

# 3D Laser Scanner AcuteLas Series

- *compact & lightweight*
- *long range & high accuracy*
- *abundant software functions*

*by Jackie Cheung 2023/08/18*



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# *1. Getting Started with AcuteLas Laser Scanner*

## 1.1. A Quick Glance by Video Clip

SOUTH

**SOUTH**南方测绘  
成就时空地理信息价值



# 1.2. Equipment Illustration



Power button

inbuilt camera

LED screen

Li-ion battery unit

battery clip

Android 2.0 interface

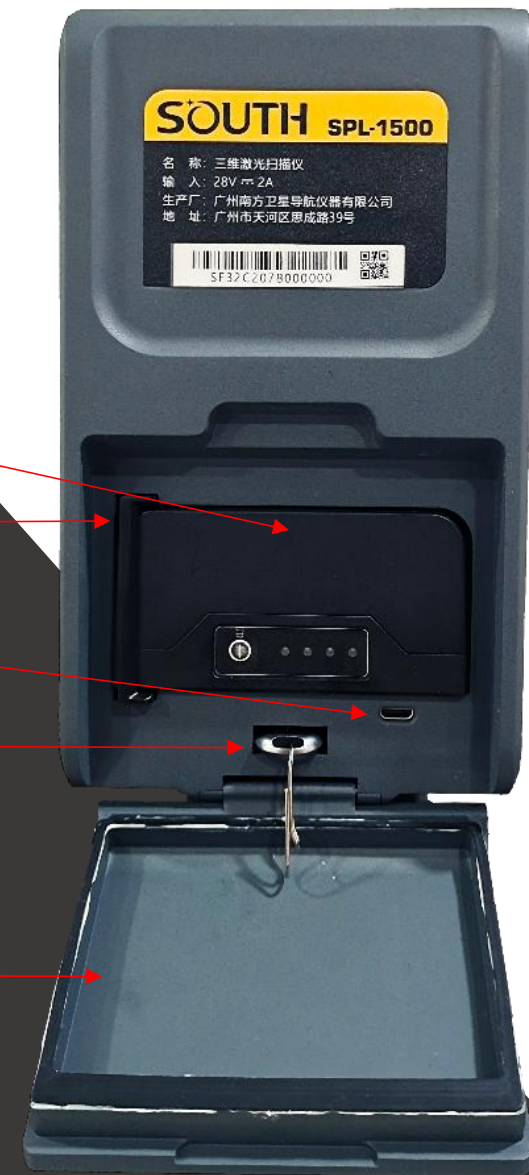
USB slot & flash drive

polygonal mirror

battery compartment cover

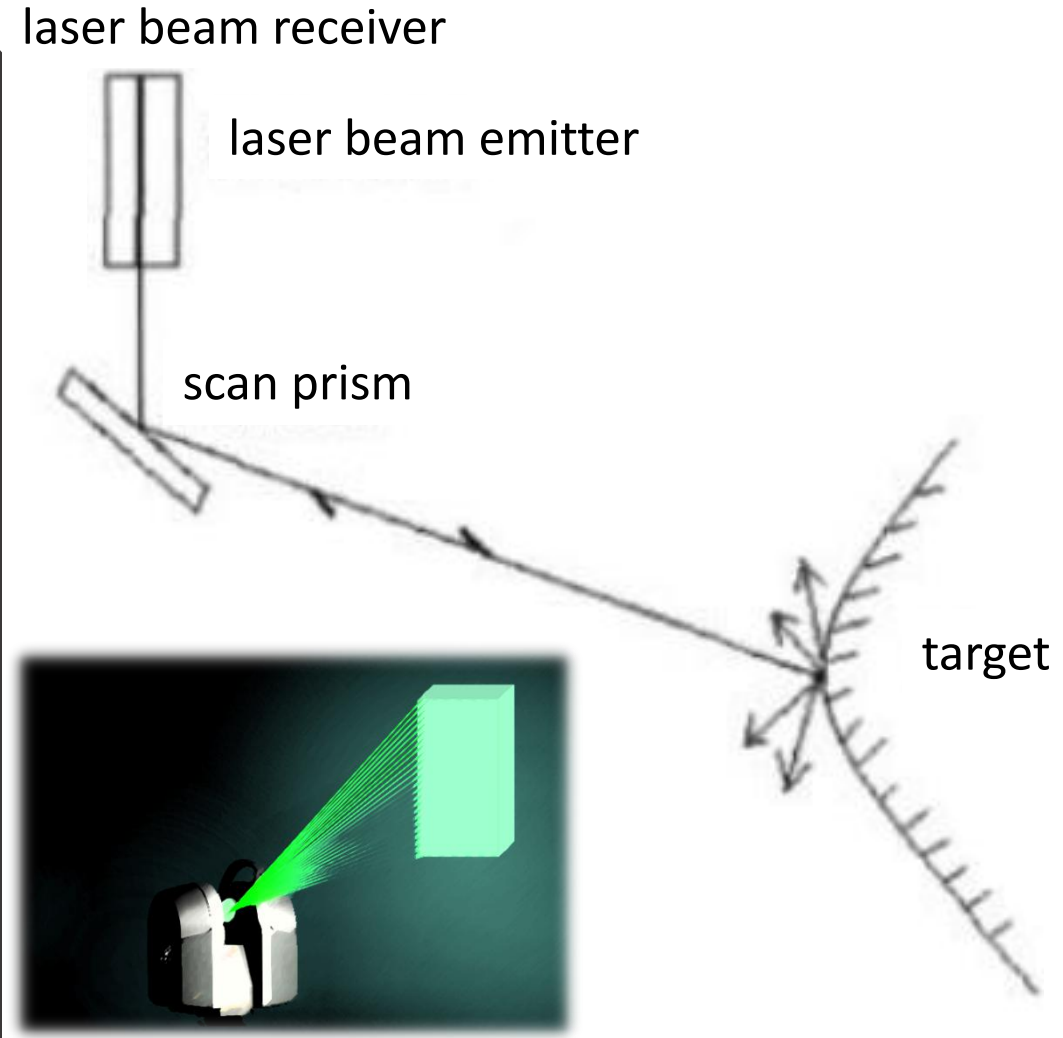
battery compartment

external power supply interface



# 1.3. Pulse Laser Scanning

Scanner Type	Pulse Laser Scanner		Phase Laser Scanner	
<b>Measuring Range</b>	Long Distance (500m or more)	Short Distance (within 300m)	Long Distance (500m or more)	Short Distance (within 300m)
	✓	✓	✗	✓
<b>Accuracy</b>	Excellent	Moderate	Invalid	Excellent
<b>Performance</b>				
<b>Typical Brands</b>	Riegl, Topcon, South		Faro, Leica, Trimble, Z+F	



