

Perry Victory Photogrammetry Report

Processing Report

28 June 2024



Survey Data

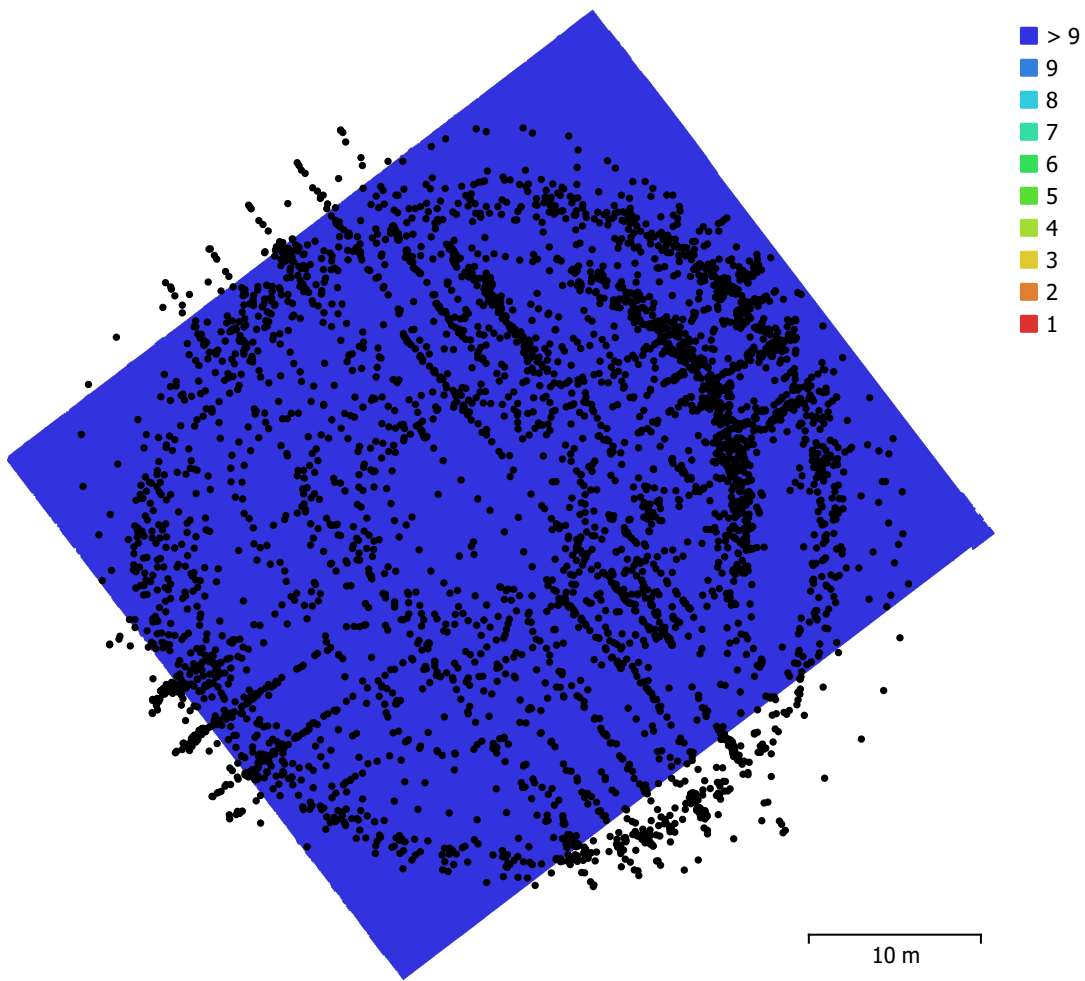


Fig. 1. Camera locations and image overlap.

Number of images:	4,816	Camera stations:	4,756
Flying altitude:	12.5 m	Tie points:	3,948,438
Ground resolution:	9.99 mm/pix	Projections:	8,656,823
Coverage area:	1.64e+03 m ²	Reprojection error:	0.378 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
VT300-Z_50 (9.8mm)	9248 x 6944	9.8 mm	0.797 x 0.797 μm	No
VT300-L_93 (7.74mm)	8192 x 6144	7.74 mm	1.64 x 1.64 μm	No

Table 1. Cameras.

