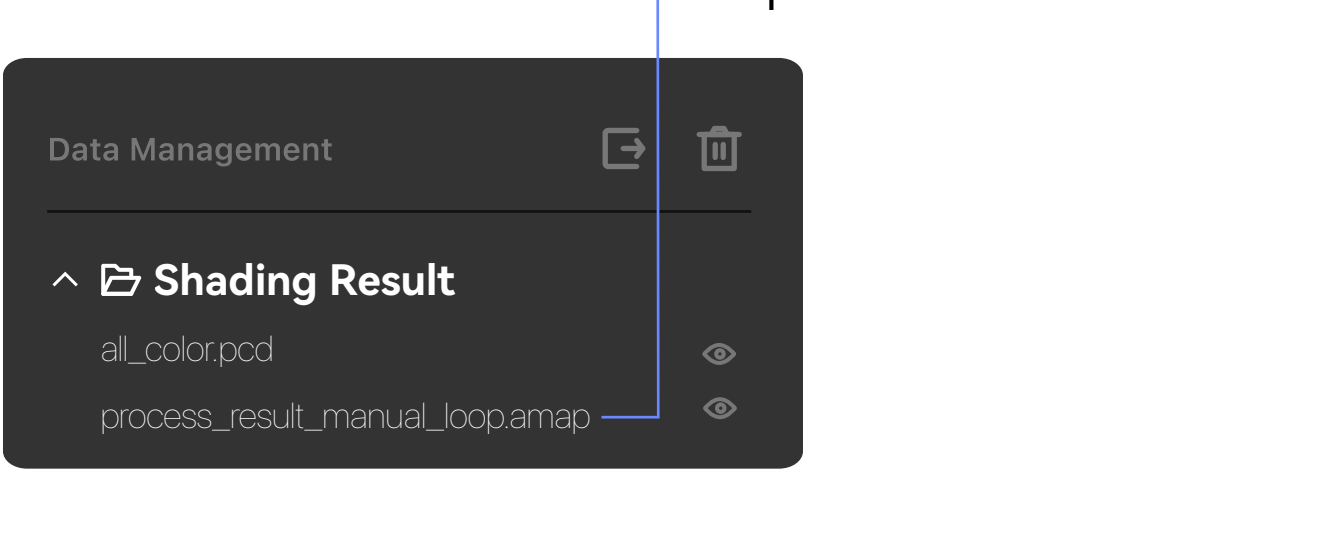
④Click "Apply" to generate the data after the point cloud is closed.



⑤ Click "Cancel" to exit the path closure screen

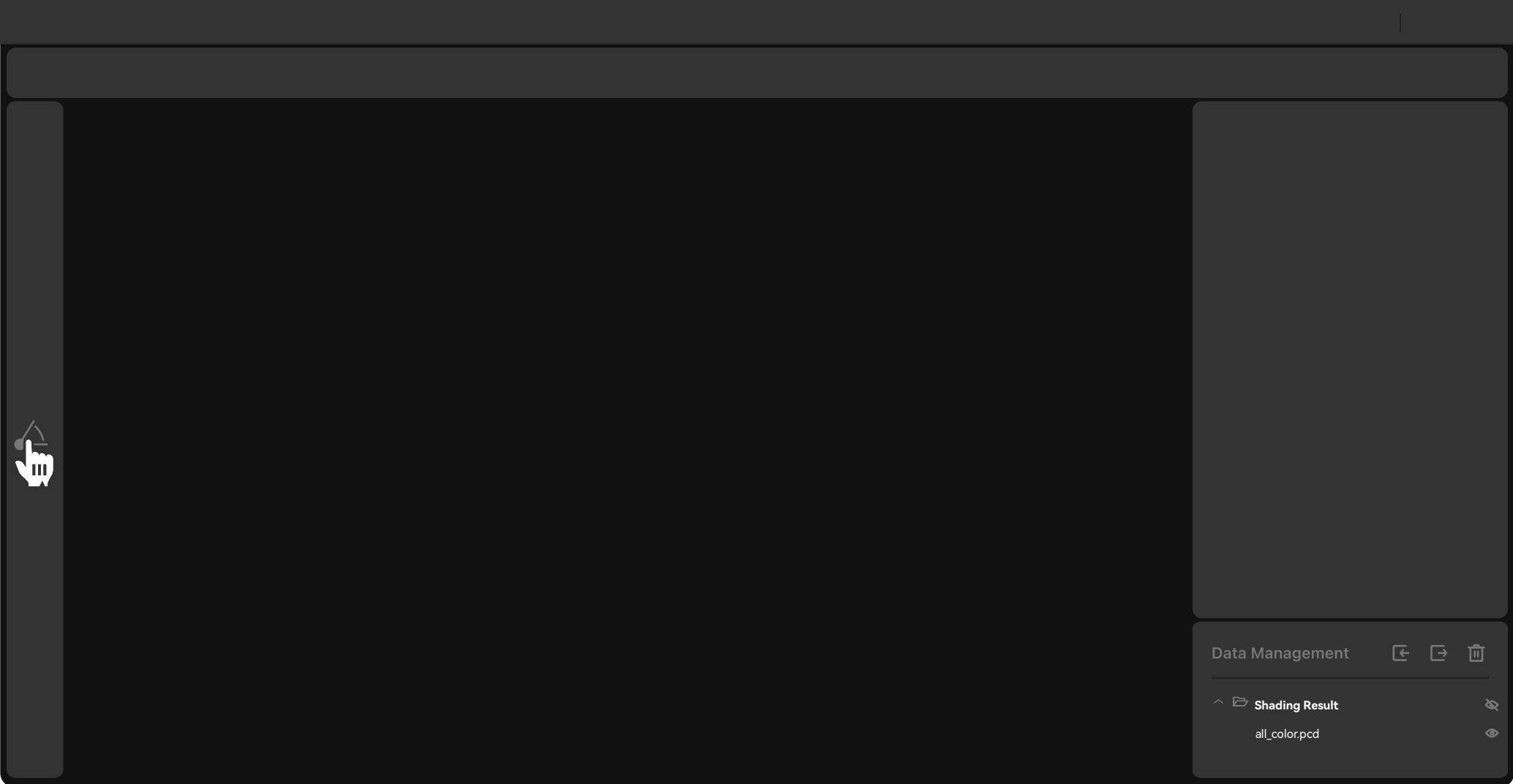


⑥ The processed data can be viewed in the data list:

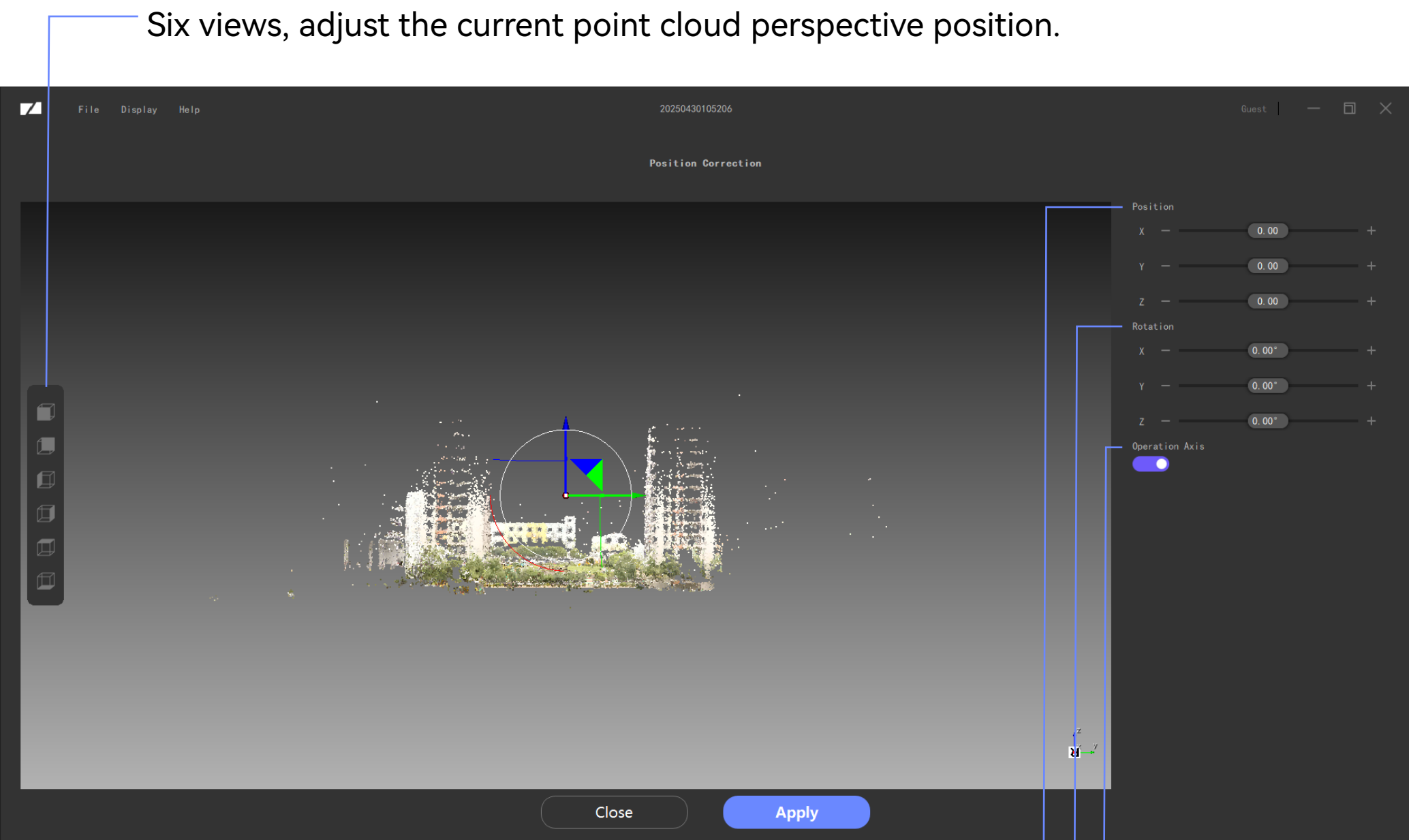


# Point cloud correction

① Click  to enter the point cloud angle correction interface.



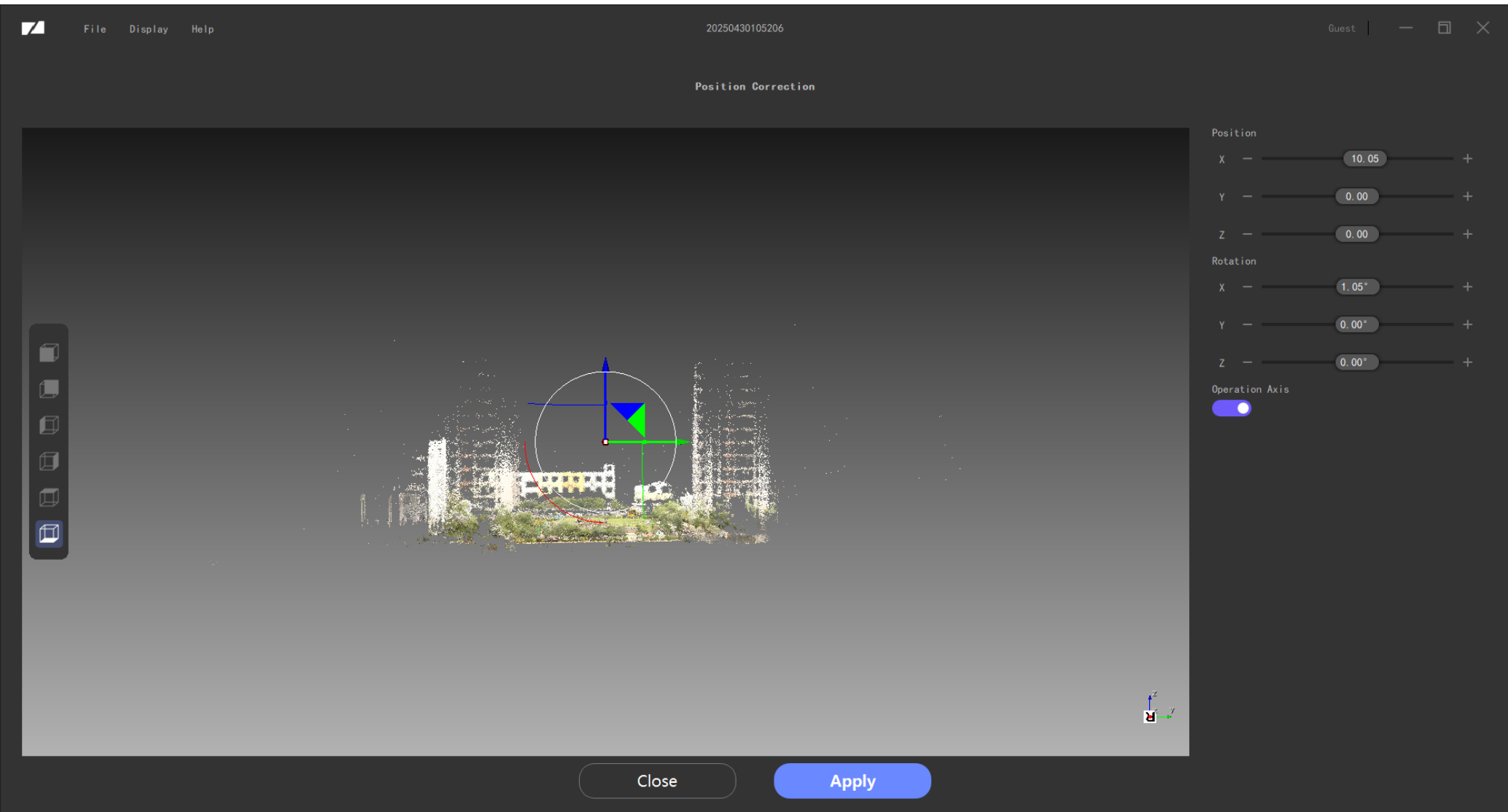
② Adjust the data location according to the requirements.