# 1.4. 2 Generations and Tailor-made Models



*model: SD-1500*



*OEM model for XXX*

*customized model for steelworks*

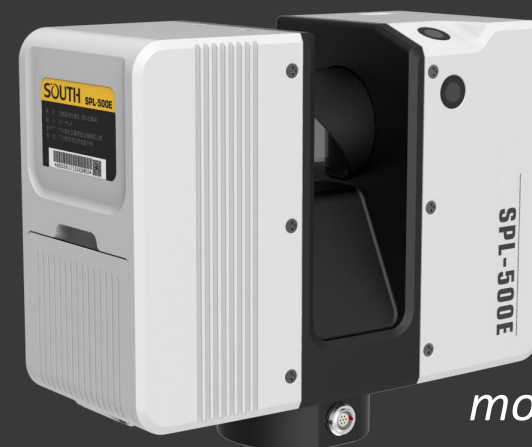


**1<sup>st</sup> Generation  
(since 2019)**

**2<sup>nd</sup> Generation  
(since 2021)**



*model: SPL-1500/SPL-500*



*model: SPL-500E, goes with  
VR for educational market*

## 1.5. 2 Models Available for Overseas Market



*model: SPL-1500*

*range: max. 1500m*

*point rate: 2,000,000 pts per second*

*accuracy: 3mm @100m (since 2022-Q4)*



*model: SPL-500 / SPL-500E*

*range: max. 650m*

*point rate: 1,200,000 pts per second*

*accuracy: 5mm @100m*



## *2. AcuteLas Laser Scanner Features*

## 2.1. Integrated with Multiple Sensors



### **inbuilt camera**

2 lens, 24.6 MP in total



### **dual-axis compensator**

range  $\pm 15^\circ$ ; accuracy  $\pm 0.008^\circ$



### **inbuilt GNSS module**

GPS L1 + Beidou B1 tracking



### **inbuilt compass**

orientation to detect



### **temperature sensor**

smart temperature self-control



### **inbuilt altimeter**

height relative (to a fixed point) to detect

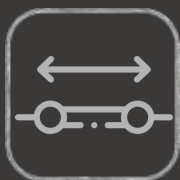


## 2.2. System Performance



**high accuracy**

3mm @100m



**long measuring range**

up to 1500m



**amazing point rate**

2,000,000 points per second



**scan FOV**

horizontal 360°, vertical 300°



**angular accuracy**

horizontal 0.001°, vertical 0.001°



## 2.3. Operation Performance



### multi-target detection

higher point density, suited to complex scenes



### automatic leveling

easy and efficient setup



### data storage

USB flash drive 256 GB



### Wi-Fi access

tablet, smartphone or laptop



### data communication

flash drive & USB 3.0 interfaces



### operation control

touch screen or Wi-Fi access





## 2.4. Physical Performance



### **battery endurance**

4 hours, hand-carry by airplane



### **compact and lightweight**

6kg only, goes with portable tripod



### **highly integrated unit**

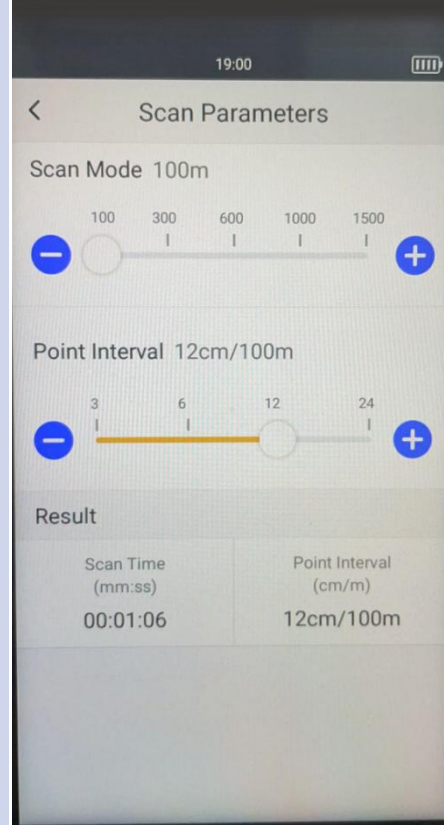
247 x 107 x 202 mm



# 2.5. Job Time

*Note: scan time results from scan resolution, sampling frequency, rotating speed, etc. instead of point interval only.*

Scan Mode	Point Interval / Resolution	Scan Time	Imaging Time
100 m	3 cm / 100 m	4 min and 16 sec	2 min (9 shots for 1 round)
300 m		8 min and 32 sec	
600 m		17 min and 4 sec	
1000 m		34 min and 8 sec	
1500 m		1 hour, 8 min and 16 sec	
100 m	6 cm / 100 m	2 min and 8 sec	
300 m		4 min and 16 sec	
600 m		4 min and 16 sec	
1000 m		8 min and 32 sec	
1500 m		17 min and 4 sec	
100 m	12 cm / 100 m	1 min and 4 sec	
300 m		1 min and 4 sec	
600 m		1 min and 4 sec	
1000 m		2 min and 8 sec	
1500 m		4 min and 16 sec	
100 m	24 cm / 100 m	32 sec	
300 m		32 sec	
600 m		32 sec	
1000 m		32 sec	
1500 m		1 min and 4 sec	



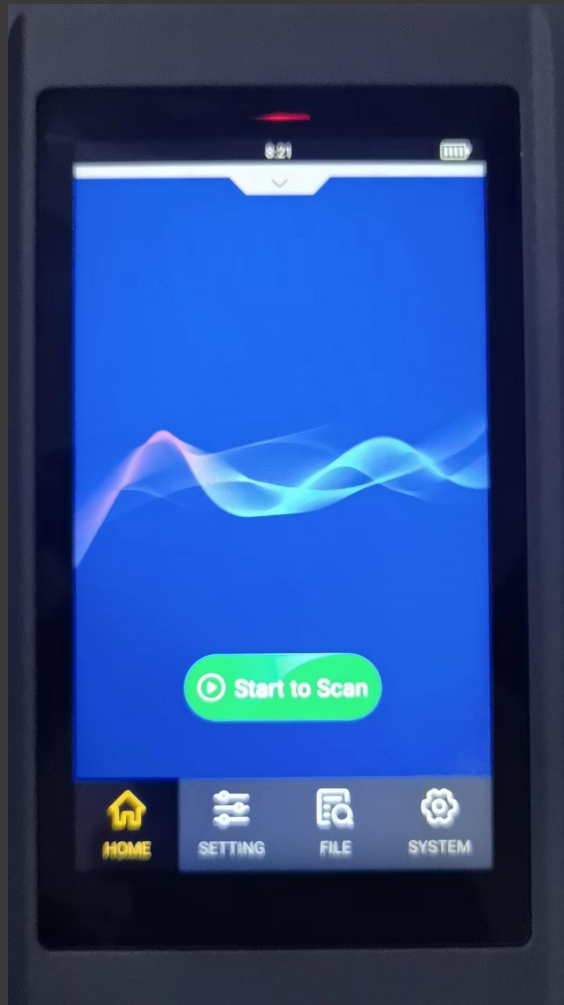
Point Interval / Resolution	Scan	Scan + Imaging (8 shots for 1 round)
50cm / 100m	34 sec	1 min 3 sec
12cm / 100m	1 min 4 sec	1 min 22 sec
24cm / 100m	1 min 4 sec	1 min 22 sec
12cm / 300m	48 sec	1 min 5 sec
24cm / 300m	48 sec	1 min 7 sec

