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Introduction

LiDAR360MLS is a feature intelligent extraction and analysis software independently developed by GreenValley International. It primarily supports devices such as LiGrip, LiBackpack, LiMobile, and other third-party mobile mapping systems. The software is designed to intelligently process and analyze acquired laser point clouds and images (panoramic/planar), providing users with a one-stop solution from pre-processing to post-processing delivery.

The software framework includes data visualization browsing, measurement and editing tools, over 60 point cloud processing tools, more than 100 vector mapping tools, over 40 image processing tools, AutoCAD plugins, etc. It is equipped with multi-scenario point cloud intelligent classification models, offering intelligent annotation of point cloud and image data, and a complete production chain from AI model training to model inference.

The Asset Extraction module utilizes point cloud and image data combined with proprietary AI algorithms to intelligently extract and vectorize various traffic signs, road markings, and roadside facilities. It is applicable to scenarios such as holographic surveying (GIS asset), topographic surveys, high-precision map production, smart city development, and infrastructure management.

The Architectural Drawings module provides automatic vectorization of architectural floor plans and faced survey, suitable for architectural design and construction planning.

The Road Condition module offers various 3D analysis functions, such as damage, clearance, height limit analysis, cross-section, and road terrain production. It can be applied in fields like 3D spatial analysis, inspection and maintenance, safety warnings, railway inspection, topographic mapping, railway inspection analyses, bridge safety analyses, urban power line clearance analyses, and road limit restriction analysis.

The Road Scene module provides one-click modeling and model editing functions for road component-level elements, applicable to component-level road 3D modeling and digital twinning.

The Forestry module offers individual tree segmentation, editing, parameter calculation, and 3D analysis, suitable for urban greening, park management, tree health monitoring, and urban ecological planning.

The GSReconstruction Module provides one-click creation of realistic GS rendering models based on data from LiGrip O1Lite and LiGrip H300 devices, and offers functions such as mapping, measurement, and roaming based on the GS model.

LiDAR360MLS V8.1.0 Release Notes

(New)GSReconstruction Module

New Features

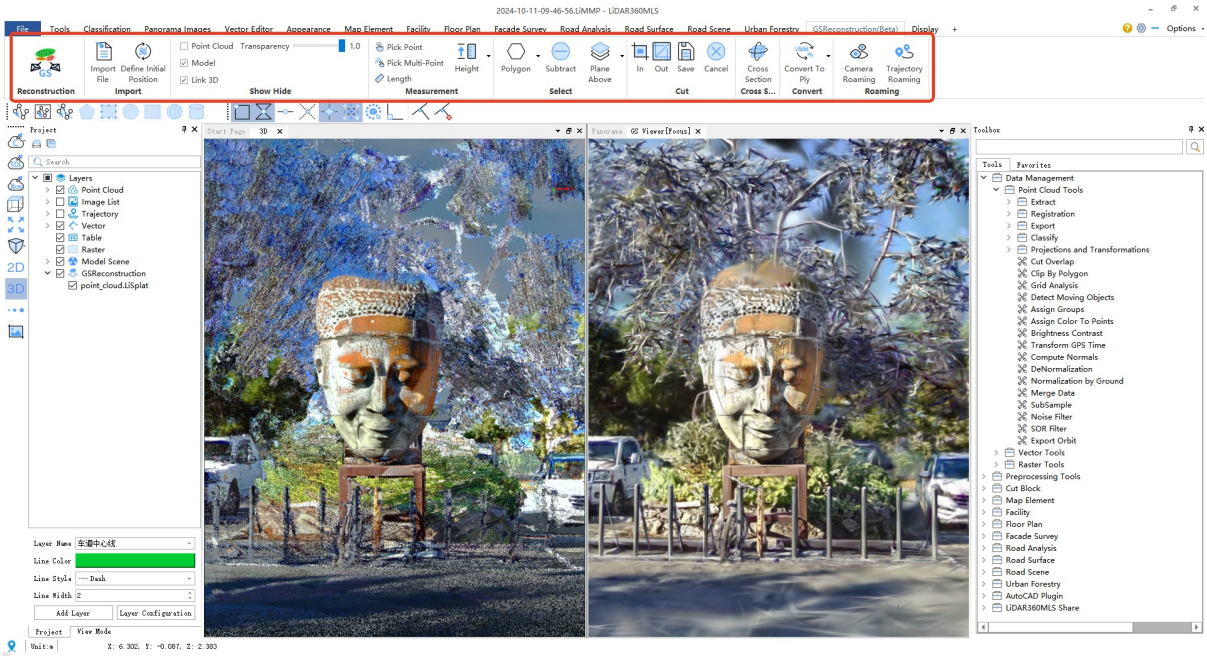
1.Added Gaussian reconstruction module, supporting one-click reconstruction of data collected by LiGrip O1Lite and LiGrip H300 handheld devices.

2.Supported the import and export of Gaussian models, as well as format conversion.

3.Supported display rendering, measurement, selective cutting and editing, and mapping of Gaussian models.

4.Supported linkage between the Gaussian window and the 3D window/panoramic window.

5.Supported Gaussian data roaming by perspective and by trajectory.

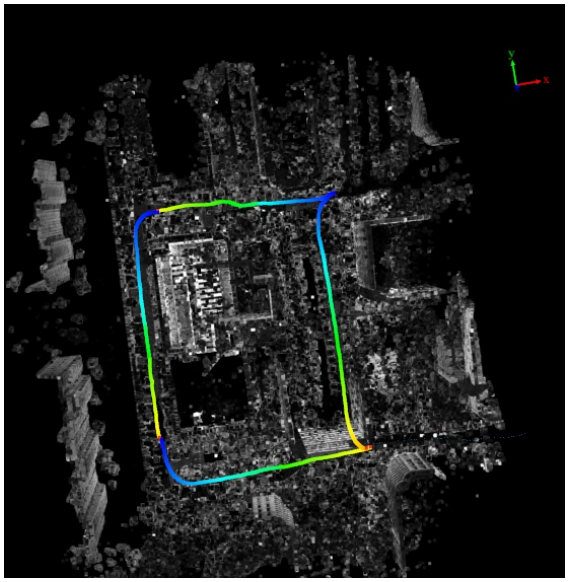


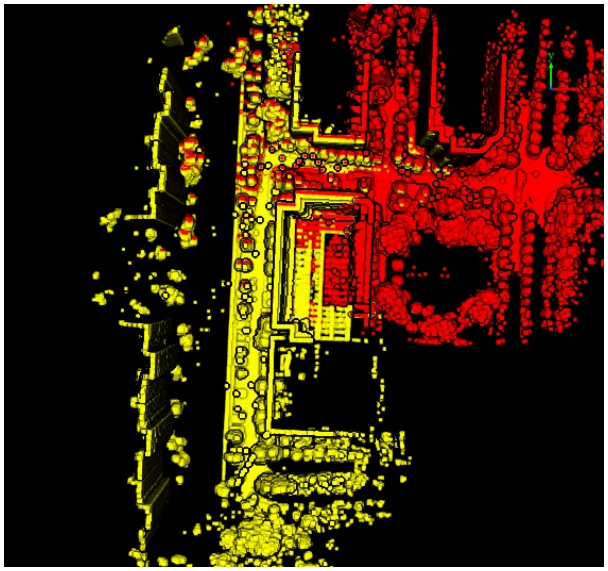
> Note:
>
> - The reconstruction function of the Gaussian reconstruction module requires authorization for the new module. Other functions such as display, browsing, and measurement can be used with either the LiDAR360MLS framework module or the BP module.
> - For specific operation instructions of this module, please refer to the user manual or tutorial videos.

BP module

Add new

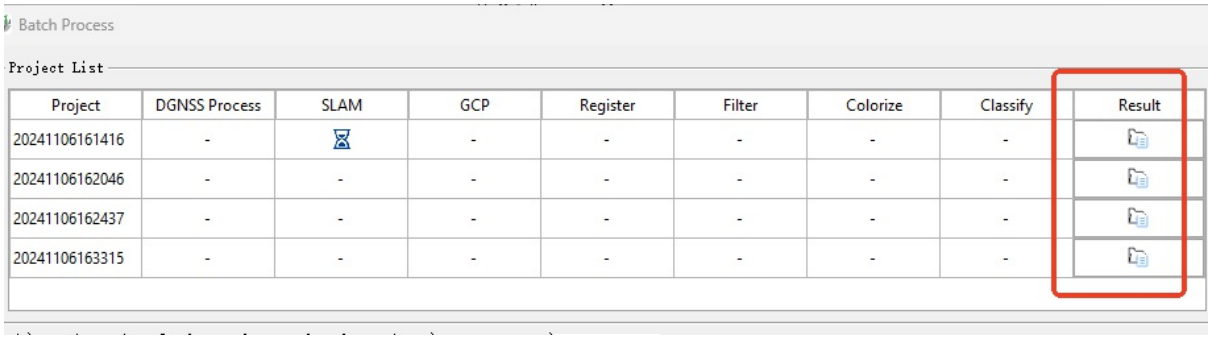
1.Support SLAM process for breakpoint continuation scan

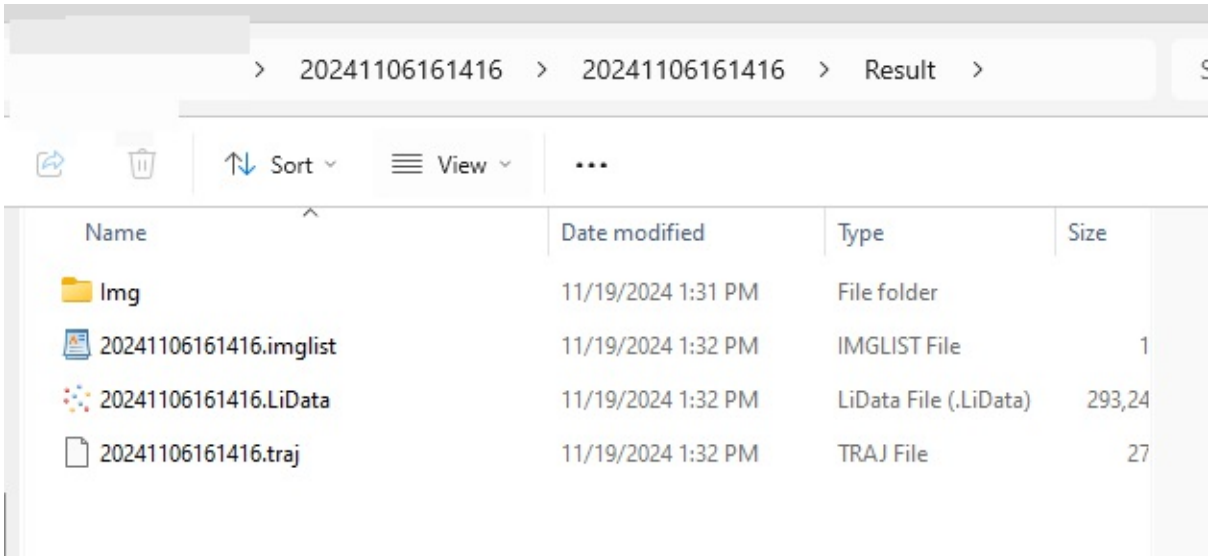




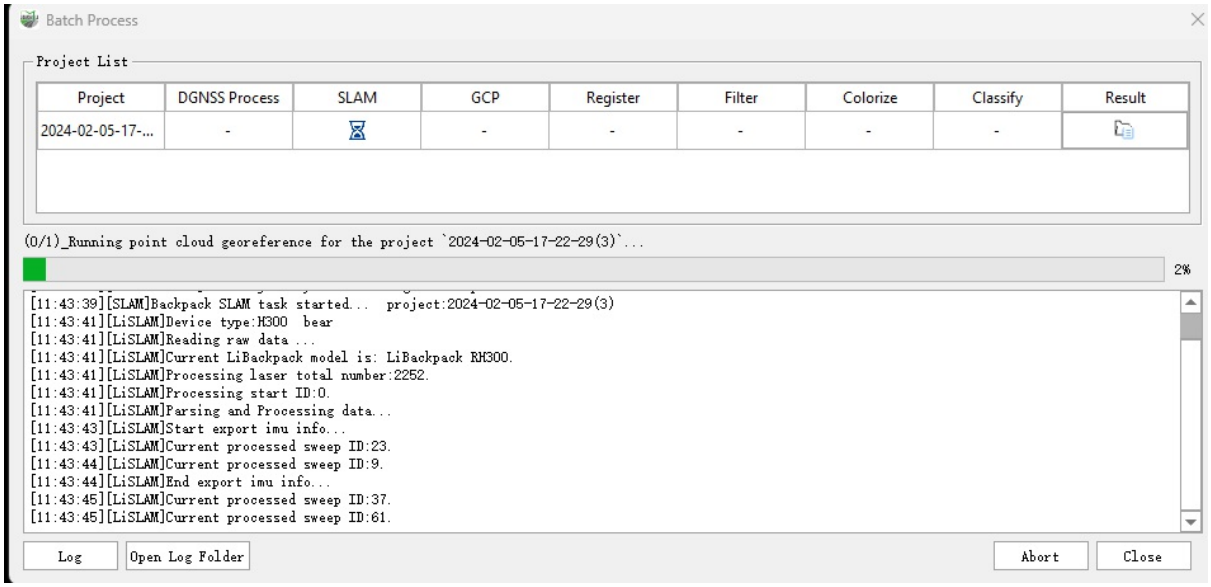
> After the breakpoint continuation scan is processed, the point clouds are roughly together, reducing the rotation and translation operations during registering

2.Added result folder in the batch process interface, clicking the result can directly open the data directory

