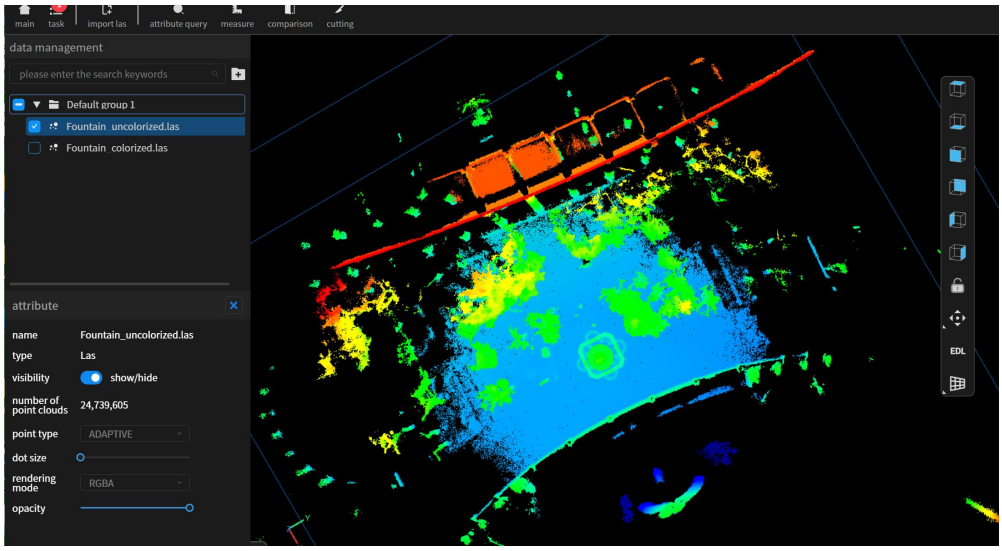
SHARE 赛尔

SHARE PointCloud Studio

Instructions V2.0



SHAREUAV Ltd

Content

Chapter 1 Software Introduction

1.1. Software Overview

SHARE PiontClouds Studio is an office processing tool software designed for SHARE handheld 3D laser scanners. The software provides functions such as project management, raw data parsing, and 3D point cloud viewing and analysis. Complementing SHARE handheld LiDAR products, it covers the entire workflow from data acquisition to data parsing and analysis, comprehensively supporting the application of 3D laser point clouds.

Supported device models: SHARE SLAM S10 (referred to as 'S10'), SHARE SLAM S20 (referred to as 'S20').

Figure 1-1 Software Main Interface

1.2. Software Function Layout

1.2.1. Project Management Interface

Upon launching the software, it defaults to the main interface (the "Project Management Interface"). The functional layout of the main interface is shown below:

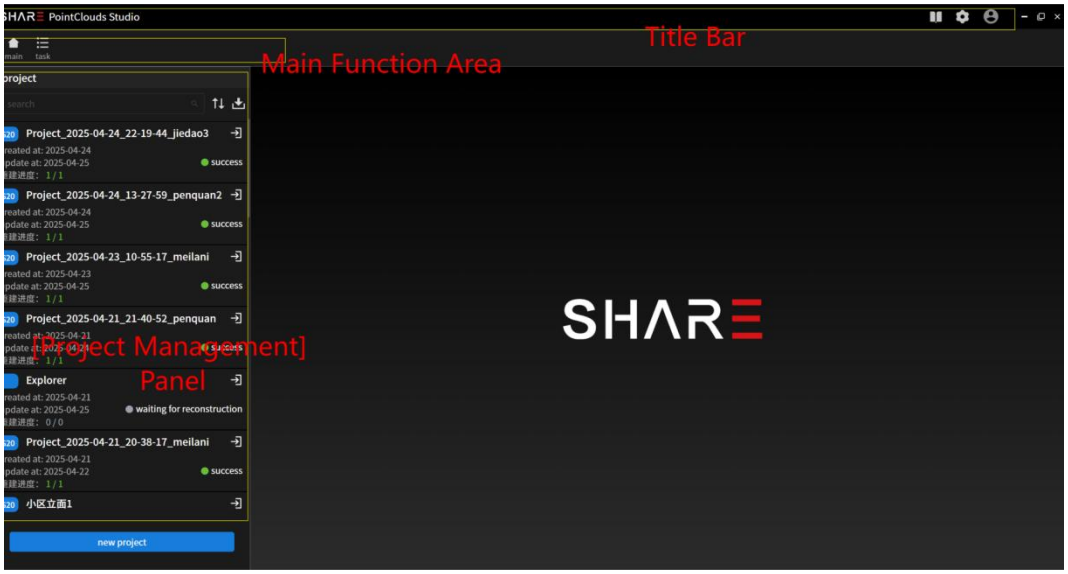


Figure 1-2 Software Main Interface Function Layout

Title Bar: Located at the very top of the software. Displays the company logo and software name, and provides access to the user manual, software settings, user login, as well as minimize/maximize/close controls for the software window.

Main Function Area: Located below the Title Bar. Contains shortcuts to common software functions related to the interface, including (Return to) Main Interface and (View) Tasks.

Project Management: Located on the left side of the software. Displays existing projects and their statuses, and provides operational entries for

projects, including New Project, Import Project, Open Project, Configure Project, Open Project Folder, Delete Project, and Export Project.

1.2.2. Project Browsing Interface

Double-click a specific project to enter the "Project Browsing Interface". The functional layout of this interface is shown below:

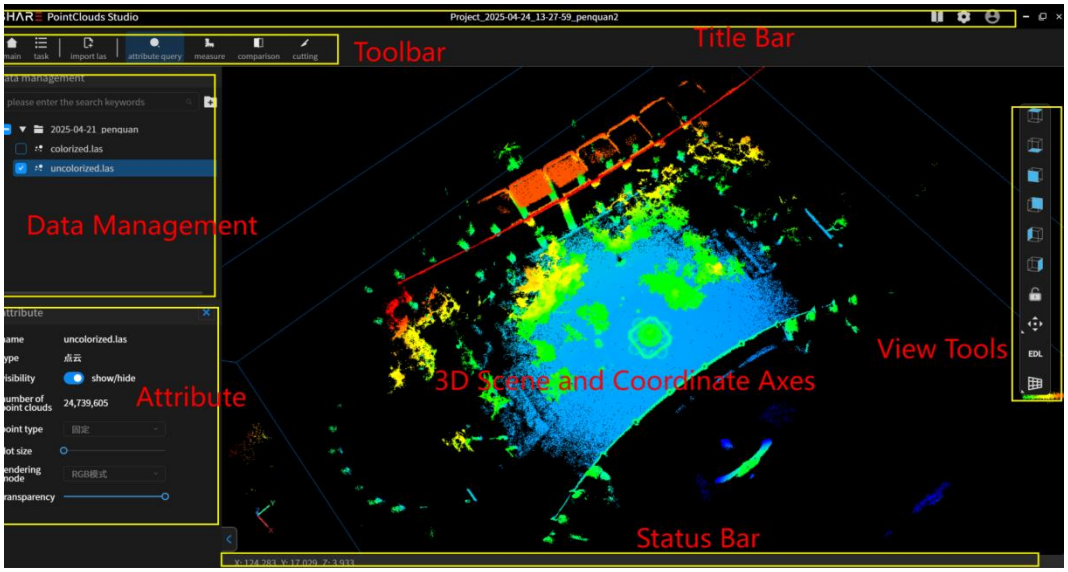


Figure 1-3 Project Browsing Interface Function Layout

Title Bar: Located at the very top of the software. In addition to providing the same functions as the main interface's Title Bar, it also displays the name of the currently open project in the central area.

Toolbar: Contains return to home page, task management, and "point cloud" related tool functions, such as importing las, cropping, attribute query, measurement, sectioning, point cloud comparison, and image comparison.

Data Management: located on the left side of the software. Manage the data

of the current project, including point cloud, measurement layer, track line, photo point, etc.

Attribute: Located on the left side of the software. Attribute information of point cloud and measurement layer data, some attributes can be set.

3D Scene and Coordinate Axis: 3D data display area, supporting translation, rotation, scaling and other operations; coordinate axis is used to indicate the posture of data in the scene.

View Tools: set the display effect of 3D scene data, including setting the viewing angle (top/front/left/back/right/bottom), locking/unlocking the view, switching the view mode, EDL special effects, glass special effects and roaming mode switching, etc.

Status Bar: Located at the bottom of the software, it displays data coordinate information and general prompt.

Chapter 2 Software Installation and Authorization

2.1. Hardware and Software Requirements

To ensure smooth software operation, the recommended configuration is as follows:

CPU	Intel® Core™ i7-10700H@2.90 GHz（or AMD equivalent processor）
Graphics Card	GeForce RTX2060 4GB
RAM	32GB
Storage	64GB or more available hard disk space
Operating System	Windows 11 series

2.2. Software Installation, Upgrade, and Uninstallation

2.2.1. Software Installation

After obtaining the software installer, double-click to run it. In the software installation wizard, click "Next" step-by-step to quickly complete the installation. Default settings can be used for all options.

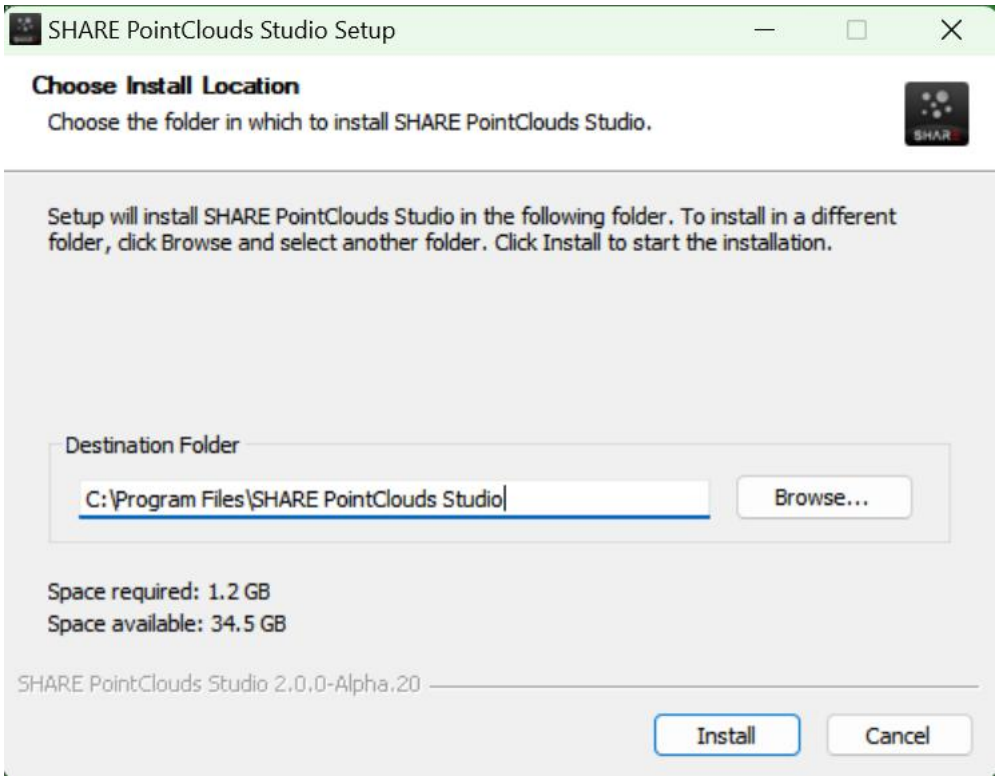


Figure 2-1 Software Installation Interface

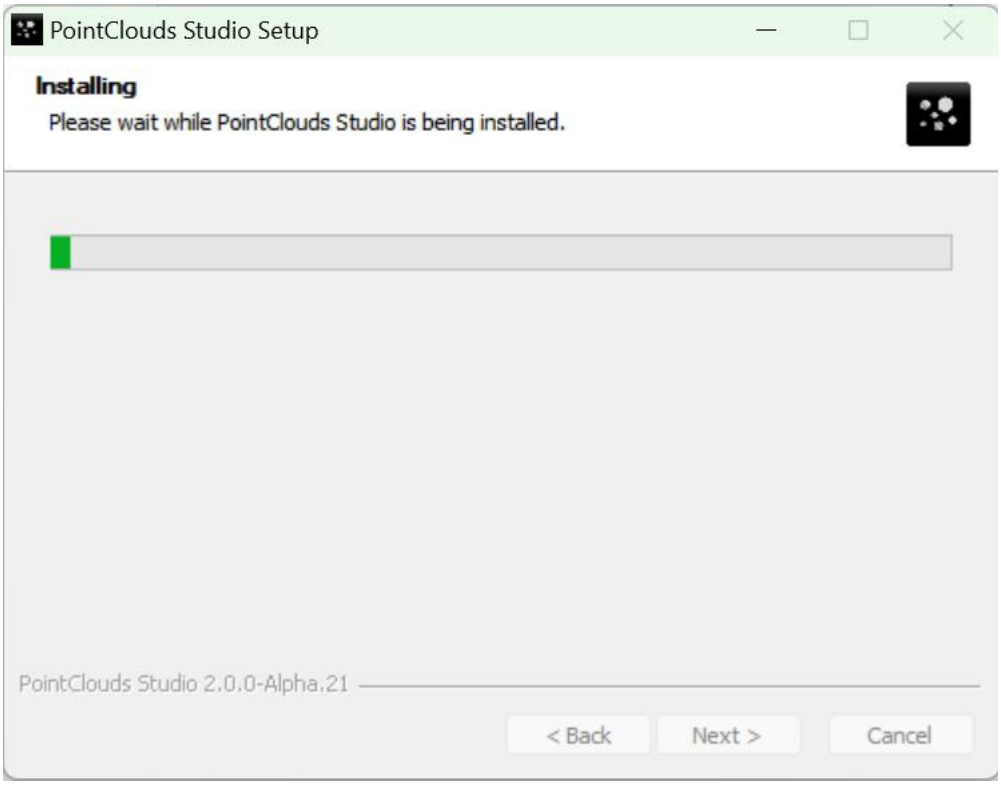


Figure 2-2 Software Installation Process Interface

2.2.2. Software Upgrade/Update

When a new version of the software is available, a pop-up window will prompt you to upgrade. Click the "Update Now" button to download the latest installation package.

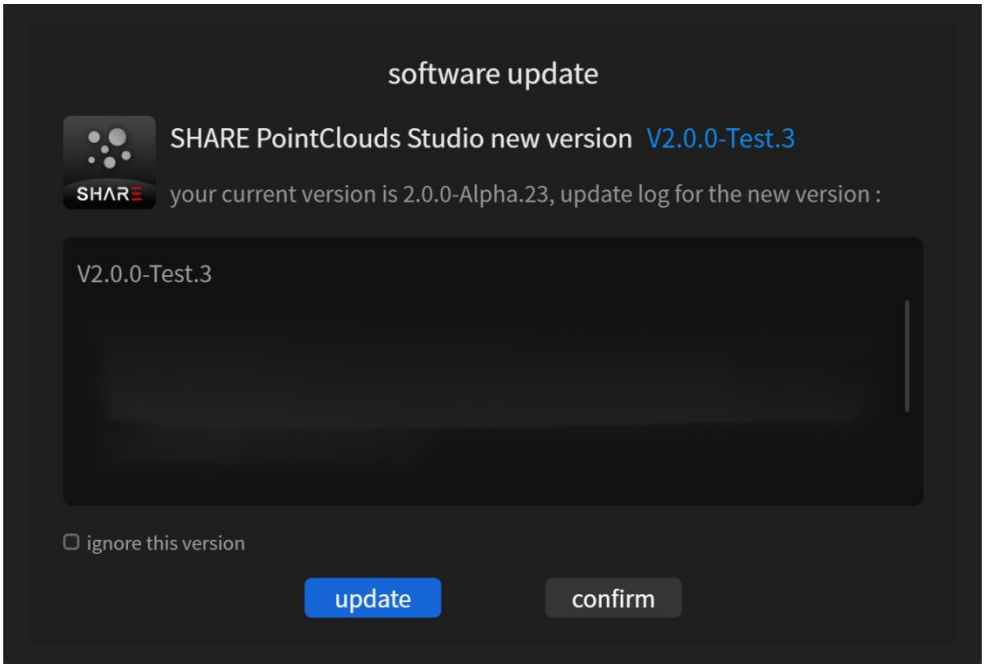


Figure 2-3 Application Update Pop-up

Once the download is complete, click "Exit Application and Install Update" to perform the software upgrade.