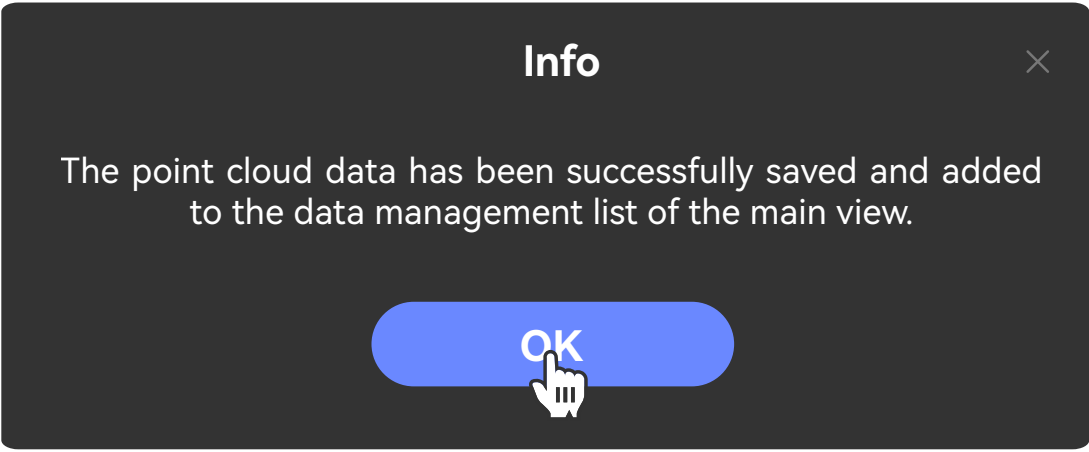
Position change by translating the X, Y, and Z axes

Position change by rotation angle of X, Y, and Z axes

When enabled, a circular coordinate system with X, Y, and Z axes appears in the point cloud image, and the position can be changed by directly dragging the coordinate system



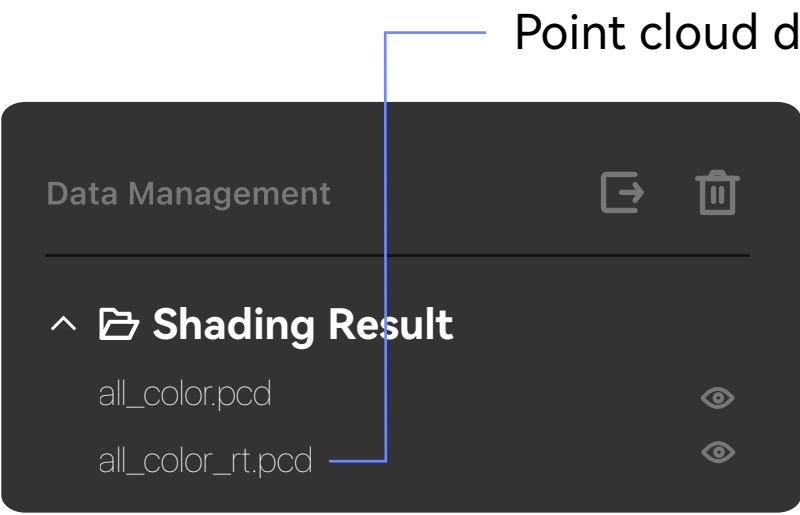
③ Click 'Apply' to generate the modified data.



④Click 'Close' to exit the point cloud correction interface.



⑤The processed data can be viewed in the data list.



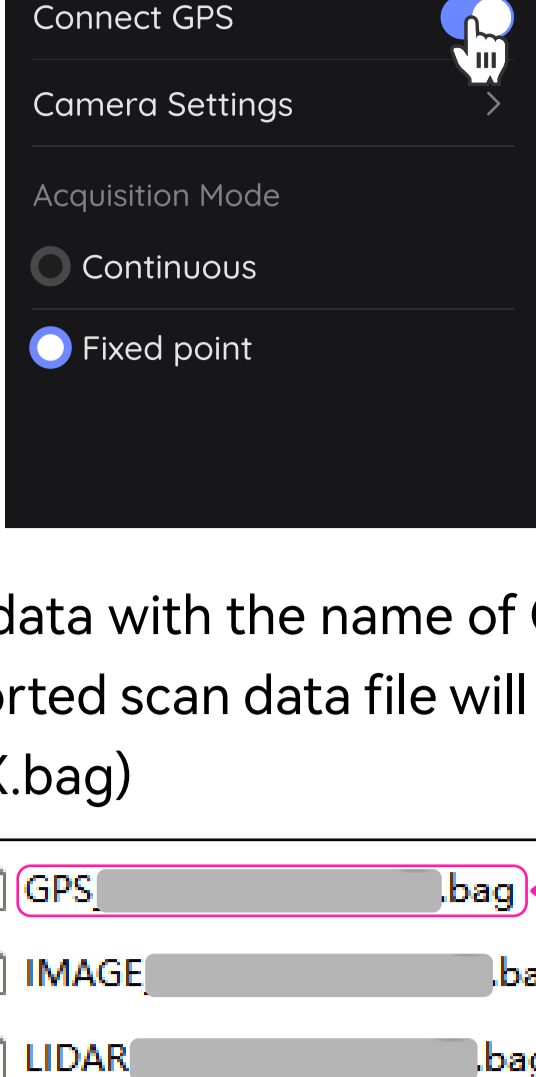
# RTK

RTK supports high-precision positioning using only the built-in GPS, as well as base station .25o Observation Data and .25p parameter files or Parameters/Position Data.

