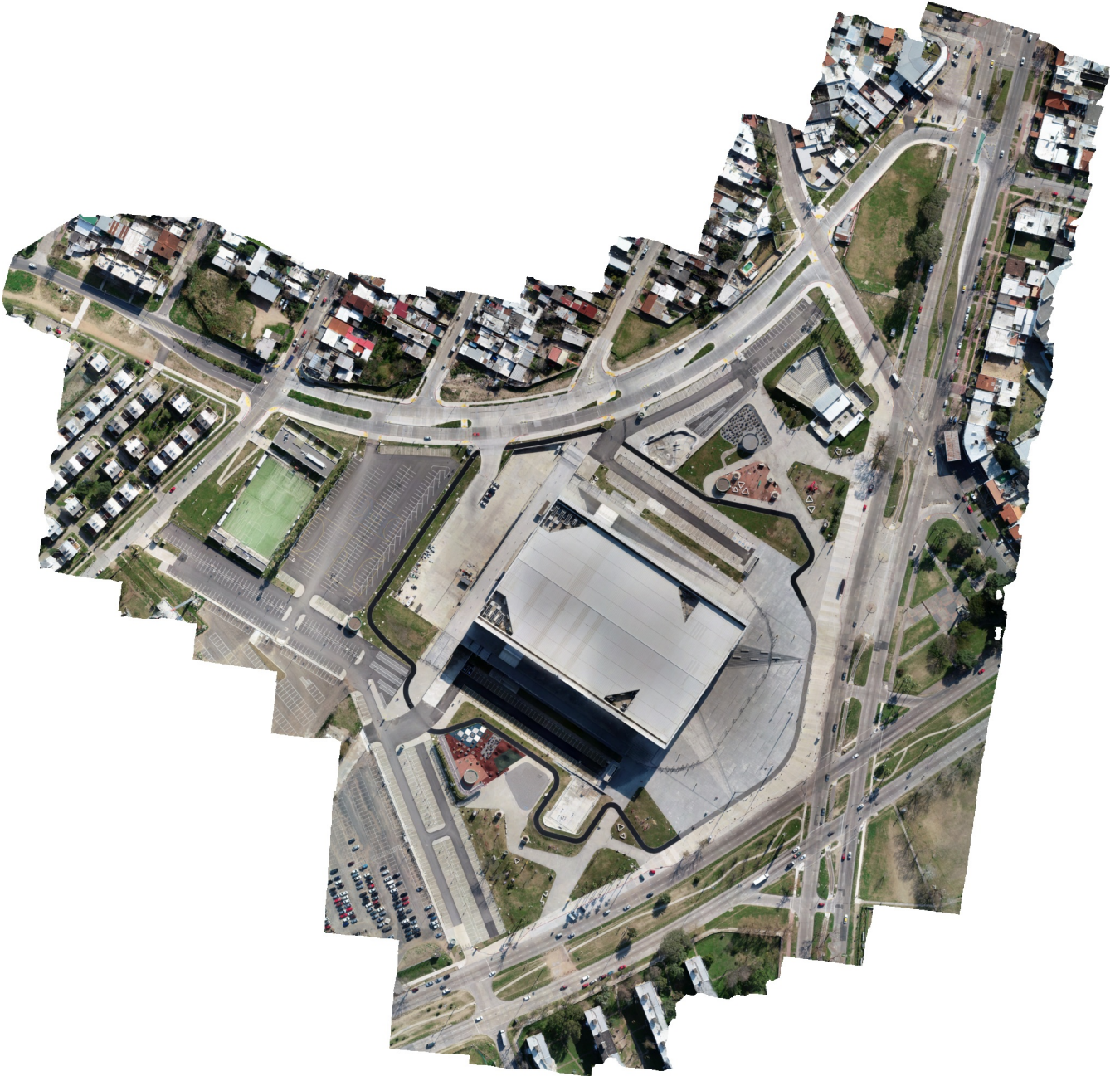


Antel Arena

Processing Report
27 September 2021



Survey Data

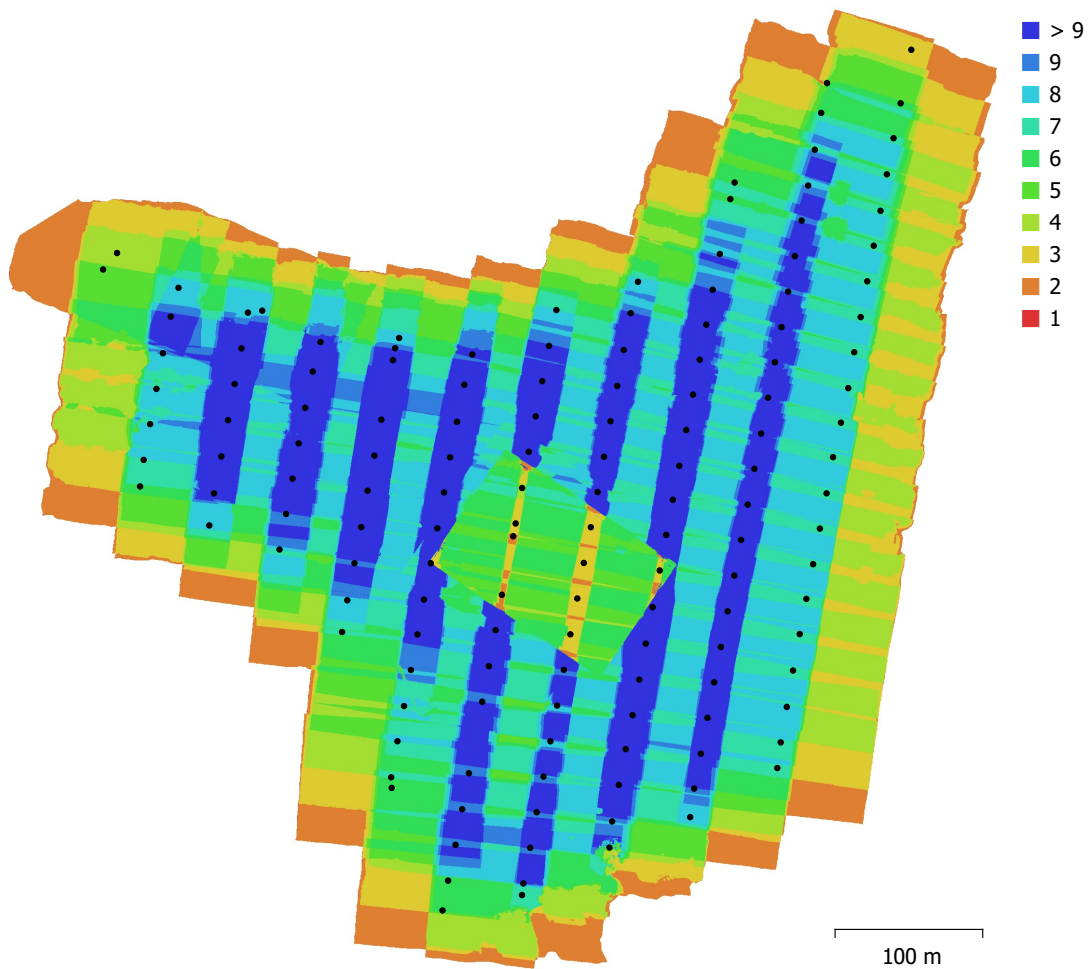


Fig. 1. Camera locations and image overlap.

Number of images:	147	Camera stations:	147
Flying altitude:	99.8 m	Tie points:	138,170
Ground resolution:	2.54 cm/pix	Projections:	542,424
Coverage area:	0.252 km ²	Reprojection error:	0.695 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
FC6310 (8.8mm)	4864 x 3648	8.8 mm	2.61 x 2.61 μ m	No

Table 1. Cameras.