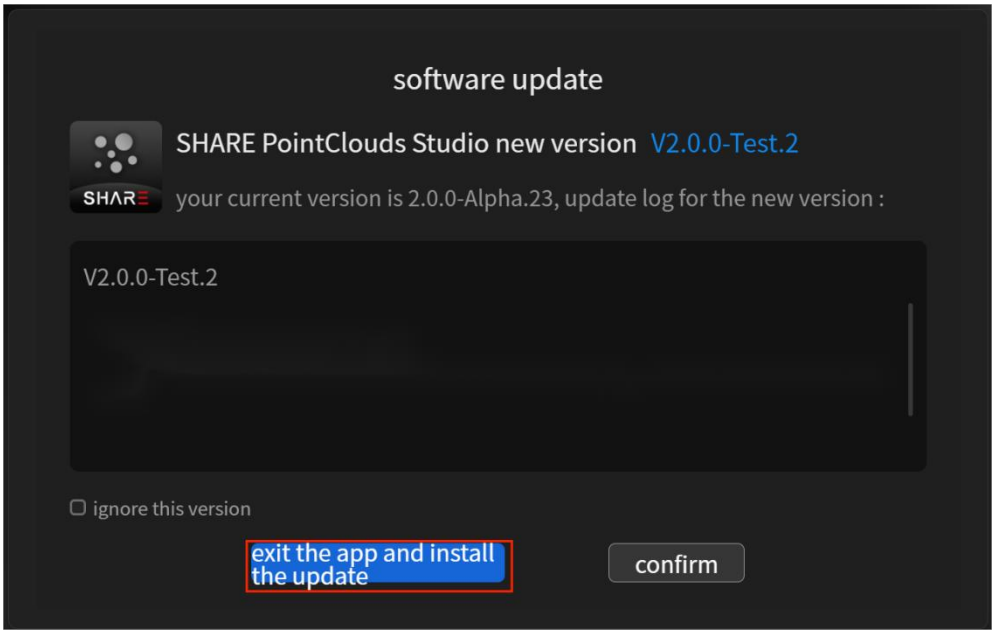


Figure 2-4 Install Update

Alternatively, you can go to the "System Settings" panel and click "Update" to see if a new software version is available.

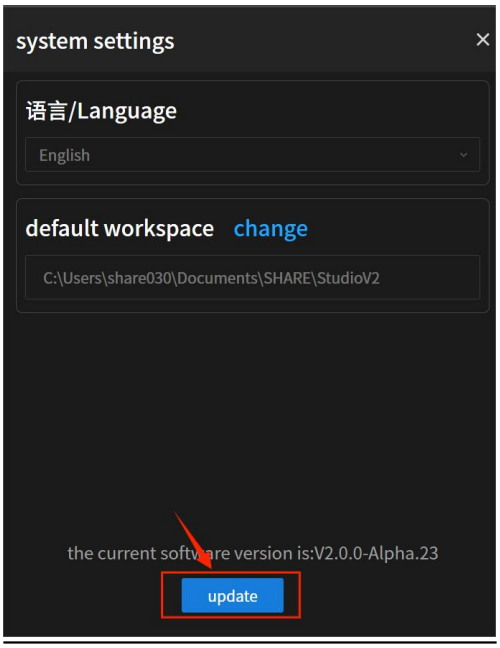


Figure 2-5 Check for Updates

Note: Software update notifications depend on network connectivity. Please ensure your computer has a stable internet connection to keep your software up-to-date.

2.2.3. Software Uninstallation

Using Windows File Explorer, browse to the directory where the software is installed. Double-click "Uninstall SHARE PointClouds Studio.exe" to start the uninstallation process.

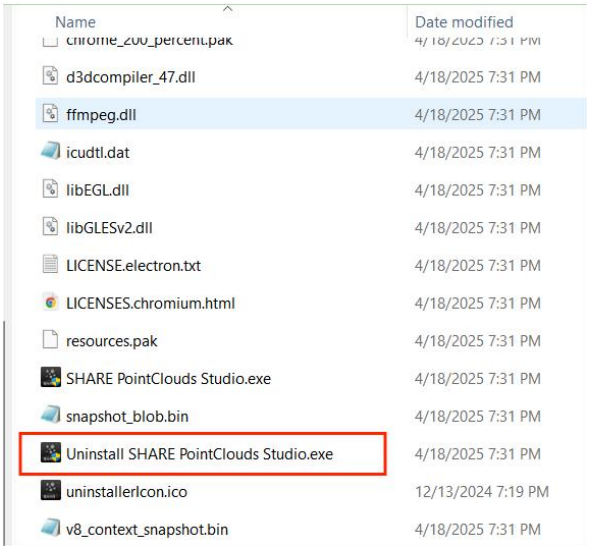


Figure 2-6 Software Uninstaller Program

In the software uninstallation window that appears, click "Uninstall" to proceed with the uninstallation.

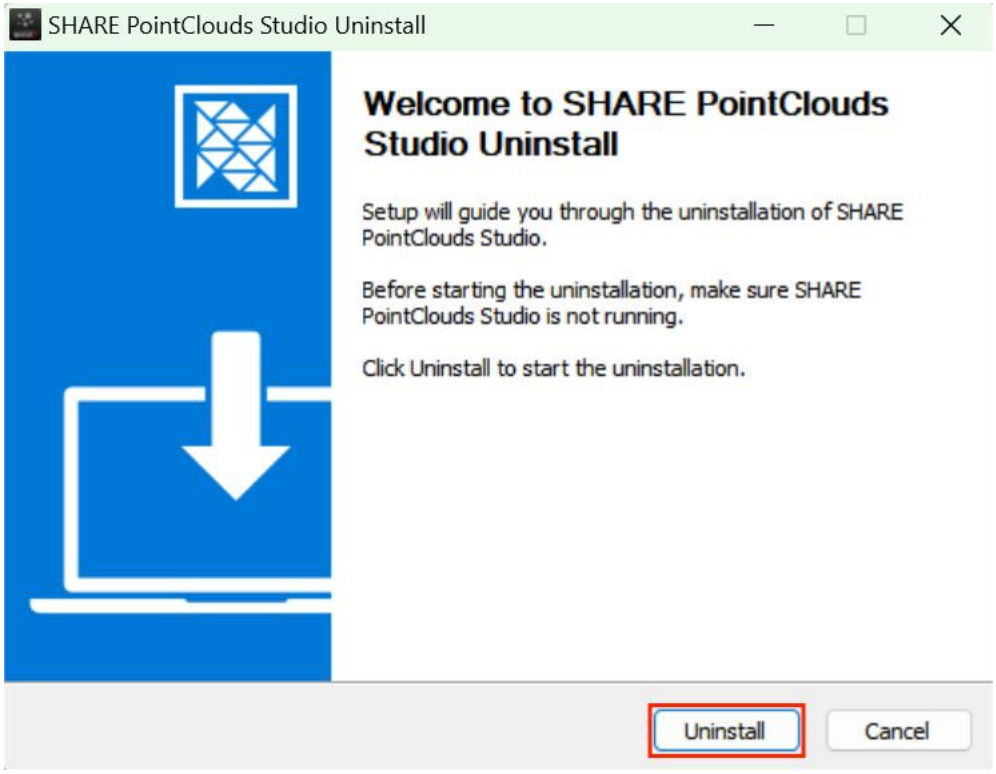


Figure 2-7 Software Uninstallation Interface

2.3. Software Authorization (required only for 'S10')

Note: Software authorization is only required for processing data collected by the SHARE SLAM S10 device. This step is not necessary for the SHARE SLAM S20.

The software uses a "Hardware Lock" method for authorization. Before proceeding with authorization, please prepare the "Hardware Dongle" encryption device and ensure the "Encryption Driver" is installed

2.3.1. Obtaining the "Hardware Dongle"

Typically, a "Hardware Dongle" encryption device is included with your purchase of the SHARE SLAM S10. If you do not have one, please contact official SHARE technical support to obtain it.

2.3.2. Encryption Driver Installation

The encryption driver is installed concurrently during the main software installation process. If successfully installed, you can find the following icon in the "Windows Hidden Icons" area (system tray):

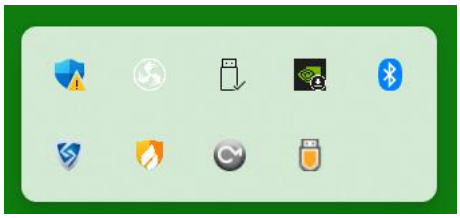


Figure 2-8 Encryption Driver Icon

2.3.3. Software Authorization

Insert the "Hardware Dongle" into your computer. Open the driver's Virbox User Tool interface. Under the "Hardware Lock- Local Encryption Lock" section, you should see the software authorization information. The following display indicates successful authorization:

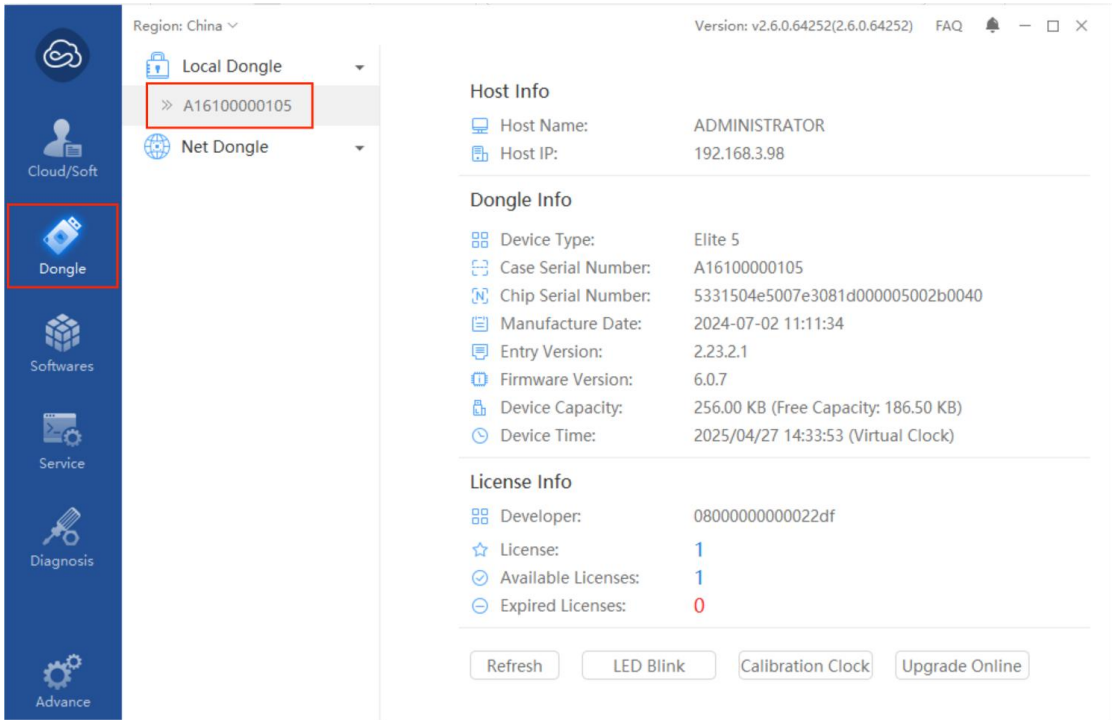


Figure 2-9 Successful Authorization Interface

Chapter 3 Data Processing Workflow Description

Using data collected by the SHARE SLAM S20 as an example, the data processing workflow includes 3 steps: Raw Data Copying, Point Cloud Mapping, and Data Viewing and Analysis. Details are provided below.

3.1. Raw Data Copying

After data acquisition with the SHARE SLAM S20 is complete, remove the device's TF card, insert it into the provided card reader, and then connect the card reader to the computer. Once the computer recognizes the TF card, copy the project data to be processed to a local folder on your computer.

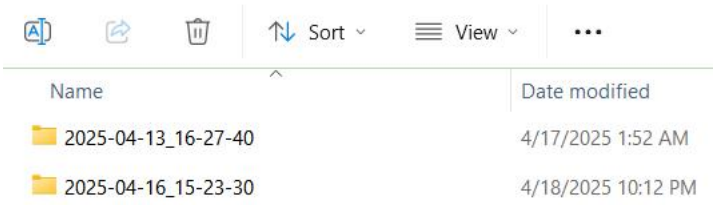


Figure 3-1 Project Data

3.2. Point Cloud Mapping

On the main software interface, click the "New Project" button at the bottom of the "Project Management Panel". The "New Project" pop-up window will appear.

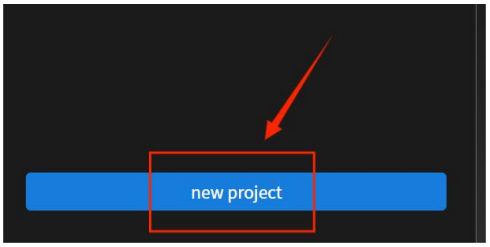


Figure 3-2 New Project Button Figure 3-3 New Project Pop-up Window

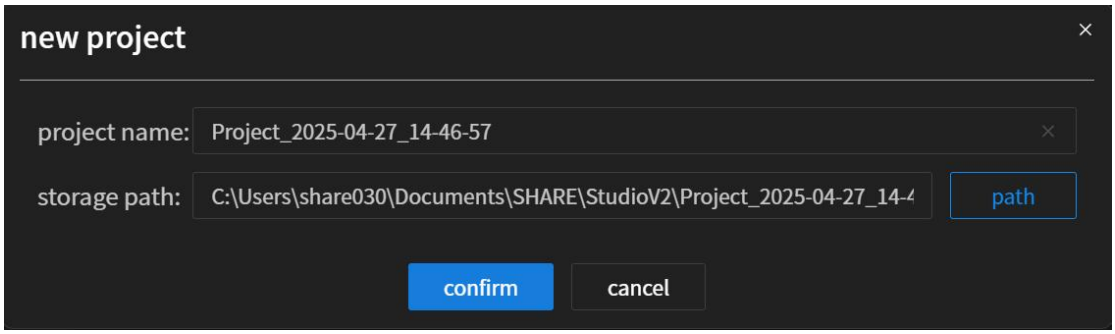


Figure 3-3 New project popup window

Click the "OK" button to enter the "Project Configuration" interface.

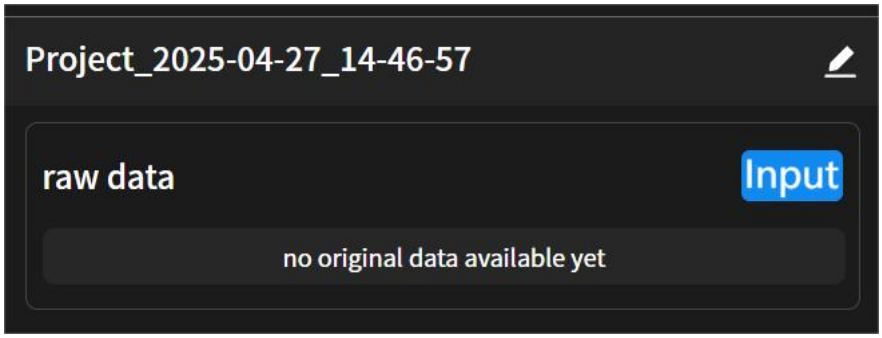


Figure 3-4 Project configuration

Click the "Add" button to add the folder containing the copied raw data. Once added successfully, the mapping parameters will appear in the panel.

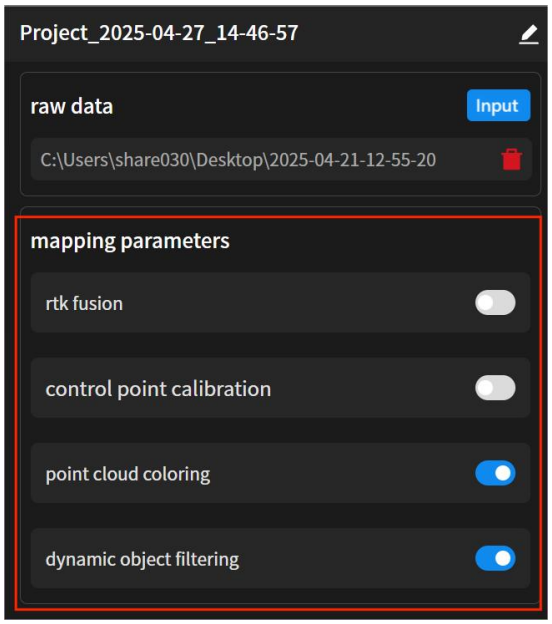


Figure 3-5 Mapping Parameters

You can configure the mapping parameters as needed. After configuration, click "Start Processing" to begin the "Point Cloud Mapping" process. The software will automatically open the "Task Management" pop-up window, where you can view the progress of the point cloud mapping for this project.

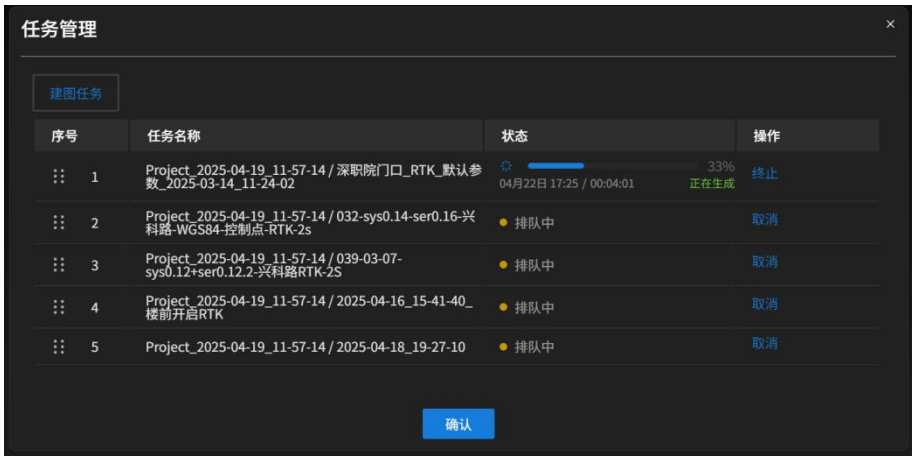


Figure 3-6 Mapping Task

Once mapping is complete, the status of the corresponding project will show as "Reconstruction Completed".

Figure 3-7 Reconstruction progress

Note: If the collected project data includes RTK information, or if control point information was collected simultaneously with the project data, you can set the "RTK Calibration" and "Control Point Calibration" parameters when creating a new project. Refer to the "Project Configuration" section for details.