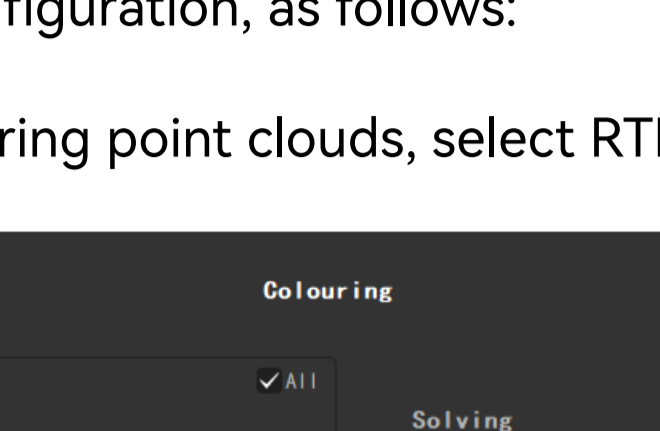
## Built-in GPS

### Scan requirements

1. GPS needs to be turned on when scanning



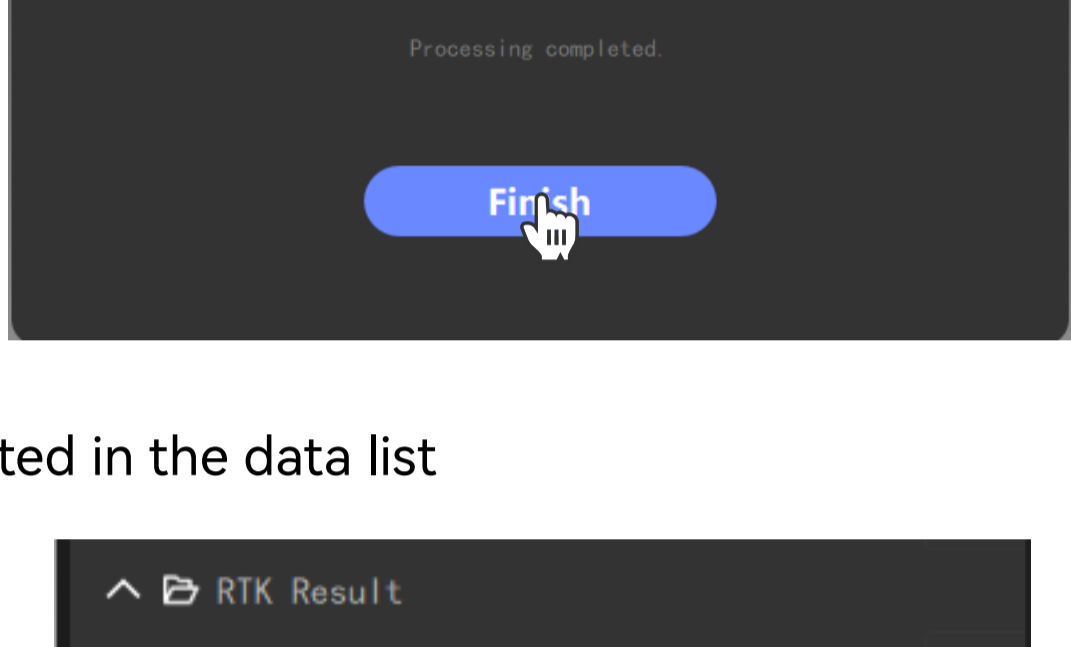
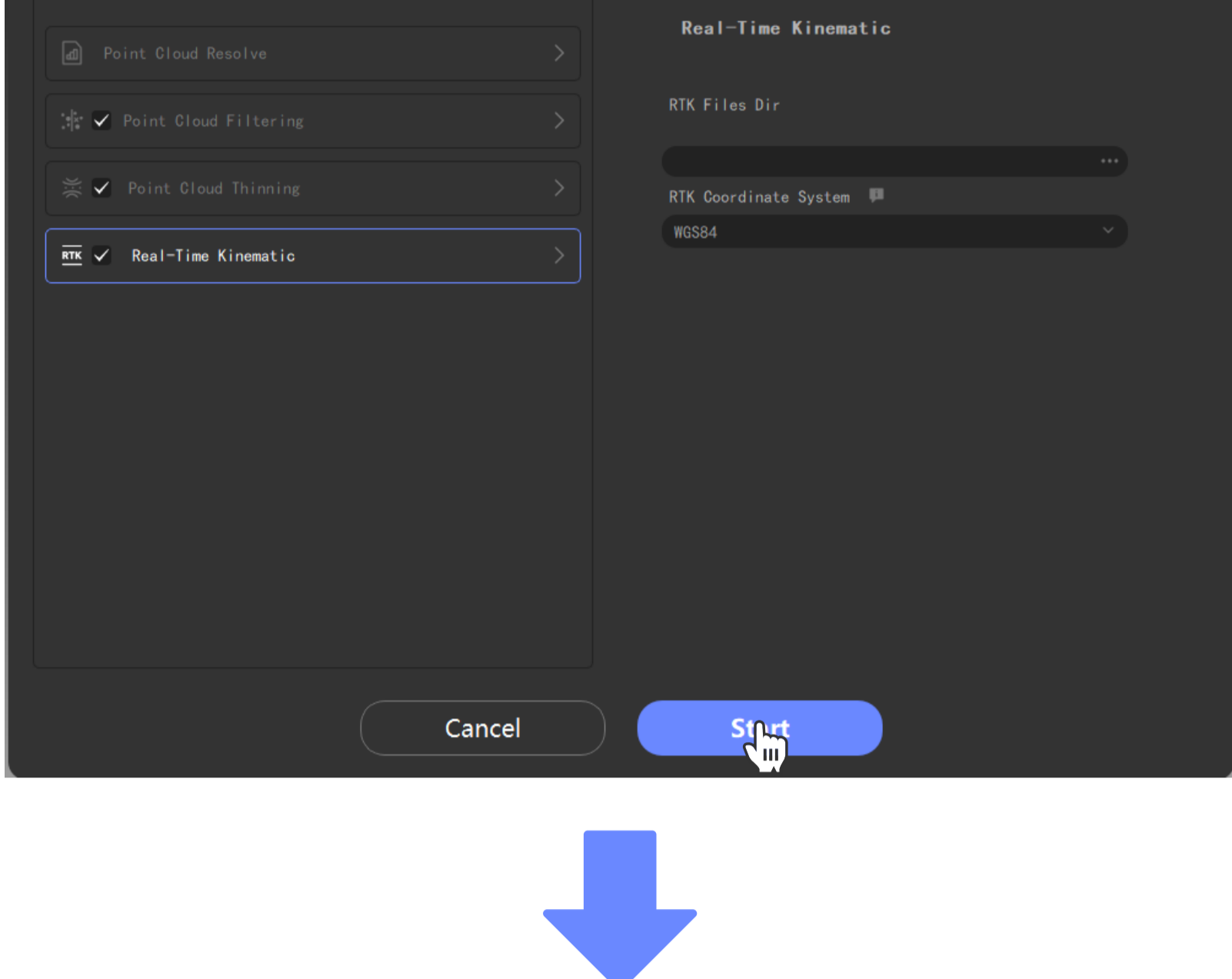
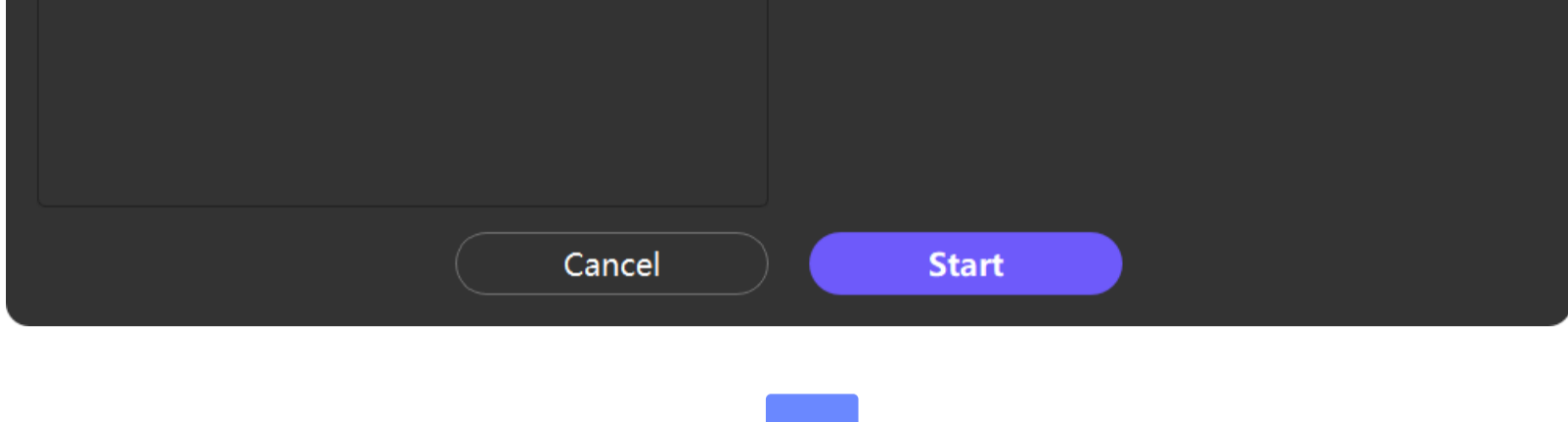
2. The exported model has the data with the name of GPS\_XXXXXX.bag (if GPS is enabled during scanning, the exported scan data file will automatically generate the data with the name of GPS\_XXXXXX.bag)