Camera Calibration

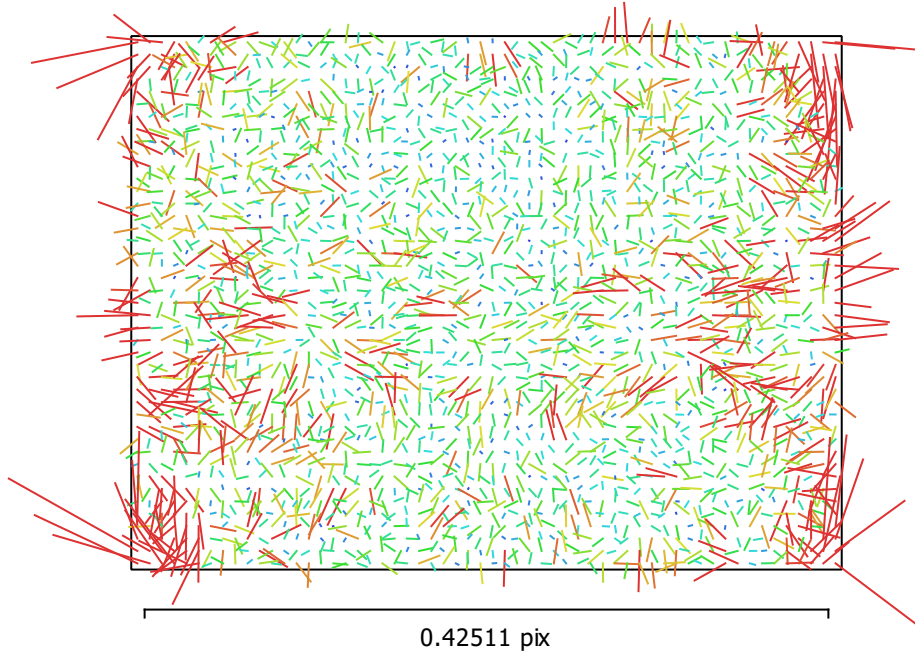


Fig. 2. Image residuals for VT300-Z_50 (9.8mm).

VT300-Z_50 (9.8mm)

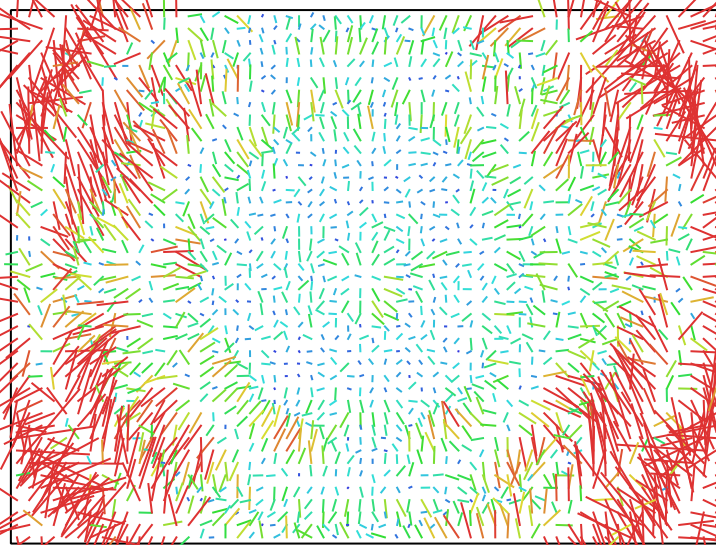
3424 images, additional corrections

Type	Resolution	Focal Length	Pixel Size
Frame	9248 x 6944	9.8 mm	0.797 x 0.797 μm

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	12334.6	0.63	1.00	0.01	0.01	-0.12	0.00	-0.99	0.98	-0.96	0.94	0.02	0.01
Cx	-19.189	0.25		1.00	0.01	-0.01	0.00	-0.02	0.02	-0.02	0.02	0.97	0.00
Cy	-6.14544	0.23			1.00	0.00	-0.01	-0.01	0.01	-0.01	0.02	0.01	0.95
B1	0.148925	0.041				1.00	-0.01	0.11	-0.11	0.11	-0.11	-0.01	0.02
B2	-0.403849	0.028					1.00	0.00	-0.00	0.00	-0.00	-0.01	-0.02
K1	0.405194	0.0016						1.00	-1.00	0.99	-0.97	-0.02	-0.01
K2	-3.30397	0.018							1.00	-1.00	0.99	0.02	0.01
K3	8.83268	0.087								1.00	-1.00	-0.02	-0.01
K4	-3.90293	0.16									1.00	0.02	0.01
P1	-1.16221e-05	9.5e-06										1.00	0.00
P2	-0.000294913	8.6e-06											1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration



0.900098 pix

Fig. 3. Image residuals for VT300-L_93 (7.74mm).