Camera Calibration

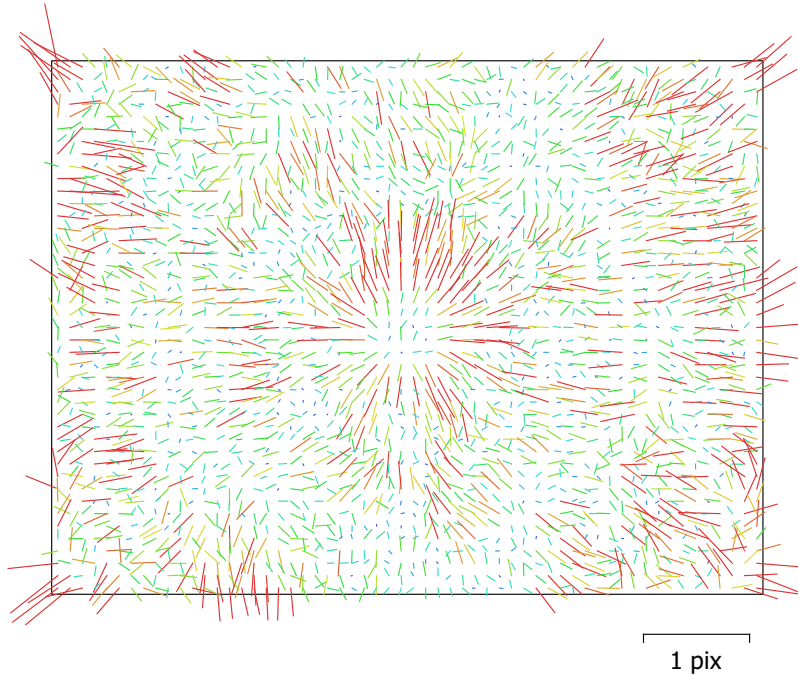


Fig. 2. Image residuals for FC6310 (8.8mm).

FC6310 (8.8mm)

147 images

Type
Frame

Resolution
4864 x 3648

Focal Length
8.8 mm

Pixel Size
2.61 x 2.61 μm

	Value	Error	F	Cx	Cy	B2	K1	K2	K3	P1	P2
F	3556.62	1.9	1.00	-0.01	0.02	0.04	0.21	-0.40	0.54	-0.01	-0.09
Cx	-4.71593	0.08		1.00	-0.01	-0.02	0.01	-0.01	0.01	0.33	-0.01
Cy	15.5743	0.057			1.00	-0.05	0.01	-0.01	0.01	-0.01	0.44
B2	-0.560422	0.016				1.00	0.00	-0.01	0.02	0.02	-0.05
K1	0.0059157	4e-05					1.00	-0.95	0.87	-0.01	-0.01
K2	-0.0252093	0.00014						1.00	-0.98	0.01	0.03
K3	0.0239668	0.00015							1.00	-0.01	-0.05
P1	-0.000153665	2.7e-06								1.00	-0.01
P2	-0.000372819	2.9e-06									1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