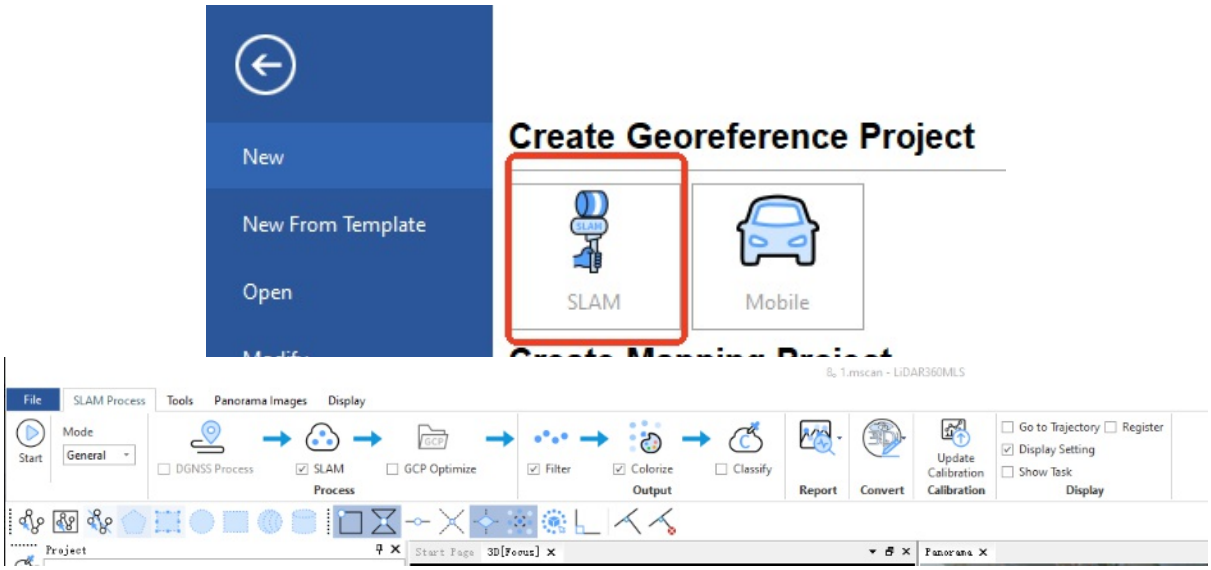




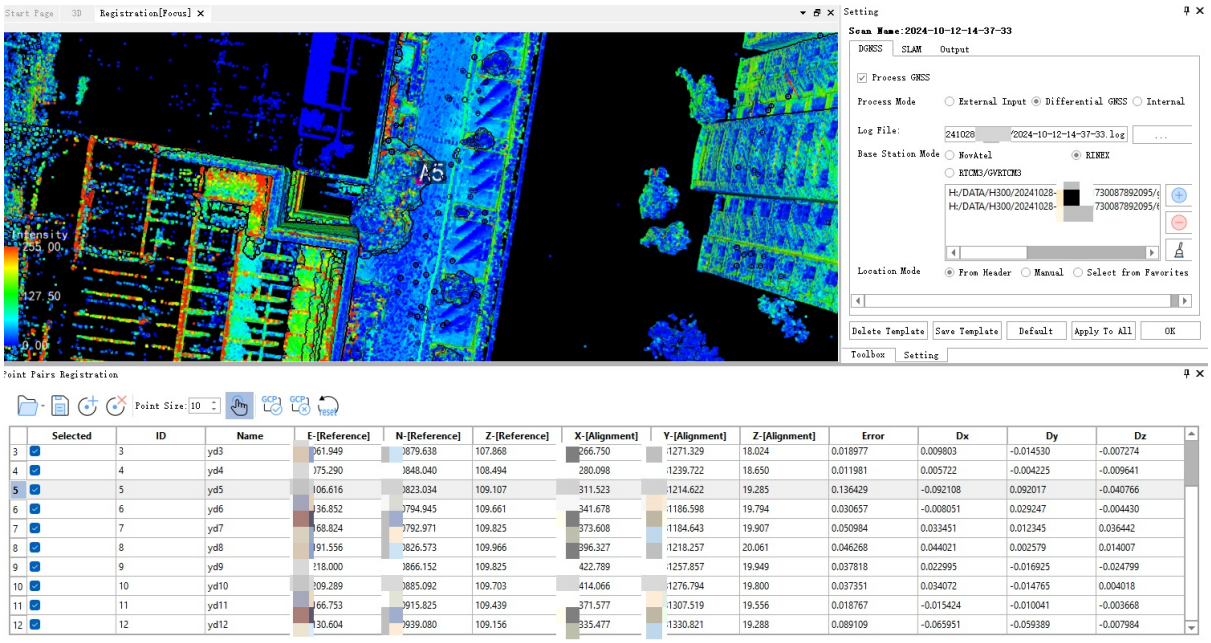
3.Added system log in batch process: You can directly see the running logs of the software on the batch interface



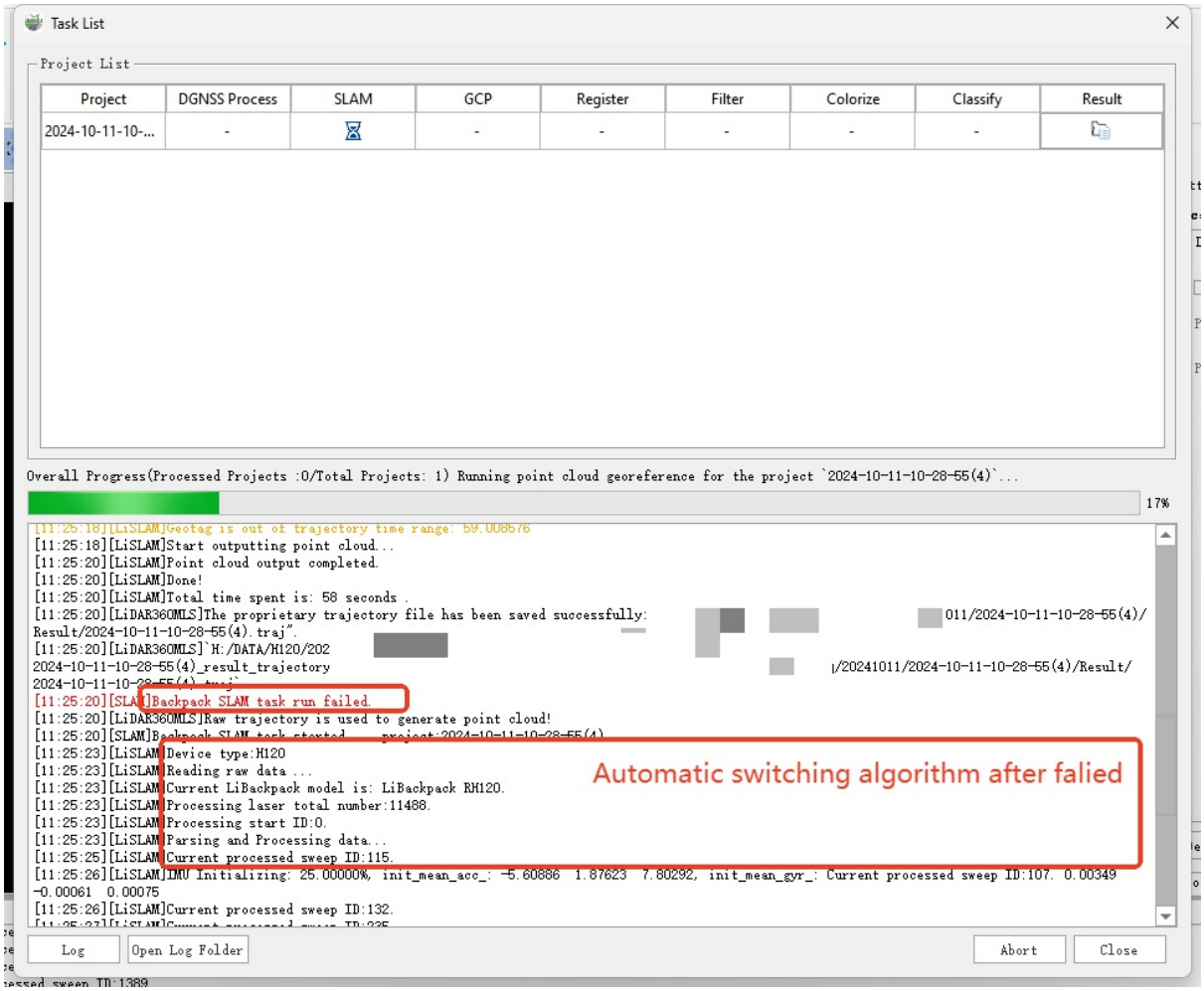
4.Supported simplified SLAM interface: After creating a new SLAM project, only display SLAM related interfaces



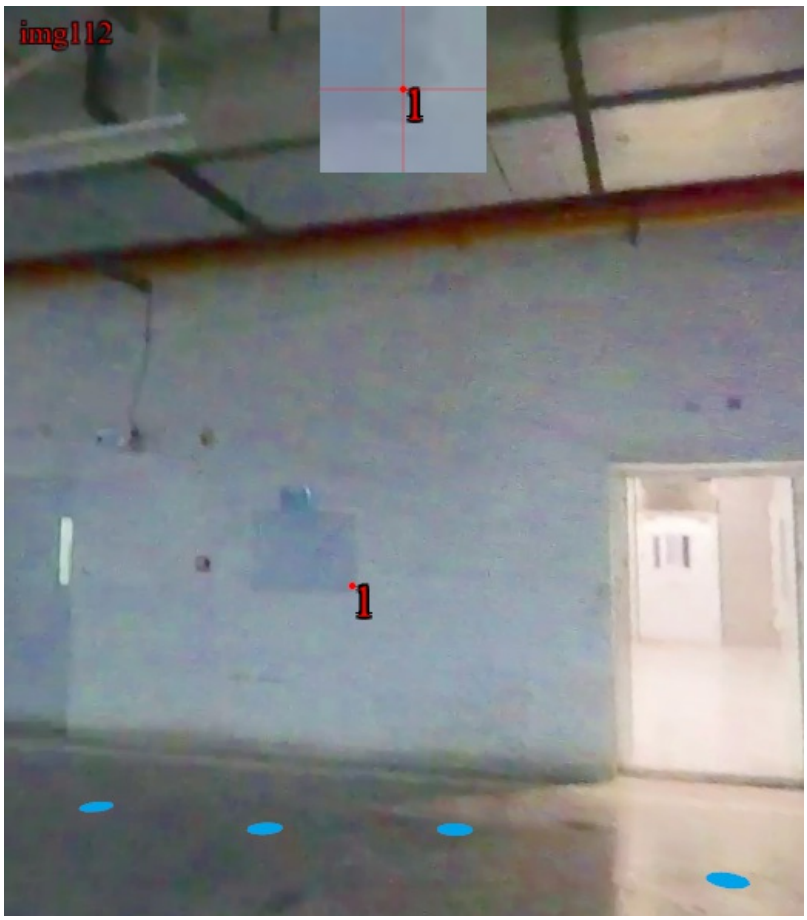
5.Supported GNSS+GCP: Support customers to convert absolute coordinates obtained from GNSS to other coordinate systems through GCP



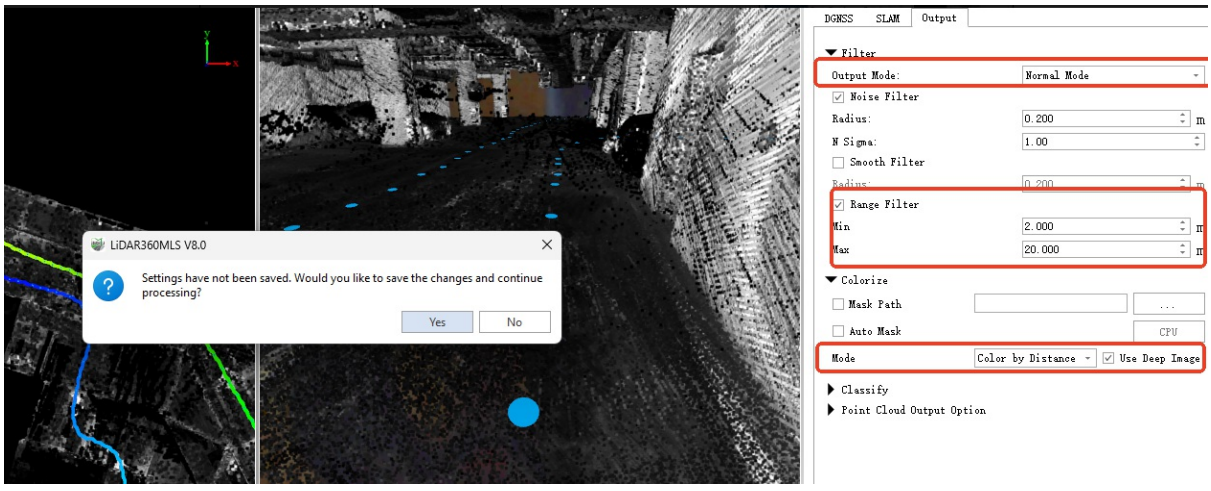
6.Supported automatic switching algorithm: When the default algorithm fails, the program will automatically switch to the stricter SLAM algorithm (up to 4 times) to improve the success rate. When the data is not successfully processed after 4 switches, retain the best result (the one with the highest number of solution frames is the best)



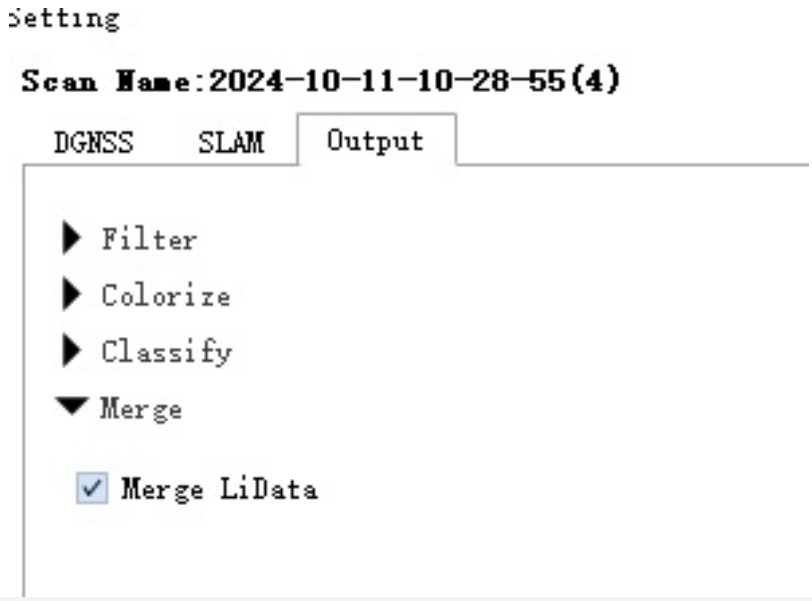
7.Added small window for panoramic point display: Supports displaying marker points in a small window during camera calibration

