V700S SLAM RTK Case Study Collection

Precise & Accurate Mapping
to Create a Smarter Planet

8th July 2025



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PART 01 Completion Acceptance of New Factory Building

PART 02 Real Estate Surveying

PART 03 3D Pipeline Surveying

PART 04 Integrated Aerial-Ground Forestry Resource Survey

PART 05 Building Facade Survey for Urban Renewal

PART 06 Volume Measurement

PART 07 Cadastral Surveying (Ongoing)

Review- Hi-Target V700S SLAM RTK Advantages

1. The all-in-one mobile surveying system is a true SLAM RTK device, integrating both RTK and SLAM technologies.
2. Non-contact measurement enables effortless operation in complex environments.
3. With SLAM-based reverse positioning technology, it maintains 2cm (relative) and 5cm (absolute) accuracy in no-signal or weak-signal environments — offering greater freedom for point collection and stakeout.
4. All standard RTK functions are retained, delivering excellent performance in point measurement and AR stakeout.
5. Unlike simulated optical solutions, the V700S is a genuine optical device that eliminates the need for complex post-processing (e.g., aerial triangulation), enabling direct 3D surface measurement.
6. Visualized accuracy, up to 10 hours of continuous operation, and more secure locking structure.
7. Compatible with global coordinate systems.

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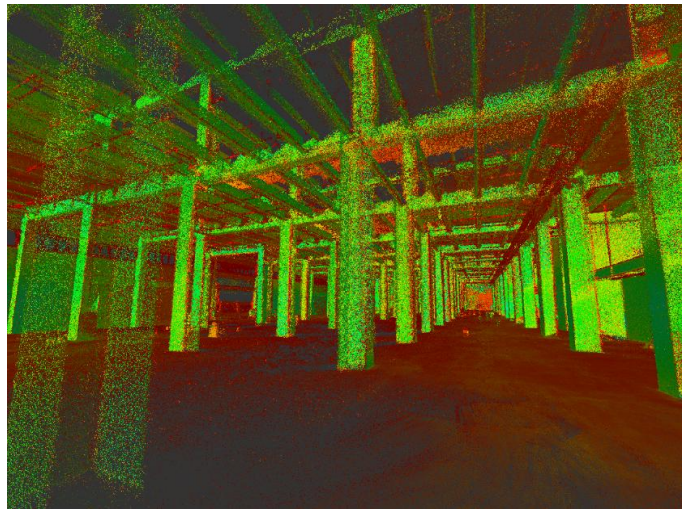
PART 05 Building Facade Survey for Urban Renewal

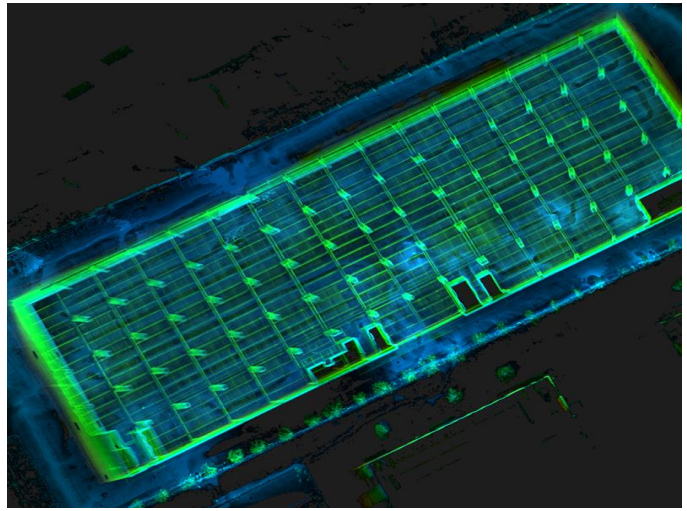
PART 06 Volume Measurement

PART 07 Cadastral Surveying (Ongoing)

1.1 Requirement Analysis

- **Location:** Sanshui City, Guangdong Province
- **Client:** A Geomatics Technology Company
- **Requirement:** Completion acceptance for a 9,000 m² factory. The task involved integrated indoor-outdoor 3D scanning, generating architectural floor plans, elevations, and sections. These were compared with the original design drawings to conduct deviation analysis.
- **Results:** Integrated indoor-outdoor point cloud; Data referenced to a geographic coordinate system; Flexible slicing for deviation comparison and analysis.




1.2 Surveying and Results

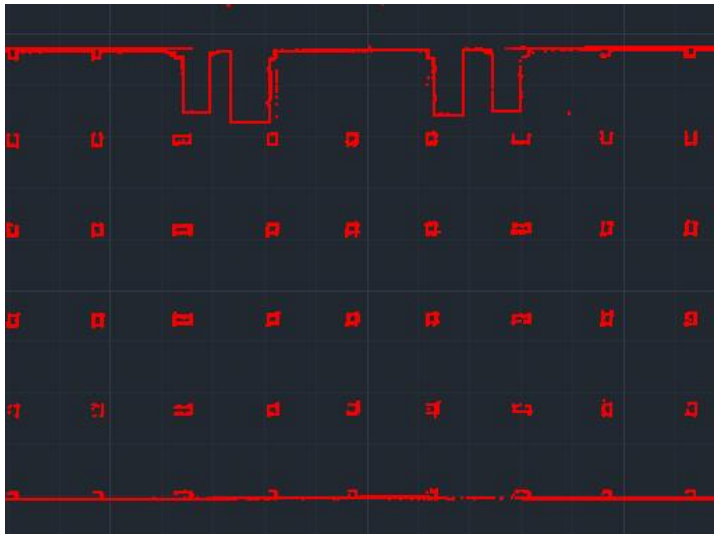
- **Site environment:** The project site is a newly constructed two-story factory building with a height of approximately 19 meters. Three control points were established on-site in advance.
- **Scanning scheme:**

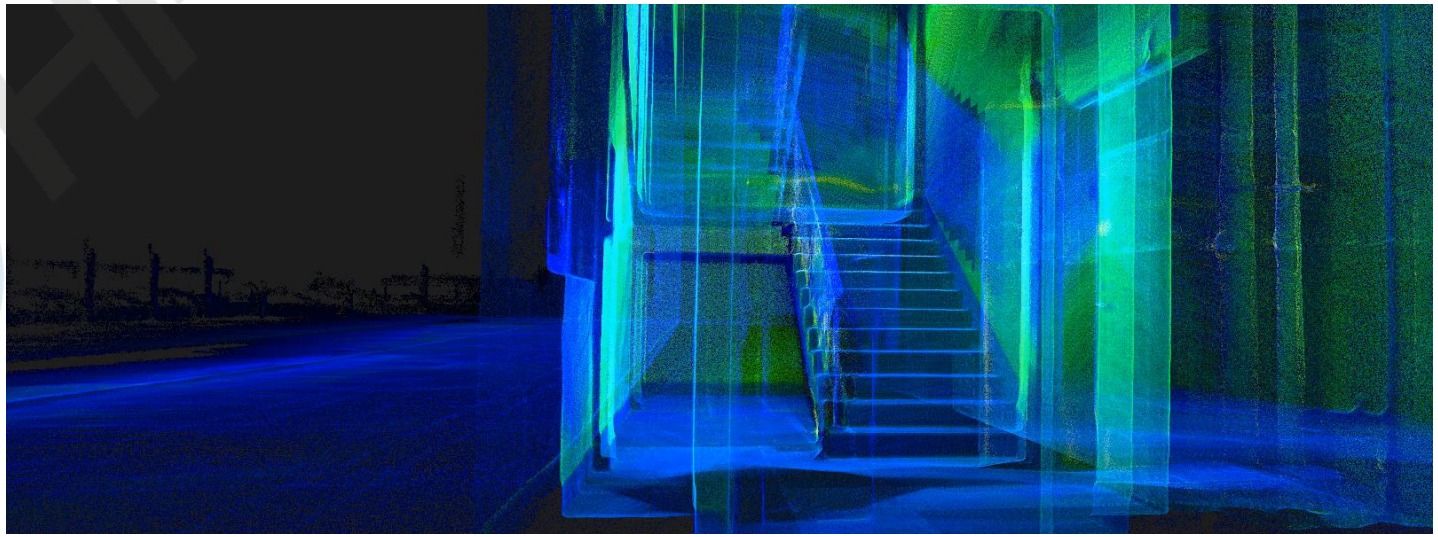
1. The Hi-Target V700S was used for scanning. An integrated indoor-outdoor scan was conducted on the first floor, while the second floor was scanned independently.
2. During scanning, the overall point cloud was georeferenced in real time using the established control points.
3. Point cloud registration was completed using desktop software in post-processing.
4. Results Display: Edge measurement verification: Measured value = 164.901 m, Design value = 165 m