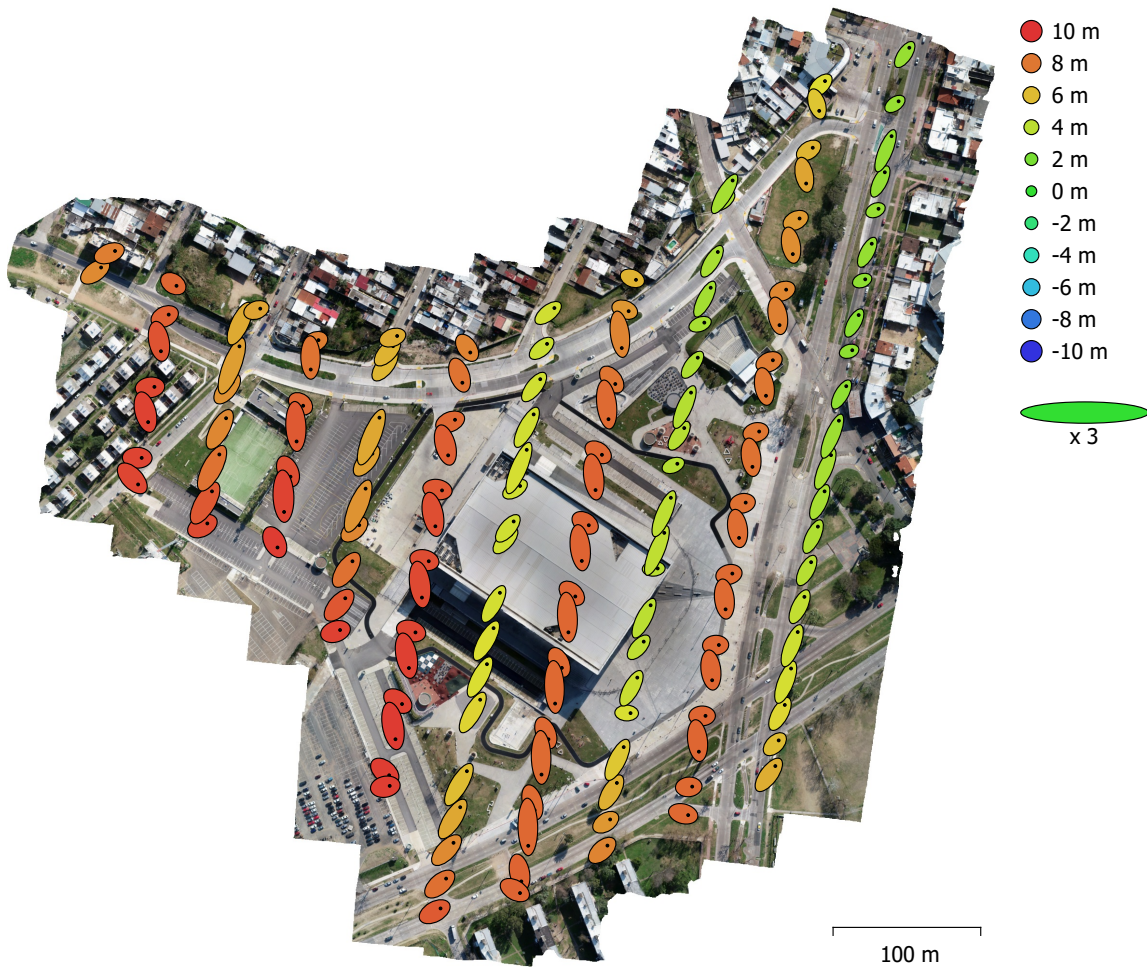


Fig. 3. Camera locations and error estimates.

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)
2.13266	4.15731	7.06078	4.67241	8.46677

Table 3. Average camera location error.