3.3. Data Viewing and Analysis

In the "Project Management Panel", double-click the corresponding project to enter the "Project Browsing Interface", where you can view and analyze the

point cloud.

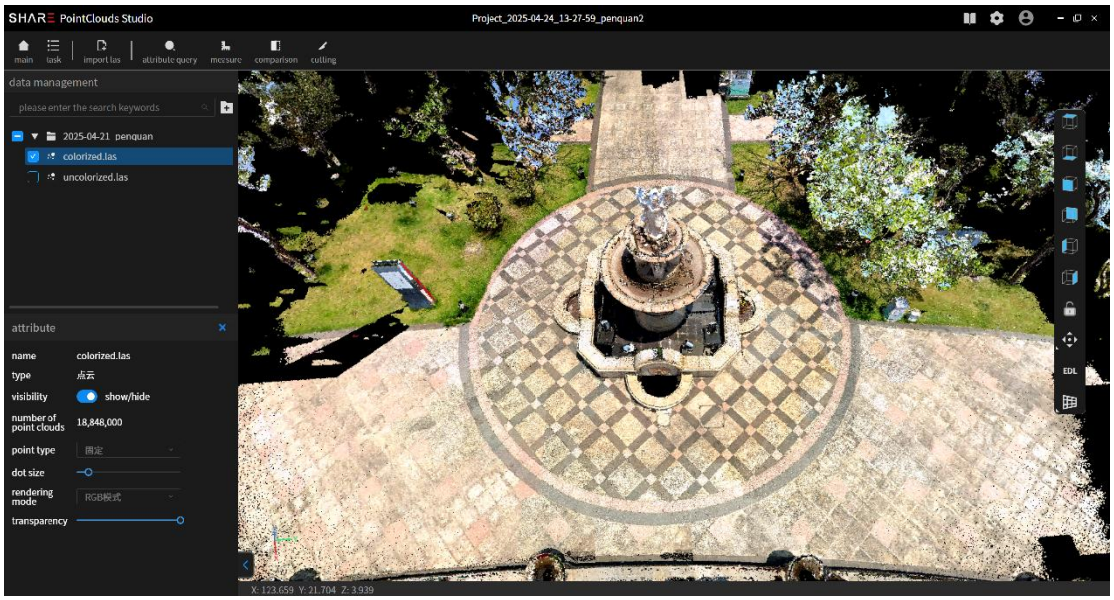


Figure 3-8 Point Cloud Viewing

Chapter 4 User Login and Registration

When you first use SHARE PointClouds Studio, a login window will appear. You need to log in with your SHARE account to use the software. If you do not have a SHARE account, you can register for one. After you log in successfully, the software will remember your account, and subsequent launches will automatically skip the login step.

4.1.User Login

In the "User Login" interface, enter your phone number (or email) and password, then click the "Log In" button.

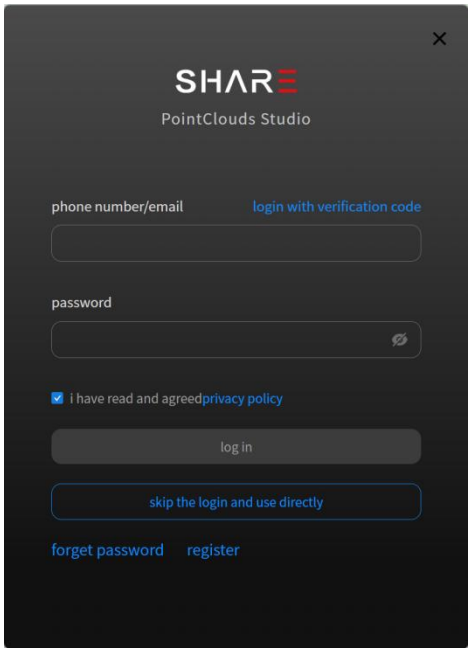


Figure 4-1 Password Login

You can also log in using a verification code. Click "Verification Code Login" to switch to that interface. Enter your phone number or email, click "Send

Verification Code" to receive the code via SMS or email, enter the received code, and then click the "Log In" button.

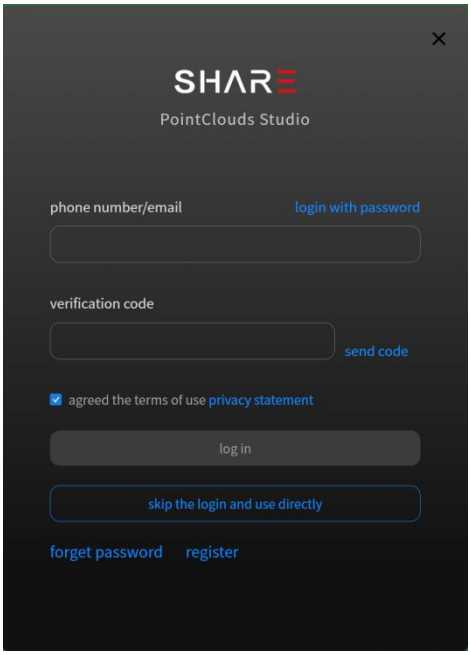


Figure 4-2 Verification Code Login

4.2.User Registration

In the "User Login" interface, click "Register Account" to be redirected to the registration page. Fill in the required information to register for a SHARE account. Registration via phone number (Mainland China numbers only) or email is supported.

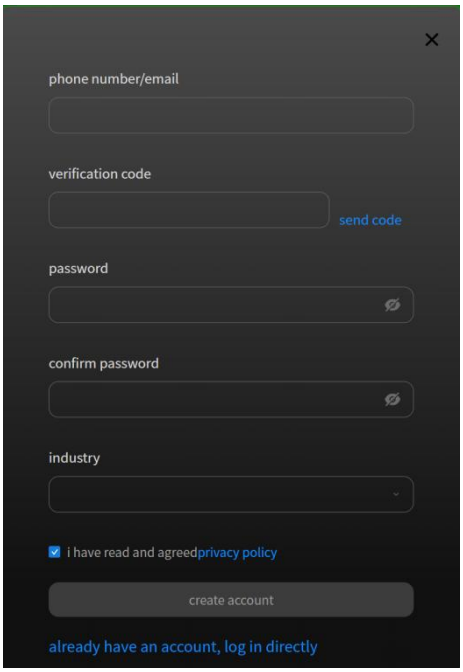


Figure 4-3 User Registration Interface

4.3.Forgot Password / Modify Password

On the login interface, click "Forgot Password" to go to the "Retrieve Password" interface. You can reset your password using the phone number or email associated with your account.

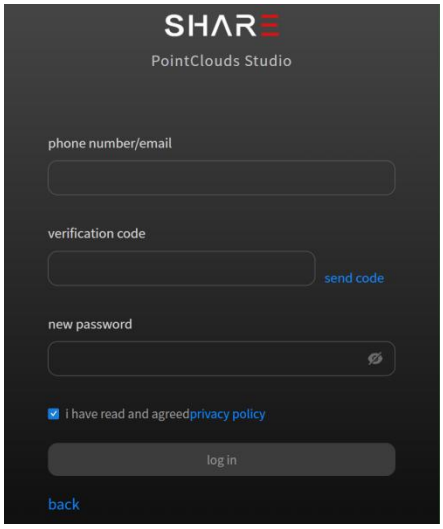


Figure 4-4 Retrieve Password

4.4.Log Out

In the software's main interface, move your mouse cursor over the "Login" button (or your user profile area) in the upper right corner. In the options that appear, click the "Log Out" button to log out of the current account.

Note: The figure captions (e.g., Figure 1-1) are translated, but the actual images are not included as I cannot view attachments.

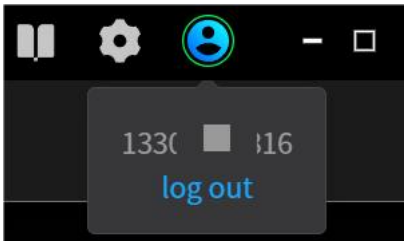


Figure 4-5 Log out

Chapter 5 Project Management

Upon launching the software, you enter the main interface (Project Management interface). A "Project" is a core concept within the software, used to organize and manage the raw data, configuration parameter information, and result files required during the "Point Cloud Mapping" process. SHARE PointClouds Studio uses the "Project Management" panel to organize related projects. The Project Management panel is located on the left side of the software and allows operations such as creating, configuring, importing/exporting projects. You can also double-click a project to open it in the "Project Browsing Interface".

Figure 5-1 Project Management Panel

5.1. Project Management Panel

5.1.1. Overview

The "Project Management Panel" is located on the left side of the software and is used to manage the software's "Projects". The interface elements of the "Project Management Panel" are as follows:

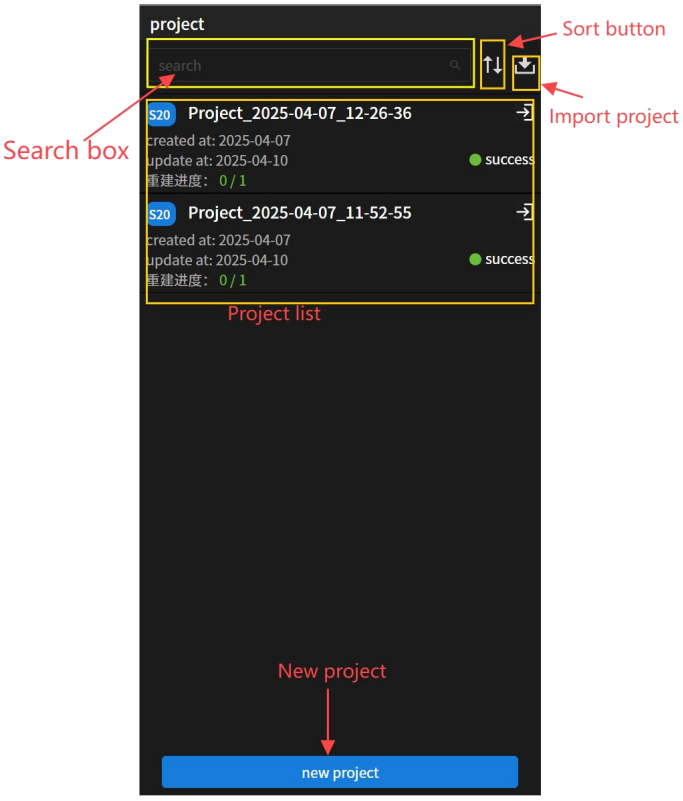


Figure 5-2 Project Management

- **Search Box:** Enter keywords in the "Search Box" to filter projects.
- **Sort:** Click the "Sort" button to sort projects by "Creation Time" in ascending/descending order.
- **Import Project:** Supports importing external projects. See the "Import Project" section for details.
- **Project List:** Displays all projects in a list format. See the "Project List" section for details.
- **New Project:** Creates a new project. See the "New Project" section for details.

5.1.2. Project List

In the "【Project Management】 Panel", all projects within the software are

displayed in a list format. Newly created projects appear at the top of the list. Each element is described below:

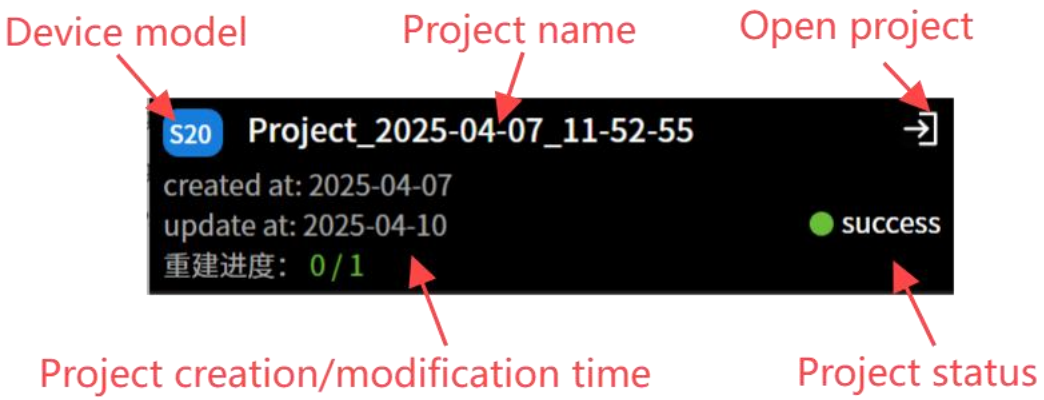


Figure 5-3 Project Record Description 1

Click to select a project. Relevant operation buttons will appear below the project entry, as shown below:

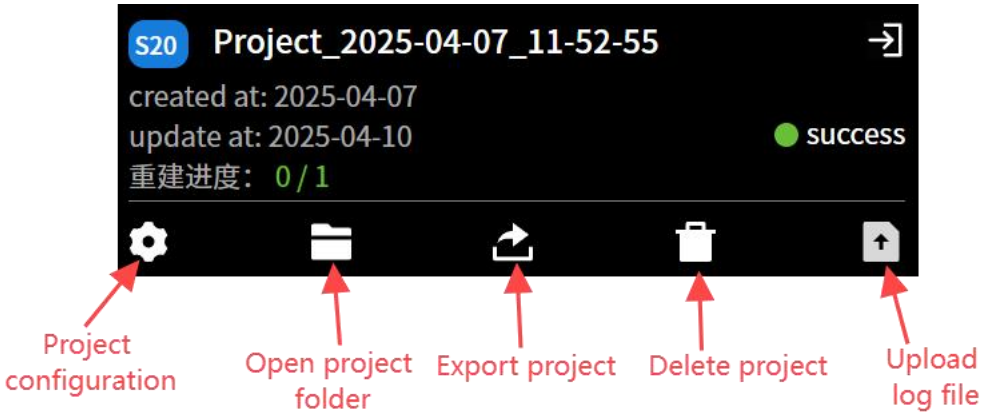


Figure 5-4 Project Record Description 2

Projects have four possible statuses: Waiting for Reconstruction, Reconstructing, Reconstruction Failed, and Reconstruction Completed. These statuses are described in the table below:

No.	Status	Description	Remark
1	Waiting for Reconstruction	Project has not undergone 'Point Cloud Mapping'.	Icon is gray
2	Reconstruction	'Point Cloud Mapping' is in progress.	1. Icon is orange. 2. Operations cannot be performed on this project.
3	Reconstruction Failed	'Point Cloud Mapping' operation failed.	Icon is red
4	Reconstruction Completed	'Point Cloud Mapping' operation succeeded.	Icon is green

5.2. New Project

Click the "New Project" button at the bottom of the "Project Management Panel" to open the "New Project" pop-up window.

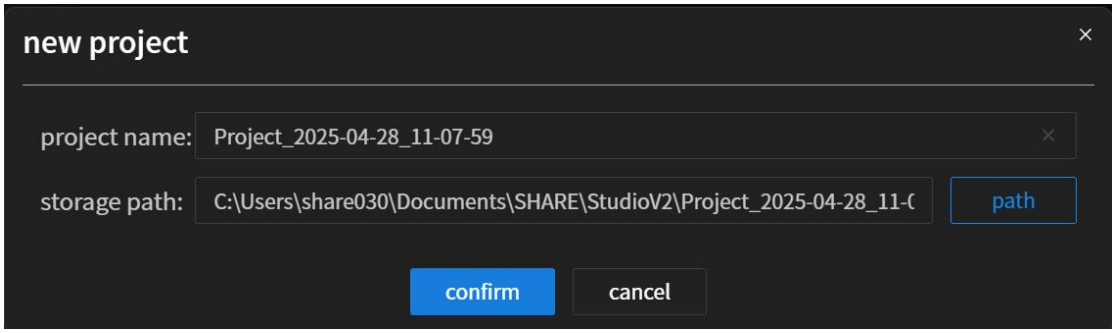


Figure 5-5 New Project Pop-up Window

The parameters are as follows:

- Project Name: The system automatically generates a project name based on the creation time. Users can customize this name.
- Storage Path: The path where the project will be saved. The default path is related to system settings (see the "System Settings" section). Users can

customize this path.

Click the "OK" button to enter the "Project Configuration" panel, where you can configure raw data and mapping parameters. See the "Project Configuration" section for details. After the project is successfully created, a corresponding entry is added to the top of the "Project Management Panel" list.

5.3. Project Configuration

“Engineering Configuration” panel allows you to set the “Raw Data” and “Mapping Parameters” for the project. It also supports renaming operations on the project, supports adding multiple sets of raw data at once for point cloud mapping operations.

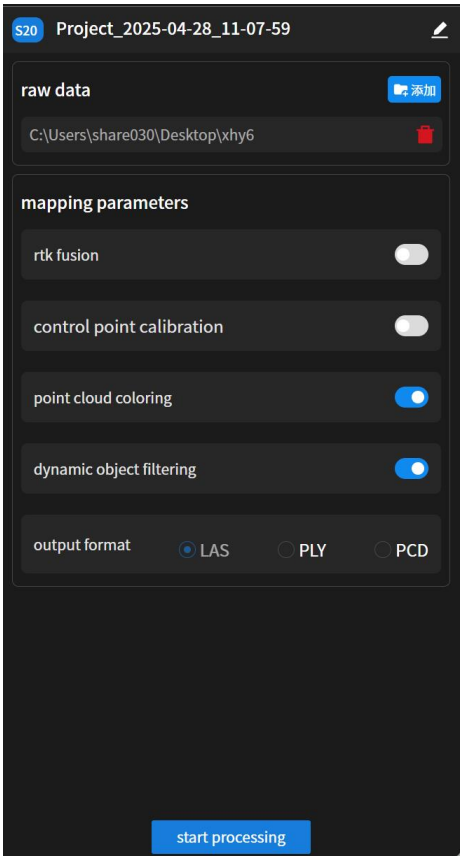


Figure 5-6 Project Configuration Panel

5.3.1. Rename Project

Click the "Rename" button at the top to enable project renaming. Press the

"Enter" key on your keyboard to apply the change.