Edge measurement check



Free slicing





Point cloud results presentation

1.3 Advantages analysis

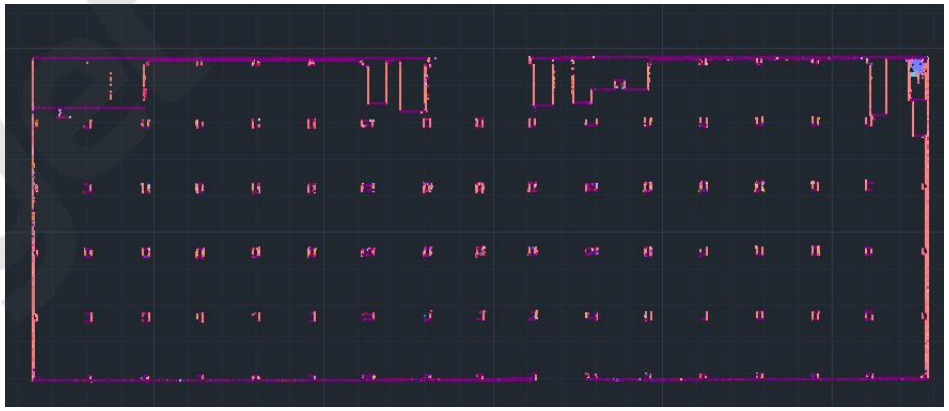
➢ **Customer pain points:**

1. Low efficiency when using total stations for measurement, requiring professional operators, and single-point measurement without comprehensive comparative analysis;
2. Ineffective measurement when dealing with surfaces or non-coplanar bodies;
3. Having used several SLAM systems, either geographic coordinate measurement is unavailable, or cumulative errors cause point cloud deformation and distortion, rendering them unusable.

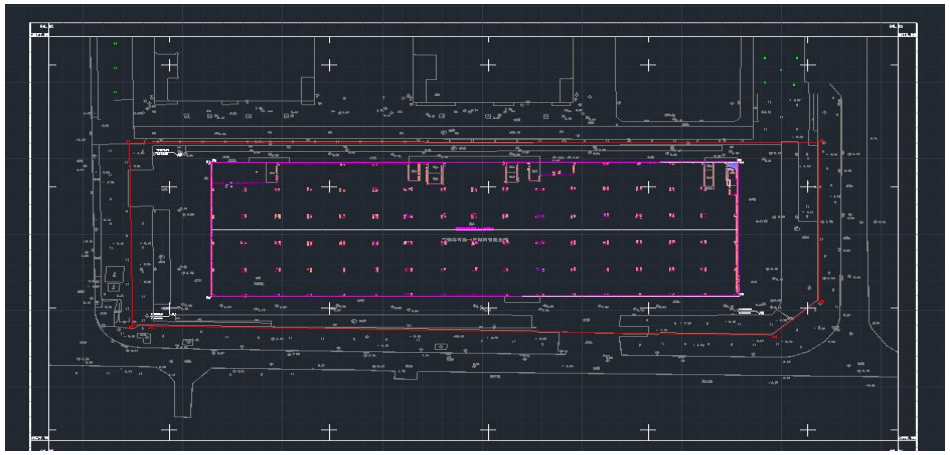
➢ **SLAM RTK Advantages:**

1. SLAM RTK Compared to SHARE S20 and XGRIDS K1 and other purely SLAM systems, it not only fulfills the scanning requirements of SLAM but also meets the customer's routine surveying projects' demand for RTK.
2. Integrated SLAM utilizing a professional dielectric antenna+ Beidou chip+ IMU + SLAM depth fusion algorithm, enables real-time elimination of cumulative errors, ensuring superior point cloud quality, with the capability for flexible slicing via desktop software. According to customer feedback, its accuracy performance is comparable to professional SLAM systems such as Feima and Goslam.
3. SLAM RTK direct output CGCS2000/WGS84 coordinate system point cloud, which can be converted among various global coordinate systems via desktop software. Pure SLAM systems such as SHARE S20 and XGRIDS K1 do not have this functionality, making it impossible to directly overlay point clouds with design drawings;

Primary client groups: architectural design institutes, construction companies, surveying and mapping qualified entities, etc.



Point cloud slicing



Match design drawing

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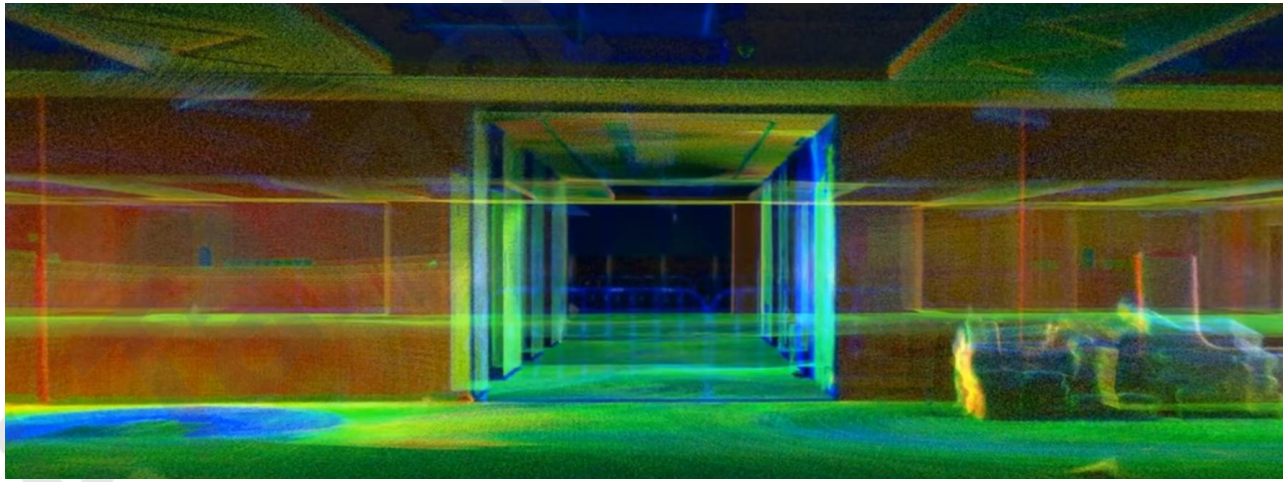
PART 05 Building Facade Survey for Urban Renewal

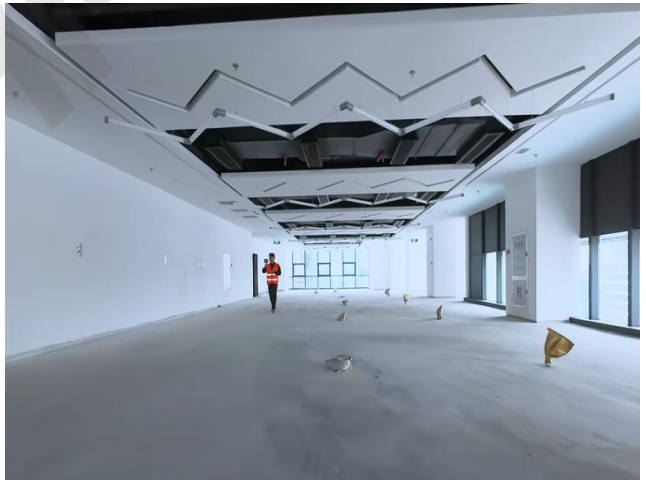
PART 06 Volume Measurement

PART 07 Cadastral Surveying (Ongoing)