*since 2022-Q4*

*since 2023-Q3*

### *3. AcuteLas Software Programs*

### 3.1. Software Programs to Go with



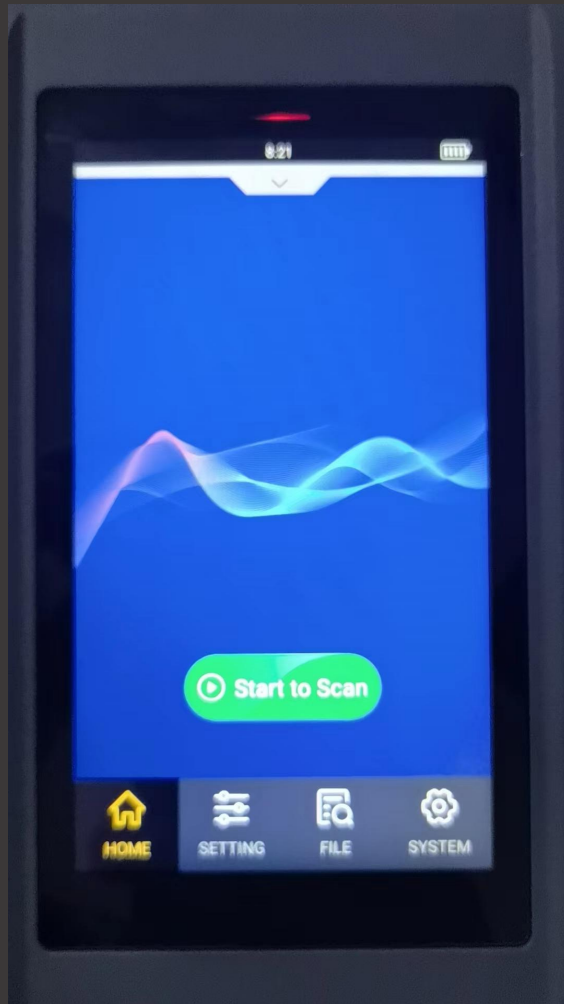
*onboard software*



*post-processing software, **AcuteLas Studio***



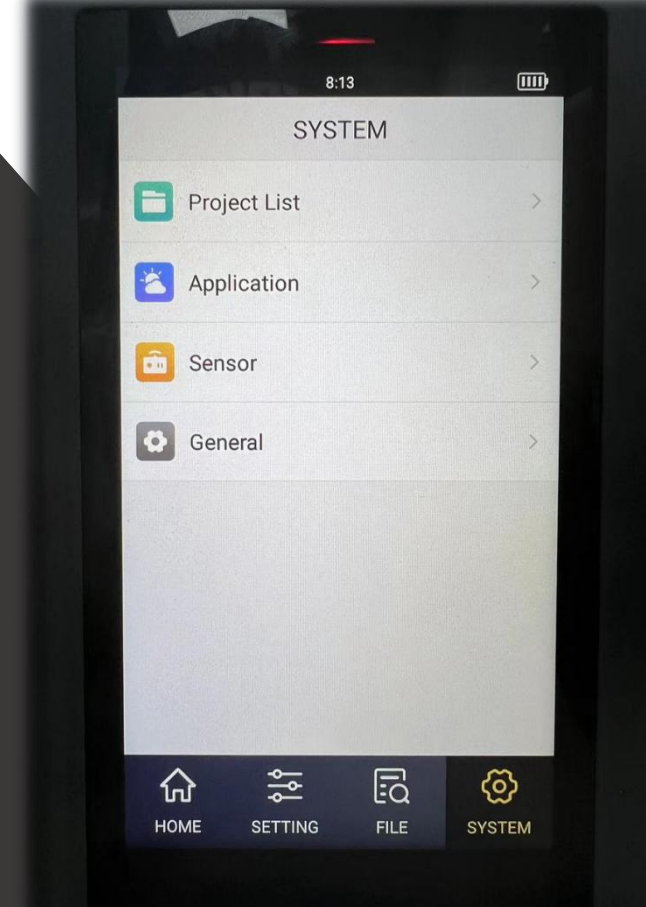
## 3.2. Onboard Software



*HOME interface*

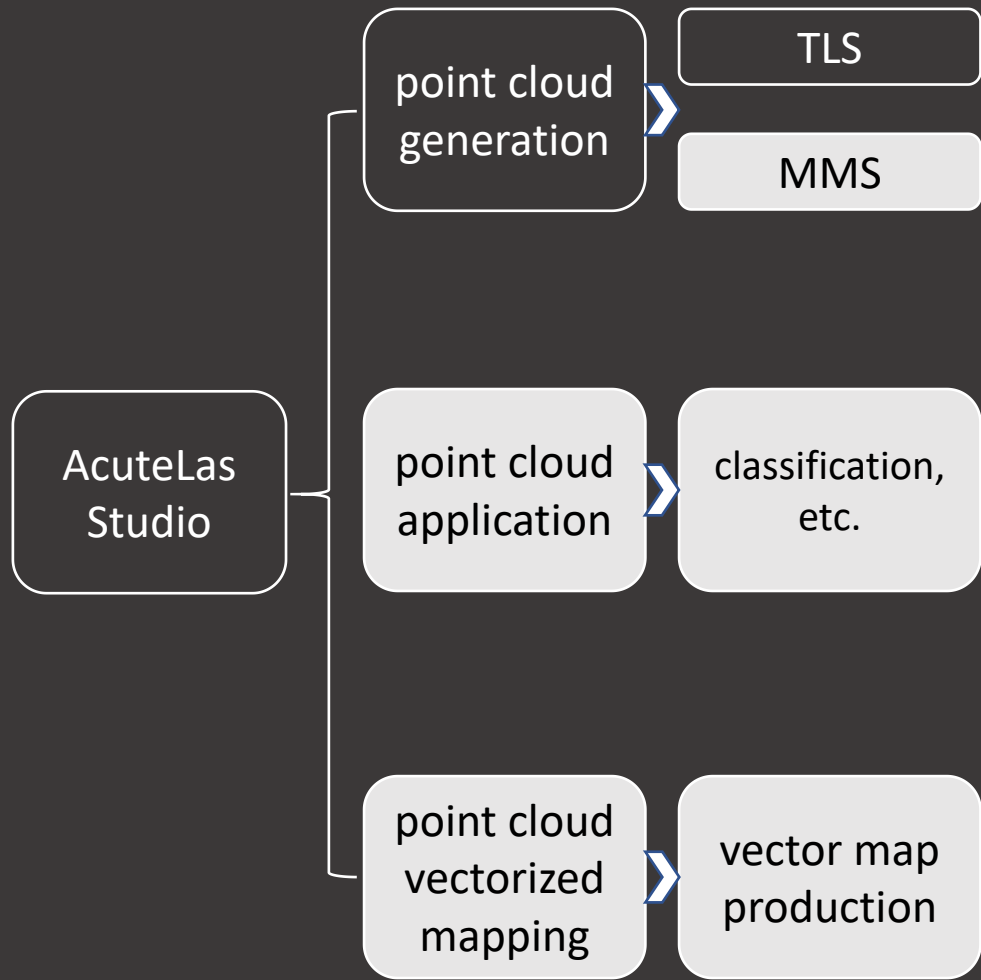


*SETTING menu*



*SYSTEM menu*

### 3.3. Post-processing Software

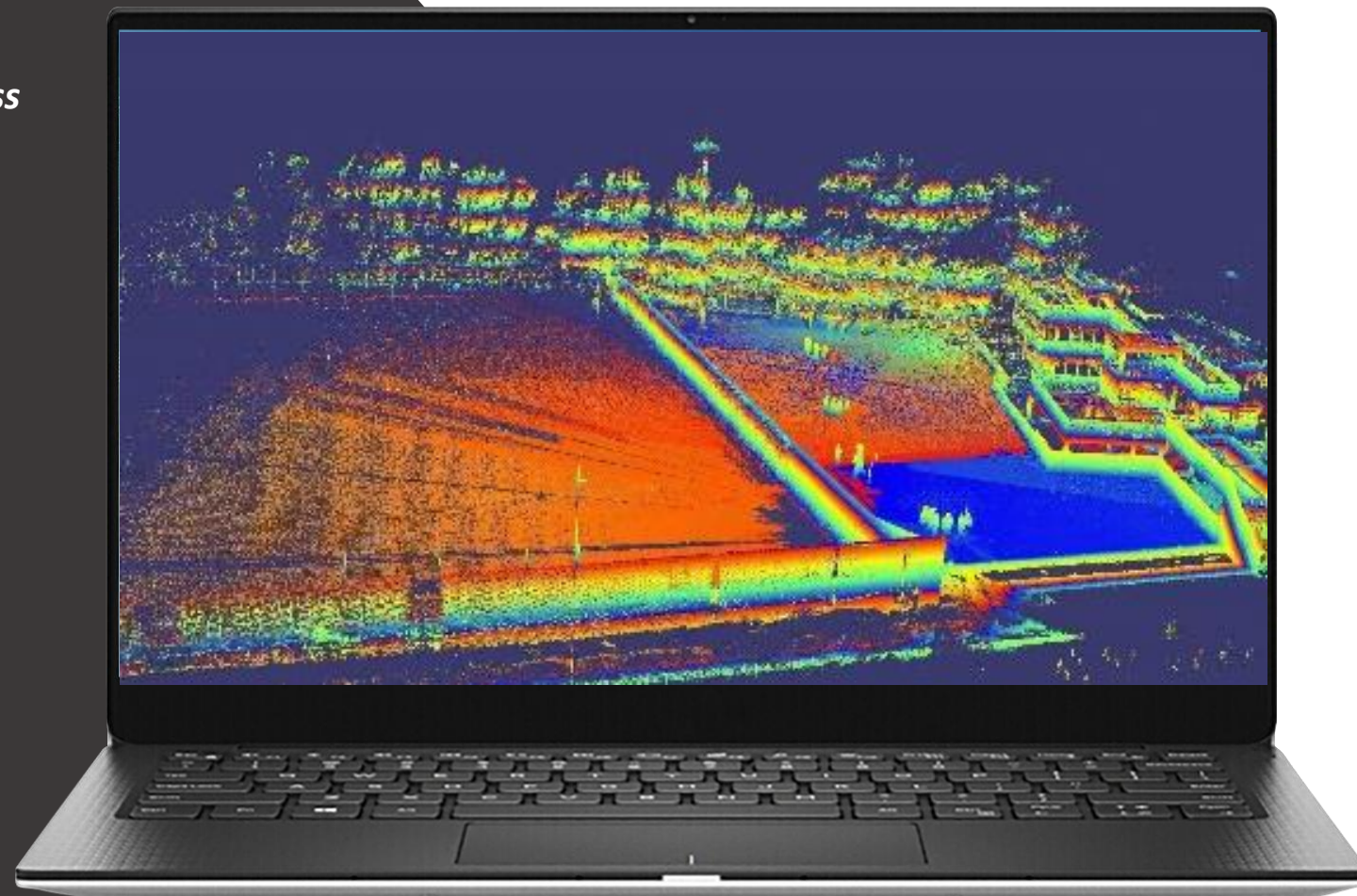


*Note: the white-box parts above are functional add-ins.*

**AcuteLas Studio**

### 3.3. Post-processing Software

- ✓ *TLS Data Pre-process*
- ✓ *MMS (UAV-based/SUV-based) Data Pre-process*
- ✓ *Point Cloud Classification*
- ✓ *Lasergrammetric Vectorized Mapping*
- ✓ *Building Elevational Drawing*
- ✓ *Volume Calculation*
- ✓ *Power Grid Inspection*
- ✓ *Sectional Data Extraction*
- ✓ *Underground Structure Calculation*
- ✓ *Auto Global Registration (las/e57/xyz)*
- *Point Cloud Correction*
- *Pano Image Registration*



**AcuteLas Studio**

## *4. AcuteLas Laser Scanner Data Quality Talk*



# 4.1. In Comparison with Faro S350

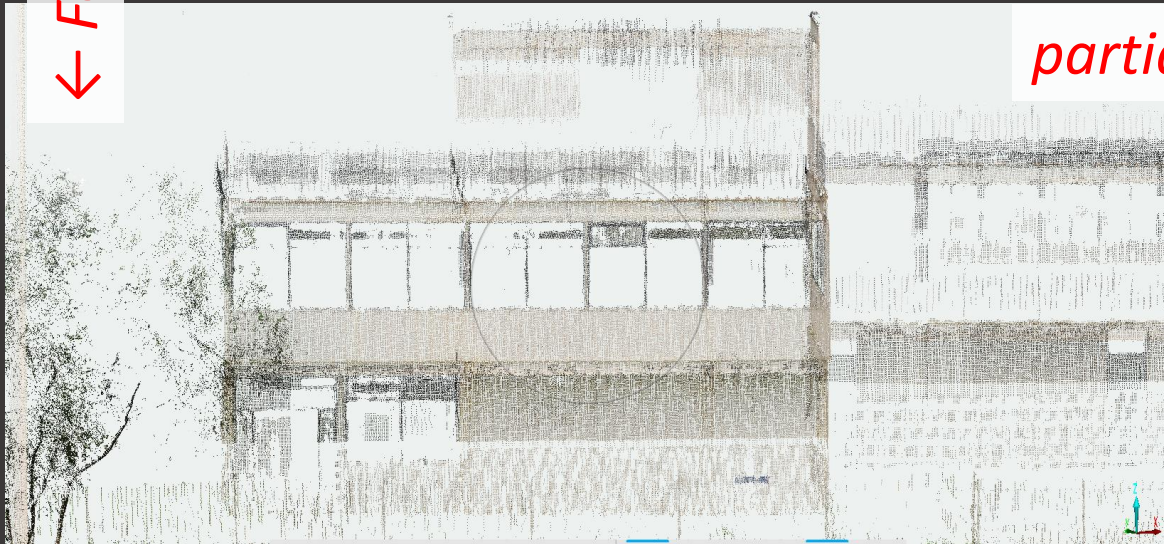


← Faro →

*global view*

← South →

4 scans (both), scan time (almost same, 90 sec), imaging time (Faro 1 min less)