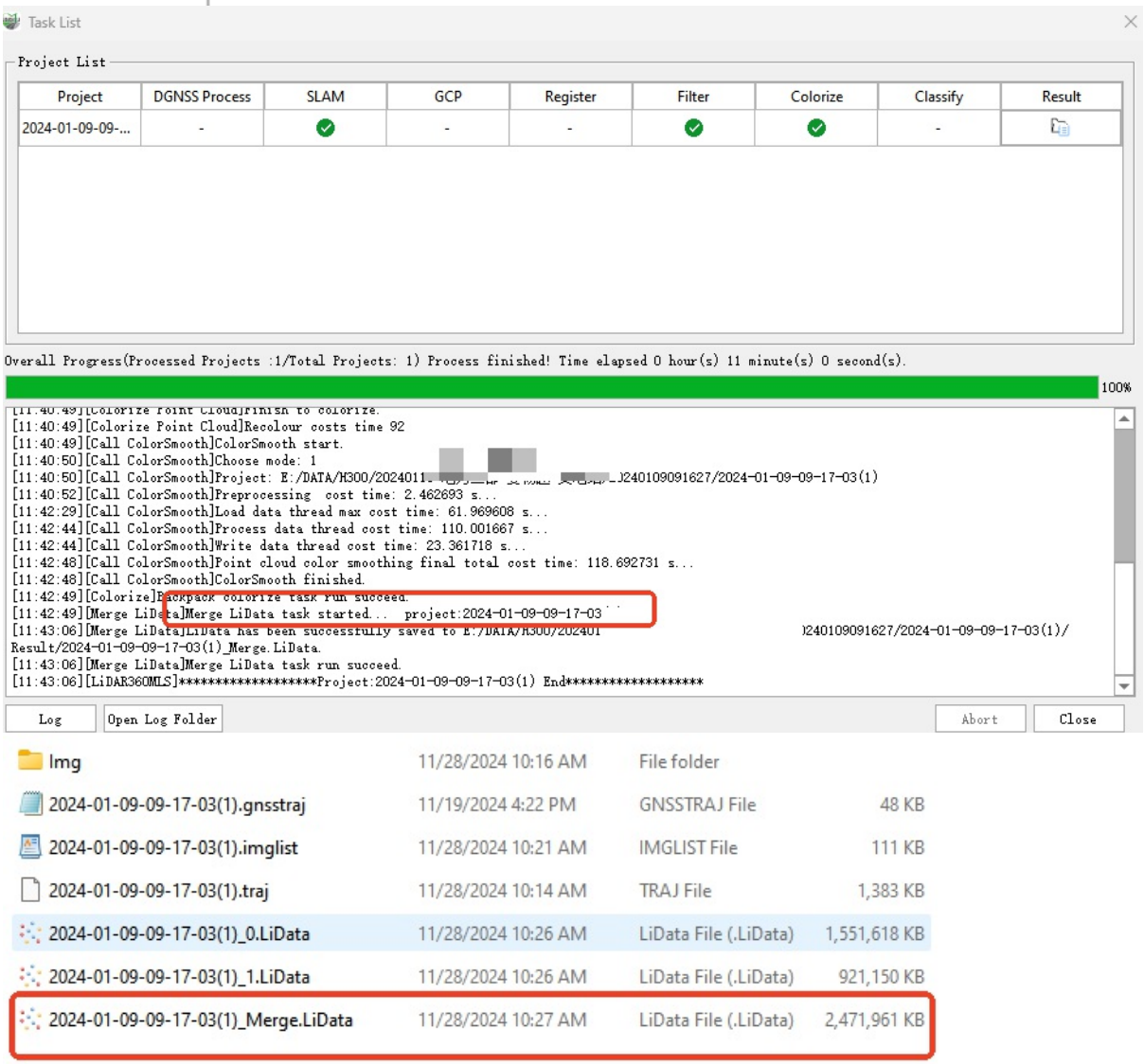


8.Added unsaved parameter reminder: Modifications to range filtering, output mode, and colorization mode will automatically remind you that parameters are unsaved



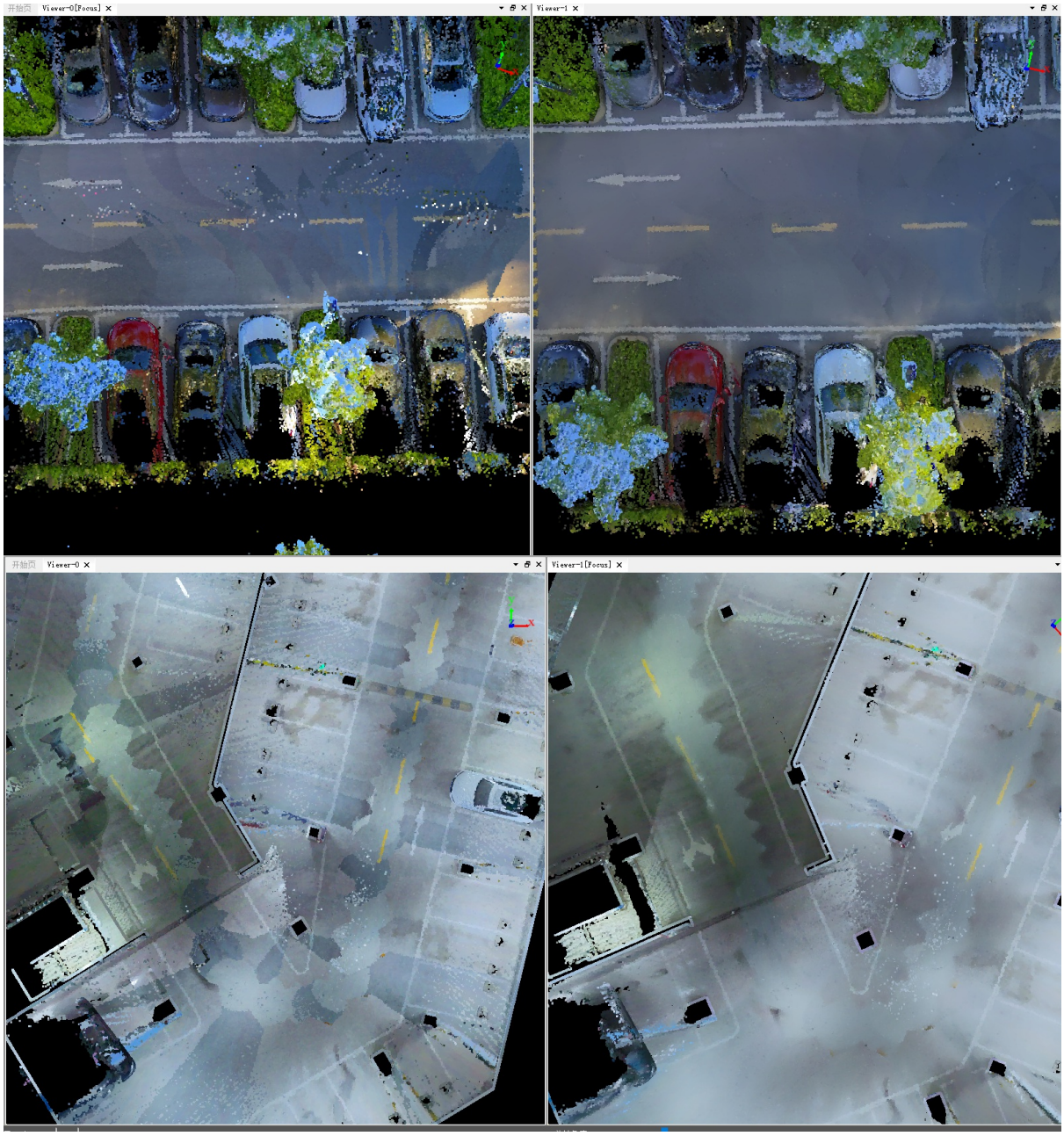
9.Added merging lidata option: Allows custom selection of whether to merge pointclouds during output. The final merged pointcloud is saved in the Result folder





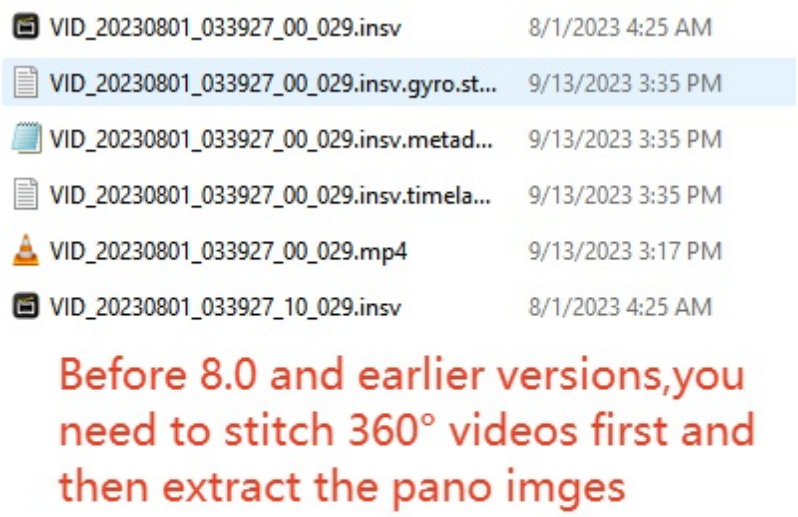
Optimization

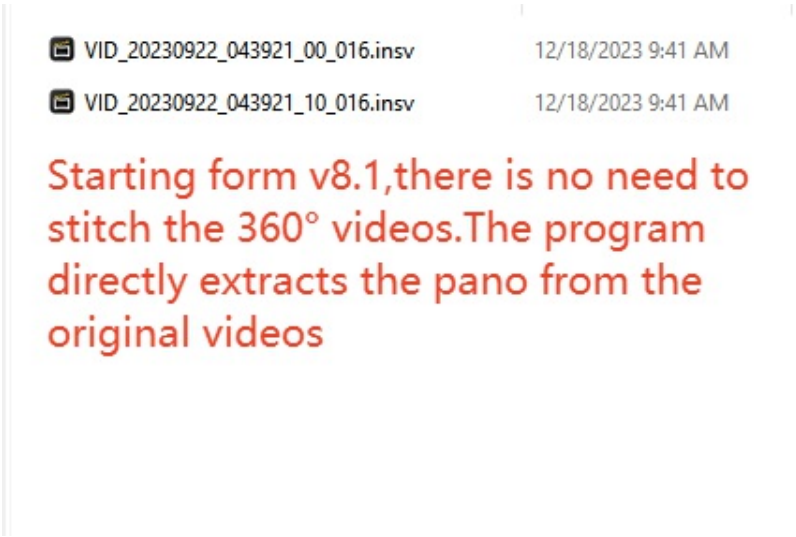
1.Optimized point cloud color speckle situation (Left:**8.0** Right:**8.1**)



2.Optimized the panoramic extraction process for INSTA cameras

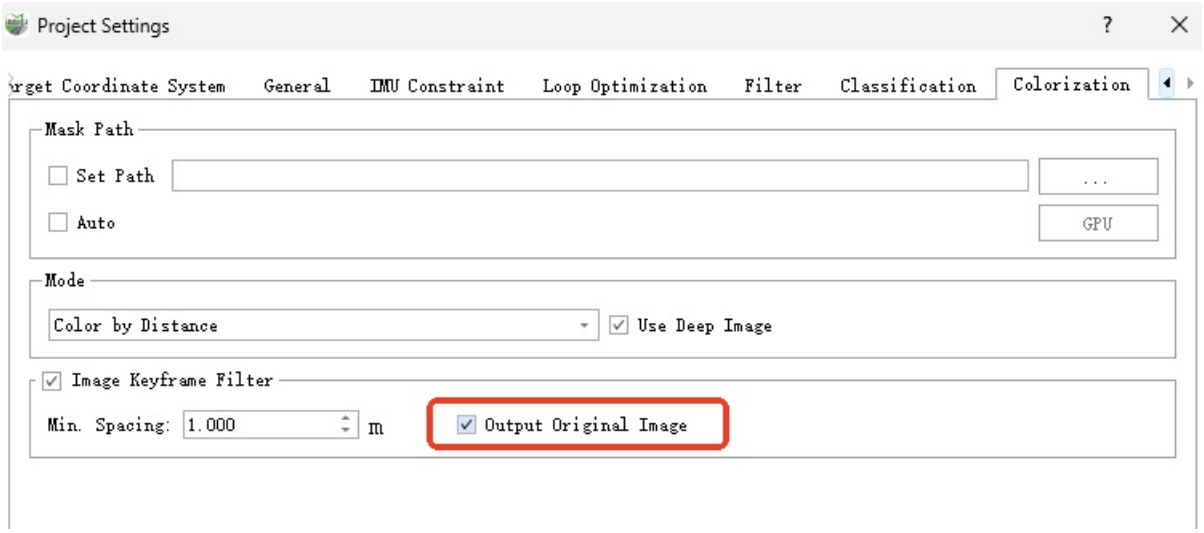
Utilize self-developed software for panoramic photo stitching, removing the intermediate step of panoramic video stitching. Panorama extraction is faster, the program is more stable, and it is less likely to be mistakenly terminated by antivirus software.



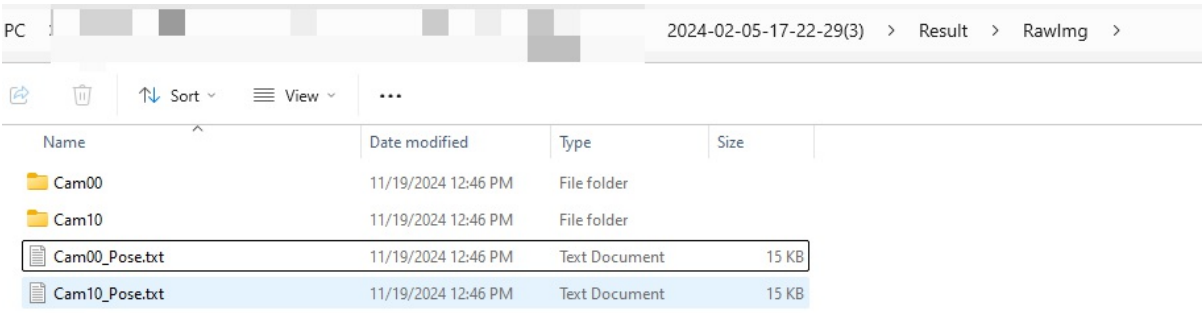


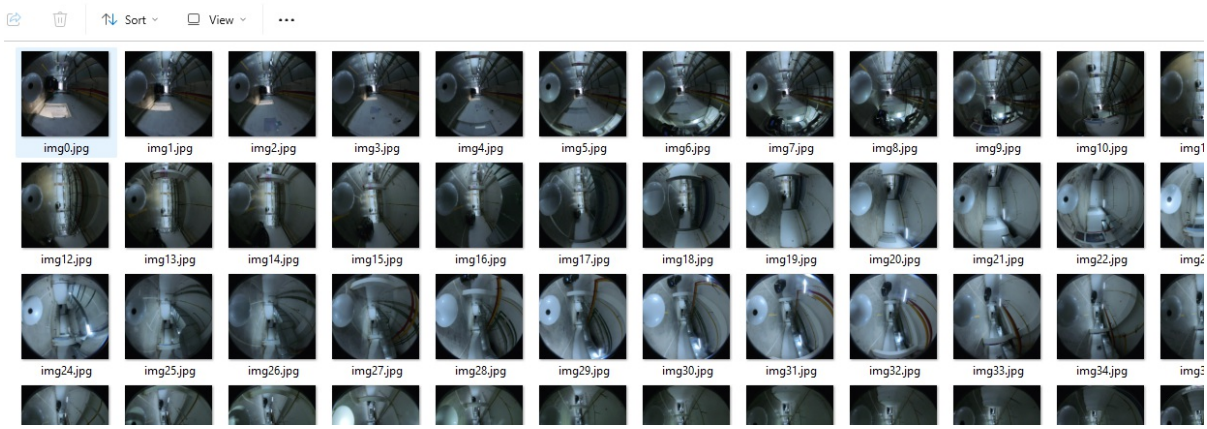
3.Fixed the issue of RTK not supporting seven parameter settings

4.Fixed the crash issue when outputting original images.