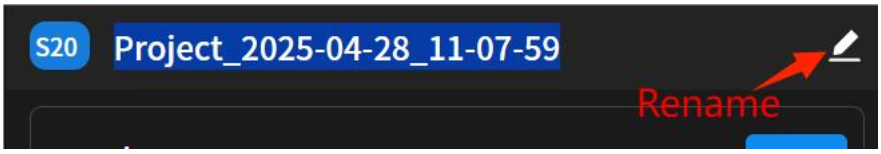


Figure 5-7 Rename Project

5.3.2. Add Raw Data

Click the "Add" button to open the "Add Raw Data" pop-up window. Select the folder containing the raw data for this project and click "Select Folder" to confirm the selection.

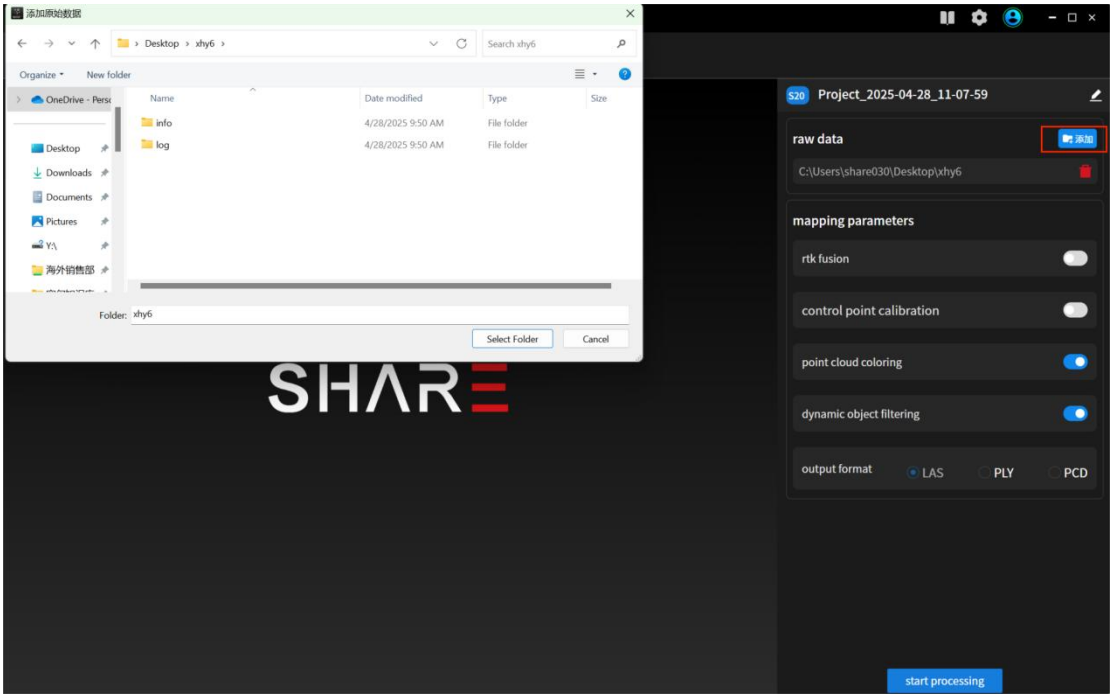


Figure 5-8 Add Raw Data

After adding, the path of the data is displayed in the "Raw Data" list. Click the "Delete" button next to it to remove the data.

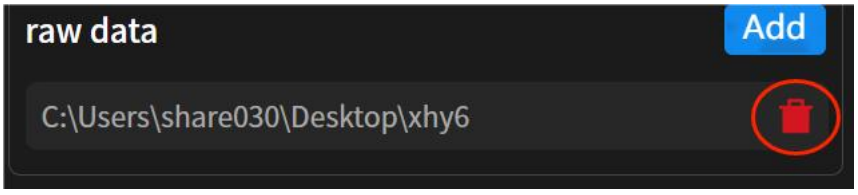


Figure 5-9 Delete Raw Data

Note: When adding raw data, the system validates it. If the raw data is invalid or abnormal, a notification message will appear:

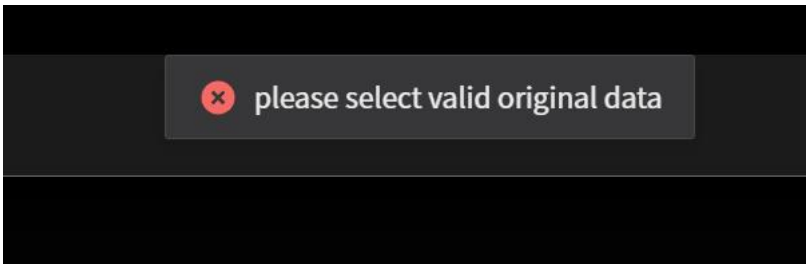


Figure 5-10 Invalid Data Notification

Note: Multiple sets of raw data can be added at once, such as holding down the "Ctrl" key on the keyboard to select multiple folders containing raw data files, and then clicking "Select Folder" to add them to the list of raw data.

5.3.3. Mapping Parameters Description

5.3.3.1. RTK Fusion

When the collected raw data contains RTK information, the "RTK Fusion" parameter can be enabled. After enabling "RTK Fusion," you can set the output coordinate system. Both known coordinate systems and arbitrary coordinate systems are supported.

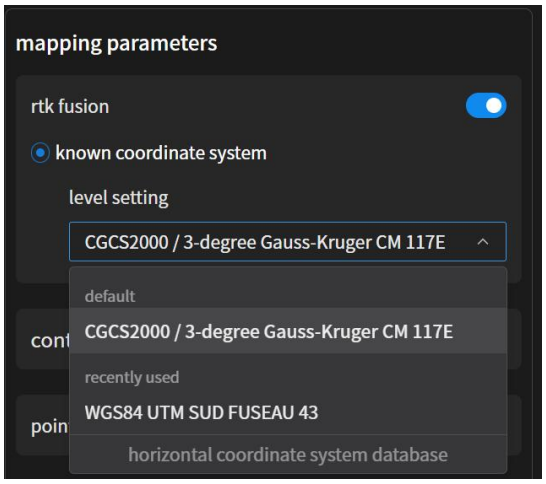


Figure 5-11 Enable "RTK Fusion"

Output Known Coordinate System By default, the output coordinate system is "Known Coordinate System." Users can set the known coordinate system in two ways: importing a PRJ file or searching.

Import PRJ file: Find and download the required coordinate system .prj file from a website like https://spatialreference.org. Then, click "Import PRJ File" to import this file.

Search: In the "Horizontal Settings" and "Elevation Settings" dropdowns, select "Horizontal Coordinate System Database" and "Vertical Coordinate System Database." Enter the coordinate system name or authorization code, select the corresponding result from the search, and then click "OK."

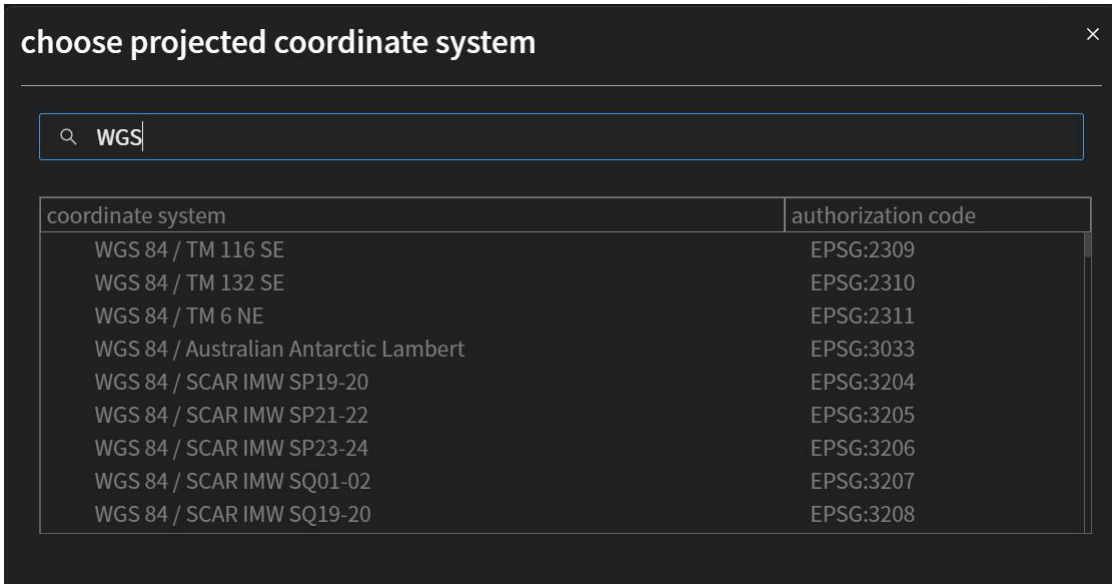


Figure 5-12 Known Coordinate System Search

5.3.3.2. Control Point Calibration

If control points were collected simultaneously during the raw project data acquisition, the "Control Point Calibration" parameter can be enabled when

creating the task. This uses external control points to transform the point cloud data into the corresponding absolute coordinate system.

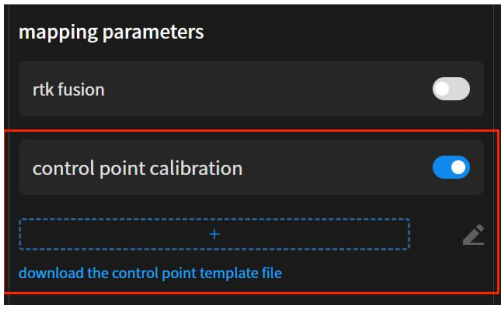


Figure 5-13 Enable "Control Point Calibration"

1. Enable the "Control Point Calibration" switch. Click "Download Control Point Template File" to download the corresponding template file. The software generates a template file based on the collected data.

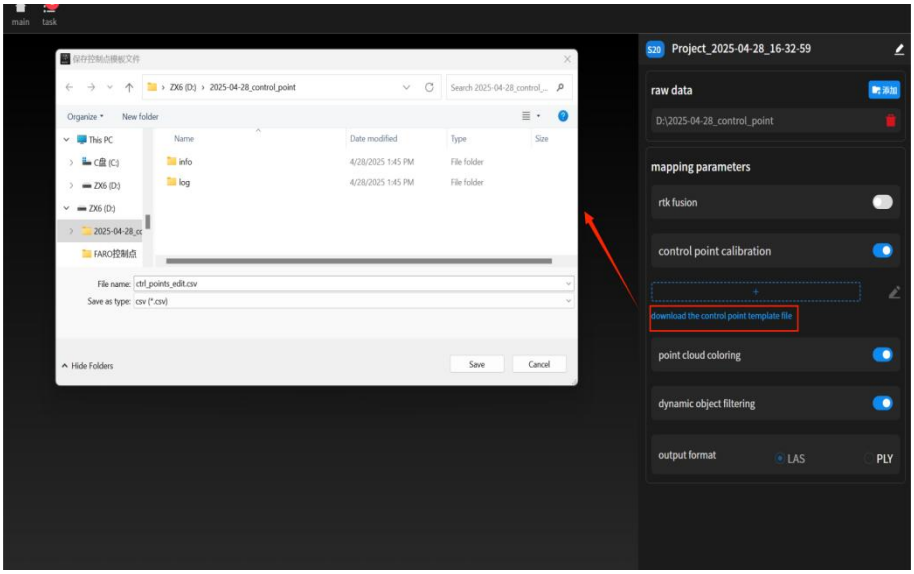
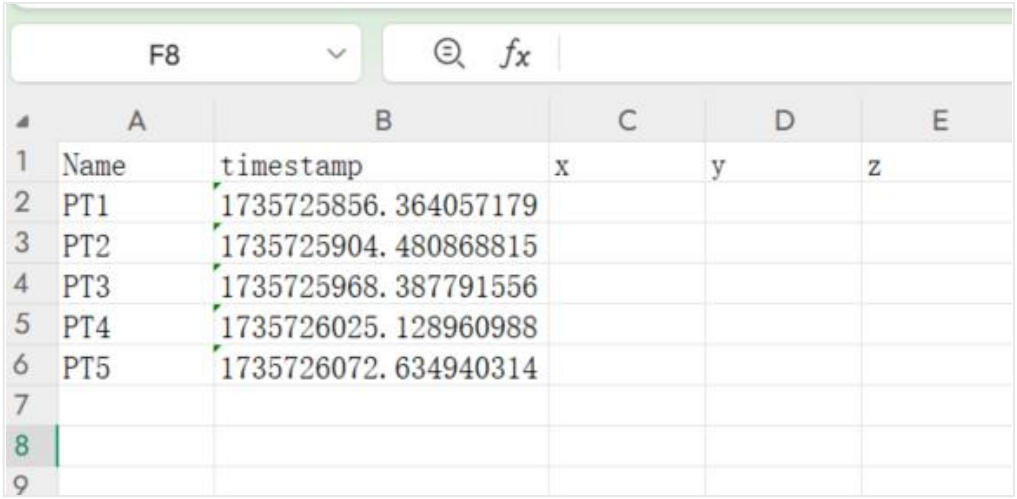


Figure 5-14 Download Control Point Template

2. Open the control point template file using Excel software and edit it. The "Name" and "timestamp" fields are the control points and corresponding timestamps added by the device during data collection. "x/y/z" represent

the "East coordinate/North coordinate/Elevation" respectively, obtained using an external RTK for the corresponding positions.



F8

	A	B	C	D	E
1	Name	timestamp	x	y	z
2	PT1	1735725856.364057179			
3	PT2	1735725904.480868815			
4	PT3	1735725968.387791556			
5	PT4	1735726025.128960988			
6	PT5	1735726072.634940314			
7					
8					
9					

Figure 5-15 Control Point Template File

Edit the control point template file according to the actual situation, primarily by filling in the "x/y/z" fields. Save the CSV file after editing. Refer to the following for an example of the edited result:

A	B	C	D	E
Name	timestamp	x	y	z
PT1	1735725856.	26.301	-0.695	28.703
PT2	1735725904.	26.805	12.584	28.707
PT3	1735725968.	19.35	22.284	28.718
PT4	1735726025.	1.53	21.406	28.706
PT5	1735726072.	1.205	6.421	28.694

Figure 5-16 Edited Control Point File

Import Control Point File. In the "Control Point Calibration" panel, click "+" to import the edited control point file from the previous step. The file format must be CSV.

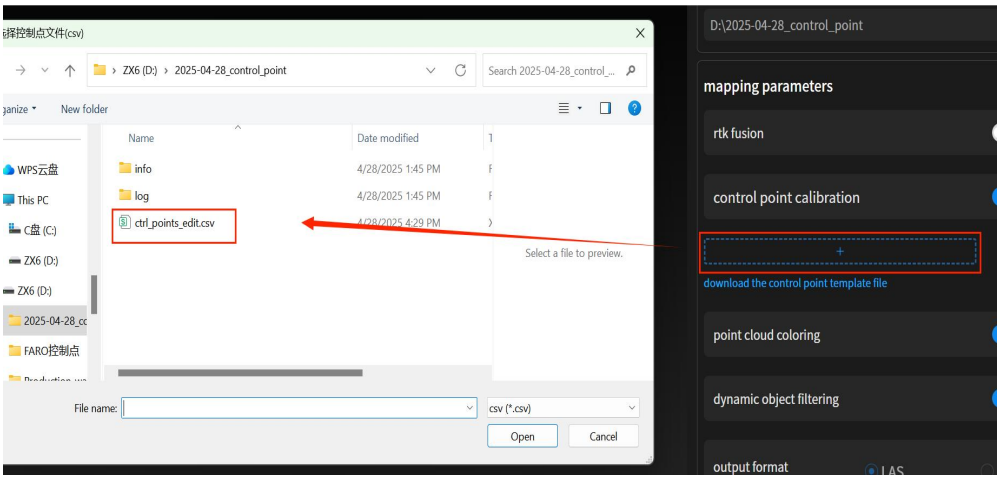


Figure 5-17 Import Control Point File

For the imported control points, click the "Edit" button to view and edit the control point file within the software.

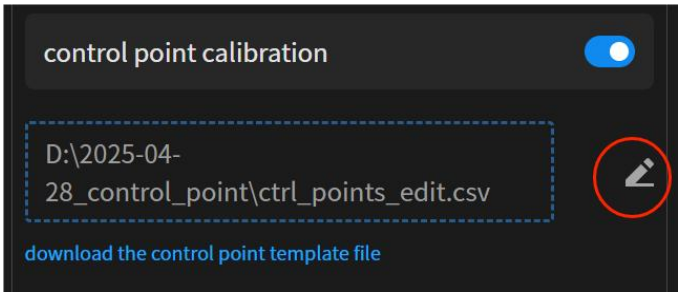


Figure 5-18 Edit Control Point Button

Edit Control Points. Clicking the "Edit Control Points" button opens the "Edit Control Points" pop-up window. Here you can view and edit control points. You can directly modify the "x/y/z" field values or delete a specific control point record. You can also preview the control points in the bottom window.