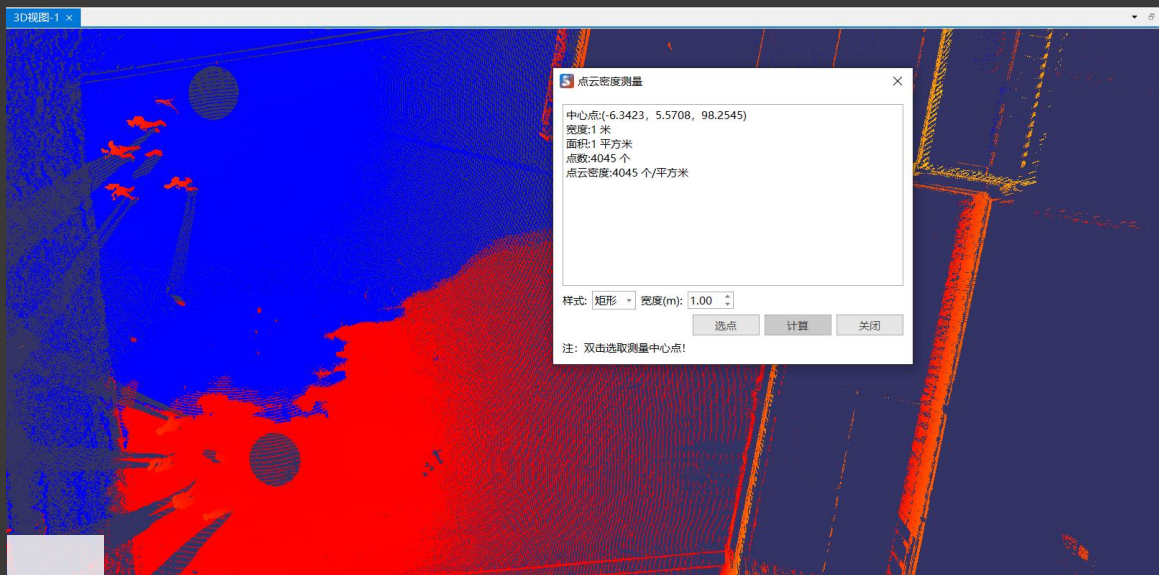


*partial view*



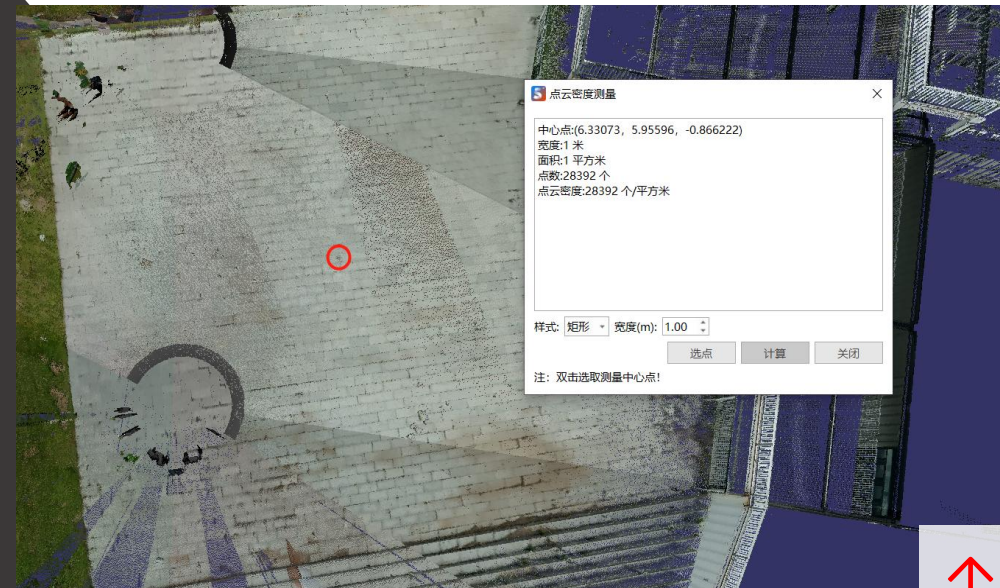


# 4.1. In Comparison with Faro S350



Faro: 4,000 pts/sq.m

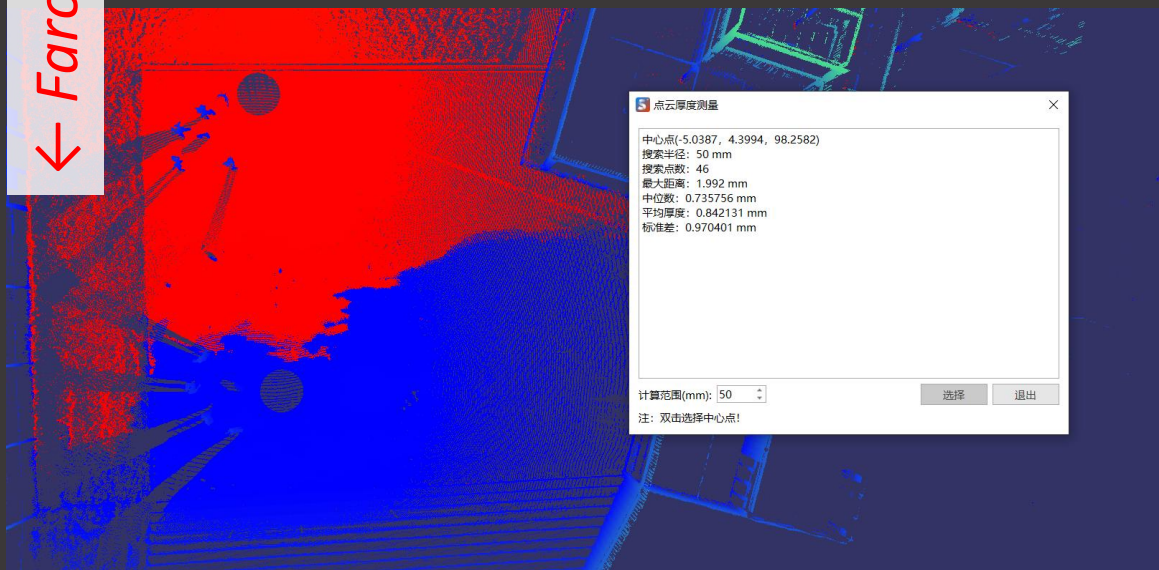
**Point Density**



SPL: 28,000 pts/sq.m

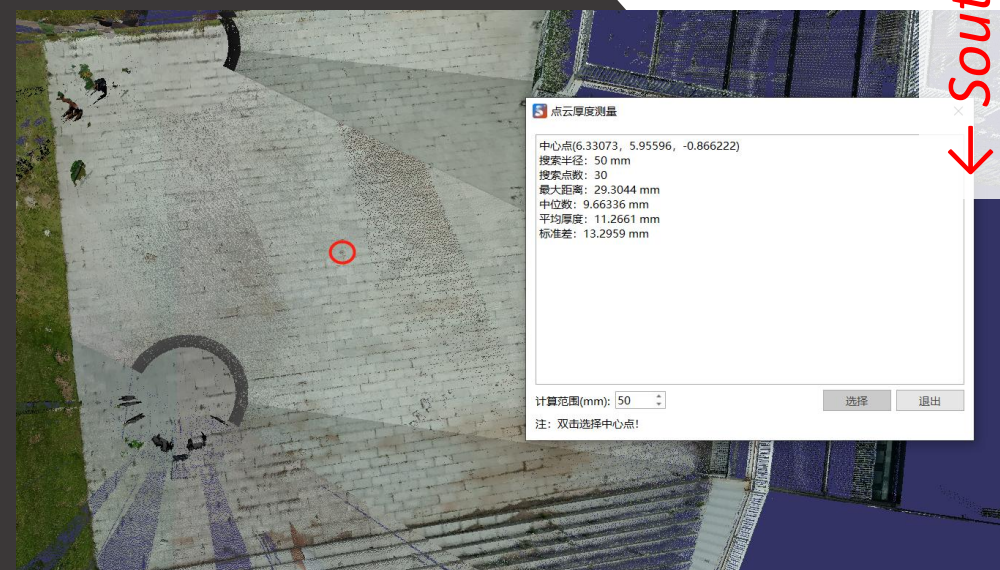
← Faro →

← South →



Faro: within 2mm

**Point Cloud Thickness**



SPL: 6-10mm

## 4.1. In Comparison with Faro S350

*In last 2 slides, we may conclude that SPL-1500 enjoys*

- 1) longer measuring range (features outside the fence could be obtained as well, so it's good for larger scenes due to effective scan range)*
- 2) higher point density (better representation in details due to higher point rate, but Faro Premium series has recently increased to 2,000,000 pts per second)*
- 3) at the same level in terms of point cloud thickness, millimeter-level (5mm is almost the top of pulse laser scanners)*