VT300-L_93 (7.74mm)

1342 images, additional corrections

Type	Resolution	Focal Length	Pixel Size
Frame	8192 x 6144	7.74 mm	1.64 x 1.64 μm

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	4956.7	0.51	1.00	0.03	-0.01	-0.21	0.01	-0.99	0.97	-0.93	0.88	0.03	-0.01
Cx	-52.5575	0.082		1.00	-0.01	-0.02	-0.02	-0.03	0.03	-0.02	0.02	0.95	-0.00
Cy	-8.84879	0.084			1.00	-0.01	-0.04	0.01	-0.01	0.01	-0.00	-0.00	0.93
B1	-0.0280342	0.023				1.00	-0.02	0.20	-0.20	0.19	-0.17	-0.03	0.03
B2	0.384144	0.013					1.00	-0.01	0.01	-0.01	0.01	-0.01	-0.05
K1	-0.067152	0.00066						1.00	-0.99	0.97	-0.93	-0.02	0.01
K2	0.266077	0.0016							1.00	-0.99	0.97	0.02	-0.01
K3	-0.331693	0.0017								1.00	-0.99	-0.01	0.01
K4	0.136287	0.00067									1.00	0.00	-0.00
P1	0.000291216	9.7e-06										1.00	-0.00
P2	0.000206376	9.5e-06											1.00

Table 3. Calibration coefficients and correlation matrix.