2.1 Property Surveying

- **Location:** Hi-Target Headquarters, Guangzhou
- **Client:** Technical Department accompanied Zhongke Yatu for testing
- **Requirement:** To perform 3D scanning of a pre-renovated floor and acquire high-density point cloud data. The point cloud would be used to generate sectional slices for accuracy inspection and to validate the feasibility of using Hi-Target SLAM RTK for real estate surveying applications.
- **Results:** 3D point cloud data, freely sliced point cloud sections, point cloud georeferenced to geographic coordinate systems



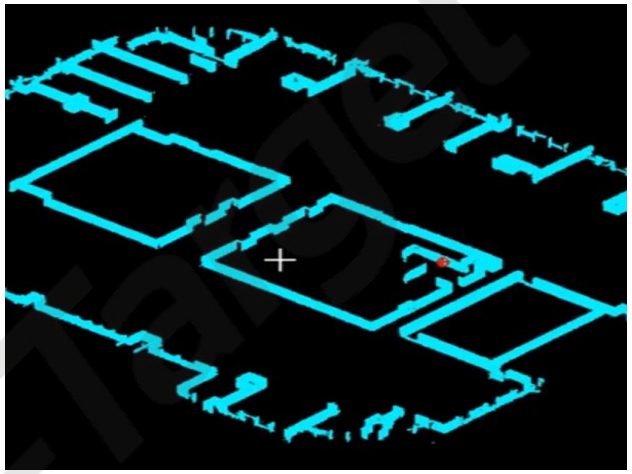


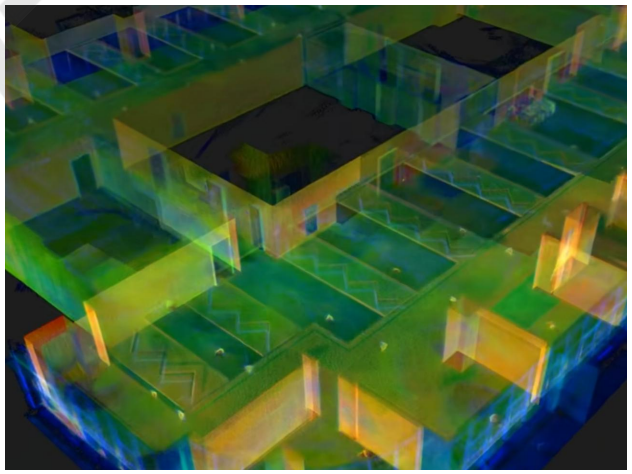


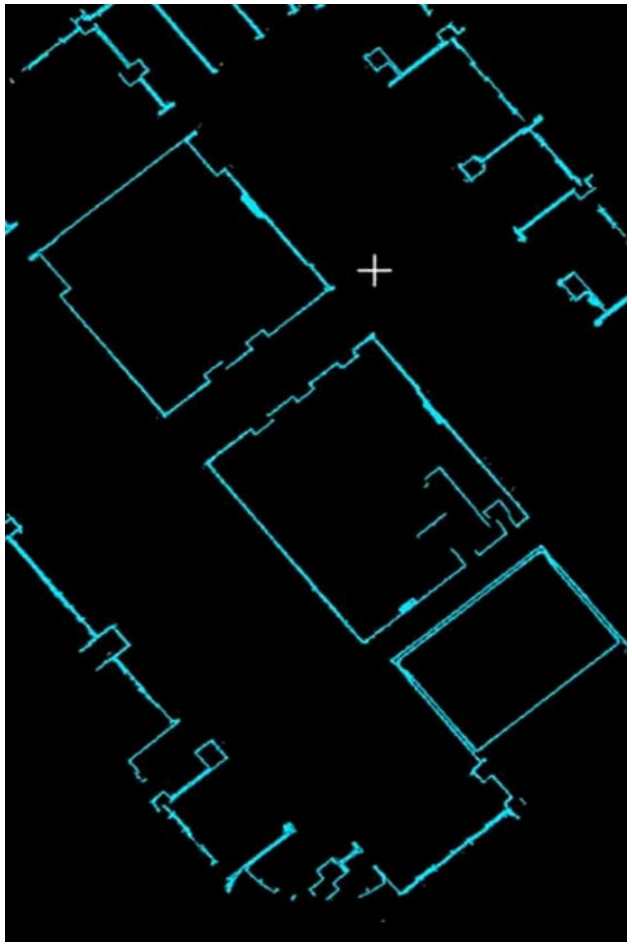
2.2 Surveying and Results

- **Site environment:** The site is a newly constructed office building. The main wall surfaces have been tiled, and large glass windows have already been installed. The interior layout is complex, with curved and irregular surfaces present. Lighting conditions vary significantly across different areas.
- **Scanning plan:**

  1. The Hi-Target SLAM RTK was used to scan the entire area, ensuring complete coverage with no omissions or voids.
  2. Ten checkpoints were established to verify edge measurement accuracy.
  3. Point cloud slicing and leveling were performed using HI-Lidar software.
  4. **Results:** The entire floor was scanned in just 7 minutes. The shapes and distribution of interior structures were clearly captured in the point cloud.







2.3 Advantages analysis

- **Customer Pain Points:**

  In traditional real estate surveying, indoor measurements rely on handheld distance meters, with sketches manually drawn and later digitized. Outdoor areas are measured using RTK to generate localized topographic maps. This process is inefficient, prone to errors and omissions, and the site is difficult to revisit or replicate accurately. Curved and irregular surfaces cannot be effectively measured using conventional tools. Traditional SLAM systems can only perform scanning and lack high-precision coordinate measurement capabilities.

- **Advantages of SLAM RTK:**

  Compared to pure SLAM systems like the SHARE S20 and XGRIDS K1, SLAM RTK outputs point clouds directly in CGCS2000 or WGS84 coordinate systems. Global coordinate transformations can be performed via desktop software, making it suitable for both indoor scanning and outdoor RTK-based topographic surveying — offering significantly higher value.Powered by deep fusion of SLAM, high-performance GNSS antenna, BeiDou chipset, IMU, and SLAM algorithms, SLAM RTK eliminates cumulative errors in real time. This ensures high point cloud accuracy, which can be flexibly sliced and analyzed in post-processing. Field edge measurements confirmed the precision meets customer requirements. Using Hi-Lidar software, users can not only process and colorize point clouds, but also perform slicing, leveling, and mapping capabilities not available in most SLAM systems like the SHARE S20.

- **Primary Target Customers:**

  Real estate surveying companies, architectural design firms, and licensed surveying and mapping organizations.