# 4.2. In Comparison with Riegl VZ400i

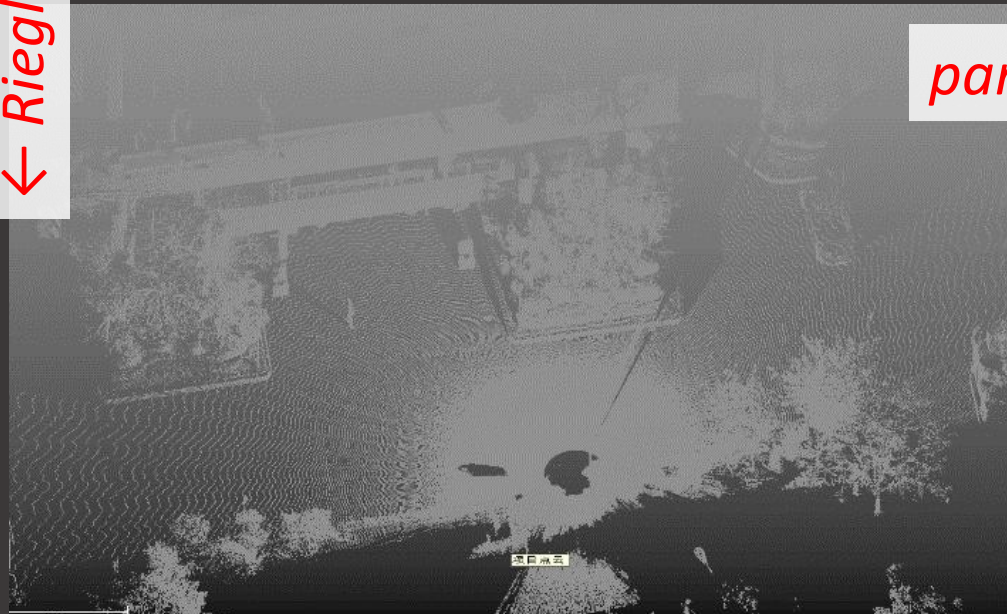


*global view*



← Riegl →

← South →



*partial view*



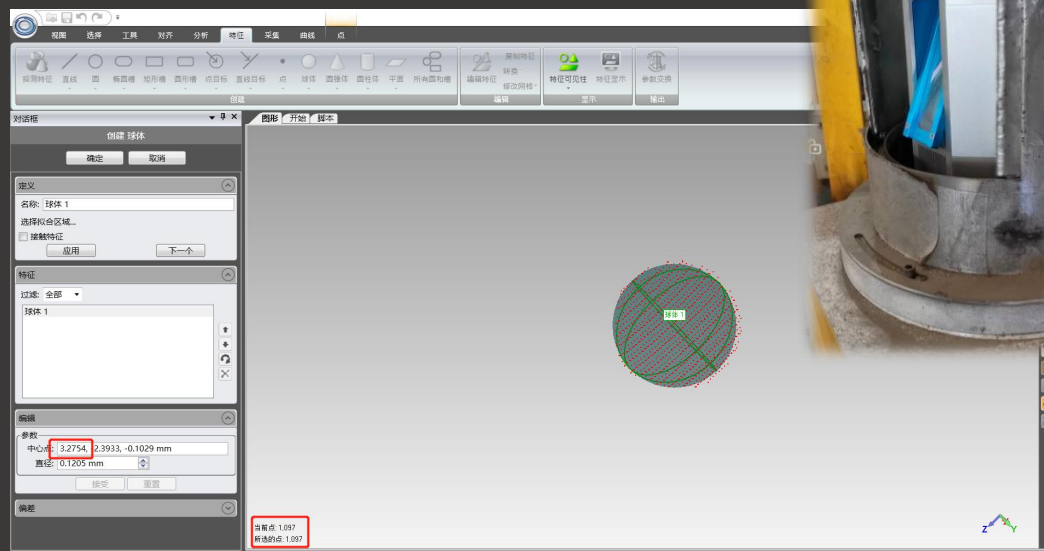


## 4.2. In Comparison with Riegl VZ400i

*In last slide, we may conclude that SPL-1500 enjoys*

- 1) higher point density (see red polygon parts, better representation in details due to higher point rate, but that was an old Riegl model from several years ago)*
- 2) almost no difference in terms of point cloud effect in the long distance*
- 3) similar time consumed in scanning (Riegl, 3 min and 18 sec; South, 3 min and 10 sec)*

### 4.3. In Comparison with Hi-target Customized for Steelworks

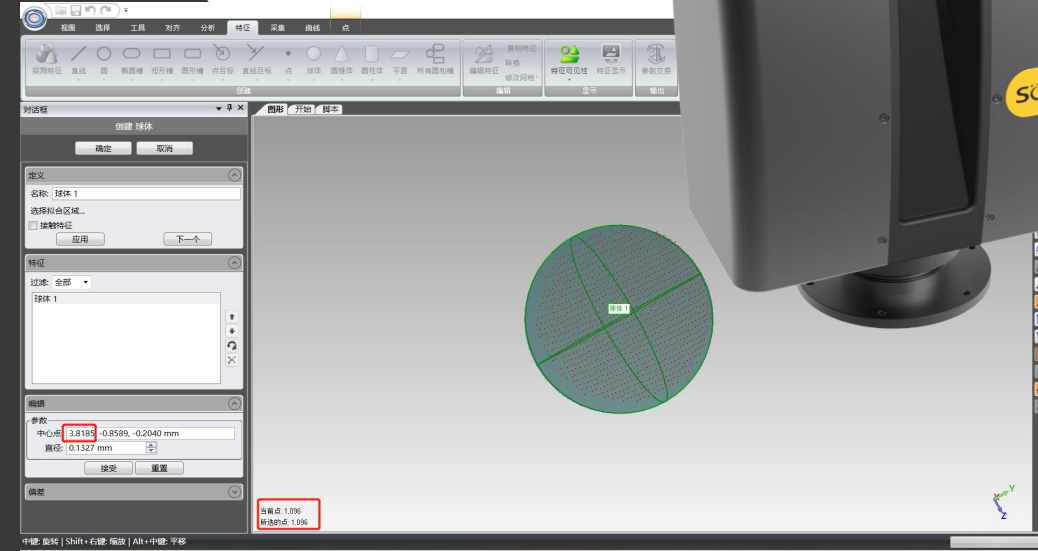


@3.27m, obtained points on sphere: 1097

```

3.2751, -2.3937, -0.1031, 2.9459, -2.4285, -0.0996
3.2740, -2.3925, -0.1044, 2.9470, -2.4289, -0.1012
3.2761, -2.3939, -0.1031, 2.9482, -2.4300, -0.1006
3.2744, -2.3929, -0.1041, 2.9465, -2.4286, -0.1009
3.2743, -2.3932, -0.1042, 2.9463, -2.4287, -0.1010
3.2765, -2.3940, -0.1041, 2.9496, -2.4302, -0.1013
3.2767, -2.3951, -0.1046, 2.9484, -2.4301, -0.1018
3.2736, -2.3922, -0.1039, 2.9450, -2.4278, -0.1006
3.2737, -2.3930, -0.1032, 2.9449, -2.4281, -0.0999
3.2738, -2.3928, -0.1034, 2.9459, -2.4286, -0.1000
    
```

max. error-of-fit 4.7mm



@3.81m, obtained points on sphere: 1096

```

3.8182, -0.8585, -0.2044
3.8174, -0.8583, -0.2041
3.8177, -0.8585, -0.2041
3.8187, -0.8590, -0.2046
3.8174, -0.8582, -0.2039
3.8191, -0.8585, -0.2041
3.8188, -0.8586, -0.2040
3.8185, -0.8586, -0.2040
3.8169, -0.8587, -0.2038
3.8174, -0.8587, -0.2039
3.8174, -0.8585, -0.2040
3.8183, -0.8590, -0.2040
3.8187, -0.8586, -0.2038
3.8187, -0.8587, -0.2040
3.8185, -0.8589, -0.2040
    
```