Camera Locations

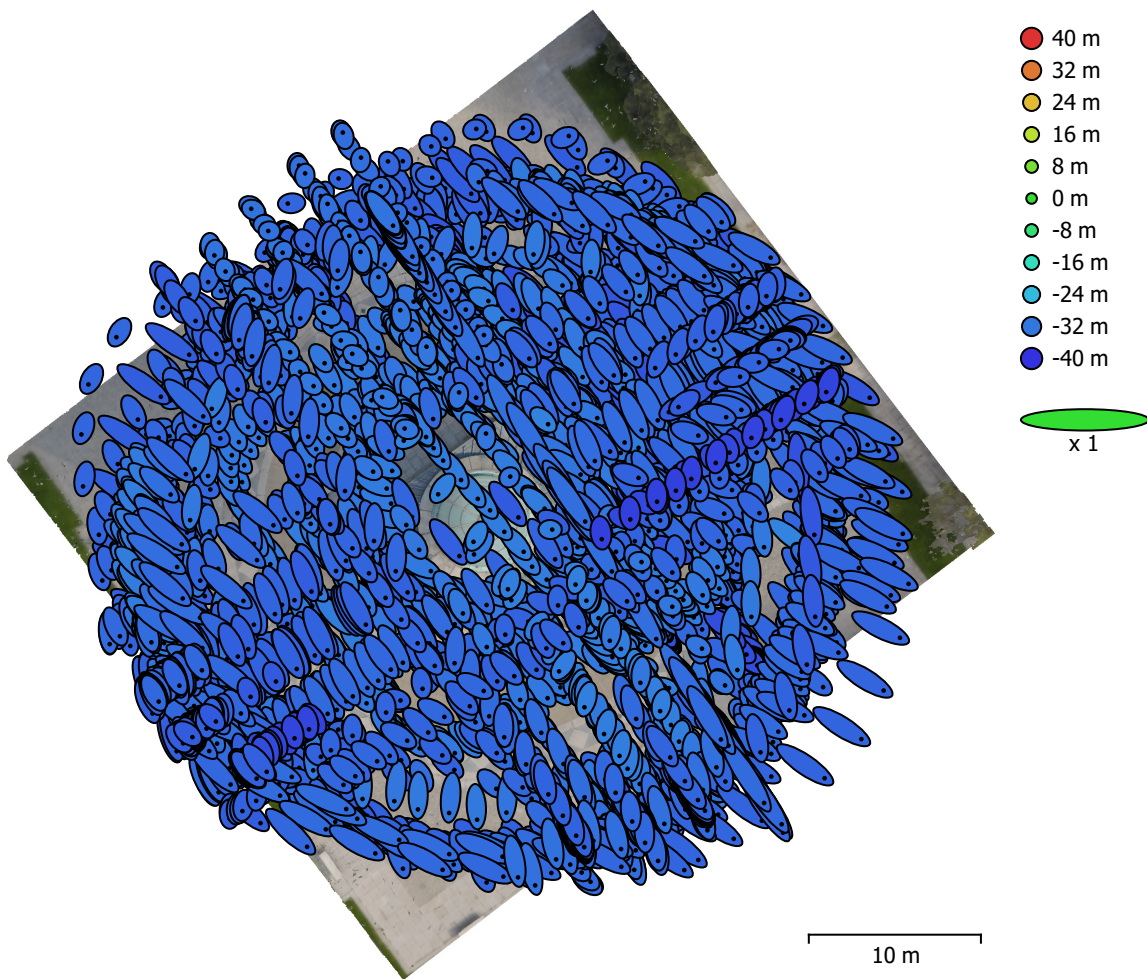


Fig. 4. Camera locations and error estimates.

Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
 Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	Z error (m)	XY error (m)	Total error (m)
0.989551	1.17896	33.7367	1.5392	33.7718

Table 4. Average camera location error.
 X - Easting, Y - Northing, Z - Altitude.

