

FortetSouthEast

Processing Report
25 February 2021



Survey Data

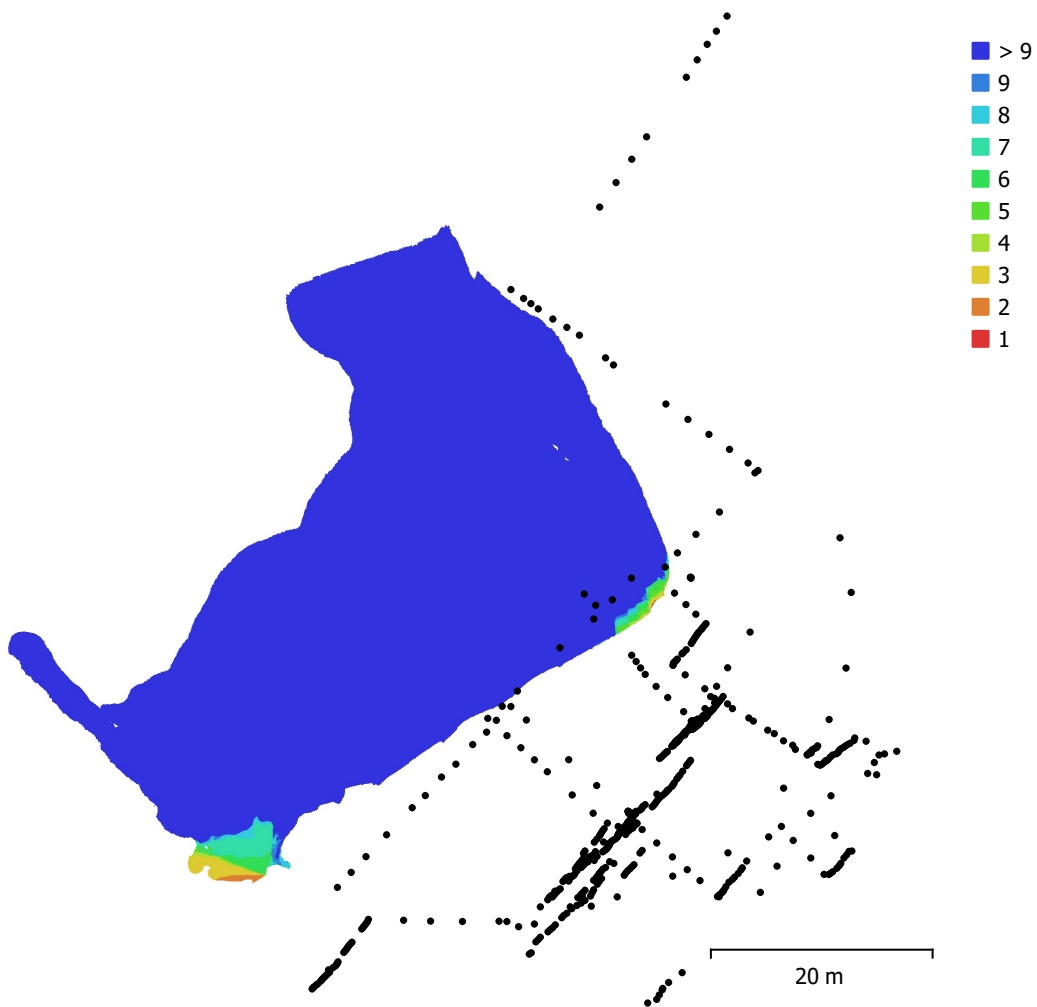


Fig. 1. Camera locations and image overlap.

Number of images:	677	Camera stations:	538
Flying altitude:	30.9 m	Tie points:	110,021
Ground resolution:	1.19 cm/pix	Projections:	878,887
Coverage area:	1.51e+03 m ²	Reprojection error:	0.565 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
L1D-20c (10.26mm)	5472 x 3648	10.26 mm	2.41 x 2.41 μm	No
unknown	2688 x 1512	unknown	unknown	No

Table 1. Cameras.