max. error-of-fit 2.2mm

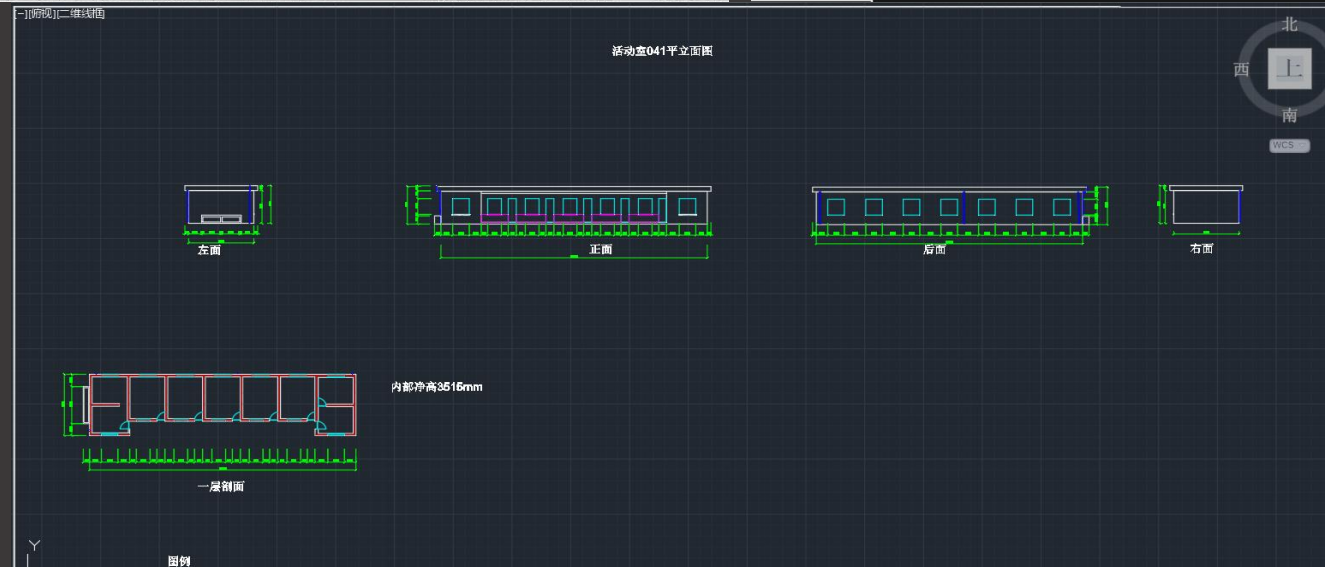
### 4.3. In Comparison with Hi-target Customized for Steelworks

*In last slide, we may conclude that SPL-1500 enjoys*

- 1) almost same points obtained but in the longer distance (in other words, point density at the same distance is better)*
- 2) better accuracy performance (on the same conditions of manual correction)*

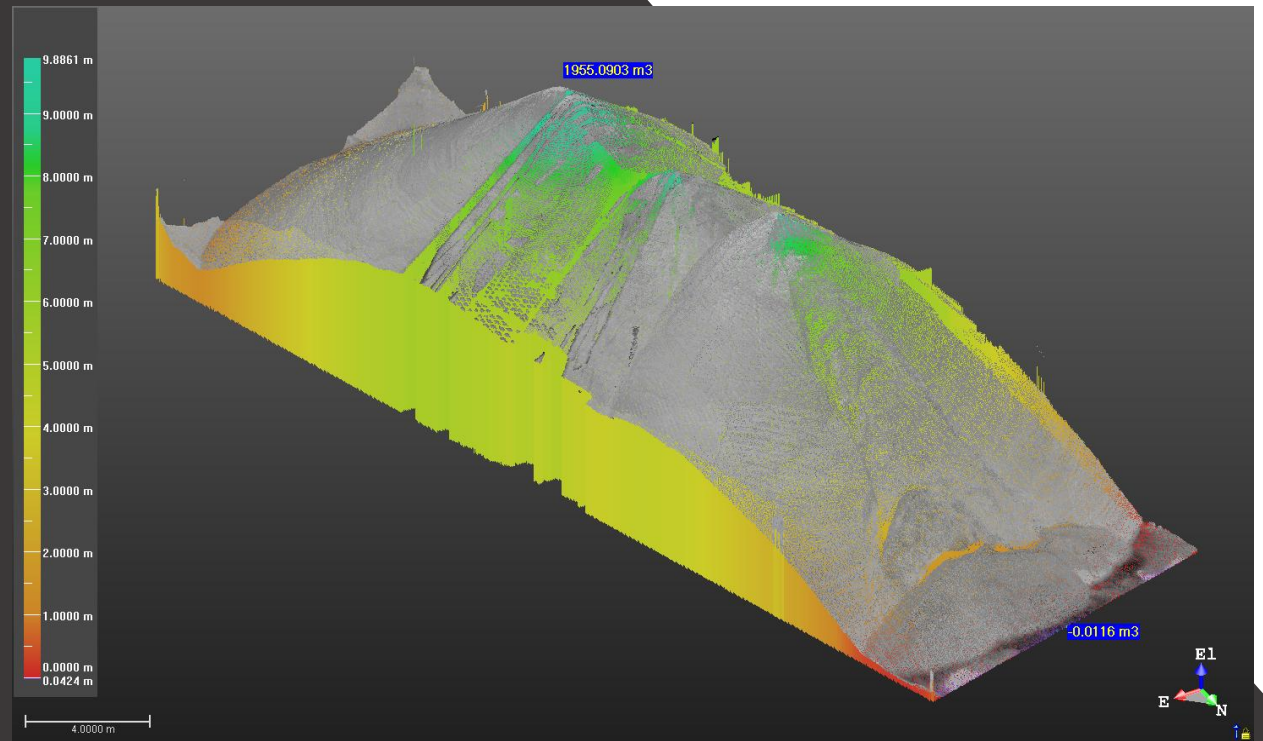
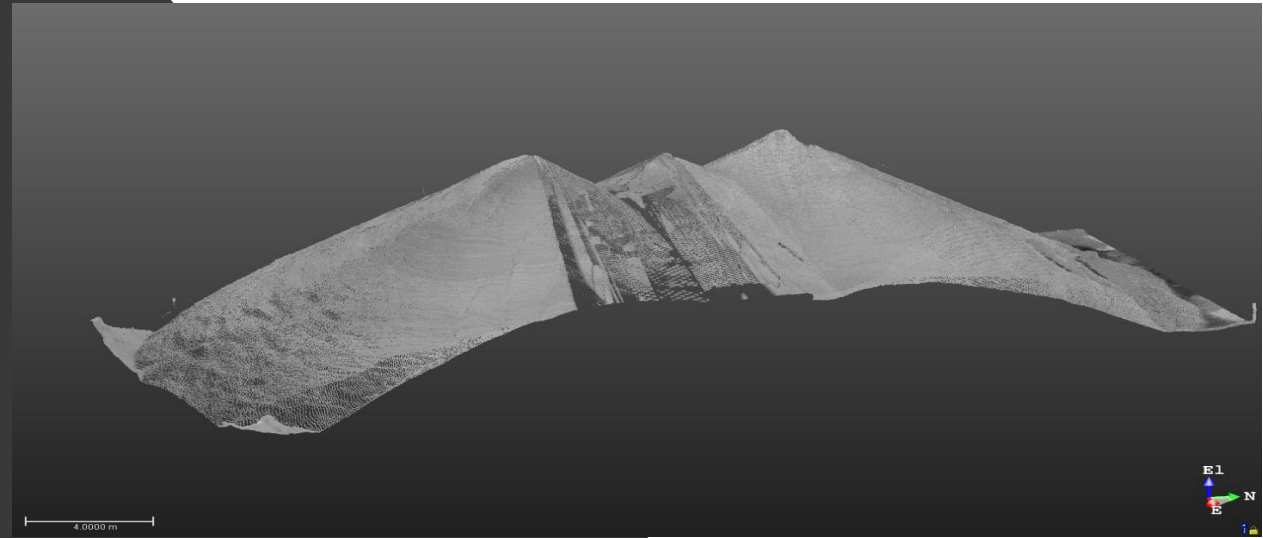
## *5. AcuteLas Laser Scanner Applications*