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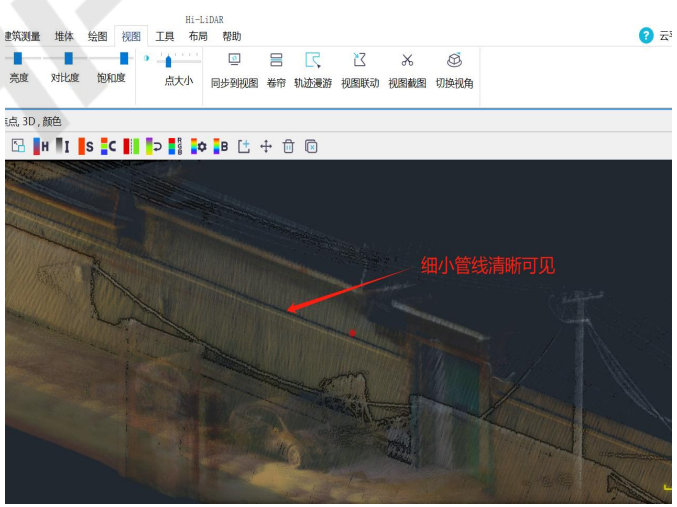
PART 07 Cadastral Surveying (Ongoing)

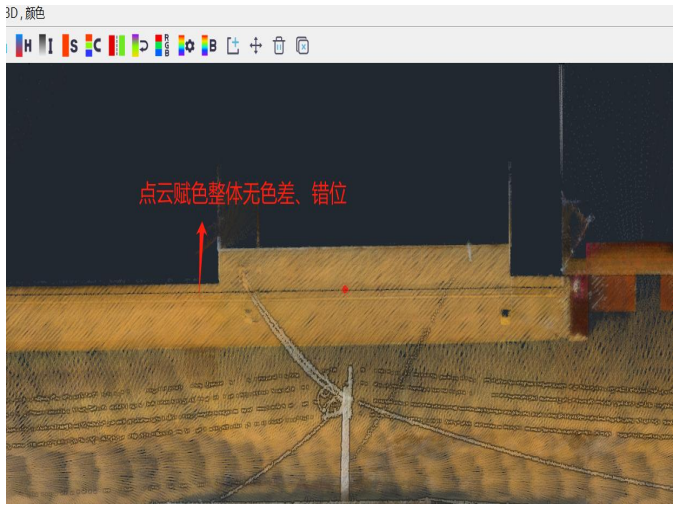
3.1 Pipeline Surveying

- **Location:** Baoding City, Hebei Province
- **Client:** A Gas Company
- **Requirement:** To scan underground pipelines within the designated survey area and generate 3D point cloud data. Based on the processed point cloud, a pipeline distribution map was to be created, with deliverables required in CAD format, 3D visualization, and georeferenced to geographic coordinates.
- **Deliverables:** 3D point cloud data and pipeline distribution map







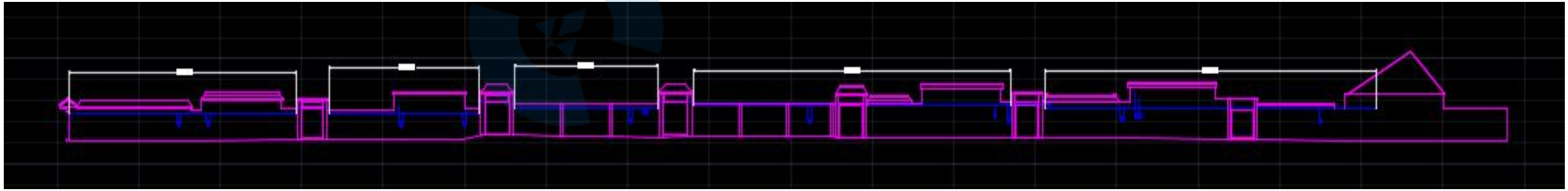


3.2 Surveying and Results

Scanning Plan:

1. The Hi-Target V700S was selected for this project, utilizing loop-free measurement technology and error suppression algorithms to enable high-precision 3D surveying.
2. During scanning, real-time georeferencing in geographic coordinate systems allowed direct output of point cloud data in CGCS2000 and WGS84. This provided an intuitive and high-accuracy foundation for subsequent mapping work.





3.3 Advantages analysis

- **Customer Pain Points:**

  1. Conventional pipeline surveys rely on total stations, whose complex operation and low efficiency lead to frequent errors and omissions.
  2. Survey sites are hard to revisit, so rework and field corrections demand significant time and effort.
  3. Traditional SLAM devices can only scan; they cannot provide high-precision georeferenced measurements.
  4. A dedicated, professional software platform is lacking.

- **Advantages of SLAM RTK:**

  1. Unlike pure SLAM units such as the SHARE S20 or XGRIDS K1, SLAM RTK outputs point clouds directly in CGCS2000 or WGS84. With its desktop software, users can convert data into any global coordinate system—serving both indoor scanning and RTK-level topographic surveying for higher overall value.
  2. An integrated system—combining a high- performance GNSS antenna, BeiDou chipset, IMU, and SLAM deep-fusion algorithm—eliminates cumulative drift in real time. The resulting point clouds are highly accurate and deformation-free, and can be freely sliced in post-processing. Field edge checks confirm that the precision meets customer requirements.
  3. A global-shutter camera ensures uniformly colorized point clouds with no chromatic or stereo-camera misalignment.
  4. HI-Lidar software not only processes and colorizes point clouds, but also supports slicing, leveling, and full 3D drafting—capabilities most SLAM systems (e.g., SHARE S20) do not provide.

- **Primary Target Customers:**

  Gas utilities, pipeline companies, architectural design firms, and licensed surveying and mapping organizations.

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4.1 Forestry Resource Survey

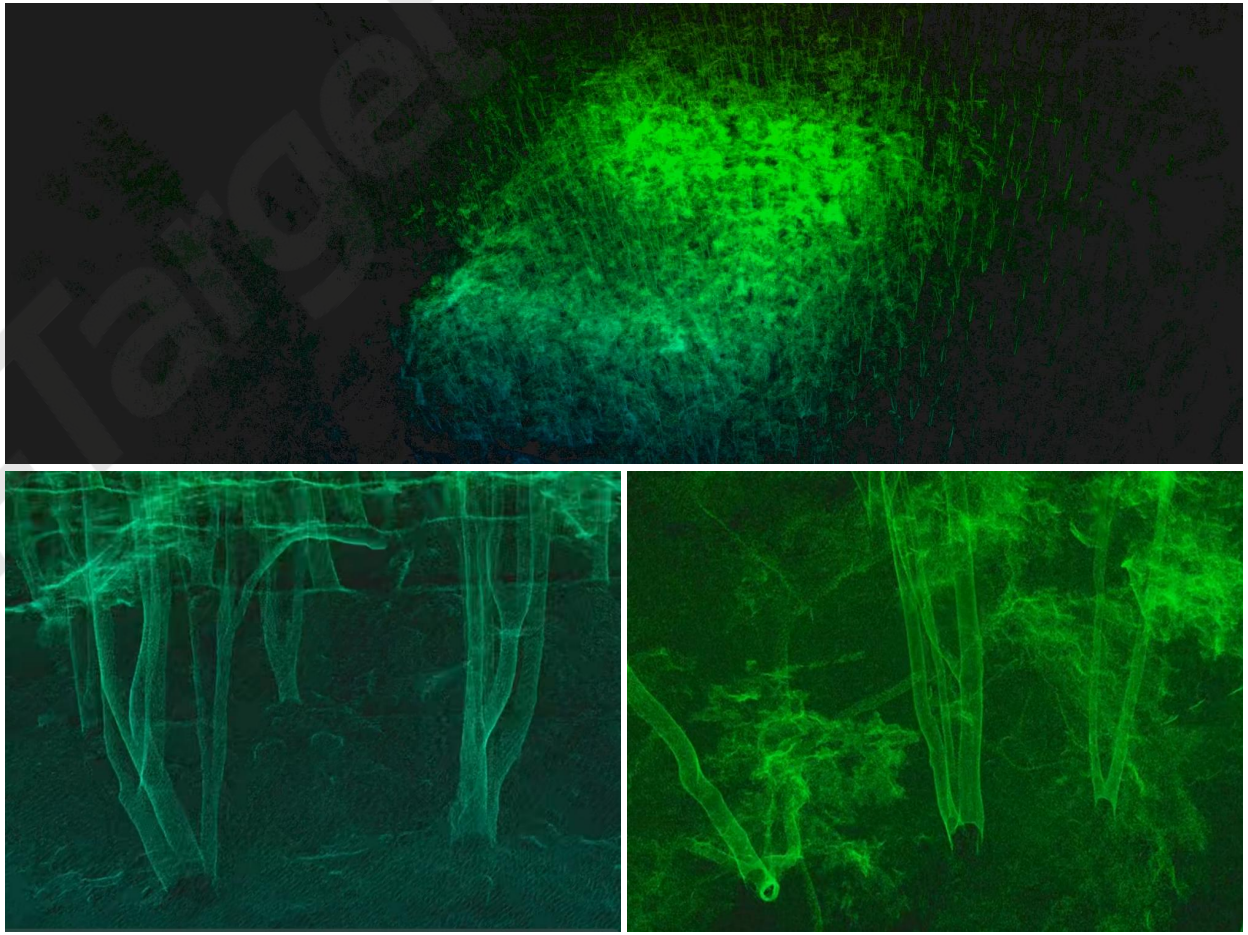
- **Location:** Shenzhen City, Guangdong Province
- **Client:** A university
- **Requirement:** To scan forested land within the designated survey area and generate georeferenced 3D point cloud data. The point cloud must be evenly distributed, free from ghosting, and clearly distinguish tree trunk diameters (DBH), plant height, and spatial distribution. The final data should seamlessly integrate with existing airborne LiDAR datasets.
- **Outcome:** Integrated aerial-terrestrial 3D point cloud data
- **Field environment:** The site is an artificial plantation characterized by high plant density, diverse tree species, dense canopy closure, and significant terrain undulation; airborne LiDAR is unable to acquire information such as tree diameter at breast height and distribution.