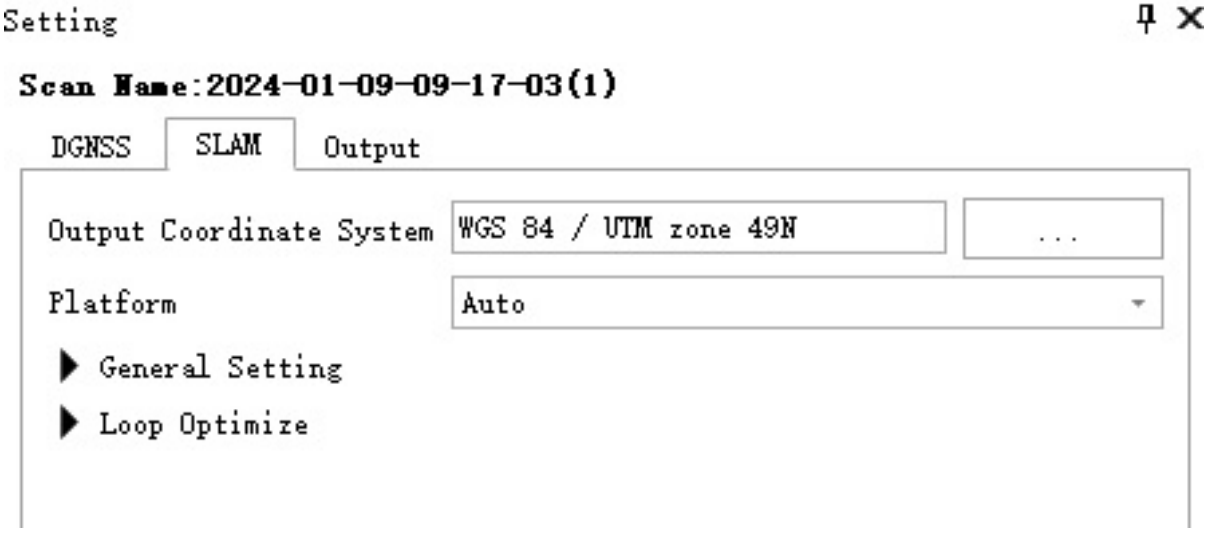


The original images consist of the original photos and the corresponding POS. The O1-LITE original has one fisheye lens, while the INSTA has two fisheye lens folders.





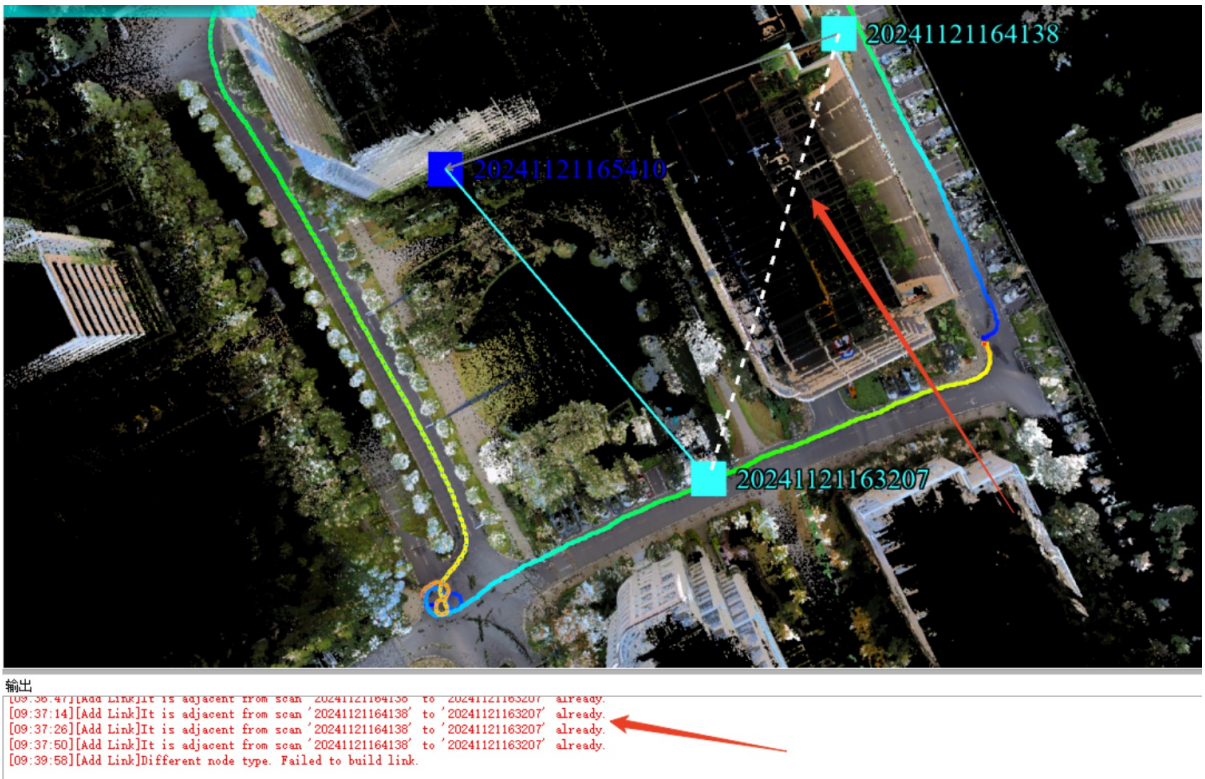
5.Fixed the bug where setting the coordinate system in the main interface was ineffective.



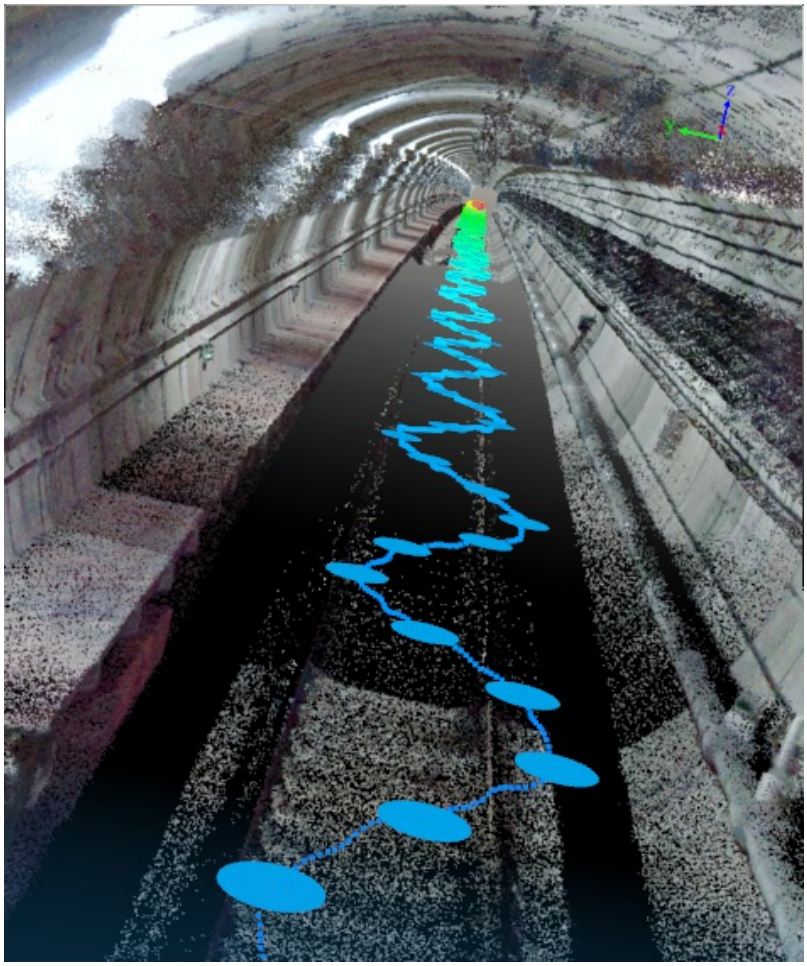
6.Optimized PPK log

```
(Single Base)Base station observation file path: H:\DATA\H300\20240824-PPK-wuhan\20240823AM\LB1U020212360035.24O
Base station ephemeris file path:
    H:\DATA\H300\20240824-PPK-wuhan\20240823AM\LB1U020212360035.24N
    H:\DATA\H300\20240824-PPK-wuhan\20240823AM\LB1U020212360035.24C
    H:\DATA\H300\20240824-PPK-wuhan\20240823AM\LB1U020212360035.24G
Rover file path: H:\DATA\H300\20240824-PPK-wuhan\2024-08-23-09-51-00.log
Rover RTK file path:
Rover ephemeris file path:
Base station location mode: 2 ---- From Base Header
Output elevation model: 0 ---- Ellipsoidal Height
Base file format: 2----Rinex
Rover file format: 0----Novatel Oem6
IMU file format: 0----Novatel(default)
System ---- All
Output time mode: 1 ---- UTC Time
-------------------------- Project settings (end) --------------------------
    <info> Enable IMU time offset compensation (time offset amount):0.000 ms),value from preset parameter
Extract base station file
    <info>:Base station RINEX version is identified as Ver.3.02
Extract rover file
    <info>:Statistics of Mobile Station Coverage by Base Stations(Mobile station duration:683.0 s, Mobile station coverage ratio:100.0 %, Missing proportion at the beginni
    <info>:baseline length(remote and base #0) = 0.181km
Navigation Process 1
    (Time statistics) Running time of this program<data extract>:   0.6 s
Navigation Process 2
    <info>:Base info1(Approxi):Longitud    16.57589(1 .504604413 deg),Latitude      6.80374  551889928 deg),Ellipsoidal height 76.794 m
    <info>:Base info2(Ant Delta):E 0.000, N 0.000, H 1.800 m
    <info>:Base Pos(info1+info2):Longitude   16.57589  .504604413 deg),Latitu    6.80374(  ).551889928 deg),Ellipsoidal height 78.594 m
    <info>:Base info3(PCV, not in Base Pos, but compensated in cal):
           NONE    (from <igs14.atx>)
           Antenna_Phase_Offset (L1):    0.000m    0.000m    0.000m
           ----------------------(L2):    0.000m    0.000m    0.000m
           ----------------------(L3):    0.000m    0.000m    0.000m
    <info>:Base info1(Approxi):Longitude          57589(     4604413 deg),Latitude      6.80374(      89928 deg),Ellipsoidal height 76.794 m
    <info>:Base info2(Ant Delta):E 0.000, N 0.000. H 1.800 m
    <info>:Base Pos(info1+info2):Longitude  -   .7589(   4604413 deg),Latitude       30374      889928 deg),Ellipsoidal height 78.594 m
    <info>:Base info3(PCV, not in Base Pos, but compensated in cal):
           NONE    (from <igs14.atx>)
           Antenna_Phase_Offset (L1):    0.000m    0.000m    0.000m
           ----------------------(L2):    0.000m    0.000m    0.000m
           ----------------------(L3):    0.000m    0.000m    0.000m
    <info>:Signal quality score (0~100):100.0, the longest lost time is 0.0 seconds!
    (Time statistics) Running time of this program<data extract>:  49.6 s
    (Time statistics) Running time of this program<data extract>:   0.0 s
    (Time statistics) Running time of this program<data extract>:   0.0 s
    <info>:debug pos time form: utct.
    <info>:Extraction result: total(683points) expo(683points) Partial matching succeeded
    <info>:Result Quality:(1)Fix:100.00%  (2)Float:0.00%  (3)Single:0.00%  (4)others:0.00%
    <info>:Signal quality score (0~100):100.0, the longest lost time is 0.0 seconds!
Total running time:   50.3 s
Data processing succeeded!
```

7.During registering, there is a warning on connecting the start and end.

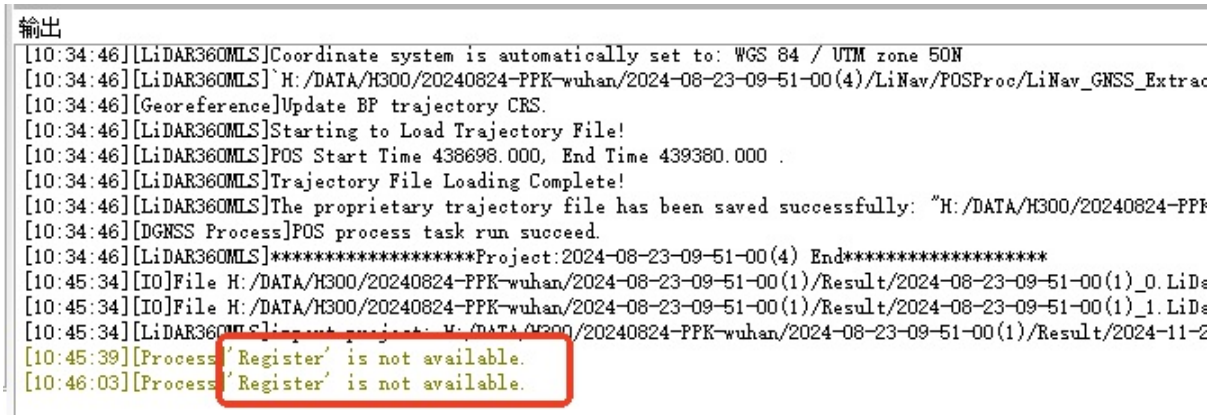


8.Fixed the issue of missing ground points in O1-LITE in rare cases.



9.Fixed blue background issues: On objects with a blue background, a gray phenomenon may occur.

10.In the SLAM interface, the added reference point cloud is prohibited from registration.



11.Fixed the issue of displaying Chinese characters for GCP control points

Point Pairs Registration

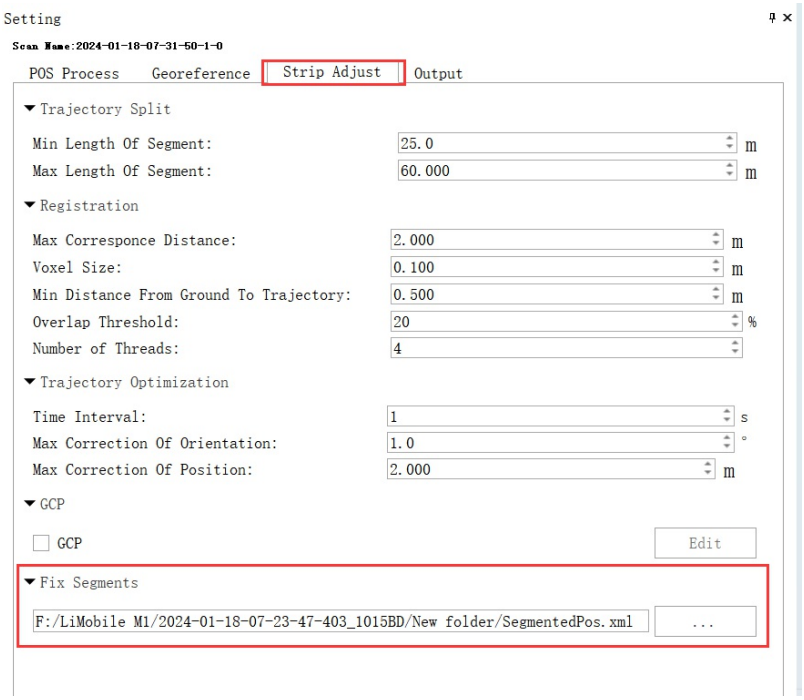
Point Size: 10

	Selected	ID	Name	E-[Reference]	N-[Reference]	Z-[Reference]	X-[Alignment]	Y-[Alignment]	Z-[Alignment]
1	☑	1	1月1日	82064.457	-15574.455	226.471	82064.457	-15574.456	226.471
2	☑	2	1月2日	82322.425	-15575.624	227.704	82322.426	-15575.624	227.704
3	☑	3	1月3日	82288.925	-15531.377	228.587	82288.924	-15531.377	228.587
4	☑	4	1月4日	82072.690	-15495.614	227.363	82072.690	-15495.613	227.363