# 5.1. Building Elevational Surveying

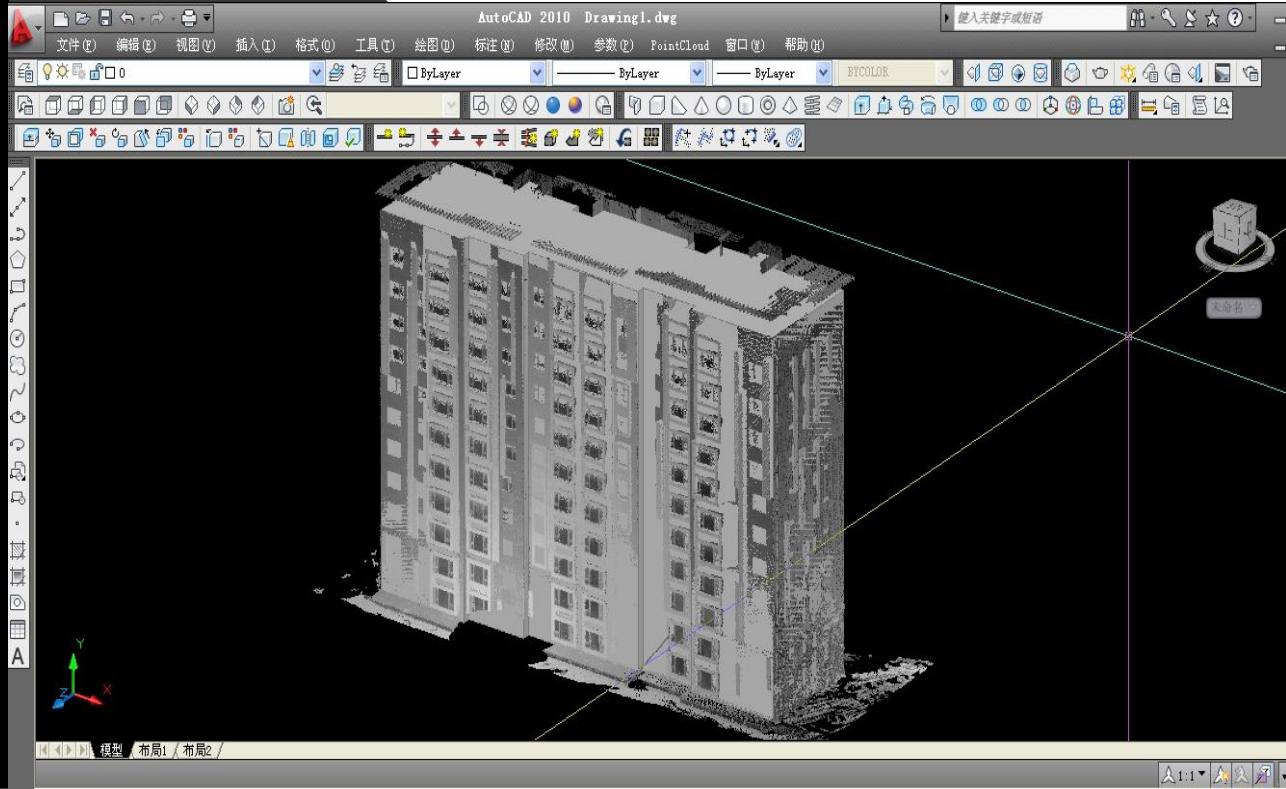




# 5.2. Stockpile Volume Calculation

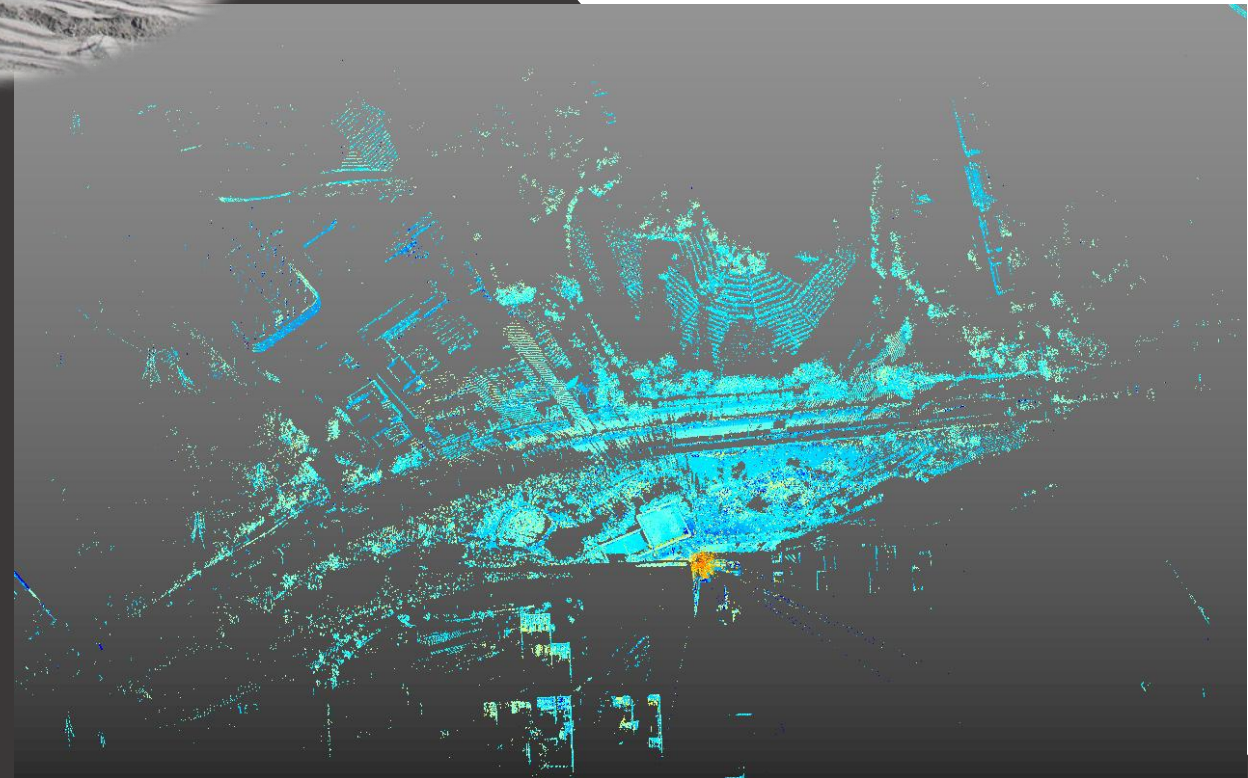
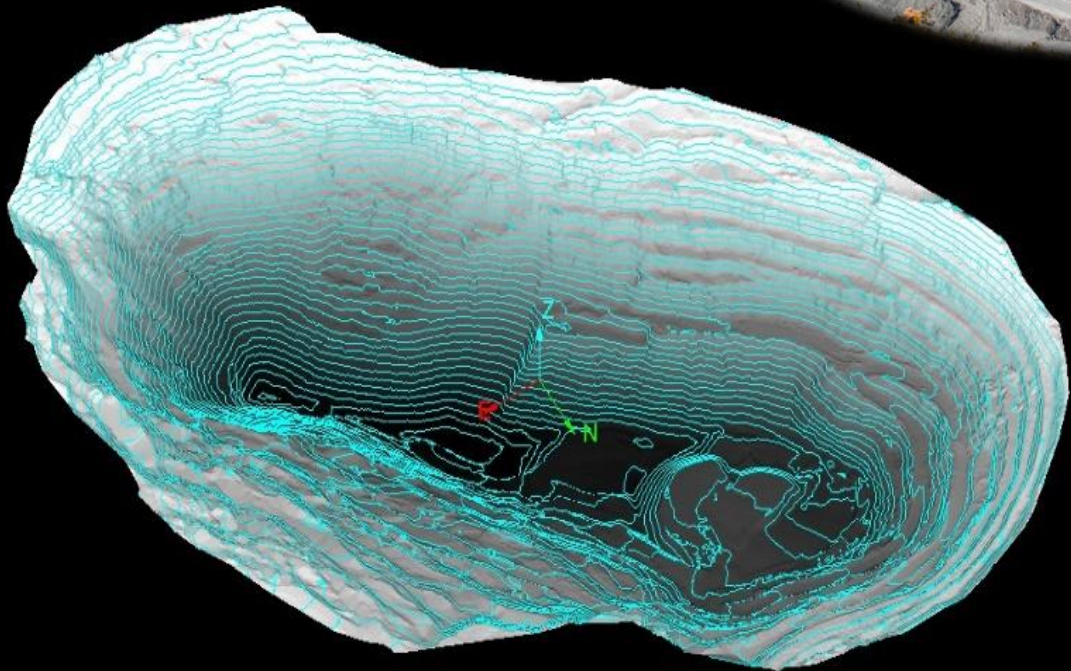