4.2 Surveying and Results

Scanning Plan:

1. The Hi-Target V700S was used to perform SLAM-based 3D scanning across the entire forest area to acquire high-density point cloud data.
2. Using the V700S real-time georeferencing capability, point cloud data was directly output in CGCS2000 and WGS84 coordinate systems.
3. HI-Lidar software was used to integrate multiple data sources, perform control point adjustment, and carry out cross-station registration, enabling seamless fusion with pre-existing UAV-LiDAR data.computation, and station-to-station registration functions, integrating prior UAV-LIDAR data;
4. Results presentation: Verified that V700S point cloud distribution is uniform, with no misalignment or ghosting of individual trees in the forest area. Perfect integration with UAV-LIDAR data is achievable, with accuracy meeting customer requirements.



4.3 Advantages analysis

- **Customer Pain Points:**

  The client had previously tested several SLAM systems and reported the following major issues:

  1. Point cloud deformation and inability to close loops, resulting in misalignment and ghosting.
  2. The scanned point cloud lacked geographic coordinates, or the software did not support cross-station registration, making it impossible to integrate with existing airborne LiDAR data.

- **Advantages of SLAM RTK:**

  1. Compared to pure SLAM devices like the SHARE S20 or XGRIDS K1, SLAM RTK supports direct output of point clouds in CGCS2000 and WGS84 coordinate systems. The accompanying desktop software enables conversion to various global coordinate systems, easily meeting the needs of topographic surveying and solving coordinate referencing challenges.
  2. With HI-Lidar software, SLAM RTK supports the integration and analysis of multiple data sources—including SLAM and airborne LiDAR. It also handles advanced applications such as point cloud classification, mapping, and volume calculation—capabilities not available in most SLAM systems like those from SHARE.

- **Primary Target Customers:**

  University research institutes, provincial forestry departments/bureaus, and municipal forestry bureaus.

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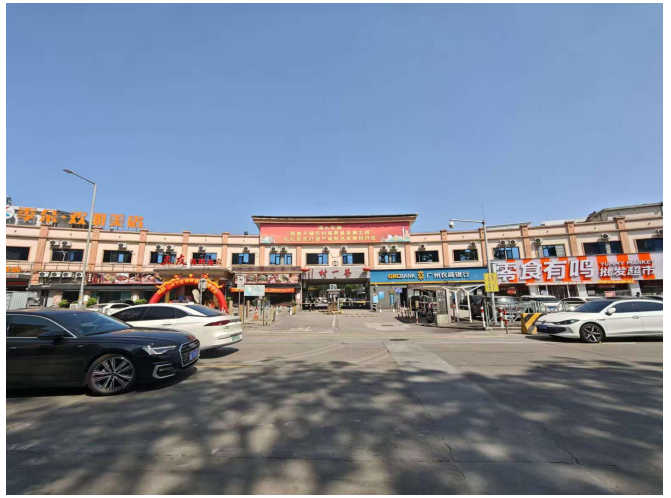
PART 07 Cadastral Surveying (Ongoing)

5.1 Building Facade Measurement

- **Location:** Guangzhou City, Guangdong Province
- **Customer:** Jingtu Surveying and Mapping
- **Requirement:** To improve the urban landscape and enhance the living environment, a streetscape facade survey was conducted within the designated area. The project involved scanning building facades along the street and generating colorized point cloud data. Based on the results, detailed facade drawings were created, including accuracy verification and area calculations, providing a reliable foundation for future engineering budgeting and design planning.
- **Deliverables:** 3D point cloud data, building facade drawing





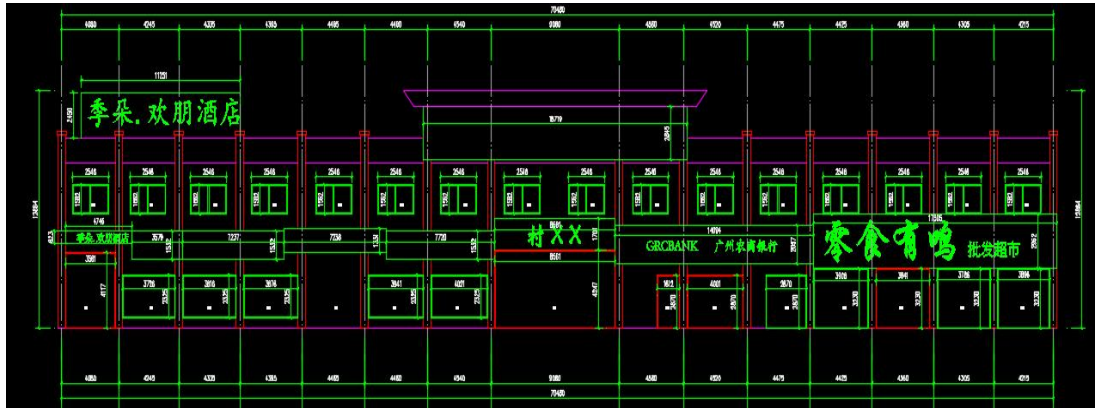


5.2 Surveying and Results

- **Site environment:** The site was an existing office building with complex wall attachments and overhanging eaves that caused significant vertical occlusion.
- **Scanning Plan:**

1. The Hi-Target V700S was used to perform SLAM-based 3D scanning, enabling full real-world replication of the area and ensuring complete coverage without omissions or voids.
2. The scanning route followed the building orientation in a zigzag (Z-shaped) pattern to minimize occlusions caused by roof eaves and prevent data gaps.
3. Point cloud slicing and leveling were performed using HI-Lidar software, and the results were exported to CAD for facade drawing.
4. Results: Hi-Target SLAM RTK enabled rapid, complete, and true-to-scale (1:1) acquisition of 3D point cloud data for the target structures, effectively avoiding fieldwork re-visits. The indoor processing phase benefited from multi-mode point cloud visualization (including colorized views), allowing clear interpretation of object properties and spatial relationships—significantly improving drawing efficiency.





5.3 Advantages analysis

- **Customer Pain Points:**

1. Total station surveying is extremely inefficient and has largely been excluded from consideration.
2. The customer previously tested the XGRIDS L2 system and found its colorization performance to be good. However, it produced excessively large datasets—over 1 GB for just one minute of scanning—making post-processing nearly impossible on standard computers.