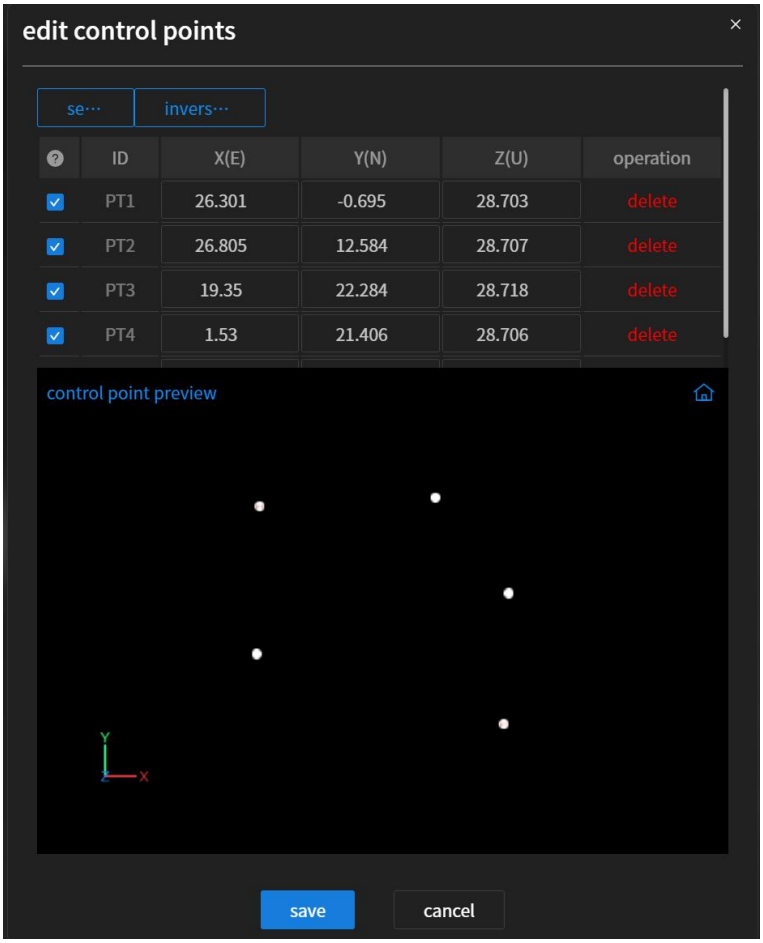


Figure 5-19 Edit Control Points Pop-up Window

By default, all control point records are selected. You can check (select) only the desired control points to be used for "Control Point Calibration." Click the "Save" button to save your changes and return to the previous interface.

5.3.3.3. Point Cloud Coloring

This controls whether to color the point cloud during point cloud mapping. This parameter is enabled by default.

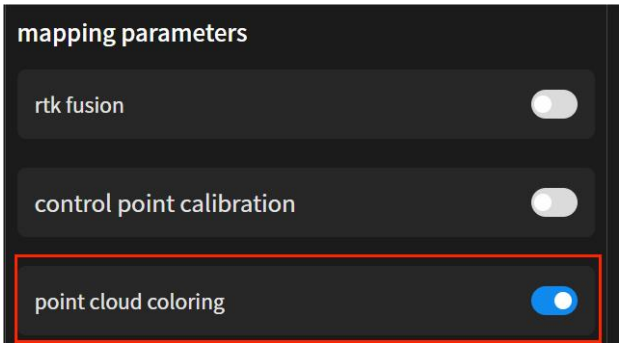


Figure 5-20 Enable "Point Cloud Coloring" Parameter

5.3.3.4. Dynamic Object Filtering

The dynamic object removal function is primarily used to remove point cloud noise data from dynamic objects captured during scanning, resulting in better point cloud data. This parameter is enabled by default but can be disabled by clicking it.

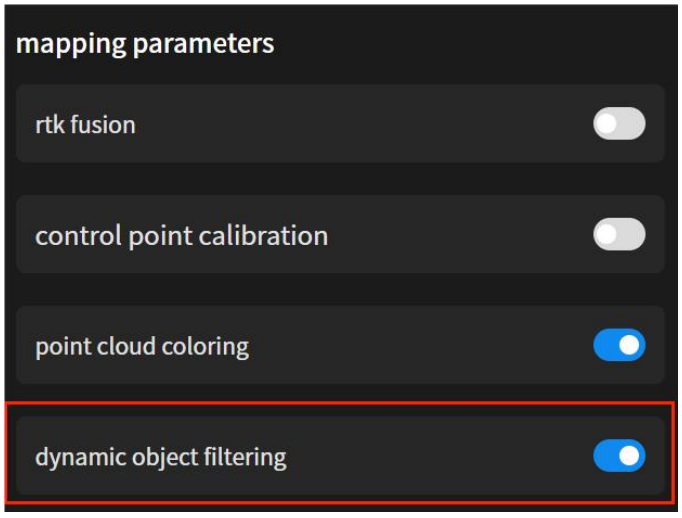


Figure 5-21 Enable "Dynamic Object Filtering" Parameter

5.4. Project Operations

5.4.1. Open Project

Double-click the project record with the mouse, or click the “Open Project” button to open the project and enter the project browsing interface. For details on the project browsing interface, see the “Project Browsing” section.

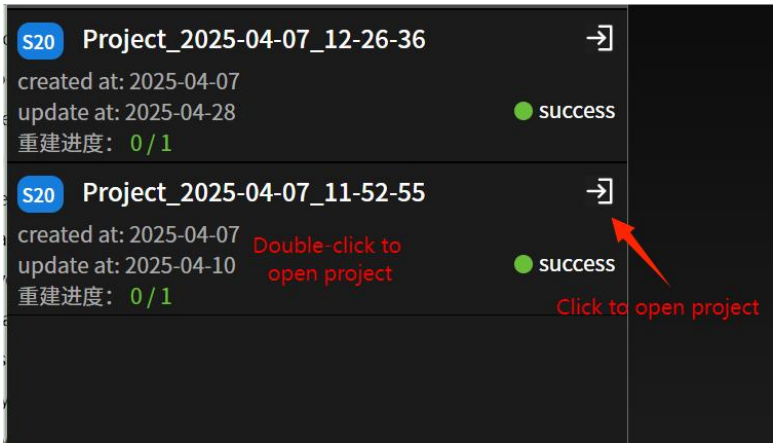


Figure 5-22 Open Project

5.4.2. Open Project Folder

Select the desired project in the "Project Management Panel" and click the "Open Project Folder" option to view the project-related data in your computer's File Explorer:

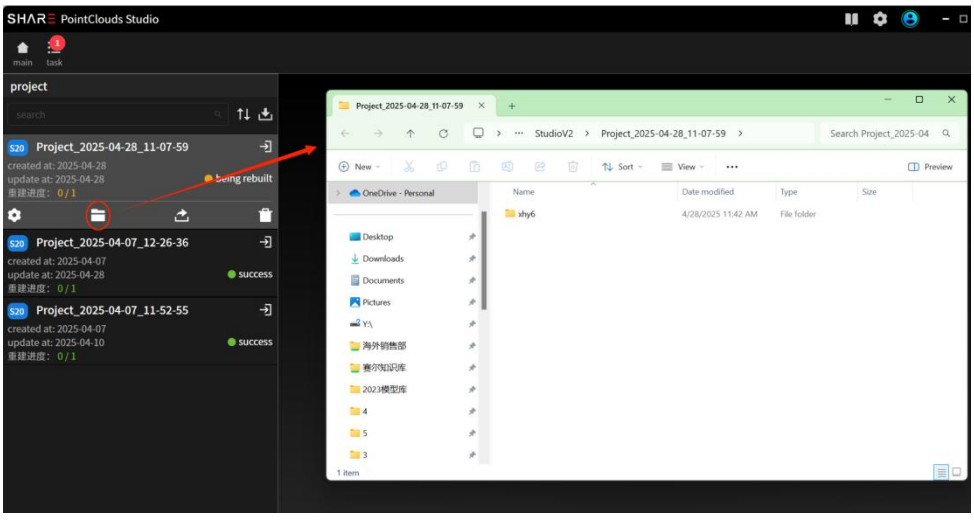


Figure 5-23 Open Project Folder

5.4.3. Export Project

Select the desired project in the "Project Management Panel" and click the "Export Project" button to export the project as a ZIP file. You can modify the file name during the export process.

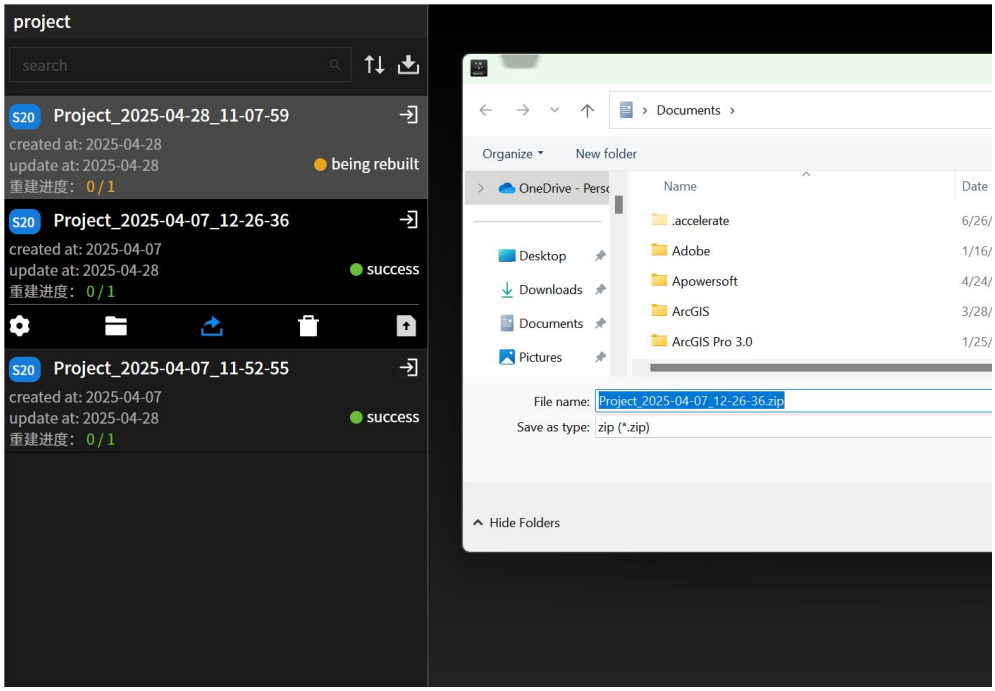


Figure 5-24 Export Project

5.4.4. Import Project

This function imports an exported ZIP project file into the software. See the "Export Project" section for details on obtaining a ZIP project file. Click the "Import Project" button to open the "Import Project" pop-up window. Select the location of the ZIP project file and click the "Open" button to perform the import operation.

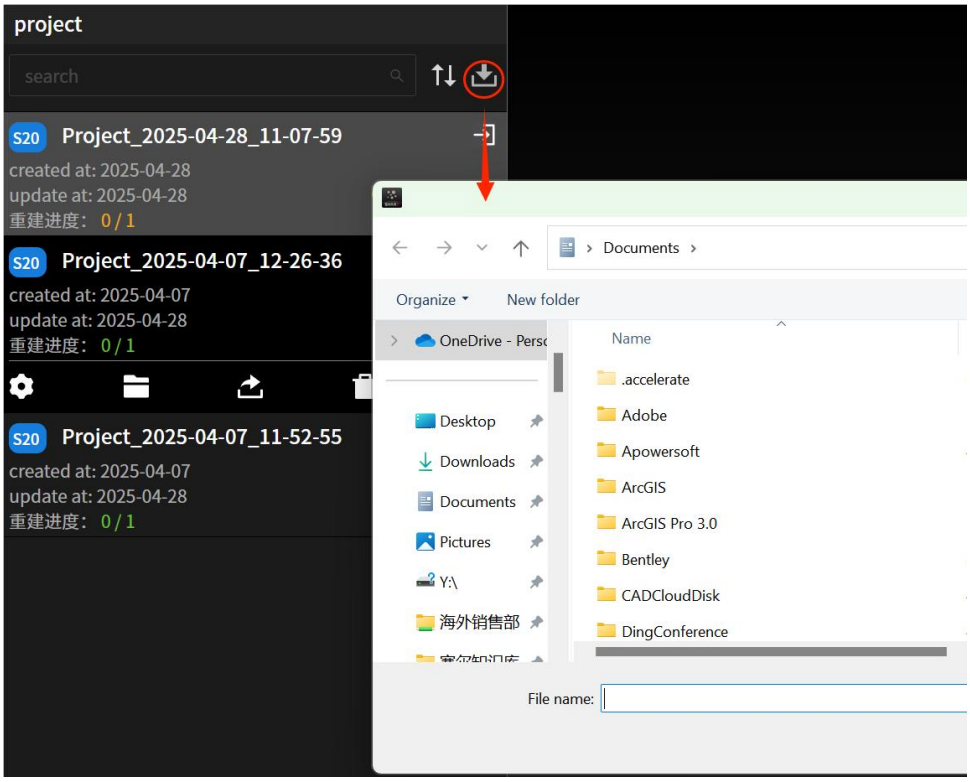


Figure 5-25 Import Project

During the project import process, the progress will be displayed.

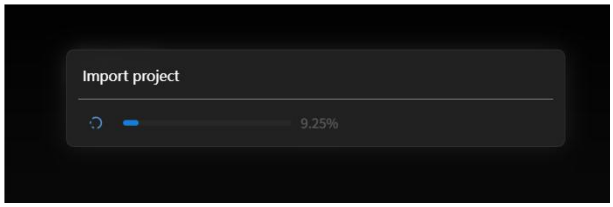


Figure 5-26 Import Project Progress

After the project import is complete, a new entry will be added to the top of the "Project Management Panel."

5.4.5. Delete Project

Select the desired project in the "Project Management Panel" and click the "Delete" button to delete the current project.

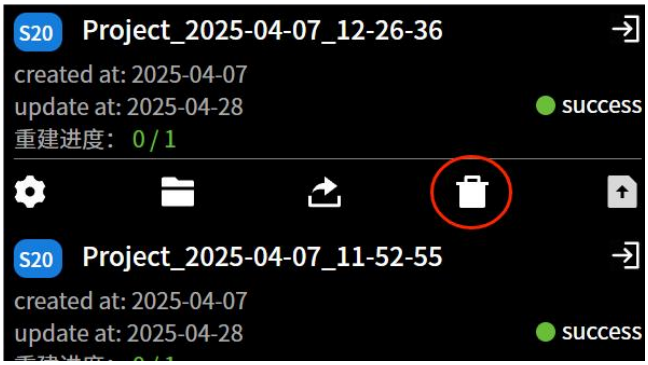


Figure 5-27 Delete Project

5.4.6. Log Upload

If you encounter abnormalities during point cloud mapping, you can send the log files for the corresponding project to the official SHARE support team for troubleshooting. Select the problematic project in the "Project Management Panel," click the "Log Upload" button to open the "Log Upload" pop-up window.

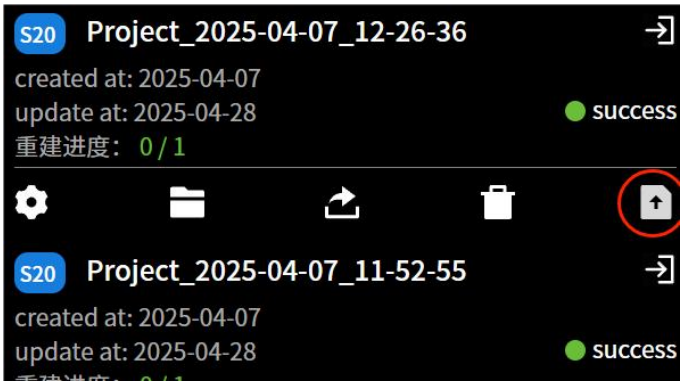


Figure 5-28 "Log Upload" Button

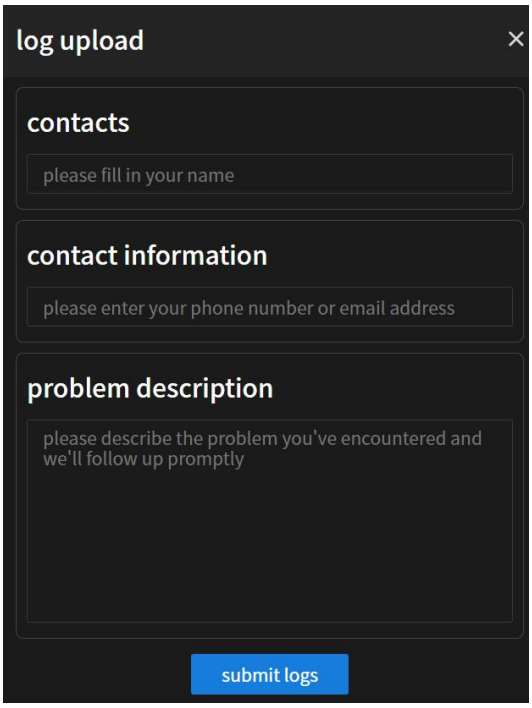


Figure 5-29 Log Upload Pop-up Window

In the "Log Upload" pop-up window, fill in the contact person, contact method (phone/email), and a description of the problem. Click "Submit Log" to send the relevant mapping logs to the official SHARE support team.

Chapter 6 Project Browsing

After a project's point cloud mapping task is completed, it can be opened to enter the "Project Browsing Interface" for viewing and analyzing the reconstructed point cloud. In the main interface's "Project Management Panel", double-click the corresponding project or click the "Open Project" button to enter the "Project Browsing Interface".