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

Ground Control Points

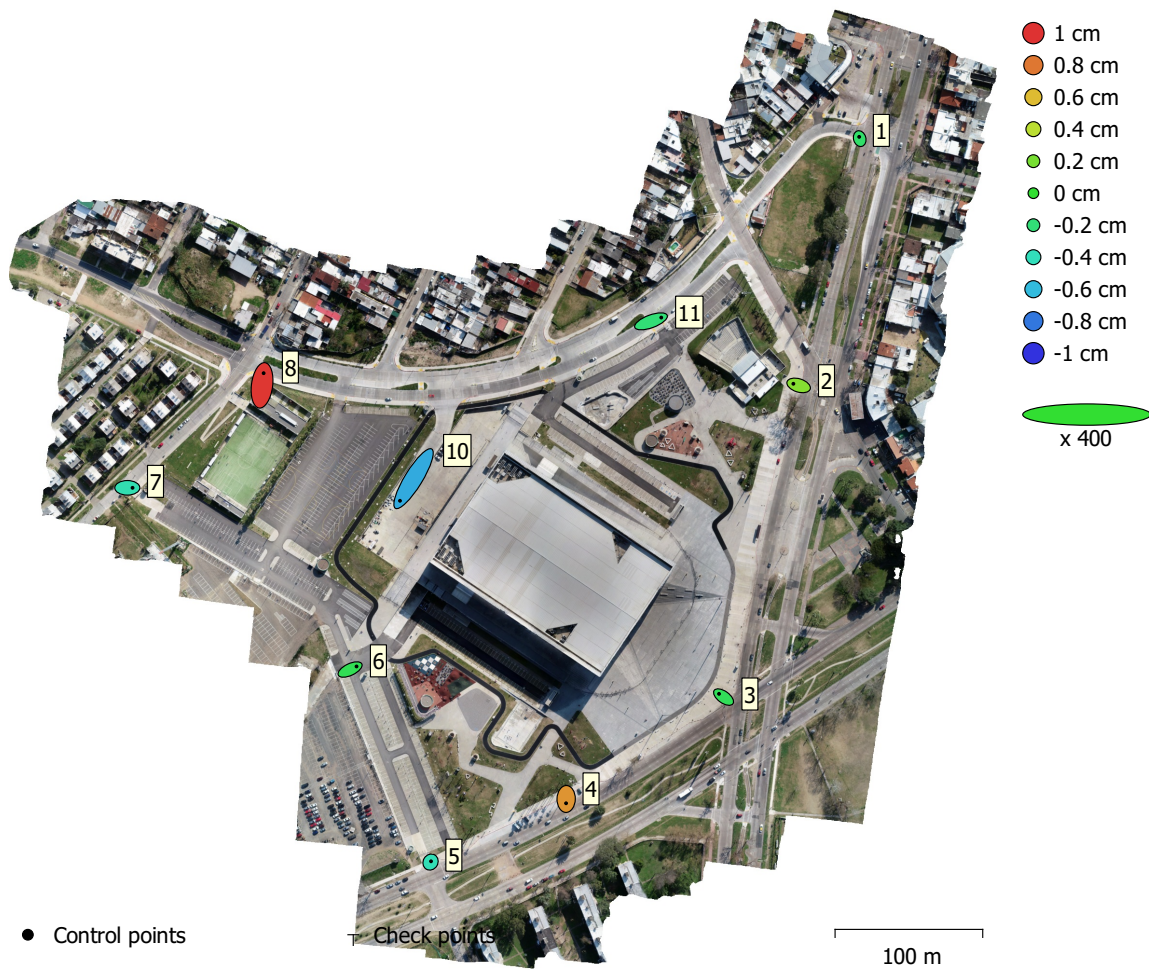


Fig. 4. GCP locations and error estimates.

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)
10	2.16687	2.82605	0.483144	3.56117	3.59379

Table 4. Control points RMSE.

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

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
2	-1.7815	0.552977	0.244691	1.88133	0.187 (8)
3	-1.53428	1.09493	-0.113252	1.88831	0.253 (10)
4	-0.0313091	-1.45709	0.71424	1.62303	0.242 (8)
5	0.158265	0.258534	-0.380682	0.486627	0.182 (5)
6	2.18869	1.0411	-0.0987475	2.4257	0.277 (5)
7	1.77093	0.00200913	-0.365814	1.80832	0.129 (6)
8	0.535404	4.11968	0.986488	4.26984	0.297 (9)
10	-4.59851	-7.4908	-0.652251	8.81384	0.233 (8)
11	3.46524	1.28031	-0.198127	3.69951	0.303 (7)
1	-0.179423	0.603487	-0.158447	0.649227	0.177 (8)
Total	2.16687	2.82605	0.483144	3.59379	0.237

Table 5. Control points.
X - Easting, Y - Northing, Z - Altitude.