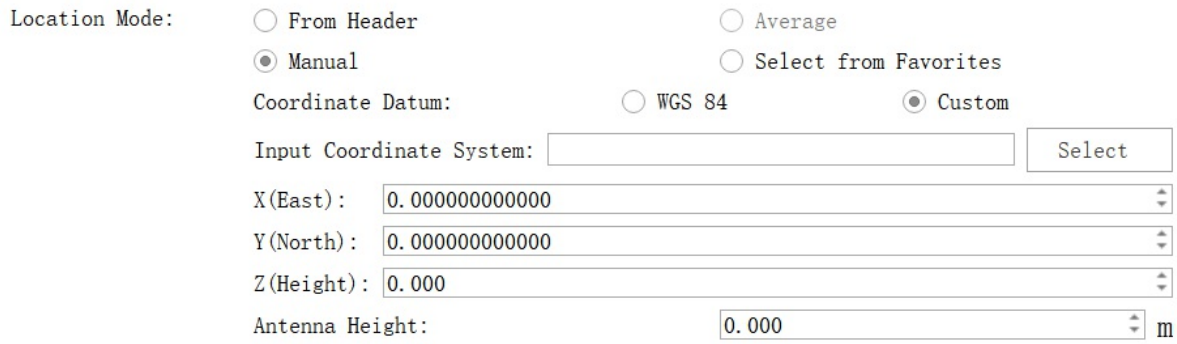
Geo Module

New Features

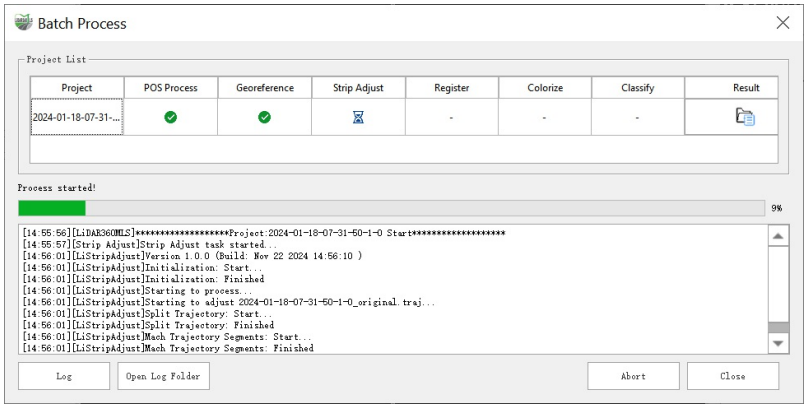
1.In the Strip Adjust setting interface, a new Fixed Segment parameter setting is added. The trajectory segment file corresponding to the current project is imported. When executing strip adjusting, the software will not process the point cloud data corresponding to the selected trajectory.



2.POS Process setting interface, base station location mode supports custom input of base station coordinates x, y, z values.



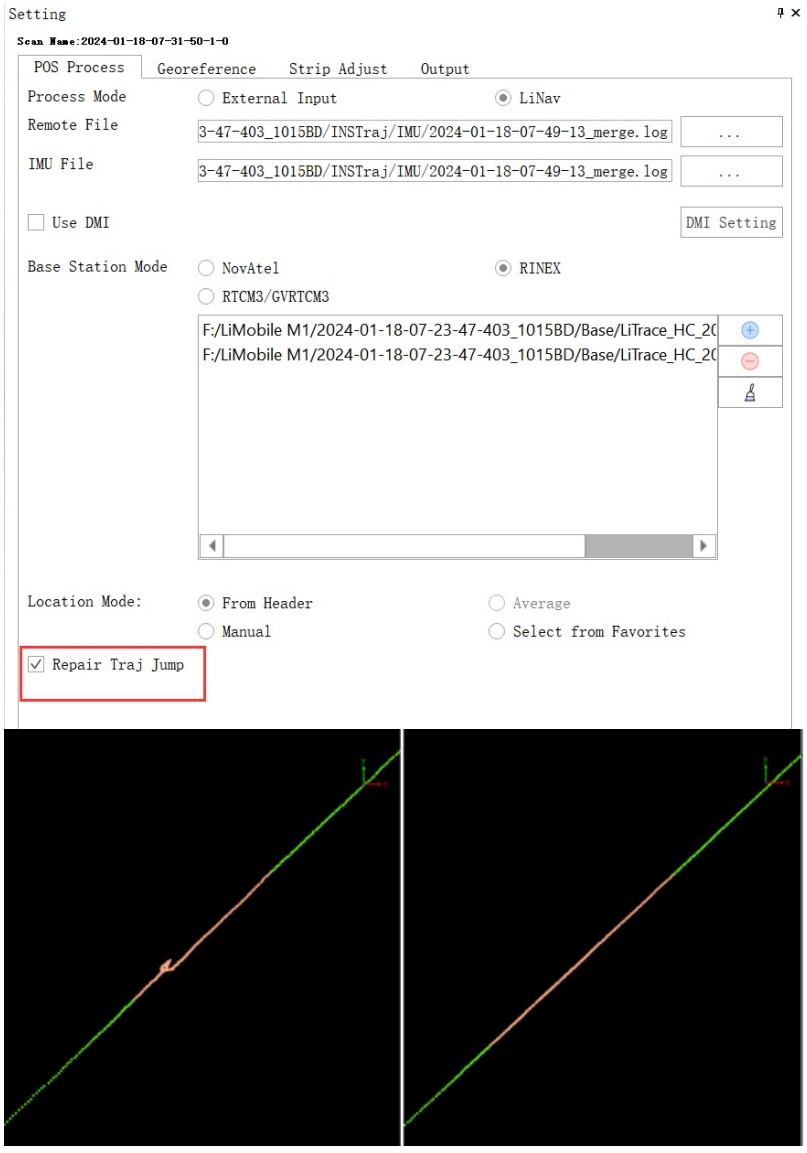
3.The Batch Process interface adds a Result button, output log display, and integrates the logs of each step. After clicking the Open Log Folder button, you can easily view the integrated log files.



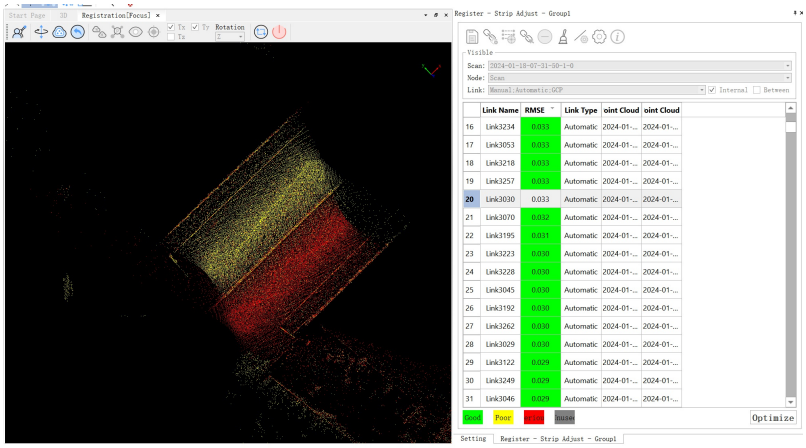
Enhancement

1.The progress display of the progress bar in the task list has been optimized.

2.The Repair Traj Jump function in POS process setting interface, supports both z-direction and xy-direction trajectory repair at the parking position.



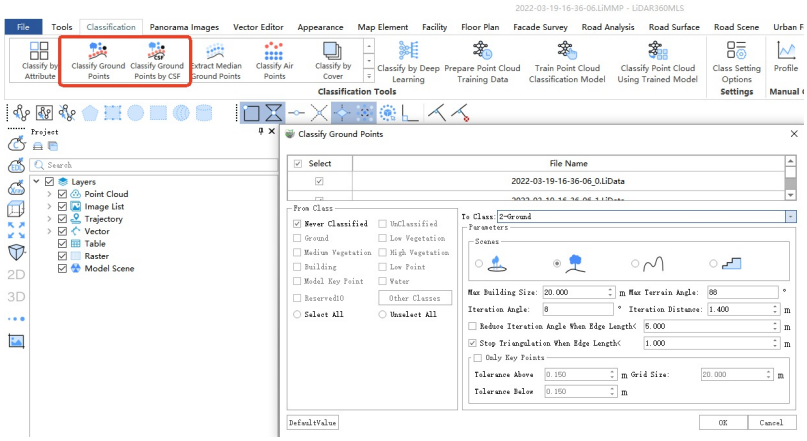
3.The Manual Registration function in the register step has a more friendly interactive mode. The Registration window will not be closed after clicking the Apply button, and the link can be switched freely.



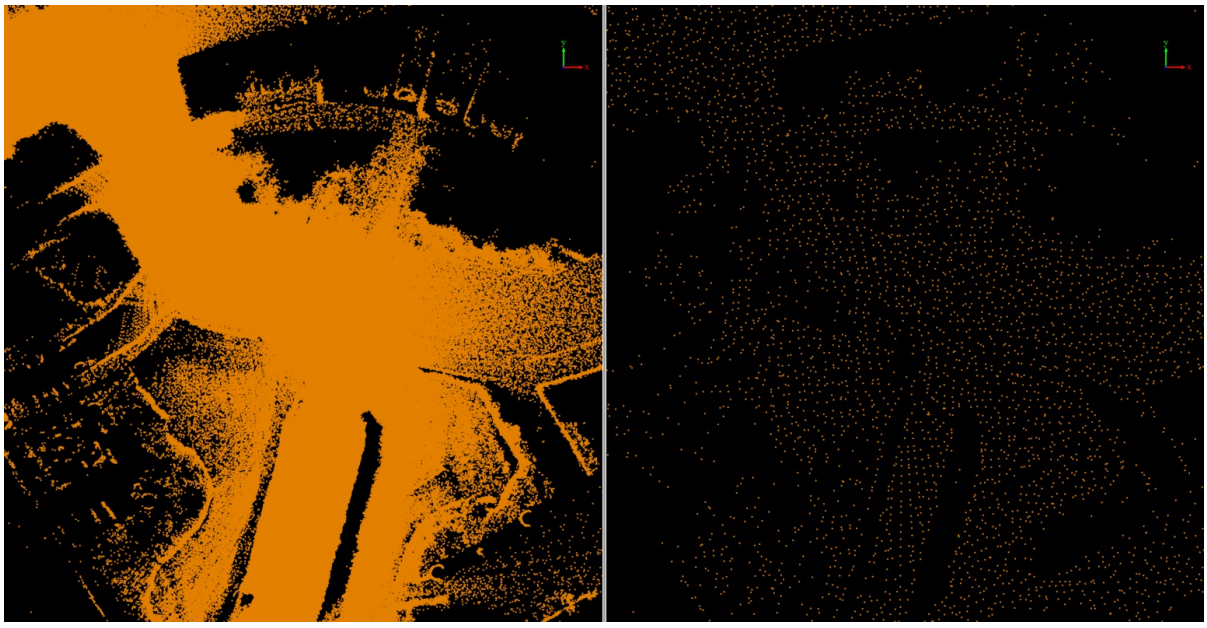
Framework

New Features

1.Added ground point classification, which is based on the triangular mesh filtering method. The original ground point classification function has been renamed to CSF ground point classification.

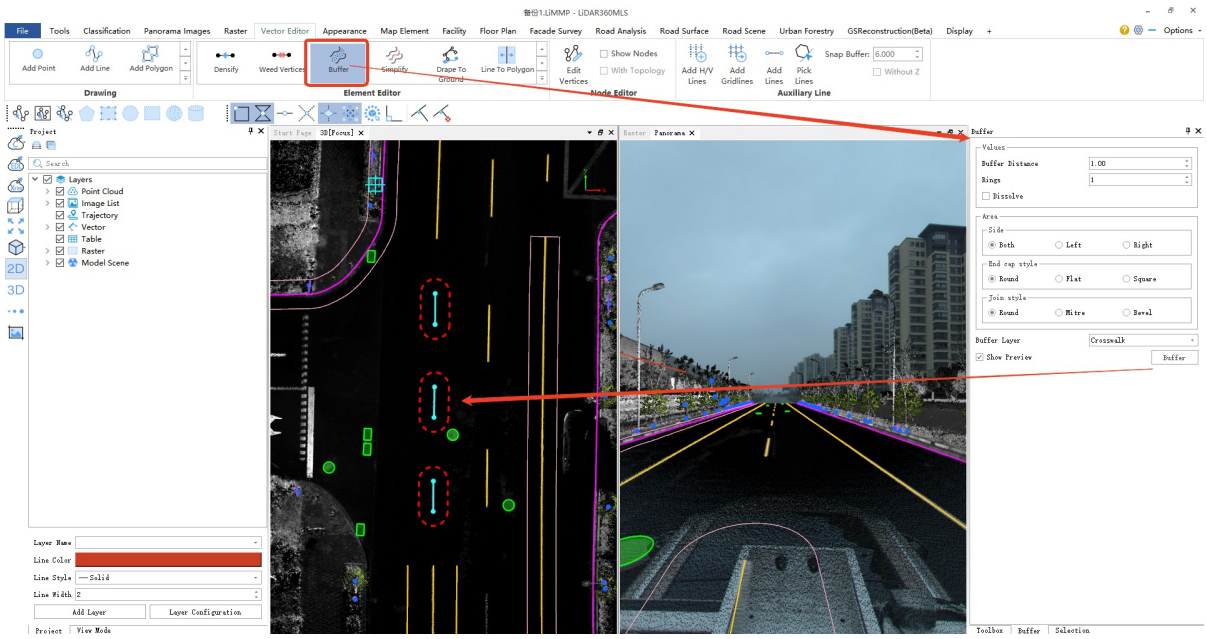


2.Added extract median ground point function.