# 5.3. BIM Modeling



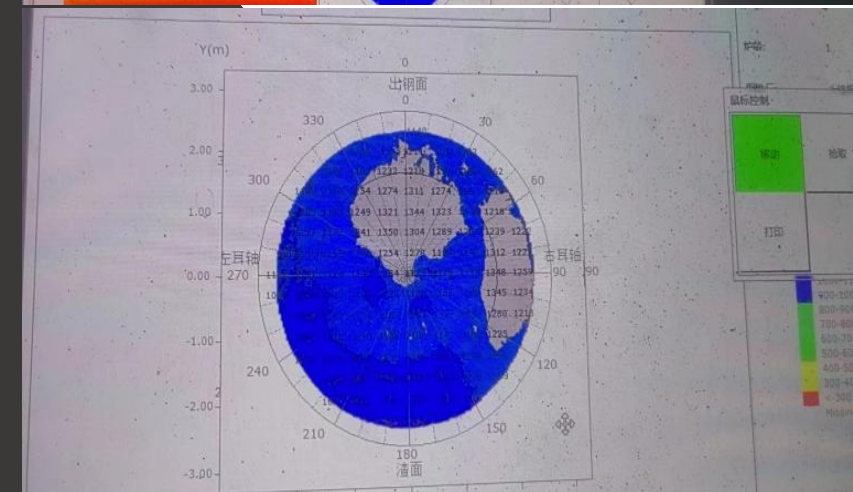
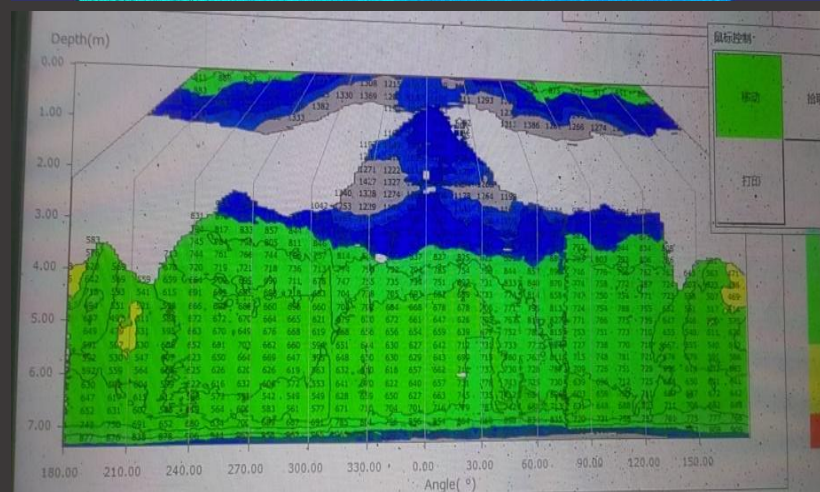
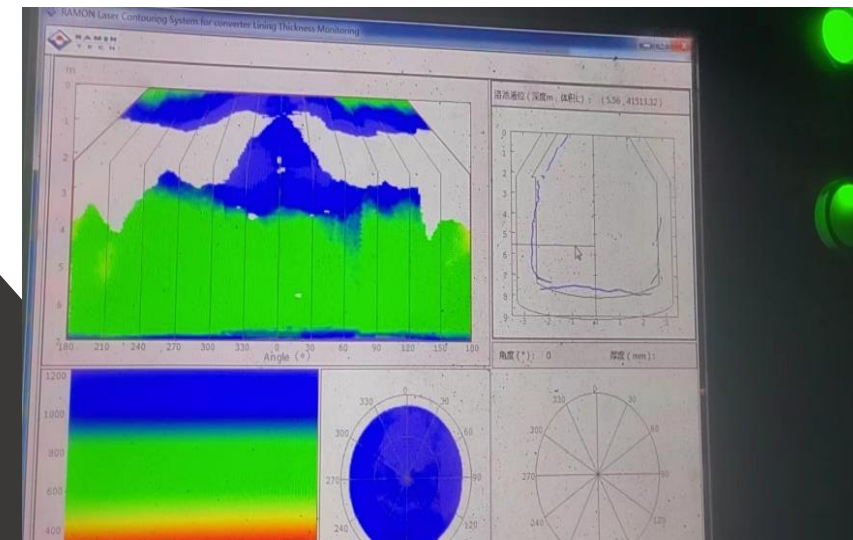
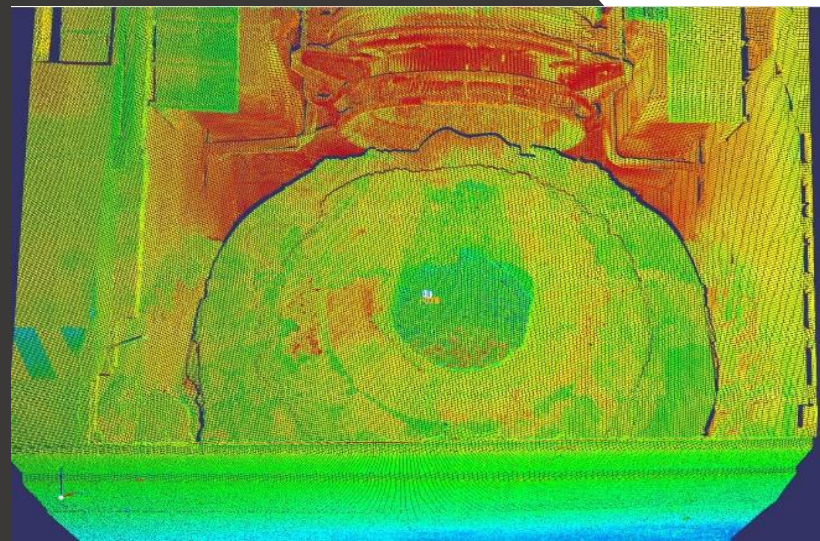


## 5.4. Open-pit Mining Digitization





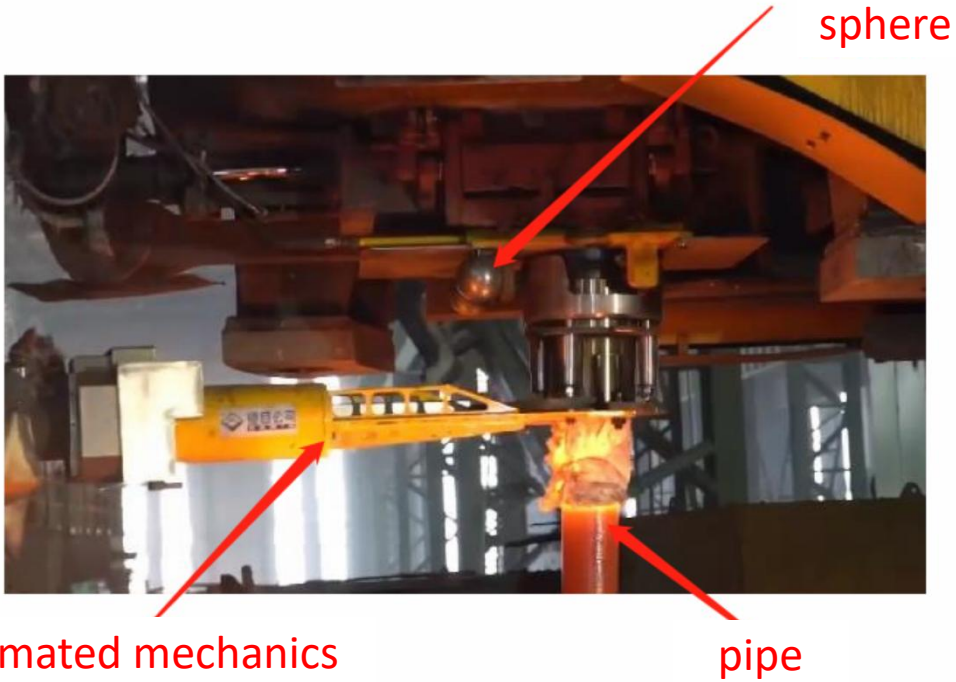
## 5.5. Customized for Steelworks (1)



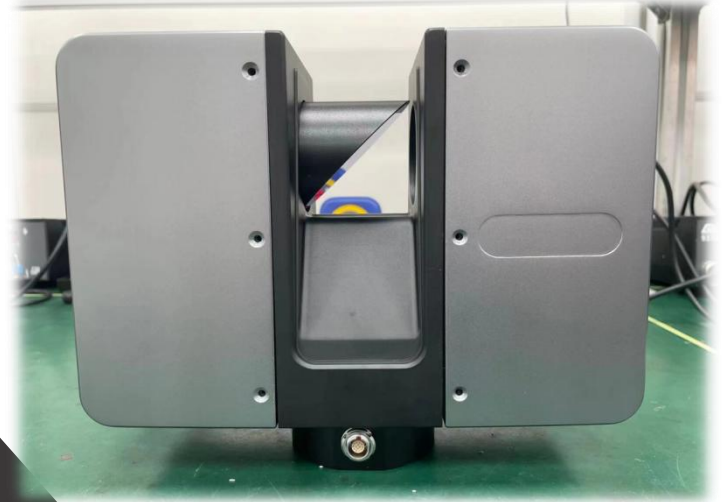
To scan 45° left, 90° face and 45° right of the furnace and obtain point cloud of furnace inner. The thickness change analysis of fireproof tiles would be used for furnace maintenance.



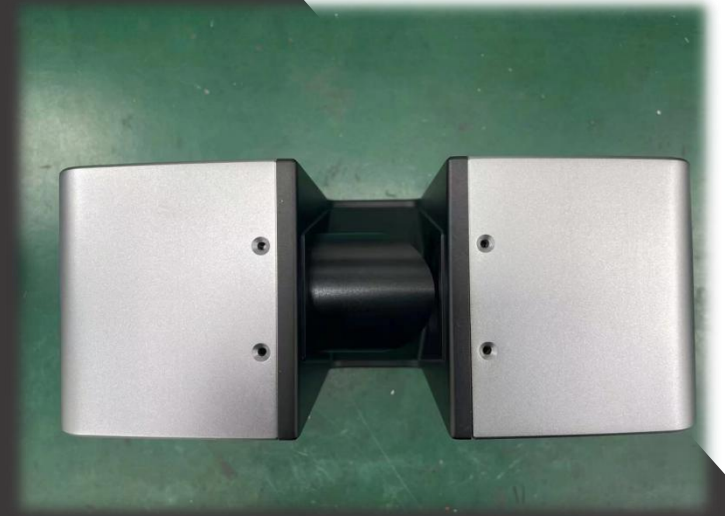
# 5.5. Customized for Steelworks (2)



automated steel water pouring



based on SPL-1500,  
IP 64, lighter and smaller,  
suited to tough working  
conditions



## 5.6. Target Clients

- ✔ *Educational Sectors (majors in geodesy, civil engineering, water resources, mining, etc.)*
- ✔ *Traditional Surveying Companies*
- ✔ *Water Reservation Institutes*
- ✔ *Mining Companies*
- ✔ *Consulting Companies*



*Thank you!*