### Procedure

After importing the scan data with the name of GPS\_XXXXXX.bag, you can process it directly if you select RTK configuration, as follows:

- ①When settling data or coloring point clouds, select RTK Configuration



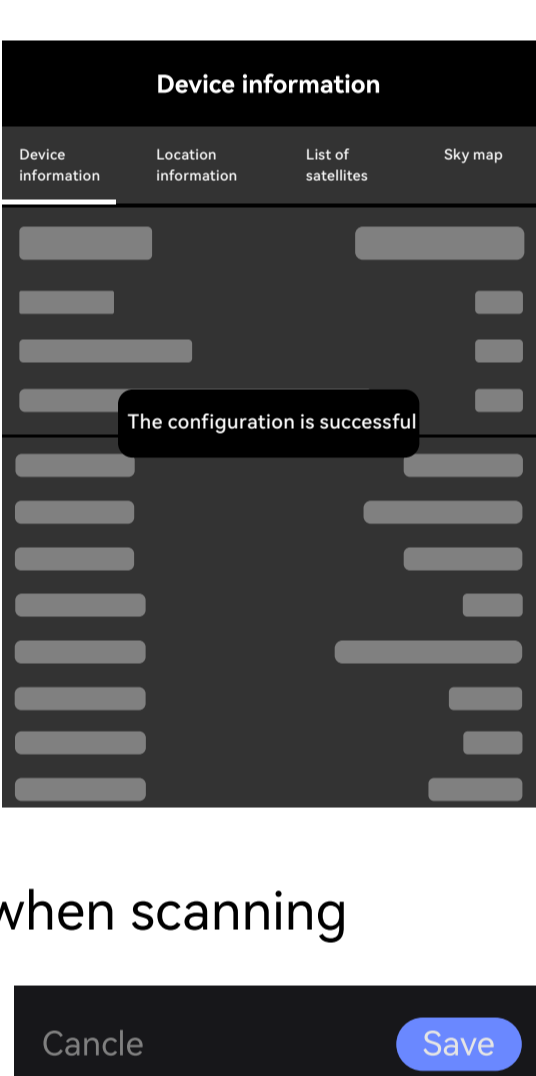
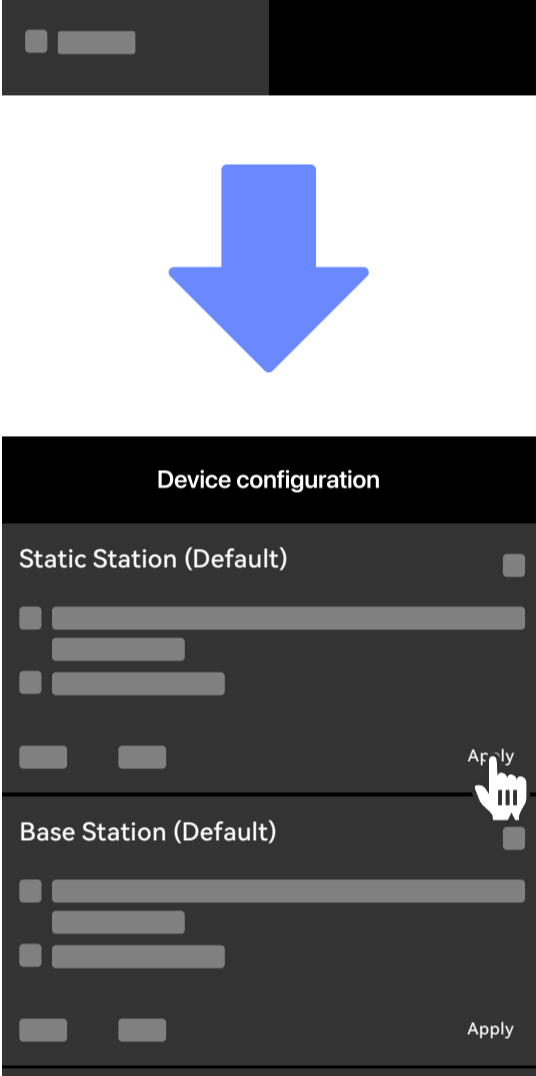
- ②RTK data is generated in the data list