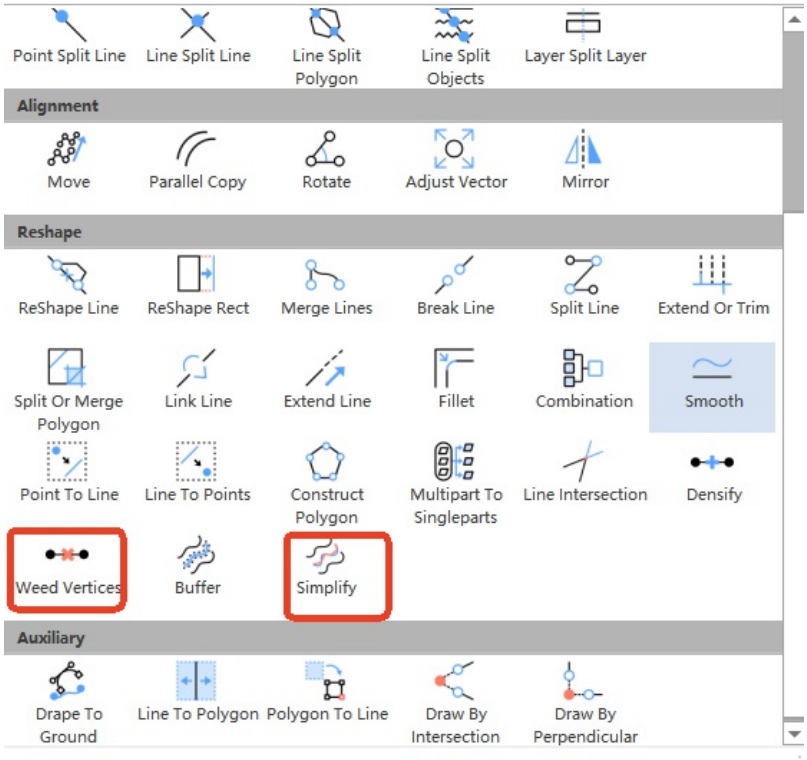


Left：Ground Point；Right：Median Ground Point

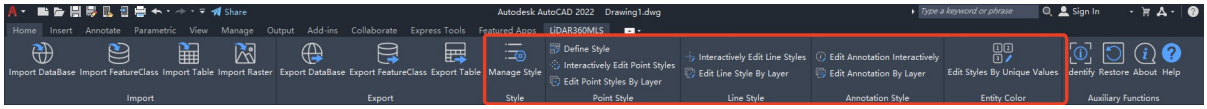
3.Added vector buffer function for interactive buffer analysis



4.Added simplify function to simplify the line object according to different algorithms, and rename the original weed function to weed vertices



5.CAD plug-in new management styles, define styles, edit styles and other related functions, support for point layers for symbolization, lines, annotation layer for style changes, and support for editing styles by unique values



6.Added Cut Overlap function, which can extract redundant data collected in multiple strip and reduce the amount of data

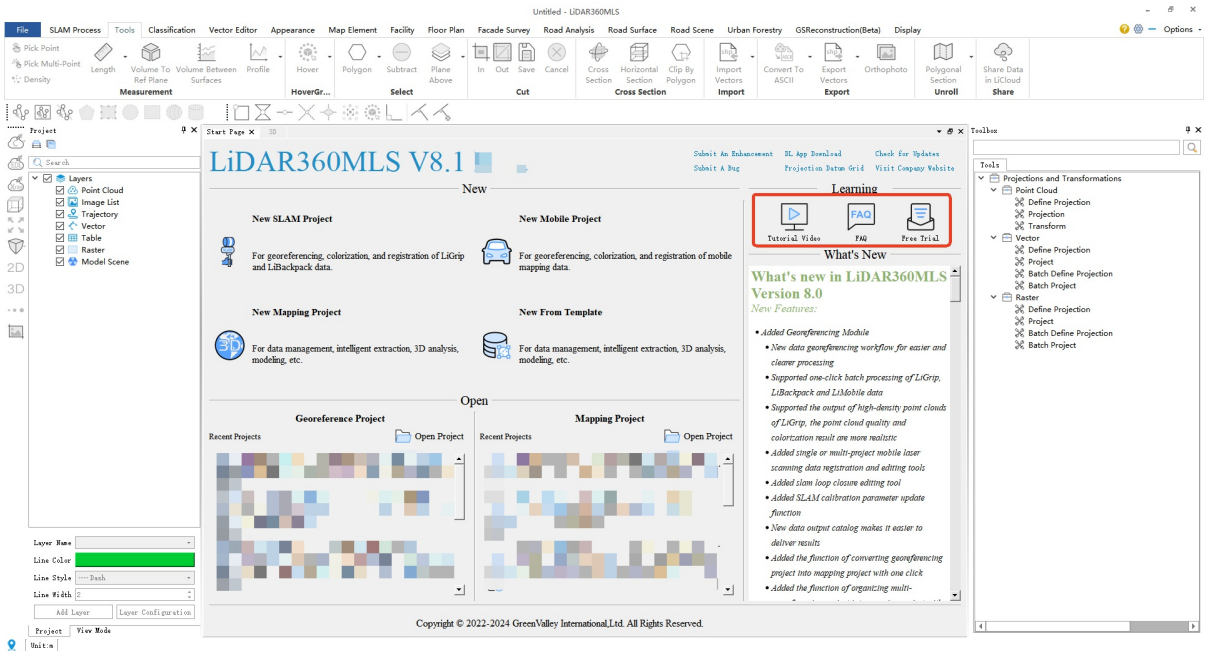
7.Added assign groups and detect moving objects function, which can be used with deep learning classification of data to quickly re-separate moving targets.

Enhancement

1.Mapping project Limmp file version upgrade to optimize file organization

> Note: Due to file version upgrade, V8.0 series software can not open V8.1 Limmp project, V8.1 software is compatible with all previous versions of the Limmp project generated!

2.Optimized the software start page, new learning resources, you can directly click to view the tutorial videos, FAQ and apply for a trial of the software.



3.Optimized the algorithm and interface of the volume measurement function.

4.Optimized vector-based profiles with support for classify editing.

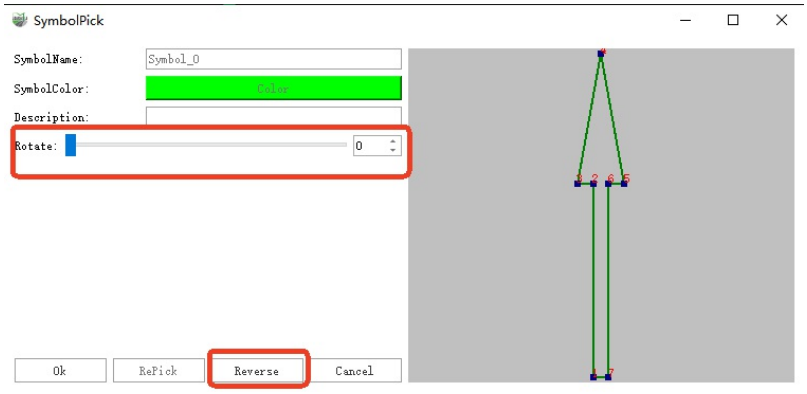
5.Optimized the function of calculating normal direction, support the calculation based on trajectory when there is trajectory.

6.Optimized the interaction of vector extend or trim function

Asset Extraction Module

Enhancement

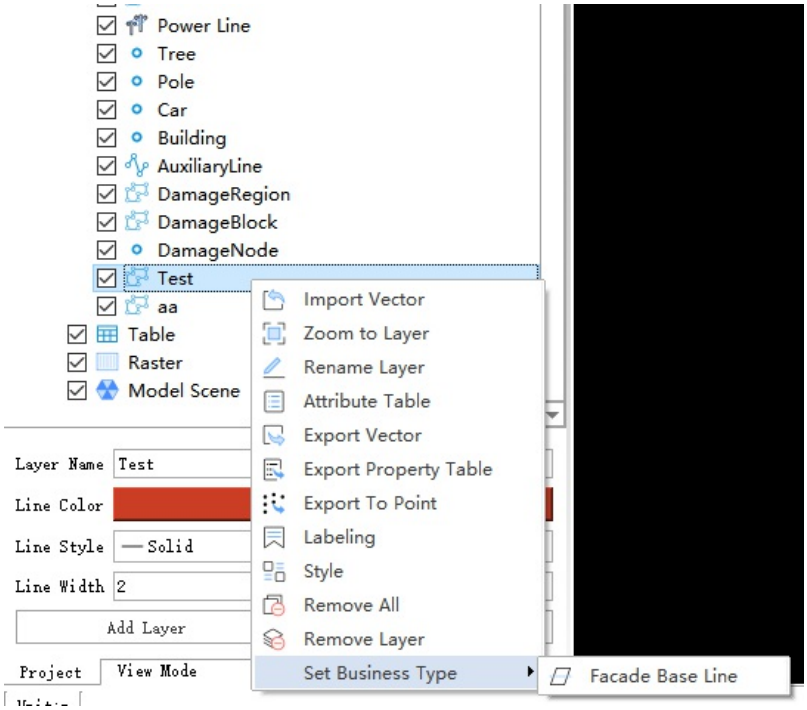
1.Optimized the function of importing shp templates for map element training, support to set the contents of shp fields as template names and adjust the direction and node order of templates



Architectural Drawings Module

New Features

1.Added the function of converting custom surface layer to "Faced Based Line" by right-clicking on the layer, which is convenient for the vector imported from outside to be used directly as the based line for subsequent drawing.

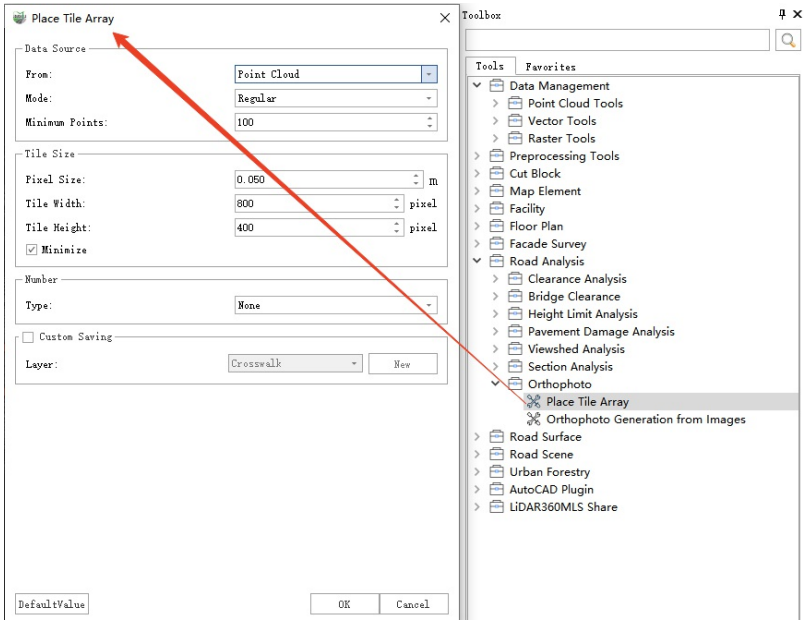


> Note: When the custom surface layer is already a faced based line layer, the right-click menu will not show this button

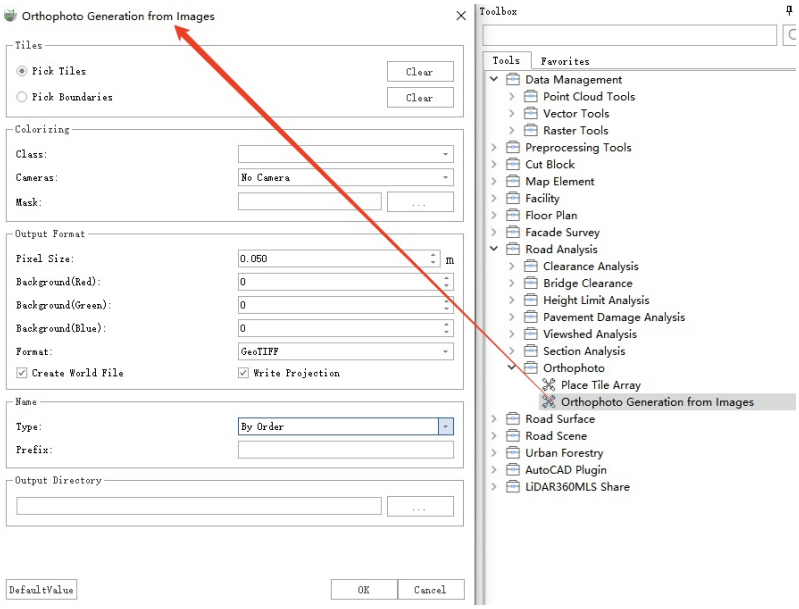
Road Condition Module

New Features

1.Added place tile array function, supporting multiple data tiling methods.



2.Added a feature to orthophoto generation from images, supporting the creation of orthophotos from point clouds derived from panoramic/planar images.



Enhancement

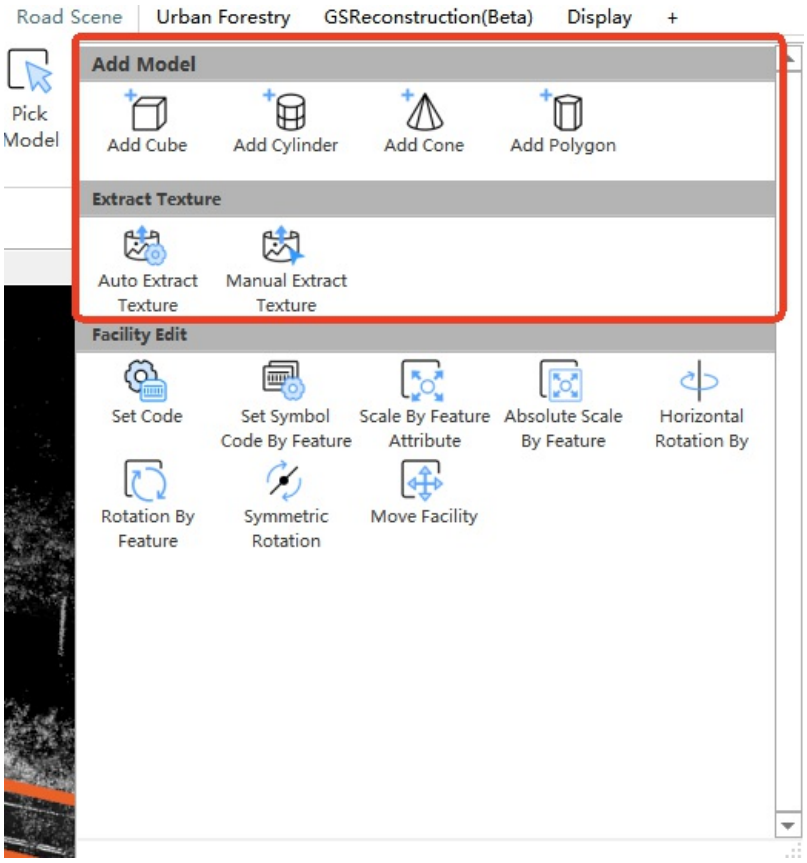
1.Optimized the clearance analysis function, supporting color modification of the clearance analysis surface and custom drawing of horizontal (shortcut key H) and vertical (shortcut key V) lines when drawing surfaces.

Road Scene Module

New Features

1.Added the functionality to manually add cube, cylinder, cone, and polygon solid models.

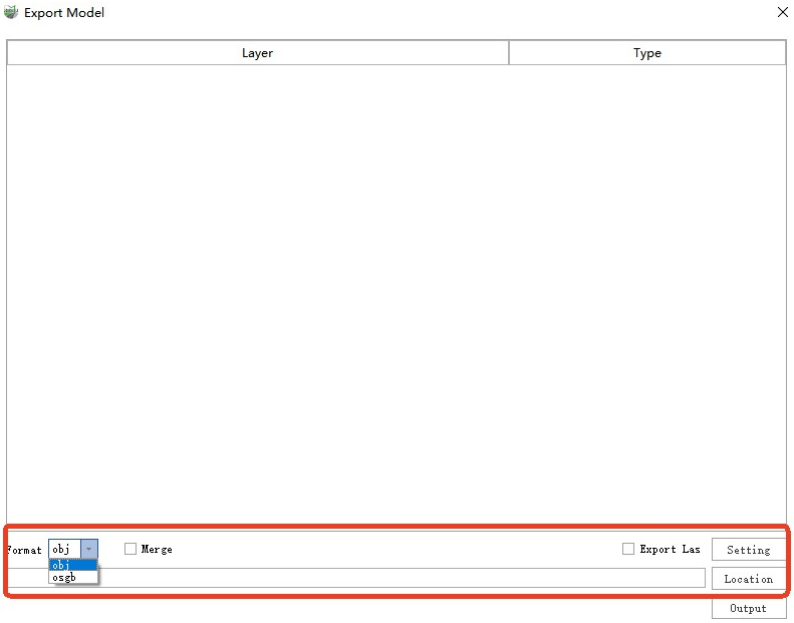
2.Added the functionality to automatically and manually extract textures from architectural models.