- **Advantages of SLAM RTK:**

1. SLAM-RTK's colorization quality meets the requirements of modern building facade surveys, with clearly defined object edges and accurate interpretation of architectural attachments.
2. As a surveying-oriented user, the client mainly handles small-area topographic surveys, parcel boundary measurements, and real estate surveying across Guangdong Province. They highly value SLAM-RTK's ability to operate in no-signal or weak-signal environments—features that pure SLAM systems do not support.
3. Real-time volume calculation and multi-period comparison were also introduced to the client, and were considered extremely practical for their surveying applications.
4. The non-contact measurement capability of SLAM-RTK's was particularly appreciated. According to client feedback, in a river dredging project in Dongguan, they were required to measure river boundaries and the area of floating debris patches on the water surface—where this feature proved highly useful.

- **Primary Target Customers:**

Urban renewal institutes, licensed surveying and mapping companies, urban planning institutes, architectural design firms, and real estate surveying centers.

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6.1 Volume Measurement

- **Location:** Xiamen City, Fujian Province
- **Client:** Xiamen Zhongcheng Surveying and Mapping
- **Client Main Business:** Surveying and Geographic Information
- **Primary Application Scenario:** Earthwork Measurement
- **Client Focus:** Real-time Volume, Multi-phase Comparison





Reason for Purchase:

1. During on-site demonstrations, the client found that SLAM RTK offered significantly higher efficiency and denser point clouds compared to traditional RTK methods. The reconstructed models closely matched the real-world environment, and the software was easy to operate, enabling quick and straightforward volume calculations. The system also allows for effortless scene reproduction later on, making the deliverables more persuasive.
2. The ability to measure coordinates in areas with no or weak GNSS signals was a major advantage—something conventional RTK or pure SLAM systems cannot achieve.

6.2 Summary – Small-Scale Stockpiles





- **Hardware:** SLAM RTK
- **Software requirements:** Volume calculation, map generation and report outputs (including volume and weight)
- **Typical clients:** Sand mining sites, quarry plants, transportation or construction units, mining plants, etc.

6.3 Summary – Large-Scale Stockpiles





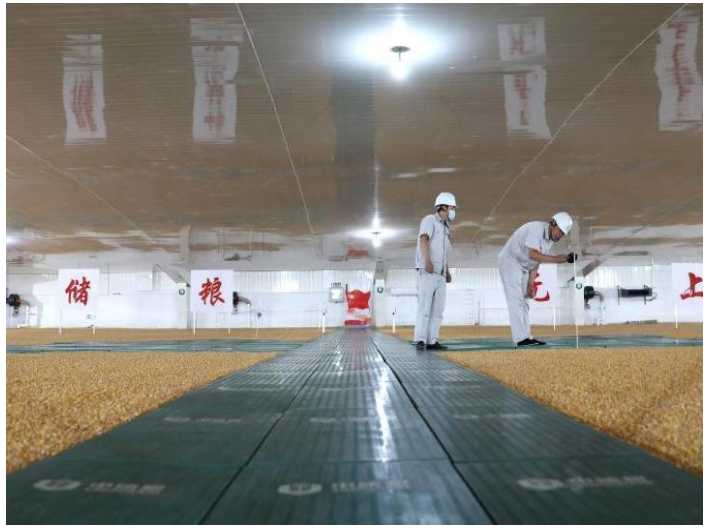
- **Hardware:** SLAM RTK
- **Software requirements:** Volume calculation, map and report generation (volume + weight), multi-period comparison for change detection
- **Typical clients:** Thermal power plants, Mining sites, Port terminals

6.4 Summary – Covered Stockpiles (Under Roof)

- **Hardware:** SLAM RTK
- **Software:** Volume calculation
- **Typical clients:** Power plants, chemical plants, grain storage facilities







6.5 Key Considerations in Stockpile Measurement

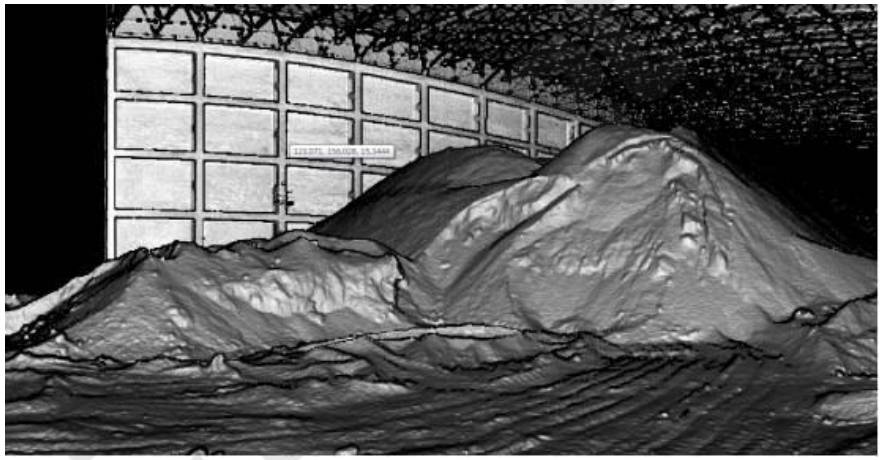
Hi-Target SLAM RTK Advantages

1. Volume Measurement: Requires higher standards for point cloud flatness, distribution, and accuracy, while colorization is generally not mandatory under normal conditions.

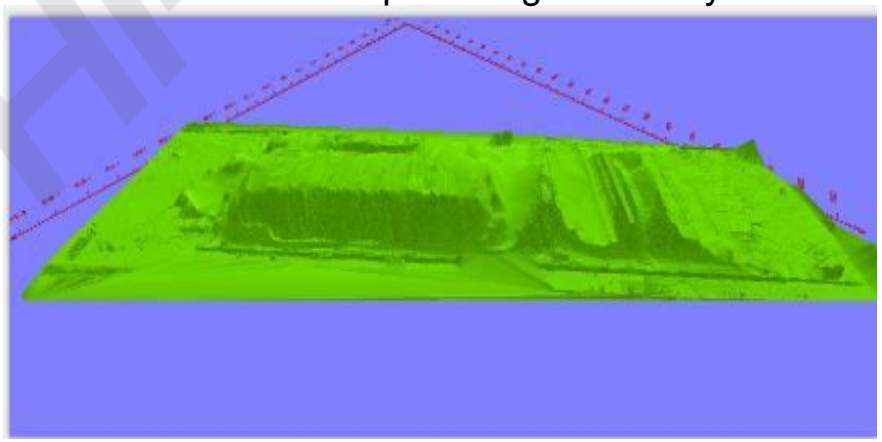
2. RTK + SLAM Deep Fusion Algorithm: Real-time elimination of cumulative errors, a capability absent in typical pure SLAM systems such as SHARE S20 and XGRIDS.

3. Accuracy Reporting: Enables timely detection of scanning quality issues—if point cloud stitching distortion occurs, the scan can be immediately stopped or restarted, saving time and increasing confidence during fieldwork.

4. Real-Time Point Cloud Monitoring: Allows instant identification of data voids or gaps, helping to avoid costly rework.