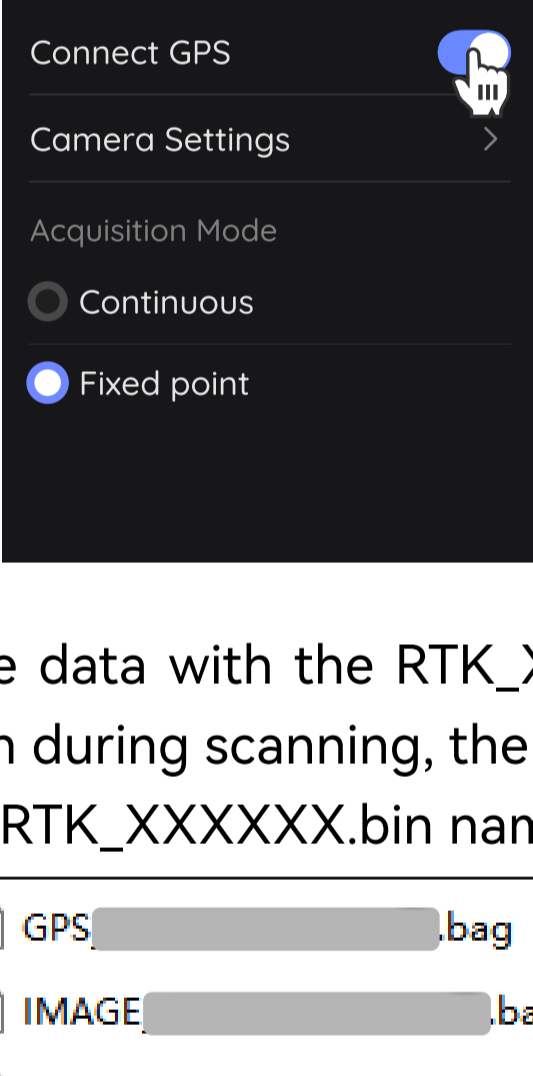
## Base station high accuracy

### Scan requirements

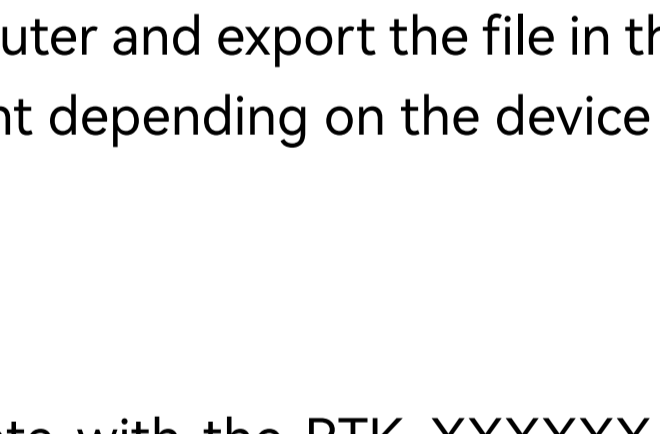
1. The scanning device needs to be a device with RTK accessories (including built-in chip and external GPS)
2. Turn on the base station before scanning
- a. Turn on the base station host and keep it stationary
  - b. Connect the base station handbook with the host
  - c. Select a static station (you can refer to the following operations, different brands of equipment are different, for reference only)



3. GPS needs to be turned on when scanning



4. The exported model has the data with the RTK\_XXXXXX.bin name (for specific RTK devices, if GPS is turned on during scanning, the exported scan data file will automatically generate data with RTK\_XXXXXX.bin name)



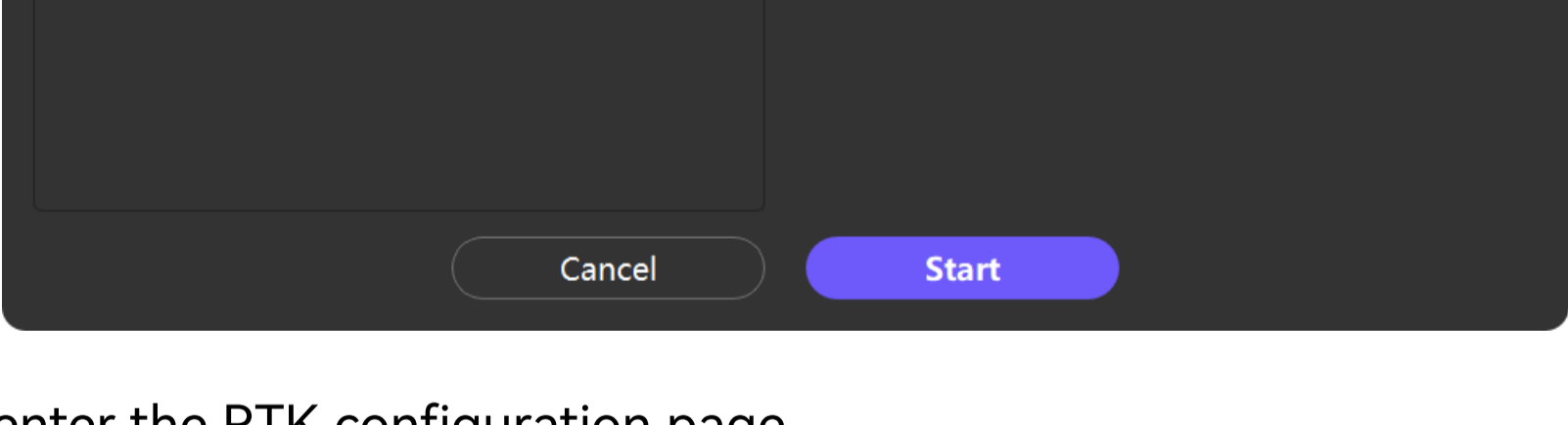
### Other requirements

You need to get the relevant files for .25o and .25p from the RTK base station. (Connect the base station to the computer and export the file in the "Static Record File", the operation may be slightly different depending on the device used)