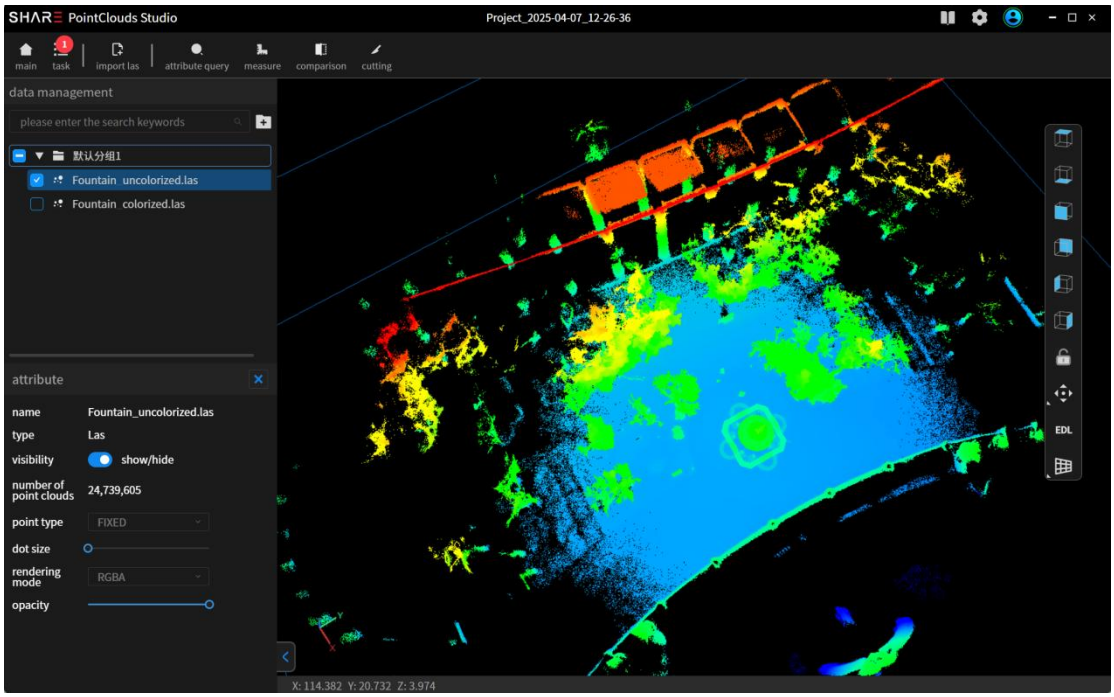


Figure 6-1 Project Browsing Interface

6.1. Data Management Panel

6.1.1. Overview

The "Data Management Panel" uses a tree structure to centrally manage the results after project mapping, as well as analysis and measurement data. This includes point clouds, measurement records, and other modeling results (such as photo points, trajectories, etc.). It supports real-time linking between data

layers and the Properties window, and also allows operations on layer groups or individual data layers.

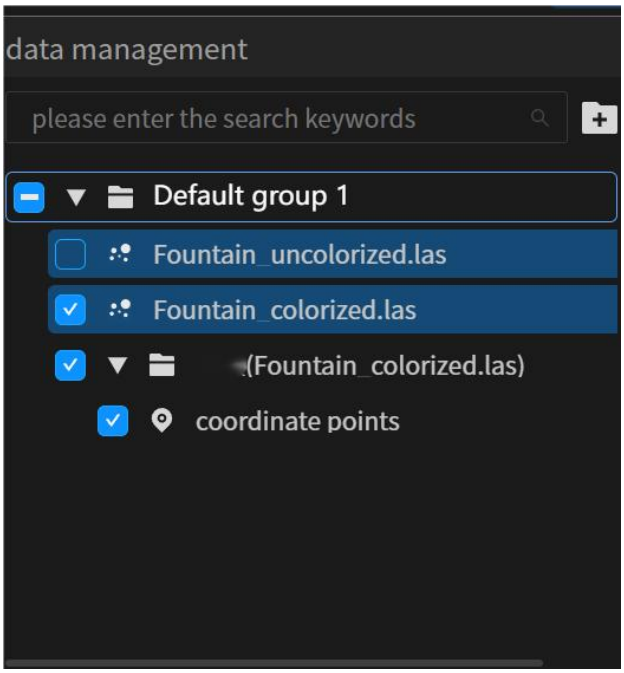


Figure 6-2 Data Management Panel

6.1.2. Search

Enter keywords into the search box at the top of the panel to filter the layer groups/layers in the panel's directory tree. Click the "×" icon next to the search box to clear the search content.

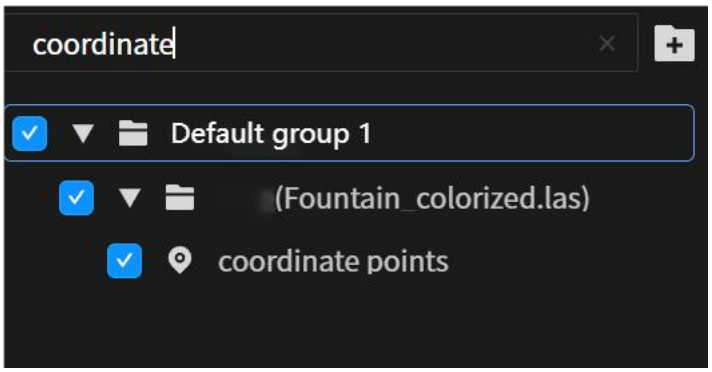


Figure 6-3 Data Search Box

6.1.3. Visibility Toggle

Click the visibility icon in front of a layer group or layer in the "Data Management Panel" to toggle its visibility in the 3D scene.

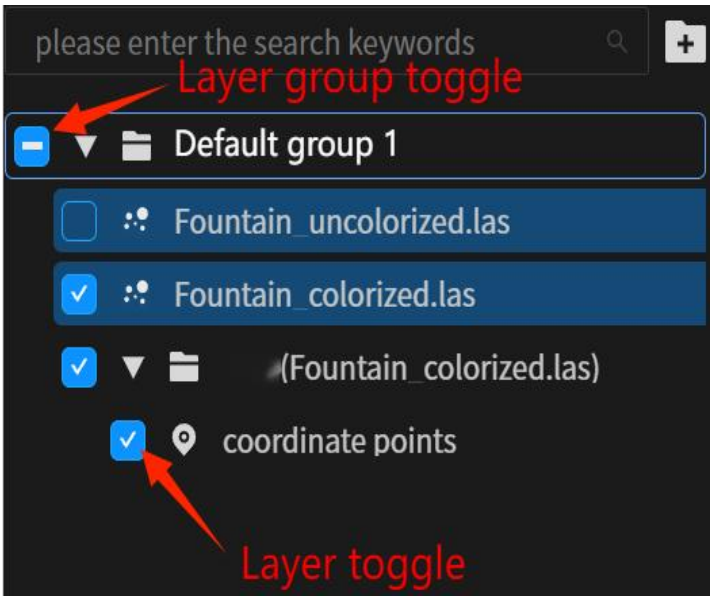


Figure 6-4 Visibility Toggle

6.1.4. Layer Group Operations

6.1.4.1. New Layer Group

A layer group is a collection of layers. To facilitate management and control, you can create new layer groups to manage multiple layers. Click the "Add Group" button next to the search box to create a new layer group at the root level.

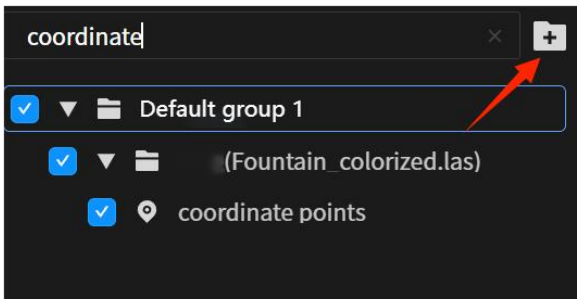


Figure 6-5 New Group

Alternatively, move the mouse cursor over the target layer group, select it, right-click to open the context menu, and click the "New Group" option. This will create a new sub-layer group under the selected group.

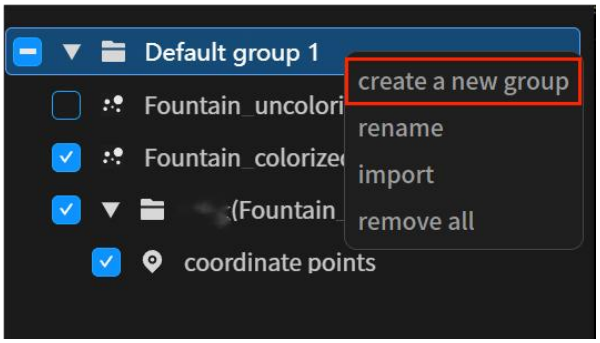


Figure 6-6 New Sub-Layer Group

6.1.4.2. Rename Layer Group

Renames an existing layer group. Right-click the desired layer group, and in the context menu, click the "Rename" option to rename the layer group.

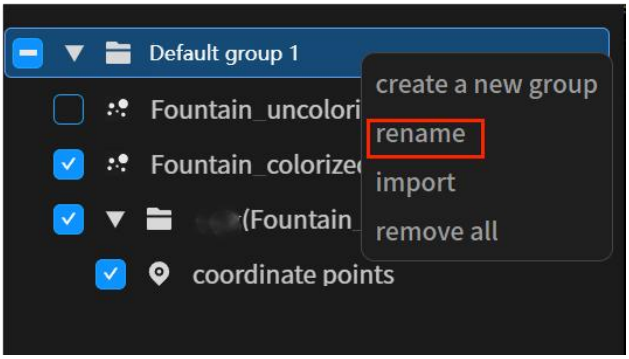


Figure 6-7 Rename Layer Group

6.1.4.3. Import LAS

Imports LAS/LAZ point cloud data into the corresponding layer group. Move the mouse cursor over the target layer group, select it, right-click, and click the "Import" option in the context menu to add point cloud data under that group. This operation is the same as "Function Area Panel - Import LAS"; please refer to that section for details.

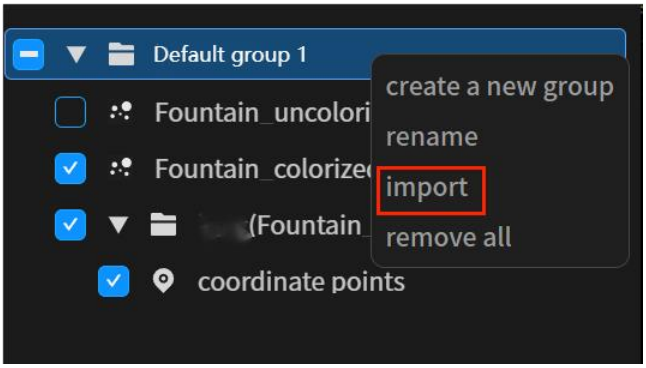


Figure 6-8 Import LAS

6.1.4.4. Remove All (Data)

Removes all data layers contained within a layer group. Move the mouse cursor over the target layer group, select it, right-click, and click the "Remove All" option in the context menu to remove all data under that group.

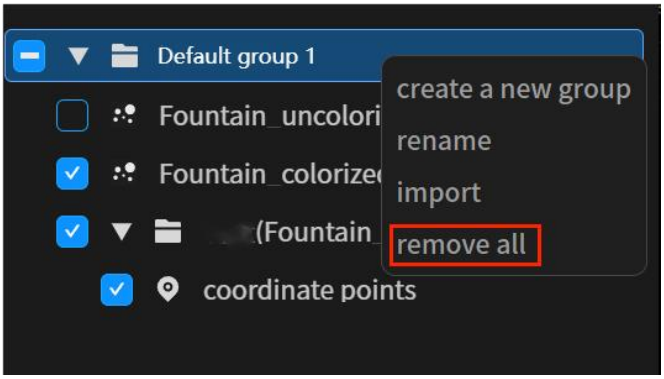


Figure 6-9 Remove All

After clicking "Remove All," a confirmation prompt will appear. The operation will only be executed after clicking the "OK" button.

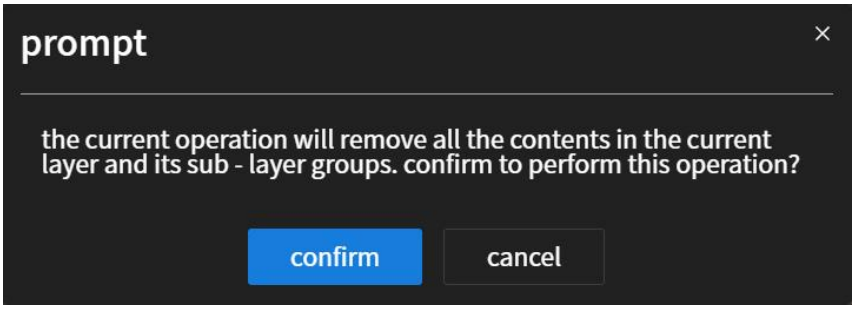


Figure 6-10 Confirmation Pop-up Window

6.1.5. Layer Operations

6.1.5.1. Point Cloud Layer Operations

In the Data Management Panel, point cloud layers support operations such as Select, Locate, Rename, Open Containing Folder, Export, Remove, and (View) Properties.

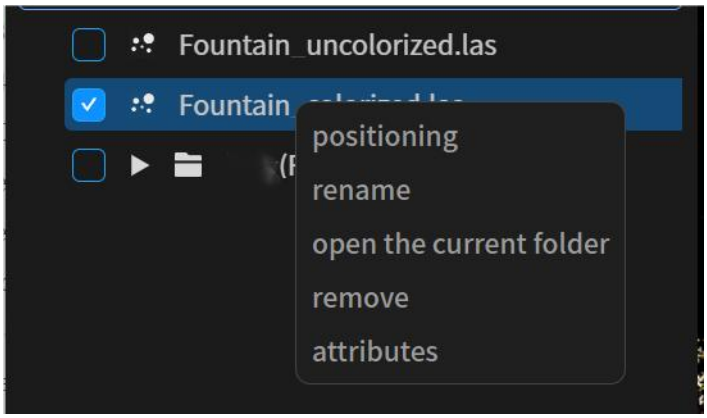


Figure 6-11 Point Cloud Layer Operations

6.1.5.1.1. Select Point Cloud

Single-click a point cloud layer in the directory tree to select it. The selected layer will be highlighted in the "Data Management Panel", and its bounding box will be displayed in the 3D scene.

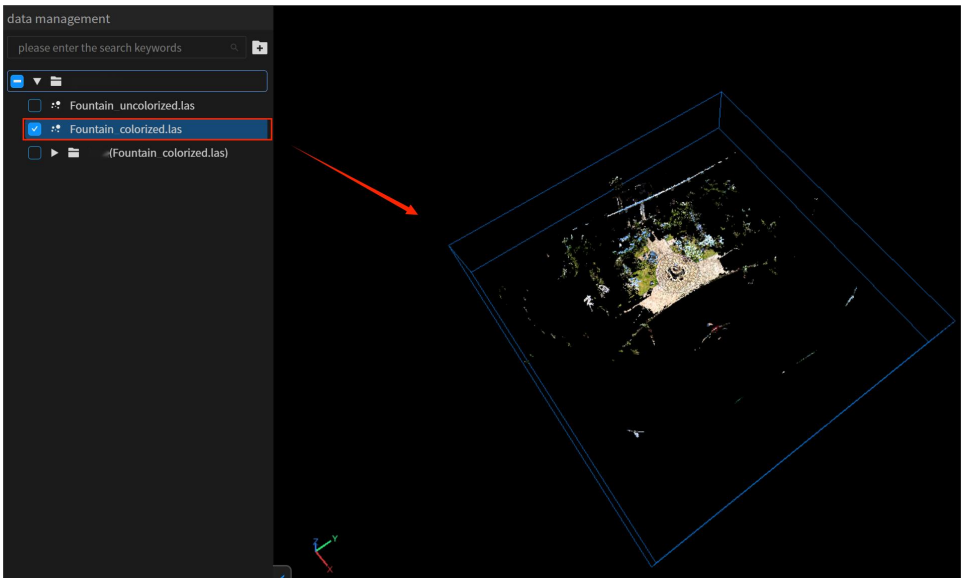


Figure 6-12 Select Point Cloud

Click the point cloud layer again or click in an empty area of the "Data Management Panel" to deselect it.

6.1.5.1.2. Locate

Move the mouse cursor over the target layer, select it, right-click, and click the "Locate" option in the context menu. The view in the 3D scene will center on the point cloud and adjust the zoom to fit it entirely.

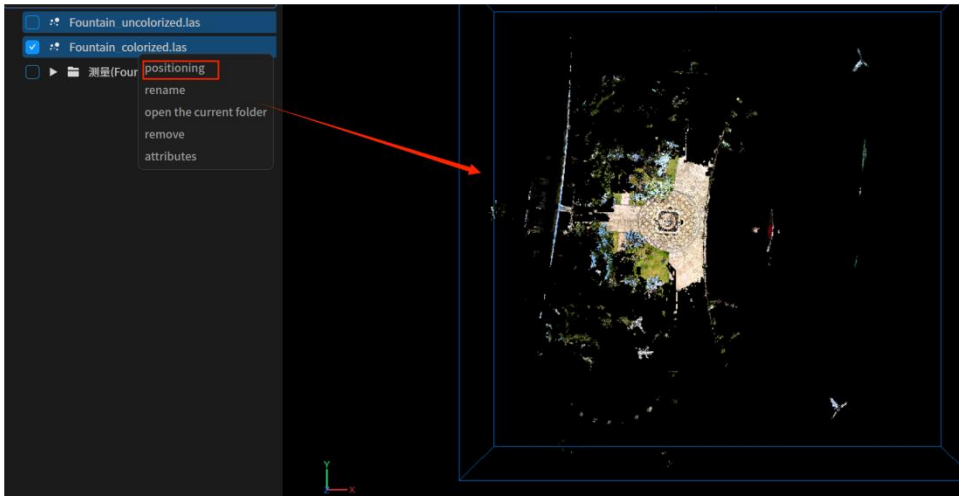


Figure 6-13 Point Cloud Locate

6.1.5.1.3. Rename

Move the mouse cursor over the target layer, select it, right-click, and click the "Rename" option in the context menu to rename the point cloud layer.