Ground Control Points

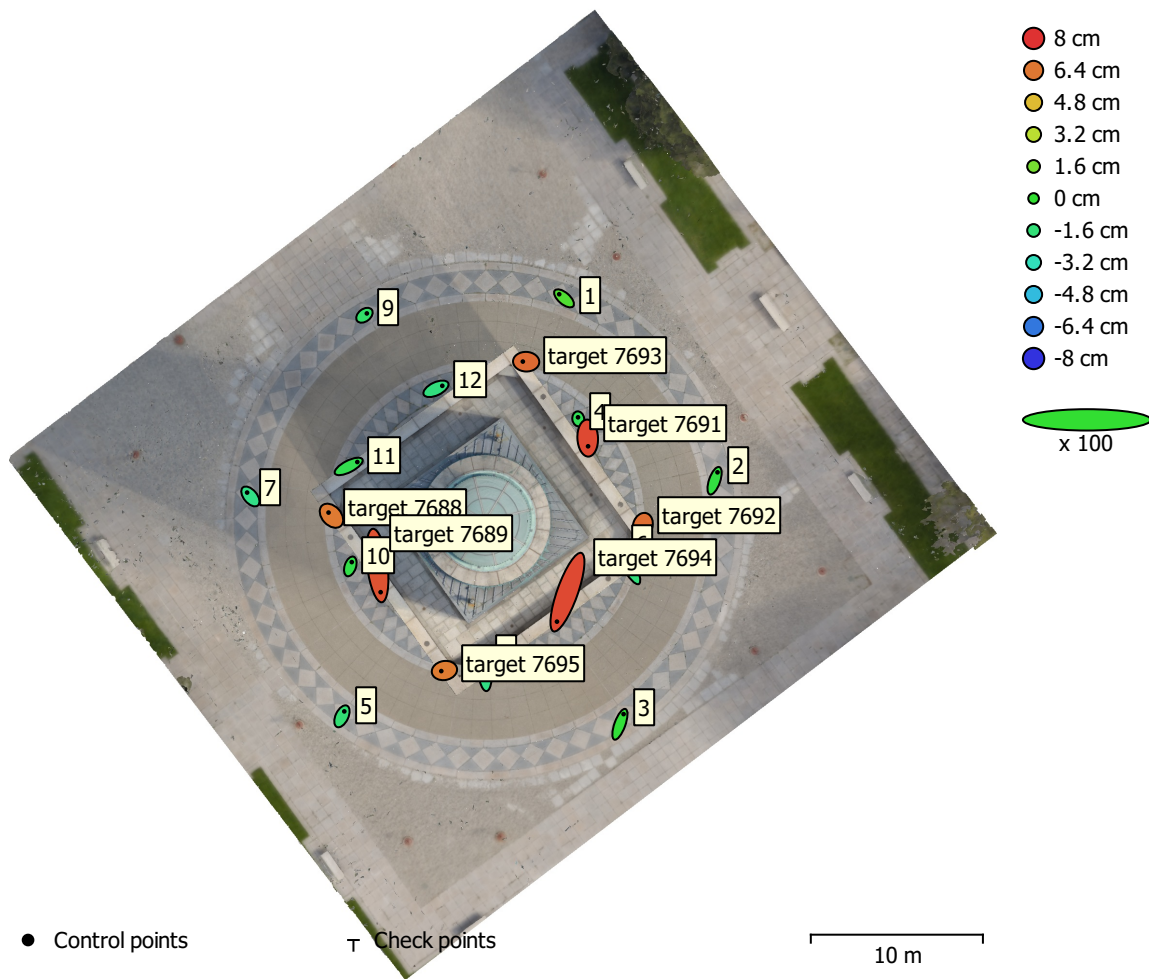


Fig. 5. GCP locations and error estimates.

Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.

Estimated GCP locations are marked with a dot or crossing.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
19	0.531841	1.284	4.303	1.38978	4.52187

Table 5. Control points RMSE.

X - Easting, Y - Northing, Z - Altitude.

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
1	-0.559246	0.478961	0.67731	1.00045	2.297 (6)
2	0.340157	0.976801	-0.345968	1.09066	0.685 (7)
3	0.42962	1.18498	-0.155842	1.27005	1.166 (6)
4	-0.0269748	0.185227	-0.884997	0.904576	3.461 (8)
5	0.272897	0.570091	-1.51908	1.64532	1.151 (8)
6	-0.909298	1.70068	-1.66475	2.54765	4.311 (11)
7	-0.378018	0.450085	-1.98547	2.07064	0.807 (6)
8	-0.12234	1.45353	-1.90649	2.40051	5.131 (7)
9	0.278751	0.213525	-1.2801	1.32739	1.155 (9)
10	0.168346	0.501096	-0.530503	0.748914	0.496 (8)
11	1.00294	0.513706	-0.668204	1.31007	0.891 (8)
12	0.738272	0.347643	-1.77655	1.955	1.036 (9)
target 7688	-0.339741	0.366563	6.3286	6.3483	1.056 (52)
target 7689	0.383346	-3.09655	7.24508	7.88839	0.378 (5)
target 7691	0.0432579	-0.951922	7.46253	7.52312	3.395 (52)
target 7692	-0.0955862	-0.326902	6.61123	6.62	3.158 (30)
target 7693	-0.385497	0.0157597	6.71074	6.72182	2.689 (66)
target 7694	-1.21999	-3.42748	7.46182	8.30149	2.299 (13)
target 7695	-0.366019	-0.0657583	6.29157	6.30255	1.380 (56)
Total	0.531841	1.284	4.303	4.52187	2.438

Table 6. Control points.
X - Easting, Y - Northing, Z - Altitude.