3.Added a feature to toggle light.

Enhancement

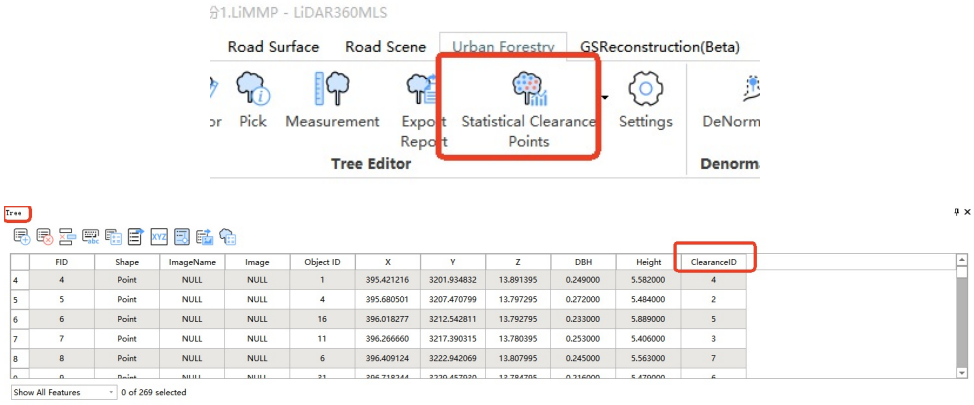
1.Optimized the function of exporting road models, added support for exporting in osgb format and merged obj format, and simultaneously supported exporting point clouds in LAS format with offsets.


Export Model
Layer
Type
Format
obj
obj
osgb
Merge
Export Las
Setting
Location
Output

Forestry Module

New Features

1.Added Statistical Clearance Points function, when the single tree point cloud has participated in the clearance analysis, the single tree clearance ID can be automatically counted into the single tree attribute table, which is convenient for dangerous point query.



LiDAR360MLS V8.0.0.5 Release Notes

1.Fixed the issue of failed save imglist error in GCP for colored data.

2.Fixed other bugs.

LiDAR360MLS V8.0.0.4 Release Notes

1.Fixed software language switching problems

2.SLAM Projection

2.1 Supported FLIGHTS SCAN HANDY datageneration.

2.2 Fixed the problem of point cloud color assignment confusion after GCP.

2.3 Fixed the problem of no color assignment when GCP is checked for color assignment and not for filtering.

3.Mobile Projection

3.1 Optimized the function oftrajectoryjumprepair.

3.2 Fixed the problem of exporting control point report ofstrip adjustment.

3.3 Fixed the problem that GCP function cannot import low version control point files.

3.4 Fixed the problem that the GCP function can't stab points when the point size is 0.

4.Mapping Projection

4.1 Fixed the problem that the strip adjustment of mapping project can not add the project.

4.2 Fixed the problem of abnormal flashback of cross-section analysis due to wrongclassificationselection.

4.3 Fixed the problem of abnormal results of panoramic measurement.

4.4 Fixed the problem that the downward growth parameter cannot be set as a negative value in the function of drop to ground.

4.5 Fixed other bugs.

LiDAR360MLS V8.0.0.3 Release Notes

1.SLAMProjection

1.1 Fixed the issue where Chinese paths cause program failures in the English system.

1.2 Fixed the issue of color assignment failure in vehicle and forestry modes.

1.3 Fixed the occasional accuracy loss issue in GCP mode.

1.4 Fixed the occasional calculation failure issue with backpack data.

1.5 Optimized photo extraction rules in forestry mode.

1.6 Fixedother GNSS-related bugs.

2.Mobile Projection

2.1 Fixed the issue withGCP during the stripadjustprocess.

2.2 Fixed other bugs

3.Mapping Projection

3.1 Optimized the unit display of the volume measurement function parameters interface.

3.2 Fixed the crash issue when importing external vectors for roadmarkingtraining.

3.3 Fixed the crash issue when checking the export vector checkbox.

3.4 Fixed the issue of missing attributes when importing geojson.

3.5 Fixed the issue where modifying the Z value was ineffective in absolute mode of vector movement.

3.6 Fixed the crash issue when calculating multiple times in the field calculator.

3.7 Fixed the crash issue when recalculating point clouds after trajectory jumps.

3.8 Fixed the language display issue on the software's initial activation page.

3.9 Fixed other bugs

LiDAR360MLS V8.0.0.2 Release Notes

1. Fixed the problem of mismatch between SLAM trajectory and GNSS trajectory caused by the GNSS synchronization problem in October of leap year.
2. Fixed the problem of anomalous splicing alignment caused by solving the project space.
3. Fixed the problem that CAD can not be opened after exporting DXF of elevation measurement module.
4. Fixed the problem of calculating the area of elevation polygon.
5. Fixed the problem of abnormal exit of road facility detection.
6. Fixed the problem of storing ecological landscape batch extraction results
7. Fixed the problem of occasional crashes when selecting .o and .p files for solving projects
8. Fixed the problem of abnormal flashback in passability analysis
9. Fixed the problem of special data normalization
10. Fixed the problem that version 1.4 las exported from old BP software cannot be imported.

LiDAR360MLS V8.0.0 Release Notes

Software version upgraded to 8.X

1.Added Georeferencing Module

1.1.New data georeferencing workflow for easier and clearer processing

1.2.Supported one-click batch processing of LiGrip, LiBackpack and LiMobile data

1.3.Supported the output of high-density point clouds of LiGrip, the point cloud quality and colorization result are more realistic

1.4.Added single or multi-project mobile laser scanning data registration and editing tools

1.5.Added slam loop closure editing tool

1.6.Added SLAM calibration parameter update function

1.7.New data output catalog makes it easier to deliver results

1.8.Added the function of converting georeferencing project into mapping project with one click

1.9.Added the function of organizing multi-georeferencing project into mapping project with one click

2.Added Road Scene Module

2.1.Added automatic road modeling function

2.2.Added automatic road facilities modeling function

2.3.Added model texture manager

2.4.Added pavement construction function

2.5.Added road facilities and building single-layer modeling function

2.6.Added road scene import and export

2.7.Added model symbol library import extension function

2.8.Added model selection function

2.9.Added model encoding settings function

2.10.Added element-based data model encoding function

2.11.Added element-based attribute scaling / absolute scaling model function

2.12.Added element-based rotation / horizontal rotation / relative rotation function

2.13.Added model movement and editing function

2.14.Added model export to third-party obj format function

3.Asset Extraction

3.1.Added template-based road sign training and inference function

3.2.Added North American road marking extraction model

3.3.Added intensity map generation function

3.4.Added average intensity calculation function

3.5.Added road facilities training function

3.6.Added road facilities detection with custom models

3.7.Added rectangular mode for individual editing

4.Road Analysis

4.1.Pavement Damage Analysis

4.1.1.Added AI-based road damage detection

4.1.2.Added interactive road damage editing

4.2.Road Section Analysis

4.2.1.Supported for road section analysis and parameter calculation

4.2.2.Added high-precision terrain generation based on cross-sectional key points

4.2.3.Added point cloud extraction along cross-section lines

4.2.4.Added export of cross-section parameters to vector format

4.3.Road Surface Analysis

4.3.1.Added point cloud-based DEM/DSM generation

4.3.2.Added TIN-based DEM/DSM generation

5.Urban Forestry

5.1.Added rectangular mode for individual tree editing, with transformations for range, angle, and position

5.2.Added individual tree point selection feature

5.3.Added table-based additional attribute assignment feature

5.4.Added batch processing for visual analysis

6.Platform

6.1.All functions supported units such as feet.

6.2.Profile

6.2.1.Added vector-based cross-section and longitudinal profile functionality

6.3.Toolbox - Data Management

6.3.1.Point Cloud Tools

6.3.1.1.Added point cloud registration tool

6.3.1.2.Added point cloud conversion to COPC

6.3.1.3.Added point cloud conversion to structured E57

6.3.1.4.Added point cloud conversion to PCD

6.3.1.5.Added unit definition function

6.3.1.6.Added projection surface elevation conversion function

6.3.1.7.Added transformation relationship calculation function

6.3.1.8.Added elevation jump function

6.3.1.9.Added elevation adjustment report function

6.3.1.10.Added assign color to points function

6.3.1.11.Added grid statistics function

6.3.1.12.Added image export in orbit format

6.3.2.Vector Tools

6.3.2.1.Added vector densify function

6.3.2.2.Added vector weed function

6.3.2.3.Added labeling to annotation conversion function

6.3.2.4.Added JSON to feature conversion function

6.3.2.5.Added feature to JSON conversion function

6.3.2.6.Added KML to feature conversion function

6.3.2.7.Added feature to KML conversion function

6.3.2.8.Added XY table to point conversion function

6.3.2.9.Added XY table to line conversion function

6.3.2.10.Added 3D ASCII file to feature class conversion function

6.3.2.11.Added feature class Z to ASCII conversion function

6.3.2.12.Added attribute-based feature to 3D conversion function

6.3.2.13.Added polygon to line conversion function

6.3.2.14.Added feature vertex to point conversion function

6.3.2.15.Added feature to point conversion function

6.3.2.16.Added feature to line conversion function

6.3.2.17.Added feature to polygon conversion function

6.3.2.18.Added feature to raster conversion function

6.3.2.19.Added point to raster conversion function

6.3.2.20.Added polygon to raster conversion function

6.3.2.21.Added polyline to raster conversion function

6.3.2.22.Added clipping function

6.3.2.23.Added splitting function

6.3.2.24.Added attribute-based splitting function

6.3.2.25.Added selection function

6.3.2.26.Added table filtering function

6.3.2.27.Added overlay analysis tools

6.3.2.28.Added count overlapping features function

6.3.2.29.Added erase function

6.3.2.30.Added identification function

6.3.2.31.Added intersection function

6.3.2.32.Added remove overlaps function

6.3.2.33.Added symmetrical difference function

6.3.2.34.Added union function

6.3.2.35.Added update function

6.3.2.36.Added proximity analysis tools

6.3.2.37.Added buffer function

6.3.2.38.Added graphic buffer function

6.3.2.39.Added multi-ring buffer function

6.3.2.40.Added projection and transformations tools

6.3.2.41.Added projection definition function

6.3.2.42.Added projection function

6.3.2.43.Added batch projection definition function

6.3.2.44.Added batch projection function

6.3.2.45.Added select by attributes function

6.3.2.46.Over 300 built-in functions expanded in the field calculator

6.3.2.47.Added new python scripting functionality

6.3.2.48.Added latitude and longitude coordinates function

6.3.3.Raster Tools

6.3.3.1.Added conversion tools

6.3.3.2.Added raster copy function

6.3.3.3.Added raster to ASCII conversion function

6.3.3.4.Added raster to point conversion function

6.3.3.5.Added raster to polyline conversion function

6.3.3.6.Added raster to polygon conversion function

6.3.3.7.Added projection and transformations tools

6.3.3.8.Added projection definition function

6.3.3.9.Added projection function

6.3.3.10.Added batch projection definition function

6.3.3.11.Added batch projection function

6.3.4.Panorama

6.3.4.1.Added label display function

6.3.4.2.Added 3D linkage function

6.3.4.3.Added control settings function for displaying point clouds, vectors, models, and trajectories in the panoramic view

6.3.5.Planar

6.3.5.1.Added label display function

6.3.5.2.Added 3d linkage function

6.3.5.3.Added control settings function for displaying point clouds, vectors, models, and trajectories in the planar view

6.3.6.Raster Image

6.3.6.1.Added raster window display settings

6.3.6.2.Added raster image measurement function

6.3.6.3.Added image labeling function

6.3.6.4.Added mask creation function

6.3.6.5.Added training image deep learning model function

6.3.6.6.Added target detection or segmentation function using trained models

6.3.6.7.Added 3d mapping function

6.3.7.Preprocessing

6.3.7.1.Added conversion of trajectories to vector function

6.3.8.AutoCAD Plugin

6.3.8.1.Added cad plugin, no format conversion required, directly opened files with attribute data

6.3.8.2.Supported attribute query function

6.3.8.3.Supported geographic database import and export function

6.3.8.4.Supported feature class import and export function

6.3.8.5.Supported raster import function

6.3.8.6.Supported table import and export function

6.3.9.LiDAR360MLS Share

6.3.9.1.Added results publishing function, allowing point clouds, images, and vector data to be published for viewing on the web

6.3.10.Display

6.3.10.1.Added window linkage function

6.3.10.2.Added rolling screen function

6.3.10.3.Added go to function

6.3.10.4.Added 3D mouse function

6.3.10.5.Added open log file function

LiDAR360MLS V7.2.2 Release Notes

1.Optimized the size of the zoom window of panorama and planar camera

2.Fixed the problem of EXIF export in point cloud without coordinate system

3.Fixed the problem of not displaying images in panorama and planar camera zoom window

4.Fixed a problem with drawing vectors in the image window

5.Fixed the problem of group authorization activation

LiDAR360MLS V7.2.1 Release Notes

1.Platform

1.1 Added support for importing TXT files via right-click on point layers

1.2 Added a secondary prompt for removal function via right-click on directory tree

1.3 Optimized efficiency issues with TXT/CSV import

1.4 Fixed issues with failed imports of third-party vector data

1.5 Fixed the problem of result file size increase in time-based extraction function

1.6 Fixed issues with importing multi-station E57 data

1.7 Fixed abnormal point selection in planar camera calibration

2.Slam Module

2.1 Added the slam's setting parameters information to LOG.TXT under slamprocess

2.2 Optimized the issue of color breakage when using time-lapse mode (using outdoor mode, color by disatnce)

2.3 Keep the output parameter of the forestry same with the general mode

2.4 Fixed the bug with black stripes on the colored pointcloud of some O1-LITE devices

2.5 Fixed the bug that the application on the login interface in the upper right corner of the software did not respond after clicking it

2.6 Fixed the bug that SLAM processing is stuck due to no data behind the IMU

2.7 Fixed the bug where O1 LITE runs in tunnel mode with immediate errors

2.8 Fixed the bug of incorrect point cloud when GCP function uses small coordinates

2.9 Fixed the bug that causes black stripes when using the H120 backpack

2.10 Fixed the bug that the memory crashes when the device is in a long period of static

3.Floor Plan Module

3.1 Optimized the category setting interface

3.2 Optimized category naming issues

4.Vector Editing

4.1 Optimized the interaction for reshape line

4.2 Optimized the interaction for moving vector

5.Road Analysis Module

5.1 Optimized IRI parameter calculation for road cross-sections

5.2 Optimized minimum parameter threshold for road damage

5.3 Fixed issue with exporting DXF for road cross-sections

5.4 Fixed problem with bridge height limit not displaying measurement values in profile window

5.5 Fixed crash issue with power line height limit

5.6 Fixed issue where custom range window was not displaying in clearance analysis

6.Urban Forestry Module

6.1 Added seed point extraction methods for circular and rectangular selections

6.2 Added the ability to import seed points via CSV

6.3 Optimized efficiency of large-scale data segmentation

6.4 Optimized efficiency of seed point updates

6.5 Optimized the ability to set parameters that do not update during individual tree parameter calculations

6.6 Fixed coordinate conversion issues with externally imported seed points

LiDAR360MLS V7.2.0 Release Notes

1.Supported for LiGrip and LiBackpack data processing.