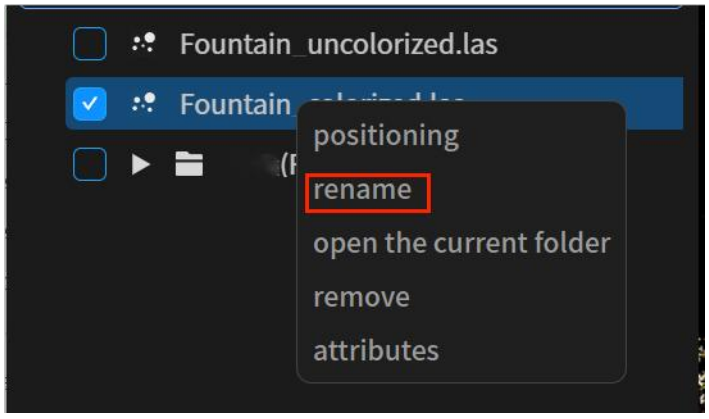


Figure 6-14 Rename Point Cloud

6.1.5.1.4. Open Containing Folder

Move the mouse cursor over the target layer, select it, right-click, and click the "Open Containing Folder" option in the context menu to open the folder where the point cloud data is stored on your computer using File Explorer.

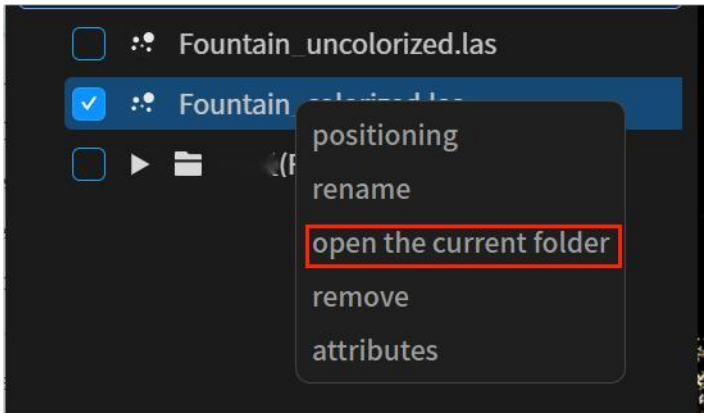


Figure 6-15 Open Containing Folder

6.1.5.1.5. Remove

Move the mouse cursor over the target layer, select it, right-click, and click the "Remove" option in the context menu to perform the point cloud removal operation (removes it from the project view).

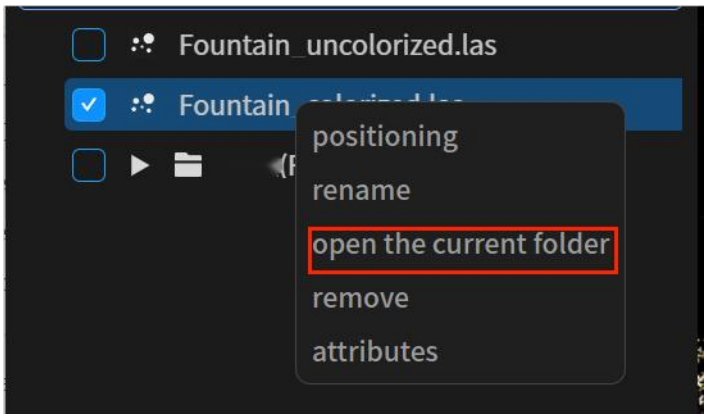


Figure 6-16 Point Cloud Remove

After clicking "Remove," a confirmation prompt will appear. The operation will only be executed after clicking the "OK" button.

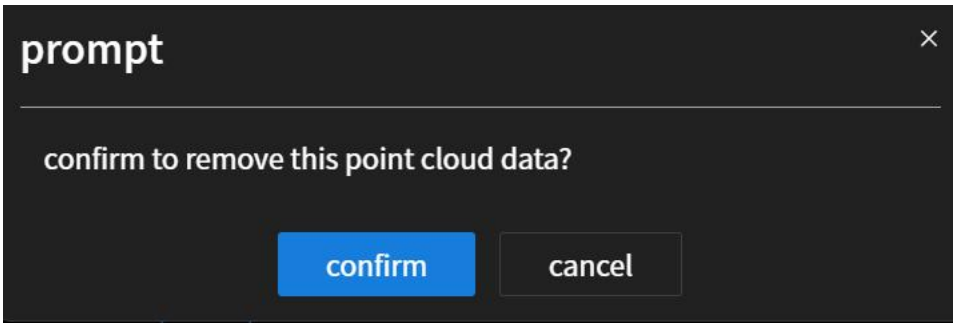


Figure 6-17 Remove Confirmation Pop-up

6.1.5.1.6. Properties

By default, the Properties Panel is open. Selecting a layer will display its properties. For details on layer properties, see the "Properties Panel" section.

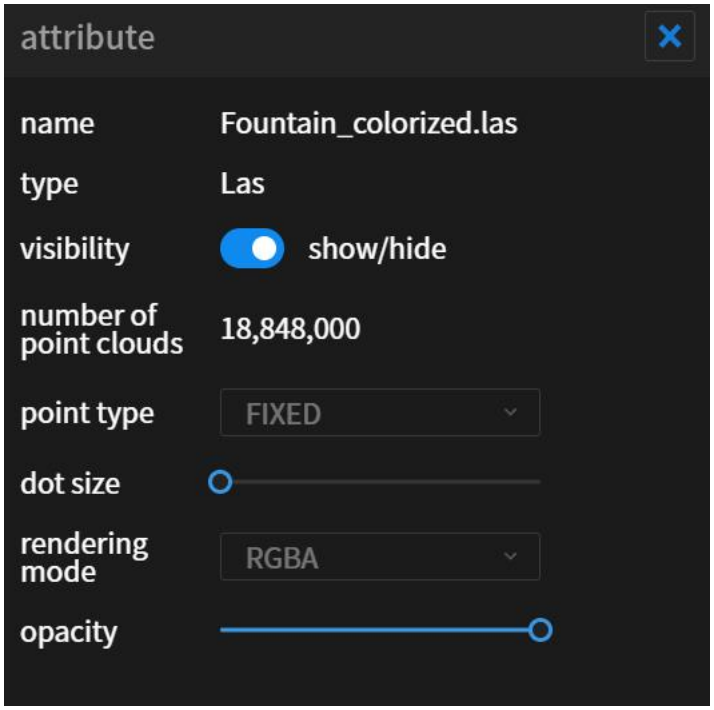


Figure 6-18 View Point Cloud Properties

If the Properties panel is closed, you can move the mouse cursor over the target layer, select it, right-click, and click the "Properties" option in the context menu to open the Point Cloud Properties panel.

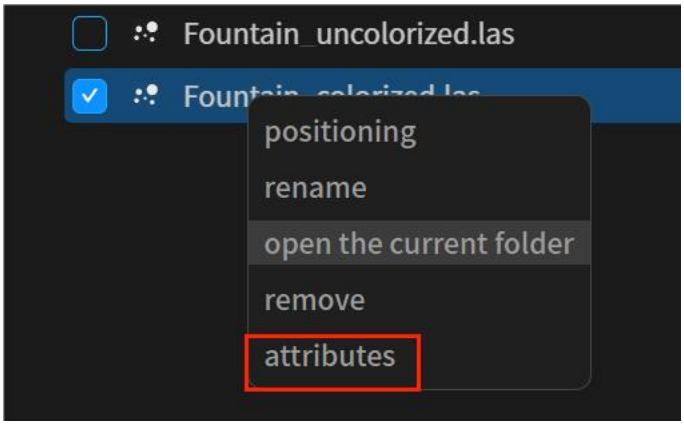


Figure 6-19 Open Properties Panel

6.1.5.2. Measurement Layer Operations

6.1.5.2.1. Select Measurement Layer

Single-click a measurement layer in the directory tree to select it. The selected layer will be highlighted in the "Data Management Panel", and its bounding box (or relevant visual representation) will be shown in the 3D scene.

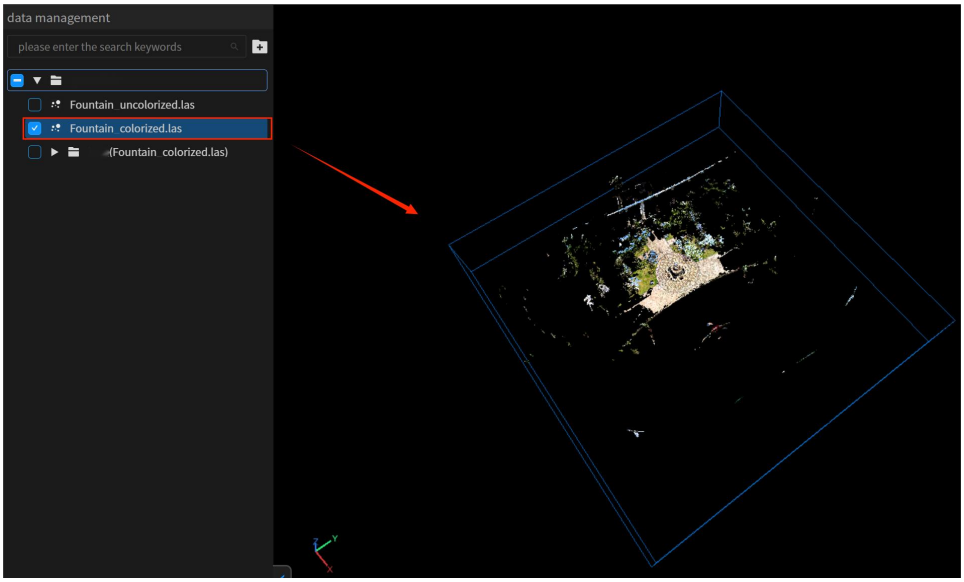


Figure 6-20 Select Measurement Layer

Click the layer again or click in an empty area of the "Data Management Panel" to deselect it.

6.1.5.2.2. Locate

Move the mouse cursor over the target layer, select it, right-click, and click the "Locate" option in the context menu. The view will center on the location of the measurement layer feature(s).

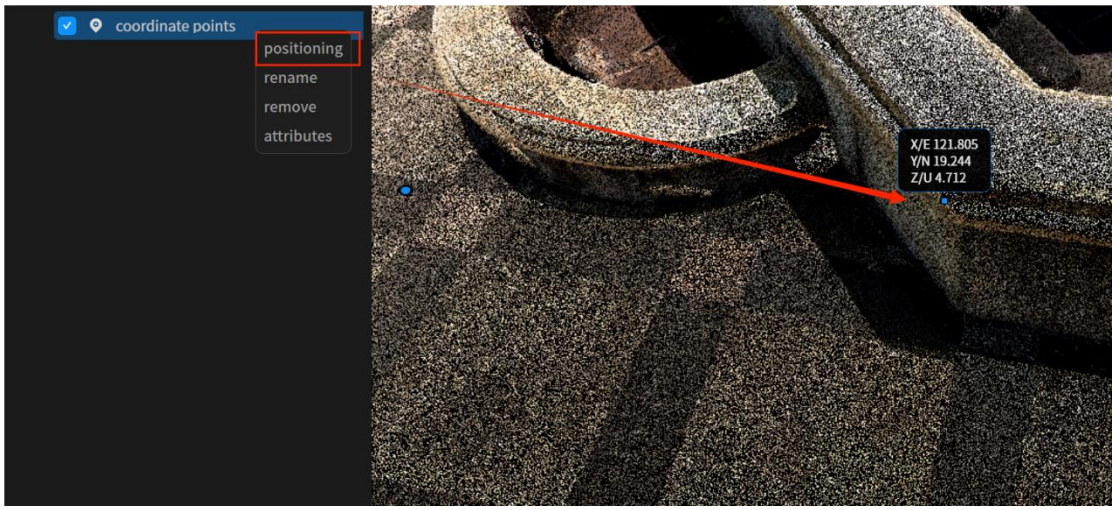


Figure 6-21 Layer Locate

6.1.5.2.3. Rename

Move the mouse cursor over the target layer, select it, right-click, and click the "Rename" option in the context menu to rename the measurement layer.

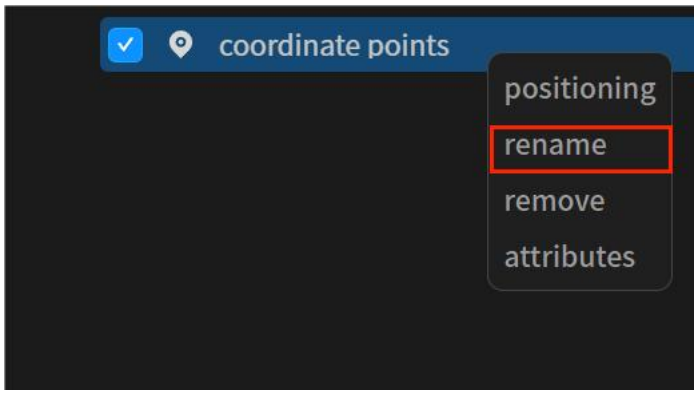


Figure 6-22 Rename Measurement Layer

6.1.5.2.4. Remove

Move the mouse cursor over the target layer, select it, right-click, and click the "Remove" option in the context menu to perform the layer removal operation.

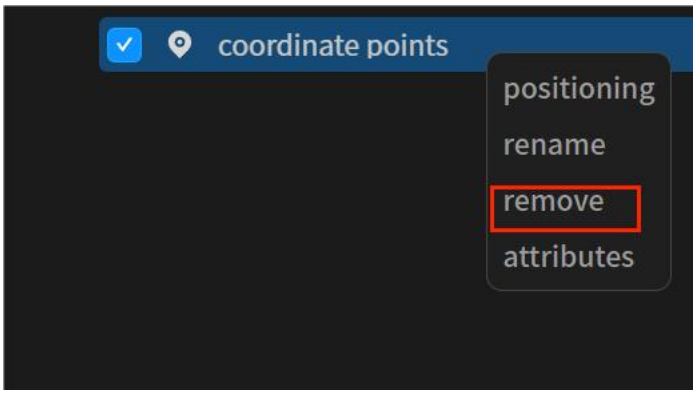


Figure 6-23 Remove Measurement Layer

6.1.5.2.5. Properties

By default, the Properties Panel is open. Selecting a layer will display its properties. For details on layer properties, see the "Properties Panel" section.

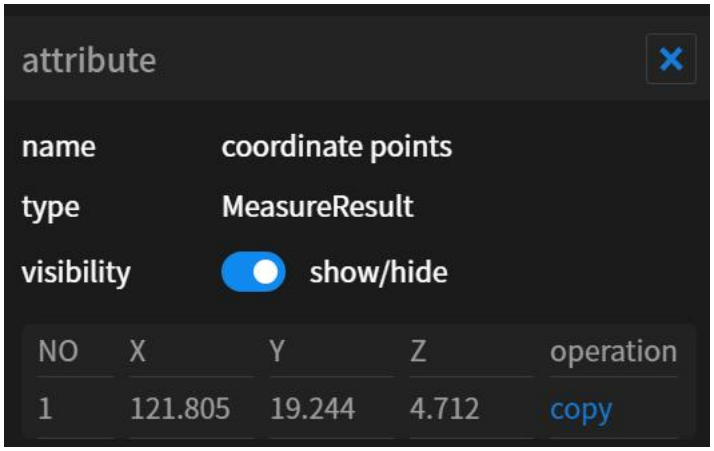


Figure 6-24 Measurement Layer Properties Panel

If the Properties panel is closed, you can move the mouse cursor over the target layer, select it, right-click, and click the "Properties" option in the context menu to open the Measurement Layer Properties panel.

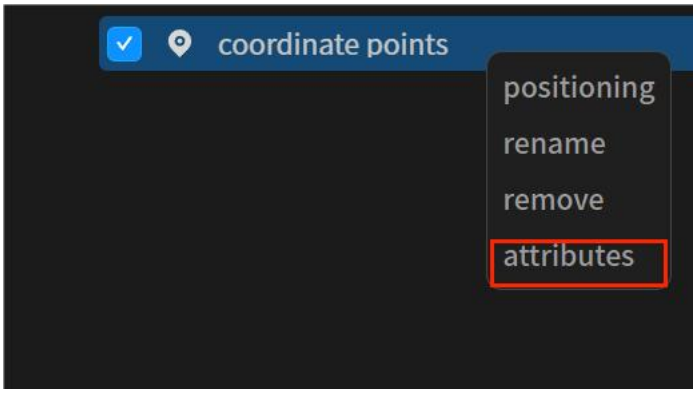


Figure 6-25 Open Measurement Layer Properties Panel

6.1.6. Reordering (Sorting)

Click and hold a layer group or layer, drag it to the desired position, and release the mouse button to change the order or hierarchical level of the layer group or layer.