Camera Calibration

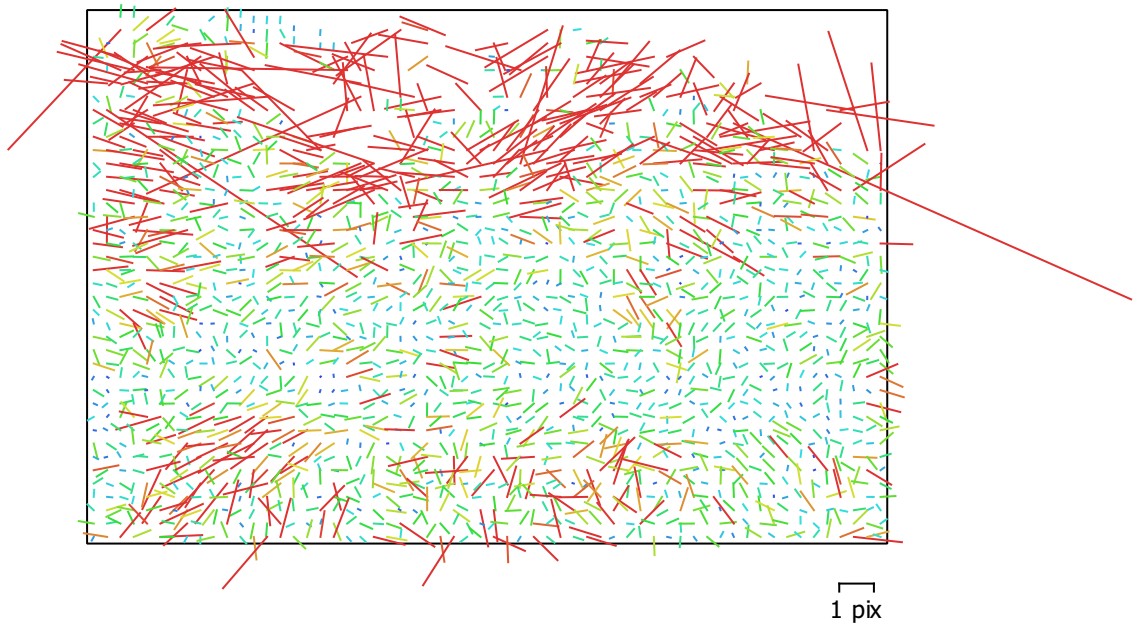


Fig. 2. Image residuals for L1D-20c (10.26mm).

L1D-20c (10.26mm)

18 images

Type
Frame

Resolution
5472 x 3648

Focal Length
10.26 mm

Pixel Size
2.41 x 2.41 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	4354.58	0.16	1.00	0.15	-0.21	-0.46	0.44	-0.39	0.10	0.04
Cx	13.037	0.45		1.00	-0.00	-0.01	0.02	-0.01	0.96	0.18
Cy	-38.7056	0.28			1.00	-0.09	0.04	-0.03	0.09	0.69
K1	0.00263014	0.0003				1.00	-0.97	0.91	-0.03	-0.14
K2	0.0349021	0.0012					1.00	-0.98	0.03	0.10
K3	-0.0347432	0.0016						1.00	-0.02	-0.08
P1	0.000648492	3.4e-05							1.00	0.19
P2	-0.00319769	1.8e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

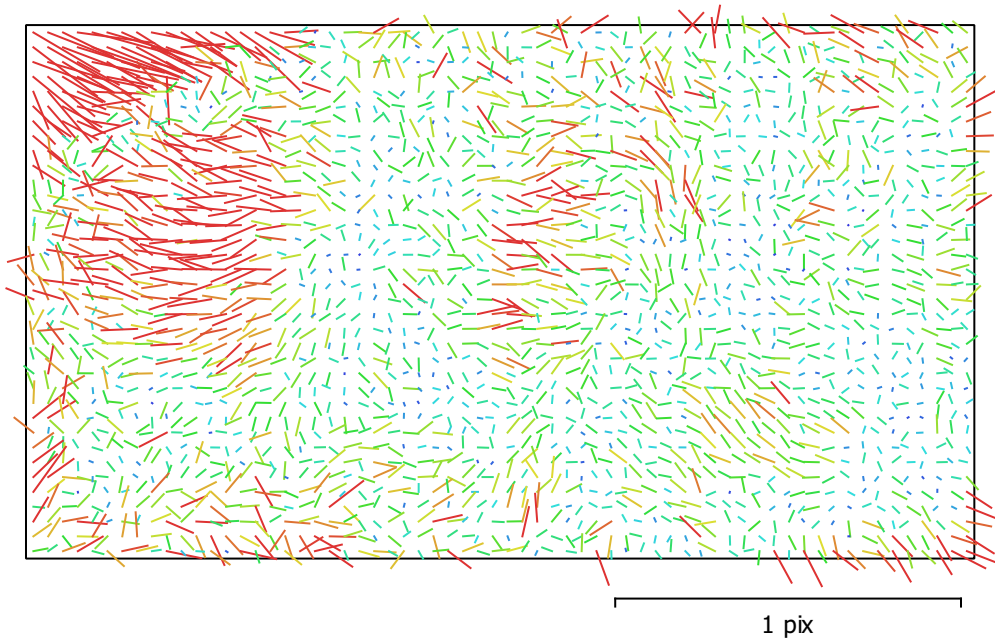


Fig. 3. Image residuals for unknown.