Digital Elevation Model

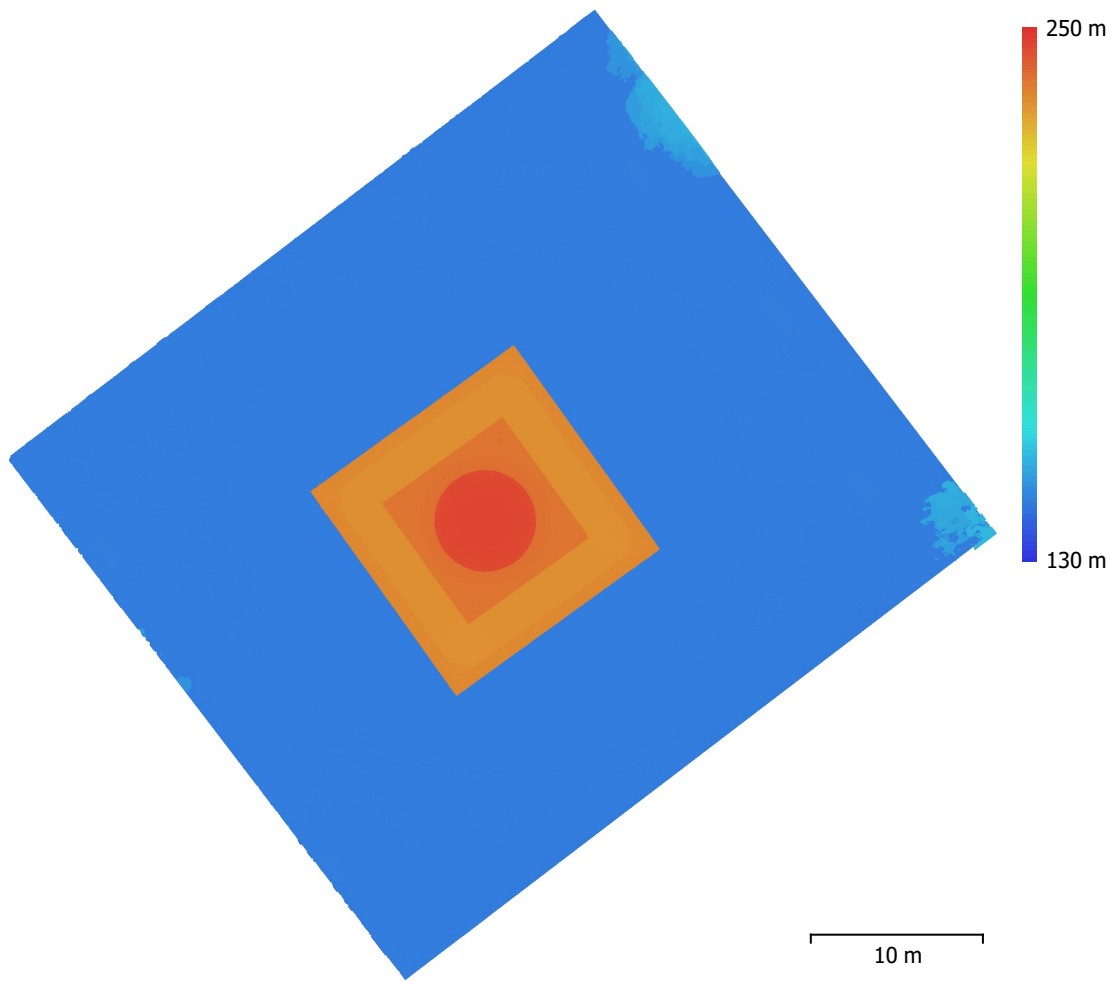


Fig. 6. Reconstructed digital elevation model.

Resolution: 3.43 mm/pix
Point density: 8.48 points/cm²

Processing Parameters

General

Cameras	4766
Aligned cameras	4756
Markers	19
Coordinate system	NAD83(2011) / UTM zone 17N (EPSG::6346)
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	3,948,438 of 18,495,522
RMS reprojection error	0.141461 (0.378151 pix)
Max reprojection error	5.52046 (10.5439 pix)
Mean key point size	2.53057 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.31546

Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	60,000
Key point limit per Mpx	1,000
Tie point limit	0
Exclude stationary tie points	No
Guided image matching	No
Adaptive camera model fitting	No
Matching time	42 minutes 36 seconds
Matching memory usage	5.49 GB
Alignment time	3 hours 15 minutes
Alignment memory usage	22.04 GB

Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k4, p1, p2
Fit additional corrections	Yes
Adaptive camera model fitting	No
Optimization time	1 minutes 10 seconds
Date created	2024:06:13 08:28:50
Software version	2.1.1.17821
File size	1.33 GB

Point Cloud

Points	78,451,709
Coordinate precision	2.5 mm

Point attributes

Color	3 bands, uint8
Normal	
Confidence	1 - 254

Point classes

Created (never classified)	78,451,709
File size	1.29 GB

Model

Faces	241,814,584
Vertices	121,323,278
Vertex colors	3 bands, uint8

Texture	10,000 x 10,000, 4 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	4 hours 58 minutes
Memory usage	10.97 GB
Reconstruction parameters	
Surface type	Arbitrary
Source data	Depth maps
Interpolation	Enabled
Strict volumetric masks	No
Processing time	5 hours 59 minutes
Memory usage	27.71 GB
Texturing parameters	
Mapping mode	Adaptive orthophoto
Blending mode	Average
Texture size	10,000
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	22 minutes 0 seconds
UV mapping memory usage	22.18 GB
Blending time	8 hours 7 minutes
Blending memory usage	22.16 GB
Date created	2024:06:14 18:46:14
Software version	2.1.1.17821
File size	10.77 GB
System	
Software name	Agisoft Metashape Professional
Software version	2.1.1 build 17821
OS	Windows 64 bit
RAM	127.75 GB
CPU	13th Gen Intel(R) Core(TM) i9-13900KS
GPU(s)	NVIDIA GeForce RTX 4090