Clear detail description- High accuracy



No blind spots, no voids



Real-time display

6.6 Typical Clients for Stockpile Measurement

Power and Chemical Plants

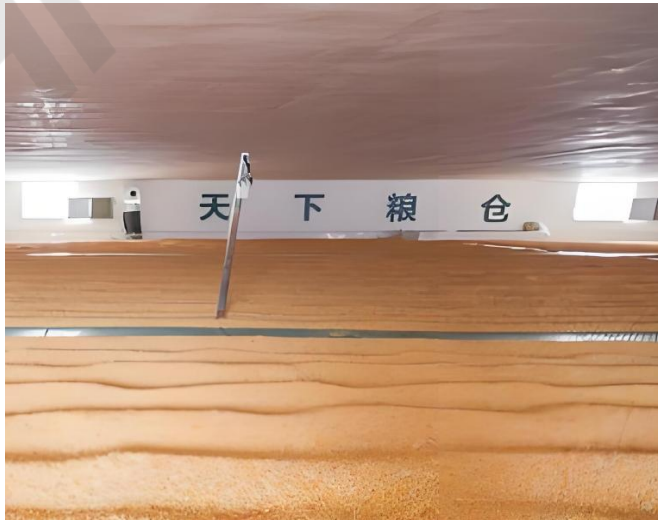
- **Grain Storage Facilities:** National Grain and Material Reserve Bureau and its subordinate local bureaus and stations.
- **Ports and Terminals:** Bulk material stockyards and handling yards.
- **Mining and Extraction:** Geological and mineral resource units.
- **Engineering Surveying:** Licensed surveying and mapping companies, construction companies, and road & bridge engineering units.
- **Municipal and Landscaping:** Municipal planning and design units across various cities.



Earthwork



Coal inventory



Grain storage



Port bulk material stockpile

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7.1 Building facade measurement

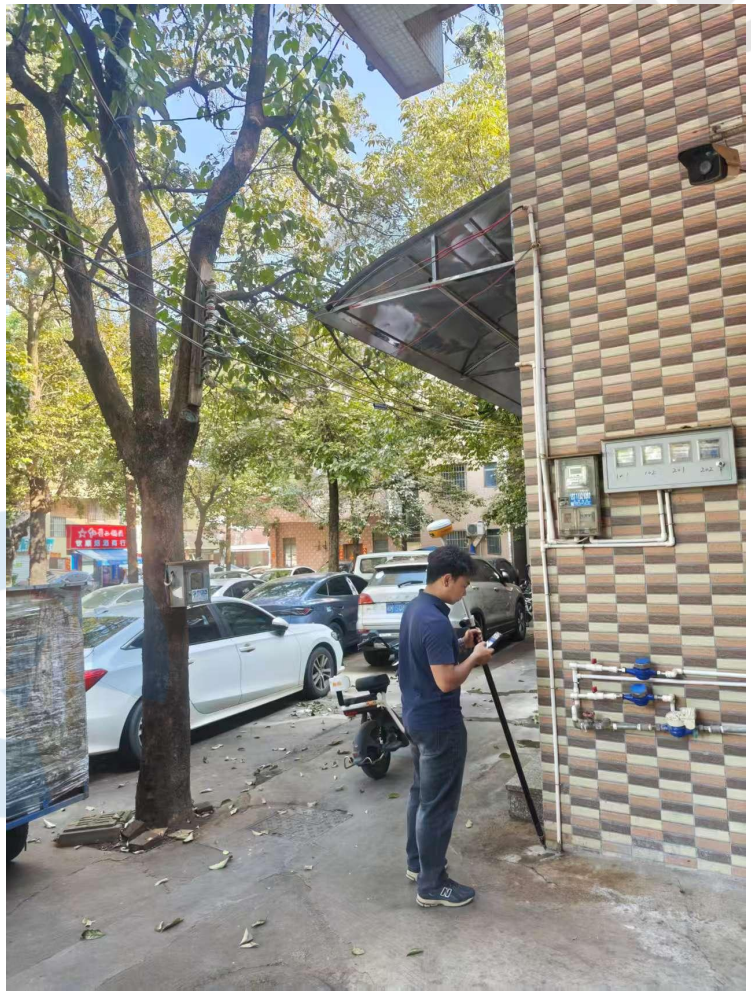
Location: Guangzhou City, Guangdong Province

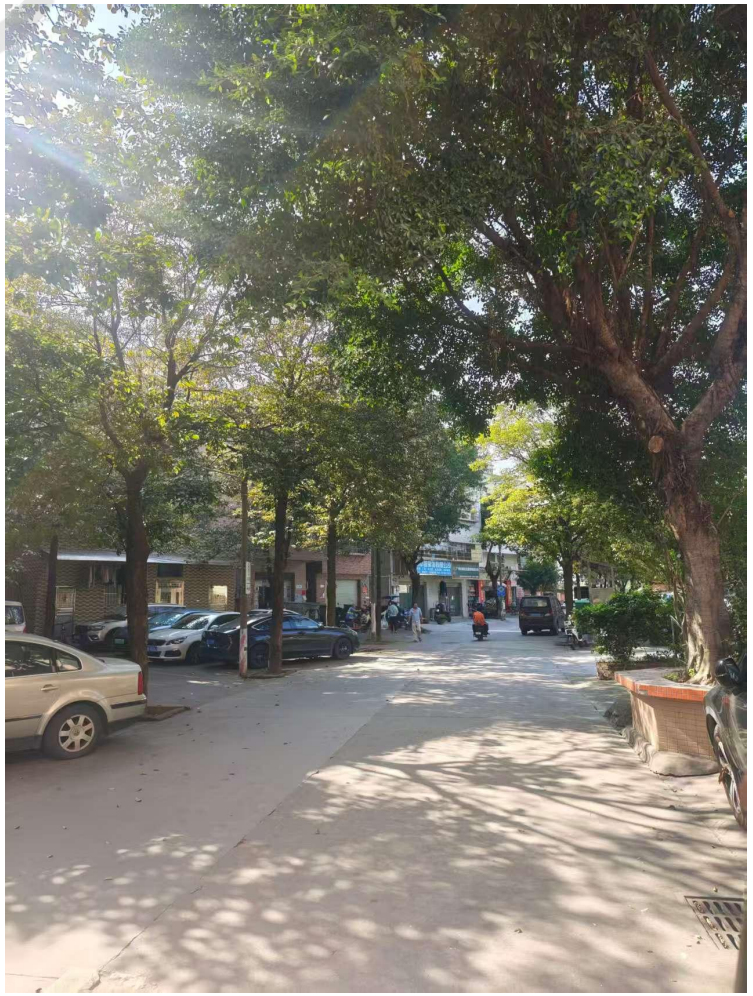
Customer: Jingtu Surveying and Mapping

Requirement: Cadastral survey of an urban village in Guangzhou

Deliverables: 3D SLAM point cloud data, cadastral map







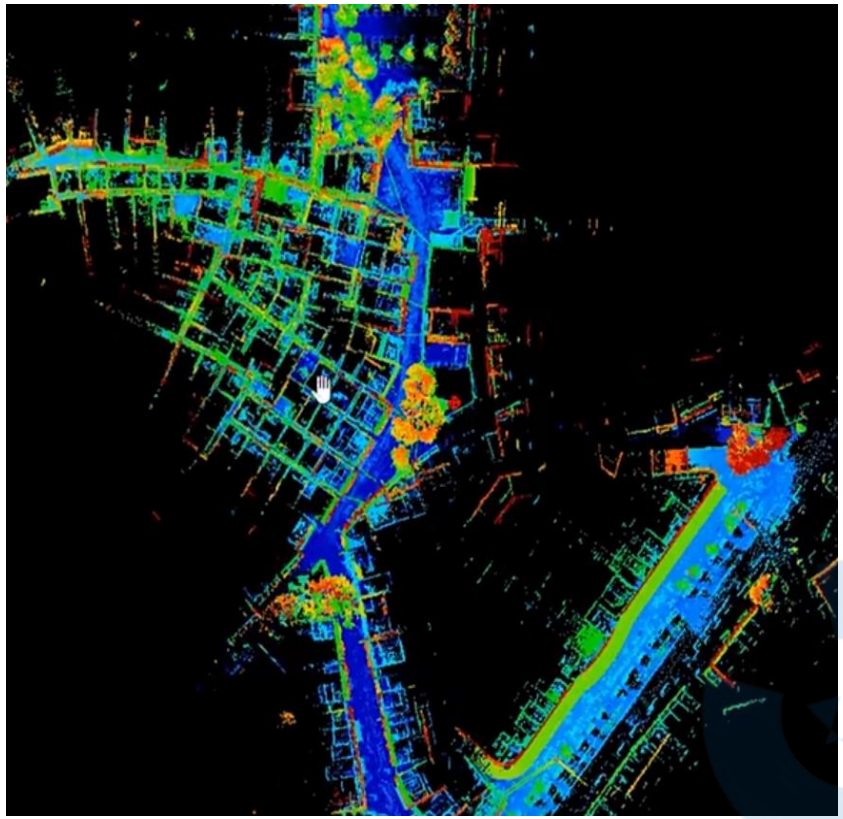
7.2 Surveying and Results Presentation

Site environment: The site is an urban village in Guangzhou with dense and tall vegetation. Buildings range from 3 to 5 stories and are arranged irregularly, forming narrow, winding alleys with short lines of sight. RTK signal is weak and unstable in many areas.