2.Improved the success rate of SLAM calculation.

3.Enhanced the efficiency of SLAM calculation.

4.Ensured consistency between the data collection end and the post-processing end.

5.Optimized point cloud colorization

6.Added Floor Plan Module

7.Added automatic vectorization function for floor plan.

8.Added DXF export function for floor plan vectors.

9.Added one-click export function for blue print.

10.Supported intersecting and perpendicular line drawing models.

11.Supported line intersection、line merging、line breaking and moving.

12.Supported vertices editing.

13.Supported length,area,angle measurement.

14.Added point cloud polygonal section unrolling function.

15.Added point cloud curved section unrolling function.

16.Added point cloud curved section unrolling function.

17.Added X-ray rendering for point clouds.

18.Added enhanced surface rendering for point clouds.

19.Added Blur Plates and Faces function for panoramic/planar images

20.Added EXIF update function for panoramic/planar images.

21.Added brightness contrast export functionality for point clouds.

22.Added point cloud vector clipping functionality.

23.Added section move step adjustment settings.

24.Supported Traditional Chinese language pack

25.Added line intersection function

26.Added auto-close mode for right-click on line drawing function.

27.Added precision setting function for attribute field.

28.Added the function of extracting seed points globally.

29.Fixed the problem of losing DXF layer styles when exporting.

30.Fixed the failure of exporting vectors from point layers imported via TXT.

31.Optimized the function of railway track detection, support category filtering

32.Optimized power line detection function, support category filtering

33.Fixed the problem of exporting DXF layer name anomaly.

34.Optimized the calculation results of road longitudinal section parameters

35.Optimized road damage detection

36.Fixed other bugs

LiDAR360MLS V7.1.1 Release Notes

1.Optimized orthophoto density map export.

2.Optimized the import shp from table, supported direct import into points, lines and surfaces, and supported coordinate conversion.

3.Optimized track jump detection and repair function

4.Fixed the issue of manually editing the label settings in the profiling module.

5.Fixed AMD graphics card display issues.

6.Fixed imagelist update problem

7.Fixed track version reading problem

8.Fixed node editing crash problem.

9.Fixed other bugs in the software

LiDAR360MLS V7.1.0 Release Notes

1.Added point cloud brightness contrast setting function

2.Added screenshot position setting

3.Added project organization functionality

4.Added import point layers from tables

5.Added image file update functionality.

6.Added data transformation functionality.

7.Added detection and correction for lateral jumps in trajectories

8.Added railway detection feature.

9.Added functionality to add XYZ to the attribute table.

10.Added the ability to export point layers in CSV format.

11.Added layer styling with support for styling based on attributes.

12.Added functionality for individual tree orientation measurement.

13.Added functionality for exporting individual tree reports.

14.Optimized volume measurement algorithm, supporting category filtering and calculation based on selected vectors.

15.Fixed the issue of not being able to copy when exporting to DXF.

16.Optimized software interface, distinguishing between Chinese and English prompts.

17.Optimized feature reports, differentiating between Chinese and English reports.

18.Fixed the issue of updating imagery data in aerial strip stitching

19.Optimized control point correction function, supporting tie points on RGB information

20.Optimized point cloud coloring algorithm.

21.Optimized functionality for extracting linear features.

22.Optimized operations for functions like line-to-point conversion, point-to-line conversion, and surface construction.

23.Enhanced interactive operations for functions such as move, parallel copy, etc.

24.Expanded the line-to-point conversion function to support converting all nodes of a line vector to a point layer.

25.Optimized the algorithm and process for individual tree segmentation.

26.Enhanced the functionality for creating thematic maps in ecological landscape analysis, now supporting the independent generation of thematic maps for multiple files.

27.Fixed other bugs in the software

LiDAR360MLS V7.0.0 Release Notes

Software version upgraded to 7.X

1.Platform

1.1.Added point cloud data format batch conversion

1.2.Added configurable project templates

1.3.Added export functionality for geojson data format

1.4.Added orthophoto window, supporting display, measurement, and mapping of orthophotos.

1.5.Added multi-window display modes for point cloud data based on different attributes.

1.6.Added Addeditional attributes for trajectories.

1.7.Added a tool for selecting within surfaces.

1.8.Added volume measurement reporting.

1.9.Added volume measurement functionality for two phases.

1.10.Added point cloud reprocessing functionality.

1.11.Added functionality for Addeditional operations on point cloud attributes.

2.Added Point Cloud Tool Module Added SOR filtering.

2.1.Added noise filtering.

2.2.Added point cloud resampling functionality.

2.3.Added point cloud merging functionality.

2.4.Added functionality to normalize based on ground points.

2.5.Added de-normalization functionality.

2.6.Added point cloud normal calculation functionality.

2.7.Added GPS time conversion functionality.

2.8.Added projection definition functionality.

2.9.Added coordinate transformation functionality.

2.10.Added functionality to extract based on Addeditional attributes.

3.Preprocessing

3.1.Added colorization functionality for mobile laser scanning point clouds.

4.Point Cloud Classification and Extraction

4.1.Added classification pre-training models for indoor, outdoor, underground parking garagescene point cloud data obtained by SLAM device.

4.2.Added custom deep learning classification functionality.

4.3.Added plane detection

4.4.Added cylinder detection

4.5.Added classify by cover

4.6.Added region growing functionality.

5.Feature Extraction

5.1.Supported automatic extraction of all types of road markings

5.2.Supported merge to lane

5.3.Added Pole Seed Point Transformation Functionality.

5.4.Added Pole Seed Point Update Functionality.

5.5.Added Pole Seed Point Editing Functionality.

5.6.Added individual segmentation of cars and buildings functionality.

6.Vector Editing

6.1.Added image (panoramic, planar, orthophoto) based vector drawing and editing.

6.2.Added radius circle and diameter circle drawing function.

6.3.Added Bezier and B-spline curve drawing modes.

6.4.Added tracking drawing mode.

6.5.Added point-to-line conversion functionality.

6.6.Added line-to-point conversion functionality.

6.7.Added polygon-to-line conversion functionality.

6.8.Added line-to-polygon conversion functionality.

6.9.Added layer interrupt layer function

6.10.Added construction surface function

6.11.Added multi-part to single-part feature

6.12.Added topological edge editing

6.13.Added auxiliary line mode

6.14.Added field calculator.

6.15.Added object photo database storage .

6.16.Added attribute quality check tool.

6.17.Added geometry quality check tool.

7.Road Analysis

7.1.Added custom clearance analysis.

7.2.Added intersecting lines clearance analysis .

7.3.Added bridge height limit analysis and analysis report.

7.4.Added urban power distribution line analysis and analysis report .

7.5.Added road damage detection.

7.6.Added pavement condition index(PCI) calculation and report generation.

7.7.Added longitudinal section analysis.

7.8.Added model key point extraction.

7.9.Added road TIN generation.

7.10.Added vehicle collision simulation analysis .

8.Added Urban Forestry Module

8.1.Added seed point transformation functionality.

8.2.Added seed point update functionality.

8.3.Added seed point editing functionality.

8.4.Added tree height and diameter calculation based on seed points functionality.

8.5.Added measurement of urban tree parameters.

8.6.Added point cloud extraction based on TreeID.

8.7.Added measurement of parameters including DBH, Height, Crown Width, Crown Length, Crown Diameter, Crown Diameter SN, Crown Diameter EW ,CBH, Angle, Area, etc.

8.8.Added ecological landscape thematic map , supporting green viewing ratio(GVR), green volume, sky view factor(SVF), etc

8.9.Added generation of ecological landscape reports.

8.10.Added ecological landscape simulation analysis functionality.

9.Expanded orthophoto export based on intensity, height and RGB attributes

10.Optimized image and vector linkage setting

11.Fixed other bugs in the software

LiDAR360MLS V2.0.4 Release Notes

1.Optimized node editing function, Supported “Z value” and “move to” function for quick modification by picking Z

2.Supported various vector selection tools to change the line direction, and Optimized shortcut keys and tips

3.Supported Riegl MMS panoramic image file import and Optimized Orbit format

4.Supported for South-North crown diameter (SN), East-West crown diameter (EW), crown length (CL) and crown width (CW) in the calculation of individual tree parameters

5.Updated trajectory data

6.Fixed the problem of Ligeo and LiFuser-BP project opening failure

7.Fixed the problem of strip adjustment

8.Fixed the problem of invalid horizontal section dragging

9.Fixed other bugs in the software

LiDAR360MLS V2.0.3 Release Notes

1.New 2D mode

2.Optimized horizontal section function

3.Optimized edit vertices function

4.Optimized drape to ground function

5.Optimized vector objects and the corresponding panoramic image window linkage jumping

6.Fixed other bugs in the software

LiDAR360MLS V2.0.2 Release Notes

1.Added new project from template

2.Added import gpkg function

3.Added road damage report export function

4.Added clearance analysis report export function

5.Added DXF and KML import and export functions

6.Added dashed line batch drawing mode

7.Added custom template drawing method for cross walk and parking spot

8.Added line smoothing function

9.Supported lane line and road edge detection with shortcut keys to switch between semiautomatic and manual modes

10.Supported layer renaming

11.Supported vector objects and the corresponding panoramic image window linkage jumping

12.Fixed other bugs in the software

LiDAR360MLS V2.0.1 Release Notes

1.Optimized the field selection limit when import trajectory

2.Optimized the right click menu of the directory tree

3.Optimized the interface of vector export function

4.Optimized the emptying tips of the directory tree layers

5.Fixeded the problem of database storage

LiDAR360MLS V2.0.0 Release Notes

The software was renamed as LiDAR360MLS

In order to develop the software into a general terrestrial mobile laser scanning（MLS） point cloud processing software platform, the software name was replace with LiDAR360MLS.

1.New Construction

1.1.Supported drag and drop point cloud to create a new project, and save as to the specified path

1.2.Supported for importing original projects of LiFuser-BP and LiGeo

1.3.Supported point cloud and panoramic data entry software for more than 90% of mobile surveying devices on the market in formats such as Trimble MX9, Leica Pegasus, Orbit Pos, etc.

2.Database

2.1.Supported database for vector storage

2.2.Supported Addeding, deleting, modifying and querying layers in the database

3.Basic Platform

3.1.Added point cloud and vector projection conversion function

3.2.Supported point cloud format conversion

3.3.Supported basic tools such as point cloud selection and cropping

3.4.Supported vector data format conversion

3.5.Supported category display 0-255 categories

3.6.Supported cross-sectional export of color orthophotos

3.7.Supported for mobile measurement device travel direction arrows and default view settings

4.Vector Editing

4.1.The right-click menu has been added to the movement function, which Supported moving in a specified distance and direction

4.2.Added arbitrary polygon, circle selection, ball selection, random selection, three-dimensional selection, and cylinder selection

4.3.Added polygon combination and split functions

4.4.Added one-to-many interrupt function

5.Symbol library and labels

5.1.Added feature symbolization function

5.2.Supported domestic standard road facility symbol library

5.3.Supported for common symbol libraries

5.4.Supported symbol number storage

5.5.Supported to set symbols for collected point features

5.6.Supported for modification of symbols

5.7.Added annotation function

5.8.Supported for annotation layers

5.9.Supported for annotations to independent objects

5.10.Supported for annotations to object nodes and edges

5.11.Supported 3D, elevation annotation

5.12.Supported annotation style modification

5.13.Added layer label function

5.14.Supported all layer properties for label display

5.15.Configurable styles for labels

5.16.Facilitate operations such as attribute entry

5.17.New vector line object direction display

6.Road feature extraction module

6.1.Added the template extraction function of strip features

6.2.Added single segmentation function

6.3.Added individual editing function

6.4.Added single parameter extraction function

6.5.Added AI-based road surface marking recognition function

6.6.Added batch processing function for road surface marking recognition

6.7.Added AI-based batch extraction of road facilities

7.Point cloud classification

7.1.Supported point cloud deep learning classification

7.2.Supported polygon-based point cloud classification

7.3.Supported point cloud classification based on vector lines

7.4.Supported air noise classification

7.5.Supported subsurface classification

7.6.Supported above ground point classification

7.7.Supported for separating lows

7.8.Supported outlier classification

7.9.Supported proximity point classification

7.10.Supported ground point classification

7.11.Supported classification by attribute

7.12.Supported classify by cluster size

8.Point cloud extraction

8.1.Supported extraction by category

8.2.Supported extraction by elevation

8.3.Supported extraction by intensity

8.4.Supported to extract by GPS time

8.5.Supported extraction by echo times

9.Planar camera browsing measurement

9.1.Added planar camera data and point cloud overlay browsing display

9.2.Added planar camera measurement

9.3.Added planar camera calibration

9.4.Added planar camera undistort

10.Vehicle point cloud preprocessing

10.1.Supported trajectory segmentation

10.2.Supported laser boresight

10.3.Supported track quality check and repair

10.4.Added control point correction function

10.5.Added strip adjust

11.Road Analysis Module

11.1.Added road damage detection function

11.2.Added headroom analysis function

11.3.Added visual field analysis function

11.4.Added road section analysis function

11.5.Added road cross section parameter extraction function

LiDAR360MLS V1.2.0 Release Notes

1.Supported vertical vertical

2.Supported horizontal guide line drawing

3.Supported range line drawing

4.Supported taking a section based on a reference/extent line and making adjustments

5.Supported the drawing of the basic elements of the facade

6.Supported for construction line drawing

7.Supported array drawing

8.Supported translation and rotation

9.Supported for exporting DXF and orthophotos

10.Added shortcut key configuration function

11.Added layer manager function

12.Added combined display function

13.Added cross drawing and vertical drawing functions

14.Added capture module

15.Optimized the drawing method of rectangular traffic signs

LiDAR360MLS V1.1.0 Release Notes

1.Added data block module

1.1.Supported track segmentation

1.2.Supported area block node editing

1.3.Supported region block merging

1.4.Supported point cloud segmentation based on block

1.5.Supported area block selective display

1.6.Supported display and hide of area blocks and their labels

2.Added more road feature template symbol library

2.1.Supported all types of arrow reticle drawing

2.2.Supported for manhole covers, parking spaces, and drainage grate to be drawn according to templates

2.3.Supported traffic signs to be drawn according to templates

2.4.Supported Chinese and English character drawing

2.5.Supported nonmotor vehicle signs, no Uturn signs are drawn according to the template

3.Added template matching function

3.1.Supported automatic vectorization matching based on default templates

3.2.Supported custom feature templates and auto-vectorization or manual-vectorization

4.Added multi-type vector editing function

4.1.Supported for modifying the shape of line features

4.2.Supported tracing other vectors when drawing vectors

4.3.Supported point break line, line break line, line break surface

4.4.Supported vector stickers

5.Added attribute table calculation and predefined functions

5.1.Added attribute batch filling function

5.2.Added line feature length calculation function

5.3.Added character replacement function

6.Added node editing function

6.1.Supported for individually modifying node coordinate values

6.2.Supported batch modification of node Z value

7.Added the function of modifying the project

8.Added layer vector copy function

8.1.Supported copying of elements on the same layer

8.2.Supported vector geometry copy between different layers

First version release of LiStreet V1.0