Digital Elevation Model

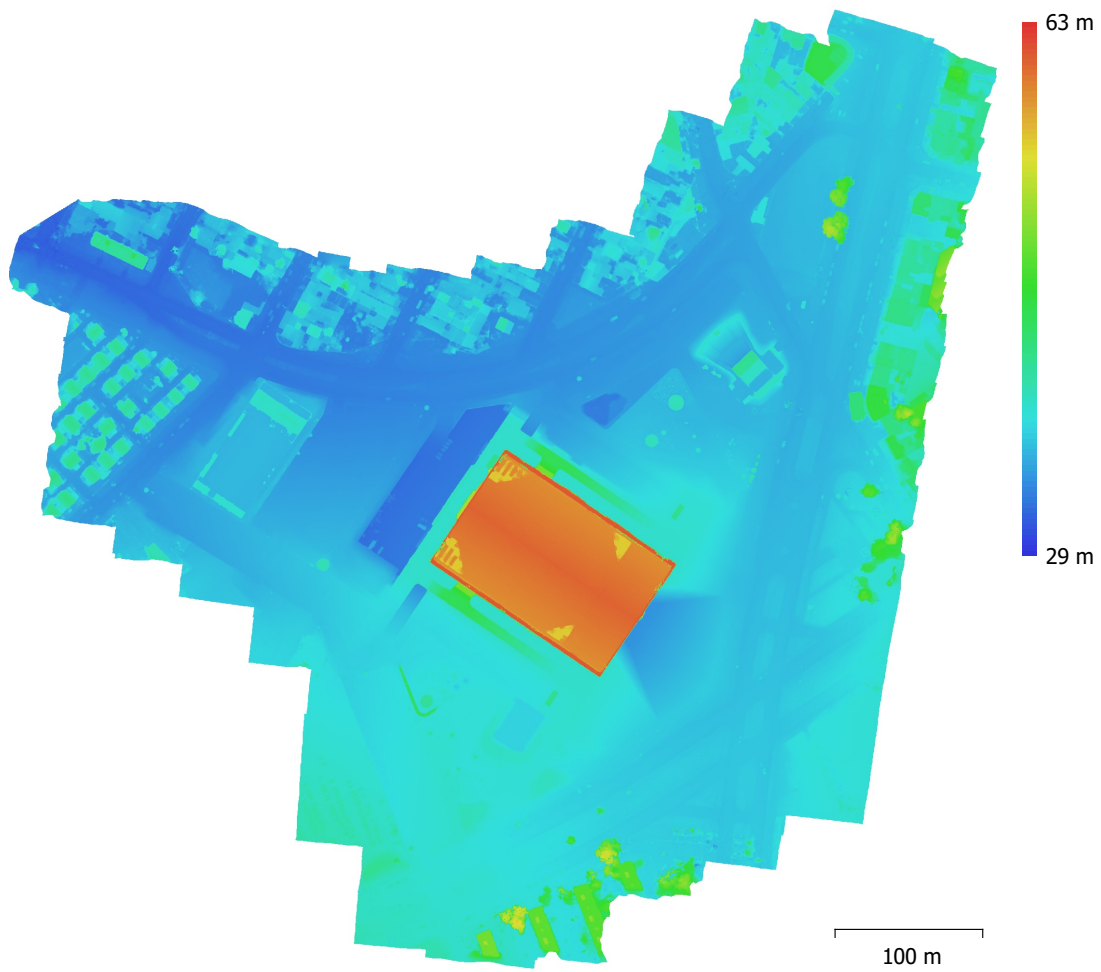


Fig. 5. Reconstructed digital elevation model.

Resolution: 5.08 cm/pix
Point density: 388 points/m²

Processing Parameters

General

Cameras	147
Aligned cameras	147
Markers	10
Coordinate system	WGS 84 / UTM zone 21S EGM08
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	138,170 of 149,832
RMS reprojection error	0.180619 (0.694755 pix)
Max reprojection error	0.825803 (25.7491 pix)
Mean key point size	3.93284 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.03405

Alignment parameters

Accuracy	High
Generic preselection	No
Reference preselection	Yes
Key point limit	40,000
Tie point limit	4,000
Adaptive camera model fitting	Yes
Matching time	5 minutes 16 seconds
Alignment time	48 seconds

Optimization parameters

Parameters	f, b2, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	4 seconds
File size	12.83 MB

Dense Point Cloud

Points	117,226,162
Point colors	3 bands, uint8

Depth maps generation parameters

Quality	High
Filtering mode	Aggressive
Processing time	14 minutes 7 seconds

Dense cloud generation parameters

Processing time	16 minutes 7 seconds
File size	1.50 GB

DEM

Size	20,928 x 20,112
Coordinate system	WGS 84 / UTM zone 21S EGM08

Reconstruction parameters

Source data	Dense cloud
Interpolation	Enabled
Processing time	3 minutes 36 seconds
File size	391.23 MB

Orthomosaic

Size	26,333 x 25,573
Coordinate system	WGS 84 / UTM zone 21S EGM08
Colors	3 bands, uint8

Reconstruction parameters

Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Processing time	4 minutes 50 seconds
File size	2.11 GB

System

Software name	Agisoft Metashape Professional
Software version	1.7.2 build 12070
OS	Windows 64 bit
RAM	63.93 GB
CPU	Intel(R) Core(TM) i7-9700F CPU @ 3.00GHz
GPU(s)	Radeon(TM) RX 460 Graphics (Baffin)