Scanning Plan:

1. Utilize the Hi-Target V700S with SLAM RTK functionality to conduct boundary point coordinate measurements in weak or no-signal areas (e.g., under vegetation, within alleys), and verify measurement accuracy.
2. Perform scanning along building alignments to generate SLAM point cloud data in the CGCS2000 coordinate system. In post-processing, extract boundary points by slicing the point cloud and validate their positional accuracy.
3. Apply the V700S's SLAM image-based measurement function for non-contact acquisition of certain boundary point coordinates on buildings, and verify the accuracy of the results.

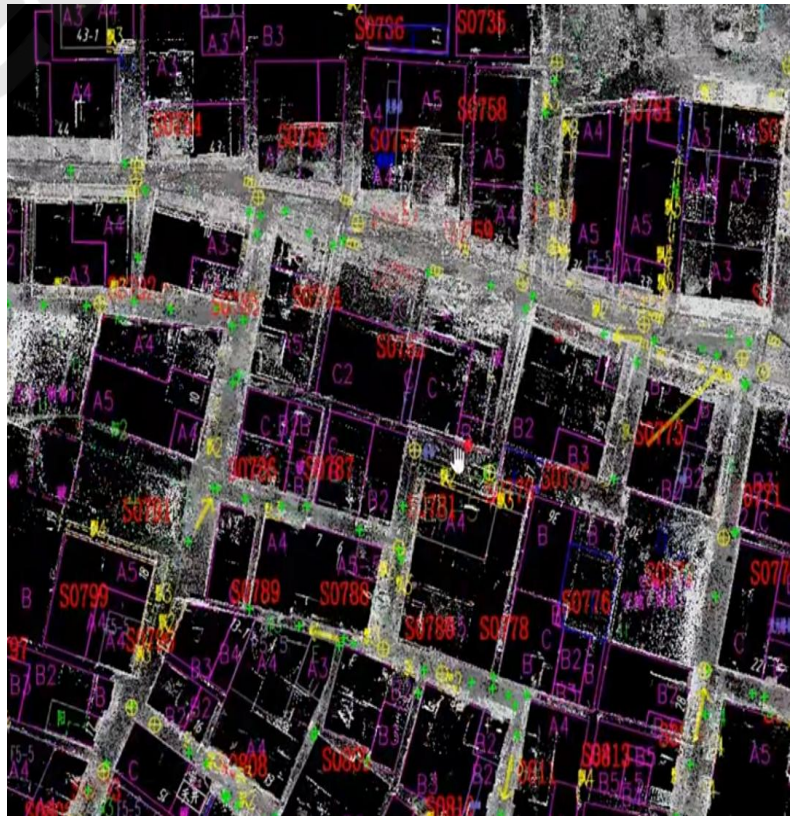
7.3 Surveying and Results Presentation



Point Cloud Data of the Test Area



Location Map of Checkpoints



Slicing and Overlay with the Cadastral Map

7.4 Surveying and Results Presentation

Customer Pain Points:

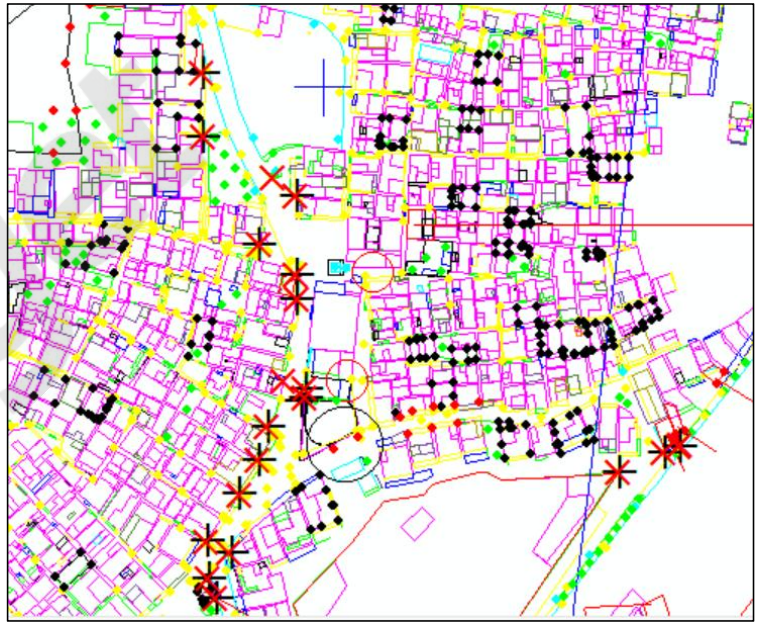
1. Short line-of-sight distances on site resulted in low efficiency when using total stations. RTK signals were weak or completely unavailable in most areas, leading to large measurement errors.

2. Due to dense vegetation and tightly packed buildings, UAV photogrammetry was not a viable option for this project.

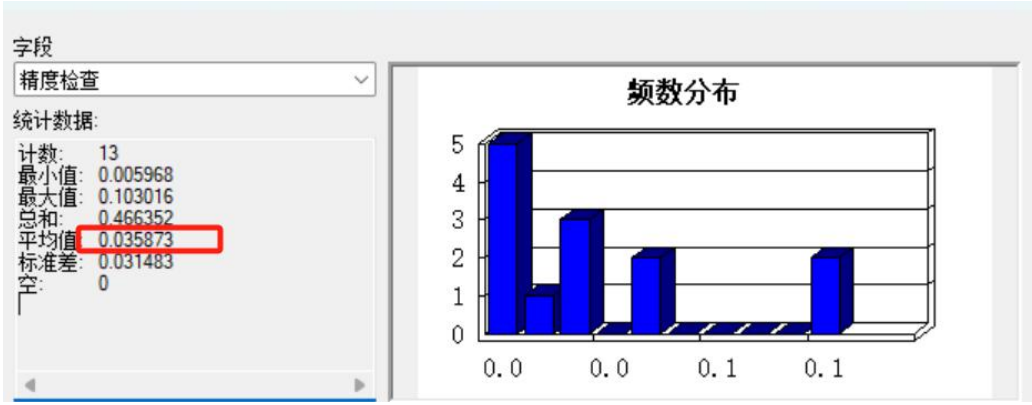
Advantages of SLAM RTK:

1. Unlike image-based RTK , V700s is a true SLAM RTK system that does not require subsequent aerial triangulation densification and can perform direct non-contact measurements, significantly enhancing measurement efficiency;

2. SLAM RTK supports direct output of point clouds in the CGCS2000/WGS84 coordinate system. Using desktop software, global coordinate system transformations can be performed. After slicing, boundary point coordinates can be directly selected (including areas with weak signal and no-signal areas). Accuracy testing indicates a root mean square error better than 5 cm, which significantly enhances measurement efficiency.



Check Points, Measured Points, and Cadastral Map Overlay



Accuracy assessment



Thank You.

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