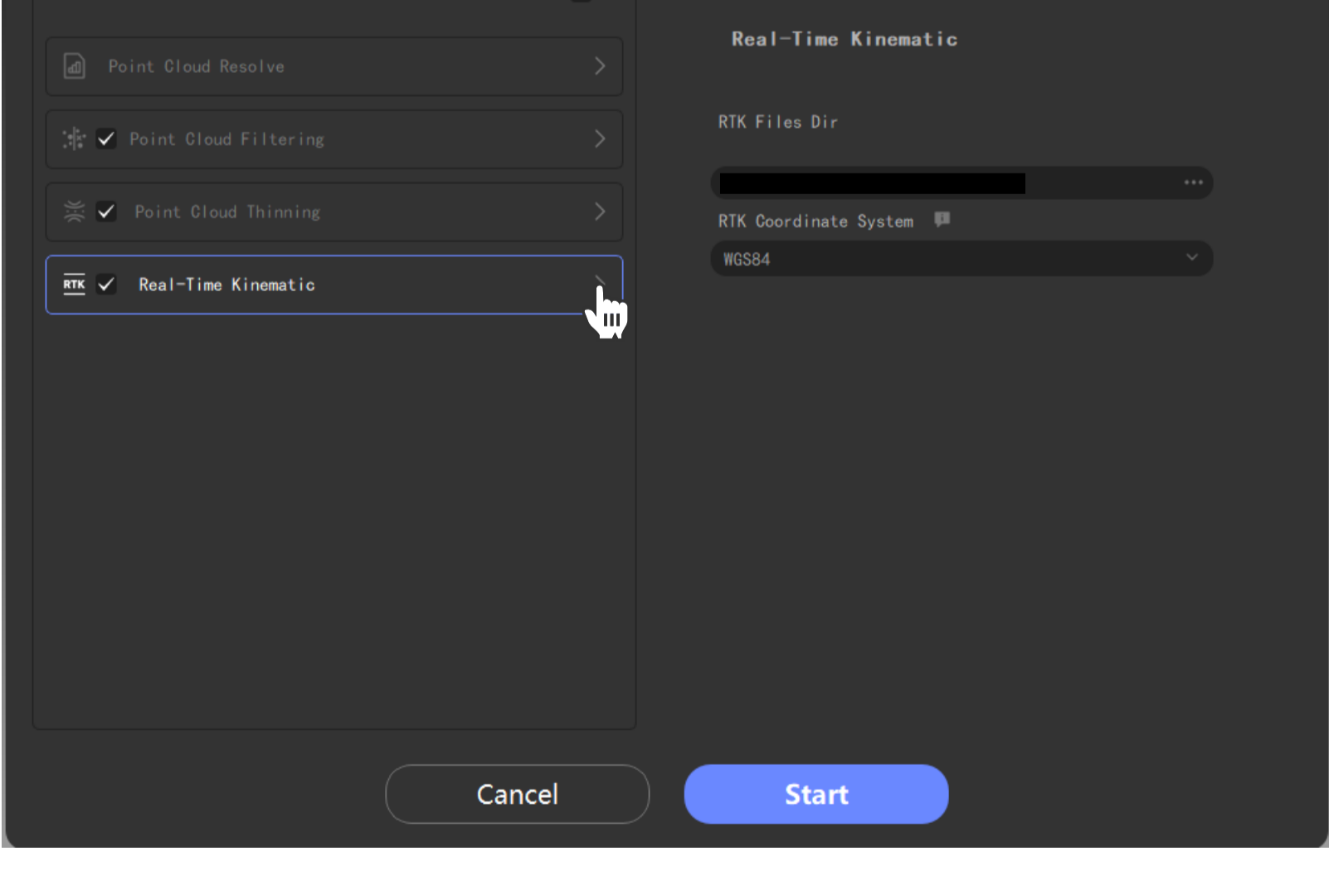
### Procedure

After importing the scan data with the RTK\_XXXXXX.bin name, if you select RTK Configuration, you can import the file path obtained from the RTK base station to perform RTK-related processing, as follows:

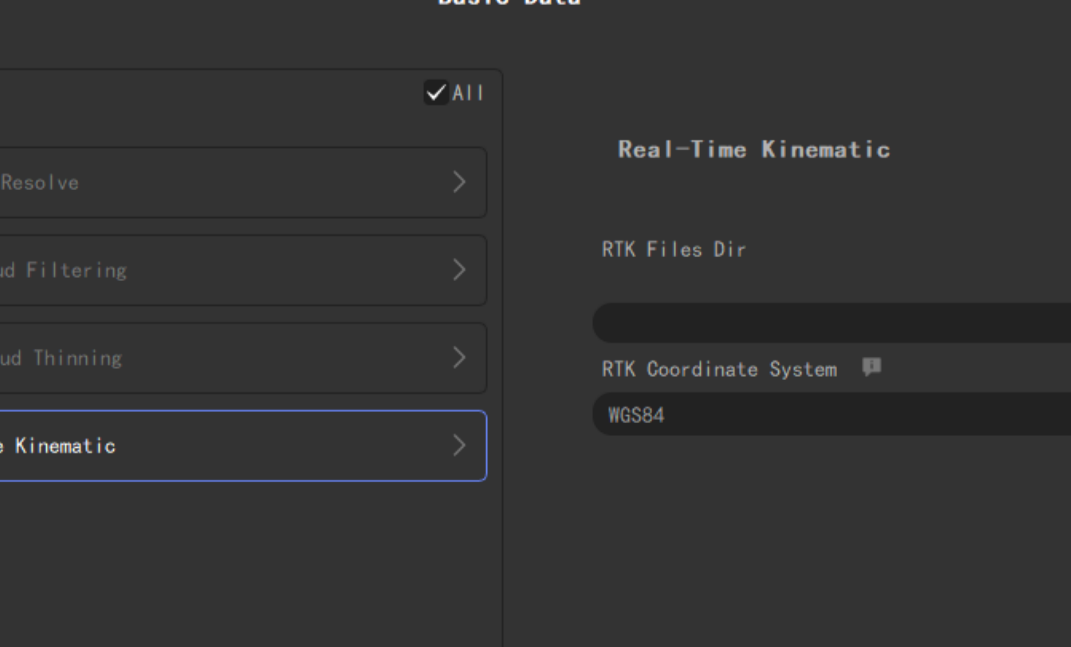
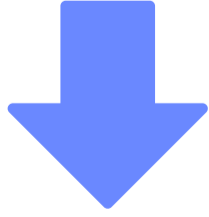
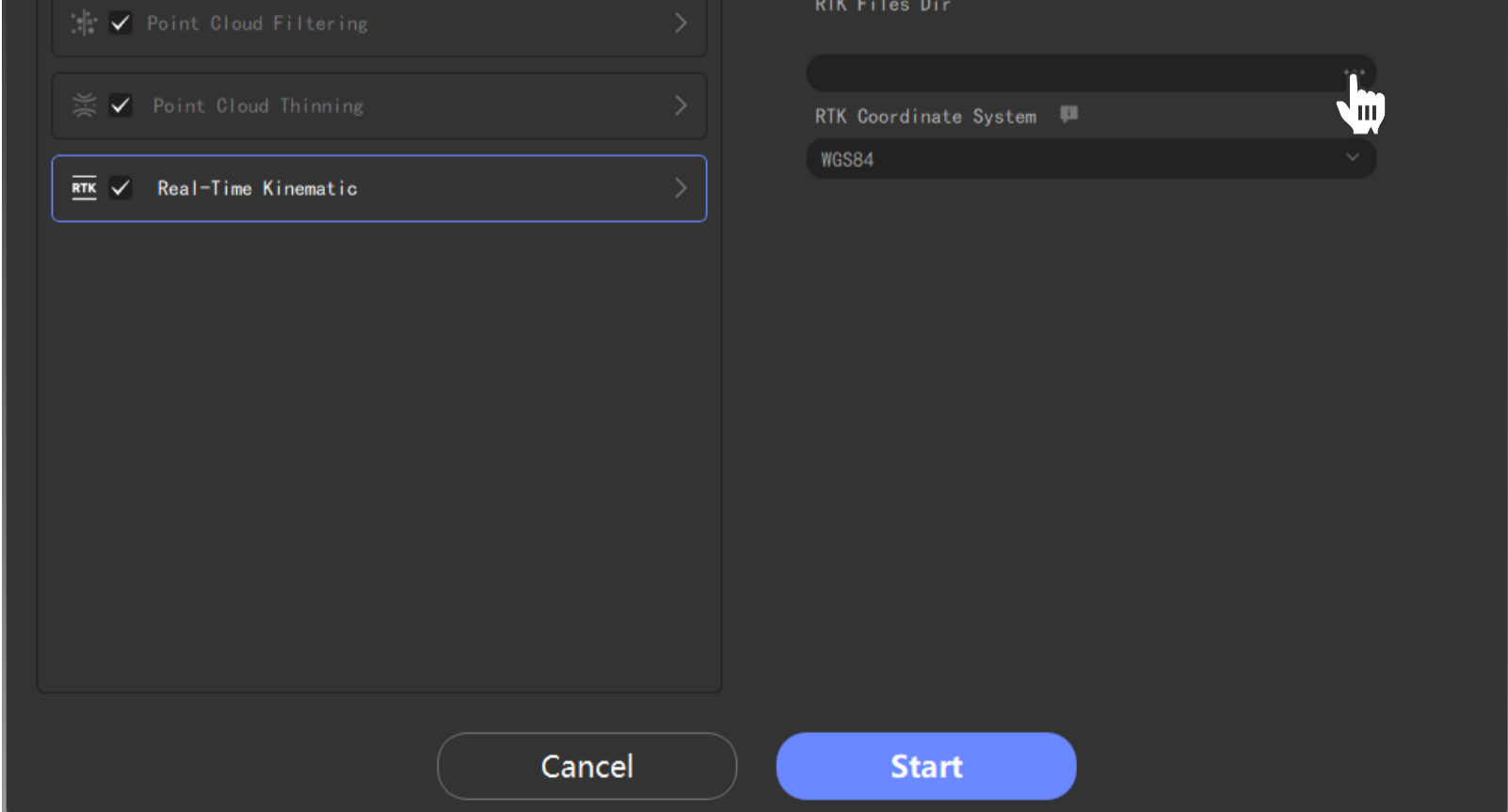
- ①When settling data or coloring point clouds, select RTK Configuration