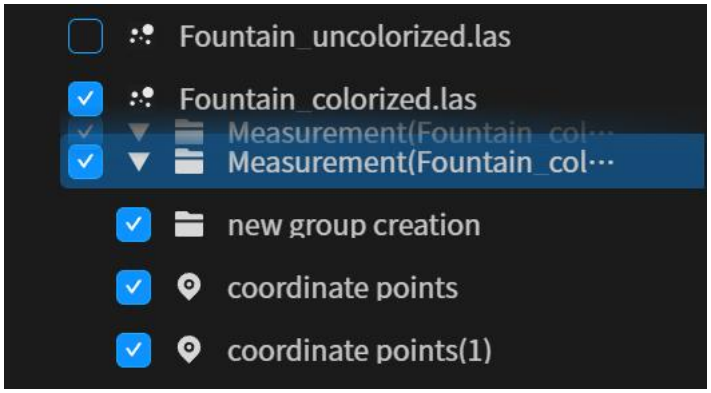


Figure 6-26 Change Layer Position

6.2. Properties Panel

6.2.1. Overview

The "Properties Panel" is located below the "Data Management Panel". It is used to display layer attribute information and also allows modification of some layer properties, such as point cloud size, render mode, and transparency. The

content displayed in the Properties Panel varies depending on the type of data selected. Select a layer to view its property information.

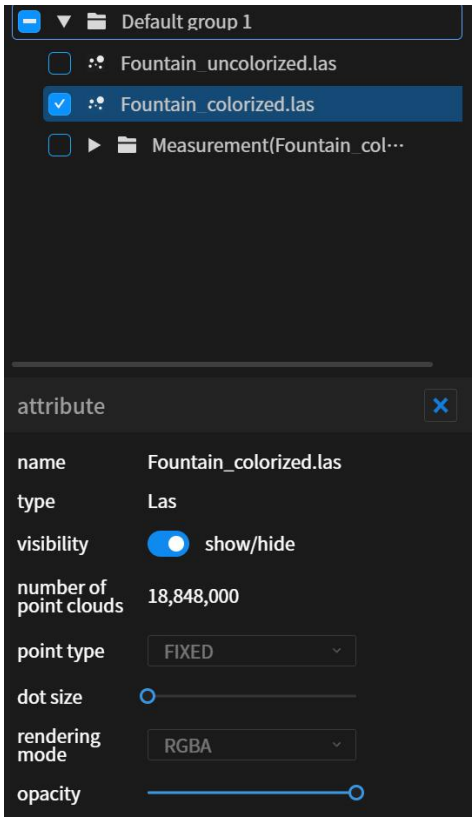


Figure 6-27 View Point Cloud Properties

By default, the "Properties Panel" is open. You can click the "×" icon in the upper right corner of the panel to close it. If the Properties panel is closed, move the mouse cursor over a layer, right-click, and select the "Properties" option to open it and view the properties for that layer.

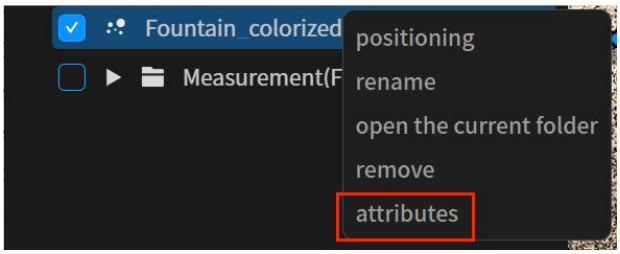


Figure 6-28 6-29 Open Properties Panel

6.2.2. Point Cloud Layer Properties

Select the corresponding point cloud layer in the "Data Management Panel" to view its properties in the "Properties Panel".

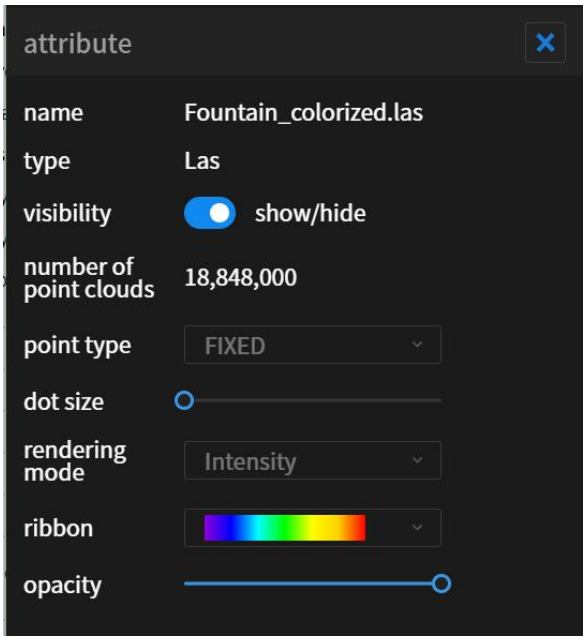


Figure 6-29 Point Cloud Properties

Property descriptions are as follows:

- Point Count: Displays the total number of points in the current point cloud.
- Point Size: Controls the size of the points displayed in the 3D scene. Default is 1. Drag the slider to change the point size.
- Render Mode: Controls how the point cloud is rendered in the 3D scene. Supports four modes: RGB Mode, Elevation Mode, Intensity Mode, and Echo Mode. Default is "RGB Mode".
- Transparency: Controls the transparency of the point cloud. Default is opaque. Drag the slider to change the point cloud transparency.

Figure 6-31 Rendering Effects for Different Point Sizes

Figure 6-32 Point Cloud Effects for Different Render Modes

If you accidentally close the "Properties Panel," move the mouse cursor over the target layer, right-click, and select the "Properties" option to open the properties panel again (as described in the Point Cloud Layer Operations "Properties" sub-section).

6.2.3. Measurement Layer Properties

Select the corresponding measurement layer in the "Data Management Panel" to view its properties in the "Properties Panel".

Figure 6-33 Distance Measurement Layer Properties

If you accidentally close the "Properties Panel," move the mouse cursor over the target layer, right-click, and select the "Properties" option to open the properties panel again (as described in the Measurement Layer Operations "Properties" sub-section).

Chapter 7 3D Scene Interaction

The "3D Scene" (or "3D Viewport") is used for the 3D rendering of data. It supports interaction with the 3D scene using the mouse and also allows manipulation of the scene view using the "View Tools".

Figure 7-1 3D Scene

7.1. Scene Mouse Interaction

Mouse controls for navigating the scene work as follows:

- Pan: Press and hold the left mouse button and drag to pan the 3D scene.
- Rotate: Press and hold the right mouse button and drag to rotate the 3D scene.
- Zoom Scene: Scroll the mouse wheel to zoom the scene. The zoom center is the location pointed to by the mouse cursor.
- Move to View Center: Double-click the left mouse button in the scene. The clicked location will be moved to the center of the view.

Note: The display of the 3D scene can also be controlled using the 'View Tools'. See the 'View Tools' section for details.

7.2. View Tools

The "View Tools" are located on the right side of the software. This tool provides a set of functions to control the display of data in the 3D scene.

Figure 7-2 View Tools

7.2.1. Top/Bottom/Front/Back/Left/Right View

Controls the camera to view the point cloud in the 3D scene from different standard perspectives.

- Top View: Camera looks down from the +Z direction towards the -Z direction.
- Bottom View: Camera looks up from the -Z direction towards the +Z direction.
- Front View: Camera looks from the -Y direction towards the +Y direction.
- Back View: Camera looks from the +Y direction towards the -Y direction.
- Left View: Camera looks from the -X direction towards the +X direction.
- Right View: Camera looks from the +X direction towards the -X direction.

7.2.2. Lock View / Unlock View

By default, the view is in the "Unlocked" state. Clicking this button changes it to the "Locked" state. When the view is locked, the mouse cannot be used to rotate the view, making it easier to examine the point cloud data from a specific orientation.

7.2.3. Interaction Mode

Roaming Mode: This is the default interaction mode. Use the mouse to navigate the point cloud in the 3D scene:

- Pan: Press and hold the right mouse button and drag to pan the scene.
- Rotate: Press and hold the left mouse button and drag to rotate the scene.
- Zoom: Scroll the middle mouse button (wheel) to zoom the scene.
- Center View on Point: Double-click in the scene to move that location to the center of the view.

First-Person Mode: Allows navigation of the point cloud in the 3D scene using the keyboard:

- **W:** Move Forward
- **S:** Move Backward
- **A:** Strafe Left
- **D:** Strafe Right
- **Q:** Move Down
- **E:** Move Up

7.2.4. Projection Mode

Perspective Mode: This is the default projection mode. It simulates the human eye's visual effect where objects appear smaller farther away ("near large, far small"), providing a more realistic sense of space.

Orthographic Mode: "Orthographic Mode" is a view without perspective distortion. All parallel lines remain parallel and do not converge with distance. This view is useful for accurately measuring distances and comparing sizes

Figure 7-3 Perspective Mode / Orthographic Mode

7.2.5. EDL Effect

The EDL (Eye-Dome Lighting) effect is a visual enhancement technique that enhances the sense of depth and contour clarity of the point cloud by simulating lighting effects, making the details of the model more prominent.

Figure 7-4 EDL Effect

7.3. Coordinate Axis

The "Coordinate Axis" indicator matches the orientation of the 3D scene, helping the user understand the current orientation and rotation of the scene.

Figure 7-6 Coordinate Axis (Note: Figure number skips 7-5)

7.4. Status Bar

The Status Bar is used to display positional information and a general notification area. Specifically:

Positional Information: Located in the bottom-left corner of the software. When clicking in the 3D scene, it displays the coordinate information of the point picked by the mouse.

General Notification Area: Located in the bottom-right corner of the software. For certain operations that require progress display (such as opening an LAS file), it shows text prompts and progress bar information, and supports cancelling the operation.

Chapter 8　Chapter 8 Function Area

The "Function Area" is located below the "Title Bar" and serves as the main entry point for the software's features.

Figure 8-1 Function Area

8.1. (Return to) Main Interface

Click this button to return to the software's main interface, which is the "Project Management Interface".

8.2. Task Management

"Task Management" is used to manage the current mapping tasks. You can view the progress of current tasks, terminate or cancel tasks, and adjust the execution order of mapping tasks.

Figure 8-2 Task Management

Once a mapping task is completed (either successfully or failed), it is removed from the list, and the status of the corresponding project changes accordingly.

8.3. Import LAS

Adds external point cloud data in LAS/LAZ format to the 3D scene. The added data is placed at the root directory of the "Data Management Panel" tree. In the "Project Browsing" interface, click the "Import LAS" button. The "Open LAS" dialog box will appear. Browse to the location of the point cloud data, select the file(s) to be added, and click "Open" to add the point cloud(s).

Figure 8-3 Import LAS

During the import process, the import progress is displayed in the lower-right corner of the software.

Figure 8-4 Point Cloud Import Progress

Once the import is complete, a new point cloud layer is added under the root directory in the "Data Management Panel" tree.

Figure 8-5 Imported Point Cloud Data

Note: You can drag the point cloud layer to change its order in the directory tree (see the "Reordering" section for details). You can also directly add point clouds under a layer group (see "Layer Group Operations -> Import LAS" section).

8.4. Attribute Query

"Attribute Query" allows you to query the coordinates, classification, RGB value, echo, intensity, and other attributes of a specific point in the scene. Click the "Attribute Query" button in the "Function Area" to activate this function. Move the mouse cursor over the point cloud point you want to query in the scene, and left-click to view its detailed attributes.

Figure 8-6 Point Cloud Attribute Query

Click the "Attribute Query" button in the "Function Area" again to exit this function.

8.5. Measurement

The "Measurement Function Group" includes several sub-functions such as Position Measurement, Distance Measurement, Height Measurement, Area Measurement, Angle Measurement, and Volume Measurement (Note: Volume Measurement is mentioned but not detailed in the provided text). The measurement results can be saved in the corresponding "Measurement" panel within the Data Management Panel. Click "Measurement" in the main function area to activate the measurement function group.

Figure 8-7 Activate "Measurement" Function

8.5.1. Position Measurement

Click the "Position Measurement" button to activate the coordinate picking function.

Select the point cloud layer to be measured in the "Data Management Panel". Left-click in the scene on the desired point. A confirmation pop-up asking whether to save will appear.

Figure 8-8 Position Measurement Confirmation Pop-up

Click "OK" to save this measurement record in the "Data Management Panel" directory tree.

Figure 8-9 Generated Measurement Coordinate Point Layer

The measurement layer in the directory tree supports operations like select, locate, rename, etc. See the "Measurement Layer Operations" section for details.

8.5.2. Distance Measurement

Click the "Distance (Measurement)" button to activate the distance measurement function.

Select the point cloud layer to be measured in the "Data Management Panel". Left-click in the scene to add vertices sequentially. Right-click to finish the measurement. A confirmation pop-up asking whether to save will appear.

Figure 8-10 Distance Measurement

Click "OK" to save this measurement record in the "Data Management Panel" directory tree.

Figure 8-11 Generated Length Measurement Record

The measurement layer in the directory tree supports operations like select, locate, rename, etc. See the "Measurement Layer Operations" section for details.

8.5.3. Height Measurement

Click the "Height (Measurement)" button to activate the height measurement function.

Select the point cloud layer to be measured in the "Data Management Panel". Left-click in the scene to add two points, defining a line segment. A confirmation pop-up asking whether to save will appear.

Figure 8-12 Height Measurement Confirmation Pop-up

Click "OK" to save this measurement record in the "Data Management Panel" directory tree.

Figure 8-13 Generated Height Measurement Record

The measurement layer in the directory tree supports operations like select, locate, rename, etc. See the "Measurement Layer Operations" section for details.

8.5.4. Area Measurement

Click the "Area (Measurement)" button to activate the area measurement function.

Select the point cloud layer to be measured in the "Data Management Panel". Left-click in the scene to draw a polygon by adding vertices. Right-click to

finish drawing. After finishing, a confirmation pop-up asking whether to save will appear.

Figure 8-14 Area Measurement Confirmation Pop-up

Click "OK" to save this measurement record in the "Data Management Panel" directory tree.

Figure 8-15 Generated Area Measurement Record

The measurement layer in the directory tree supports operations like select, locate, rename, etc. See the "Measurement Layer Operations" section for details.

8.5.5. Angle Measurement

Click the "Angle (Measurement)" button to activate the angle measurement function.

Select the point cloud layer to be measured in the "Data Management Panel". Left-click in the scene three times to define a triangle. After finishing, a confirmation pop-up asking whether to save will appear.

Figure 8-16 Angle Measurement Confirmation Pop-up

Click "OK" to save this measurement record in the "Data Management Panel" directory tree.

Figure 8-17 Generated Angle Measurement Record (Note: Measurement layers support select, locate, rename, etc. as detailed in "Measurement Layer Operations")

8.6. Point Cloud Comparison

The "Point Cloud Comparison" function provides users with an efficient way to visually compare different point cloud datasets. By synchronizing the operations in two point cloud viewports, users can identify differences and similarities between datasets.

Figure 8-18 Point Cloud Comparison

8.6.1. Operating Steps

Step 1: Open "Point Cloud Comparison

"Click the "Point Cloud Comparison" button in the function area to activate the feature. Once activated, the "Point Cloud Comparison Settings" pop-up window appears in the upper-left corner of the scene:

Figure 8-19 Activate "Point Cloud Comparison" Function

Step 2: Point Cloud Comparison Settings

Figure 8-20 Point Cloud Comparison Settings Window

In the "Point Cloud Comparison Settings" window, you can configure the viewport linking method and select the point cloud data to be displayed in each viewport.

By default, "Viewport One" and "Viewport Two" are linked. Rotating, panning, or zooming operations performed on the point cloud in one viewport will automatically be replicated in the other viewport, enabling synchronized viewing. Turn off the "Link" button to operate on the point clouds in each viewport independently.

By default, the list displays all point cloud data currently in the "Data Management Panel." You can individually control the visibility (show/hide) of each point cloud layer in each viewport. You can also click the "Add" button at the top to add external point clouds to the list.

Supports removing a specific point cloud or clearing all point clouds from the comparison list. Also supports the "Locate" operation for a specific point cloud.

Step 3: Point Cloud Comparison Viewing

When the "Link" button is enabled, you can move the mouse into either viewport and pan, rotate, or zoom the point cloud; the other viewport will change synchronously. Alternatively, disable the "Link" operation to independently manipulate the view in one viewport without affecting the display state of the other.

8.6.2. Application Value

Quality Check: Compare point cloud data from different stages of a construction project to check construction quality and progress.

Environmental Monitoring: Compare terrain or vegetation cover at different time points to monitor environmental changes.

Cultural Heritage Preservation: Assess the condition changes and effectiveness of preservation work by comparing scan data of historical buildings from different times.

Chapter 9 System Settings

System settings allow configuration of language and the default workspace, as well as checking for new software versions.

Figure 9-1 System Settings

9.1. Language Switching

Click the "Language/Lang" dropdown list to switch the system language. Supports switching between Chinese and English.

Figure 9-2 Language Switching

9.2. Change Default Workspace

When creating a new project, the project data is stored in the "System Workspace" by default. This path is initially located on the C: drive, but users can change it. Click the "Change" button to modify the default workspace location.

Figure 9-3 Change Default Workspace

9.3. Check for Updates

Click the "Check for Updates" button to verify if the current version is the latest. If a newer version exists, you can update the software.

Figure 9-4 Check for Updates

Figure 9-5 Software Update Prompt

Click "Update Now" to begin the software update and upgrade process. For details on the software update procedure, refer to the "Software Upgrade/Update" section (in Chapter 2).