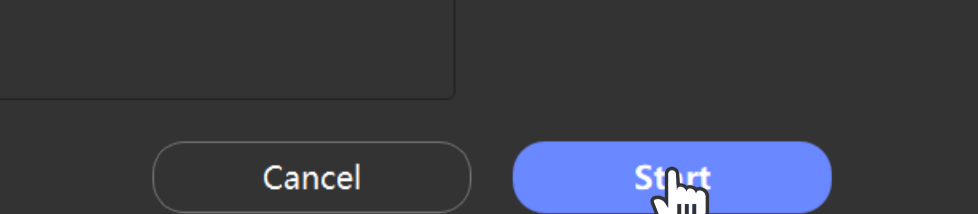
- ②Click to enter the RTK configuration page



- ③Select the folder corresponding to the local RTK base station (containing .25o and .25p data) and click to start data processing

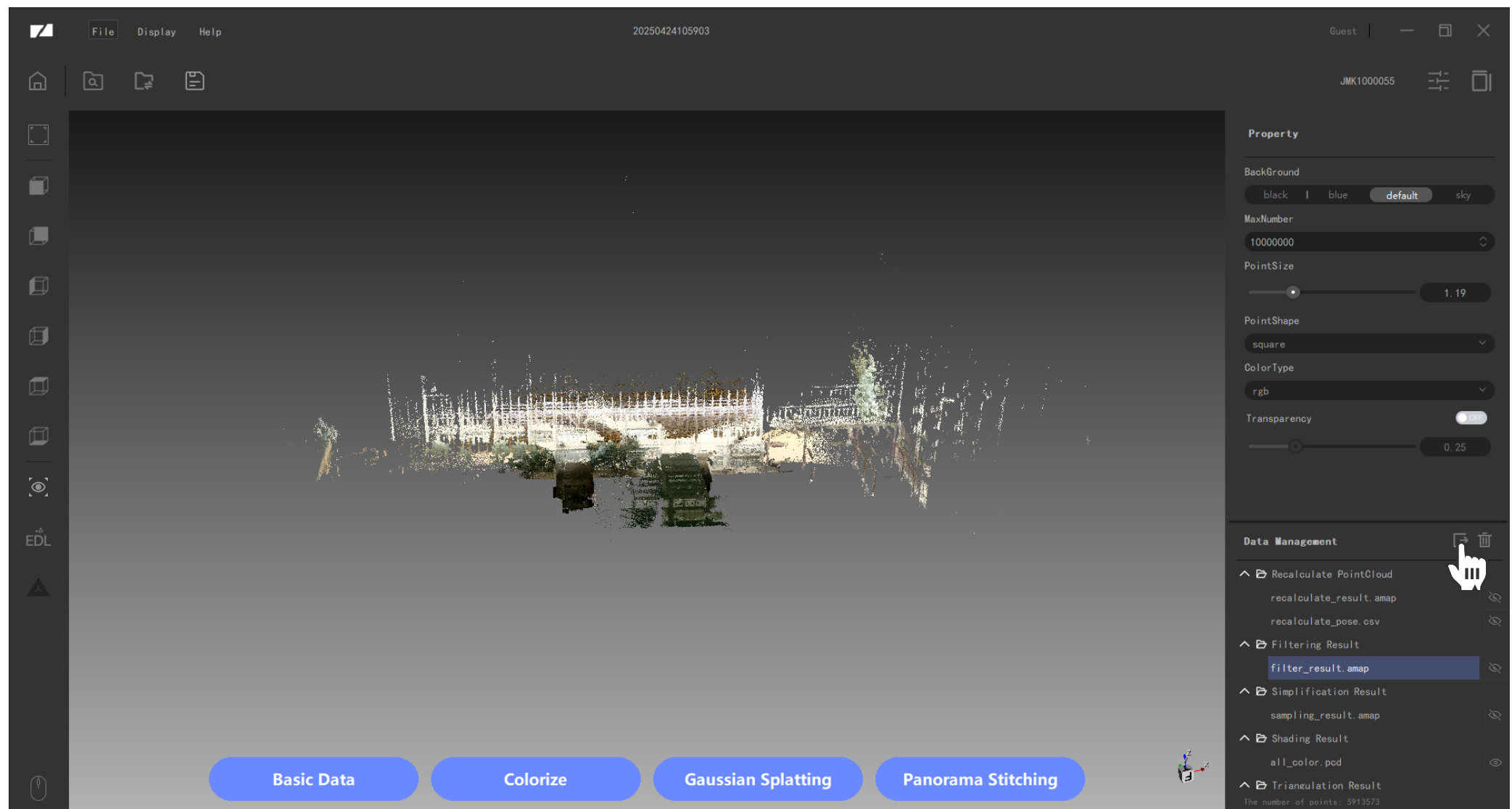


- ④RTK data is generated in the data list



# Export the Model

Click "Export" in the "Data Layer List" at the bottom right:



At present, the software point cloud data supports the export of LAS, PCD, PLY formats, and more model formats will be added in the future, thank you for your attention!