unknown
659 images

Type **Frame** Resolution **2688 x 1512** Focal Length **unknown** Pixel Size **unknown**

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2209.88	0.057	1.00	0.11	-0.18	-0.10	0.19	-0.17	0.12	-0.10
Cx	3.23242	0.11		1.00	-0.08	0.02	0.00	0.00	0.91	0.02
Cy	-25.709	0.083			1.00	-0.06	0.01	-0.01	-0.01	0.72
K1	0.00676434	7.4e-05				1.00	-0.95	0.89	0.04	-0.09
K2	0.0261544	0.00033					1.00	-0.98	-0.01	0.02
K3	-0.0264146	0.00046						1.00	0.02	-0.02
P1	0.000257985	1.5e-05							1.00	0.03
P2	-0.00326636	9.8e-06								1.00

Table 3. Calibration coefficients and correlation matrix.

Camera Locations

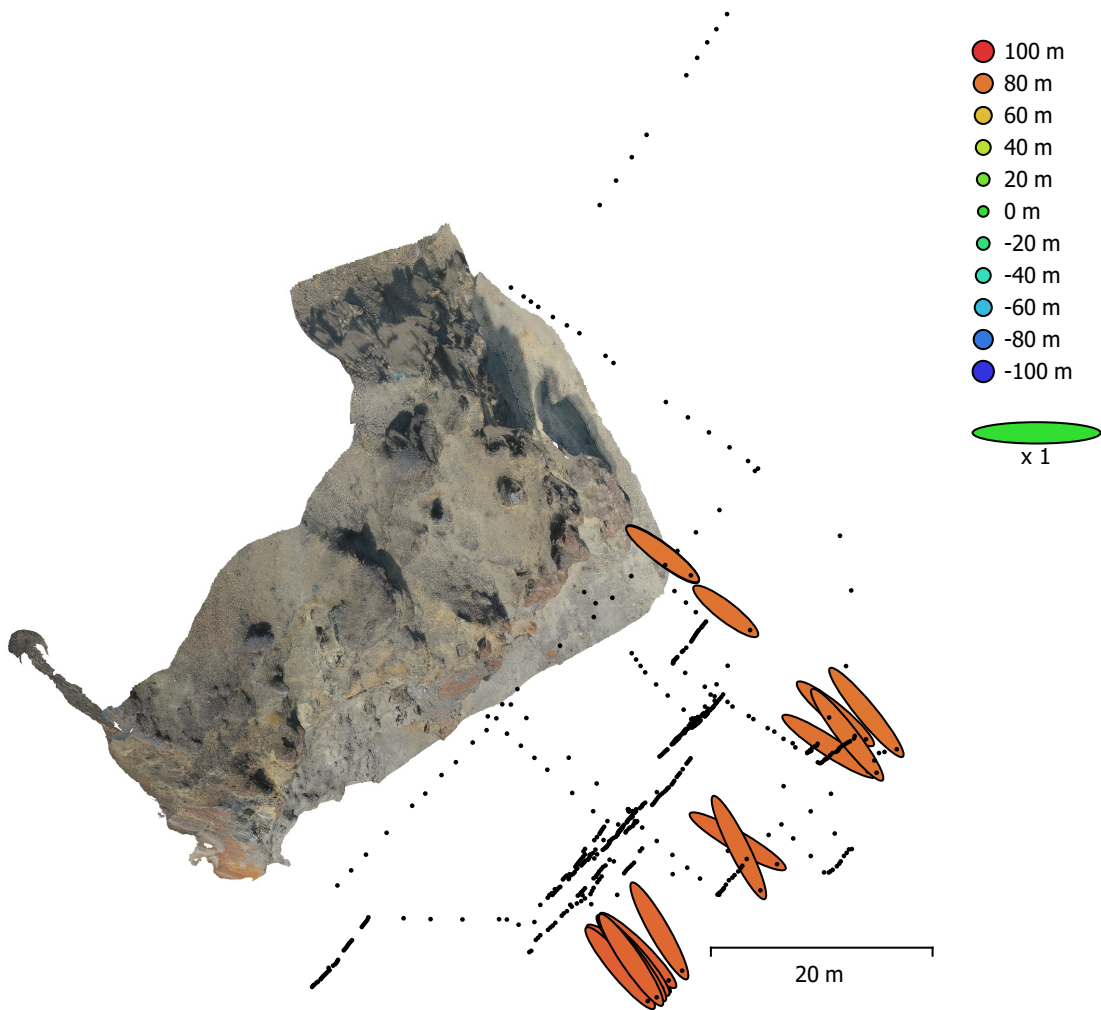


Fig. 4. Camera locations and error estimates.

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)
5.27861	5.46754	83.2117	7.59985	83.558

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

Ground Control Points

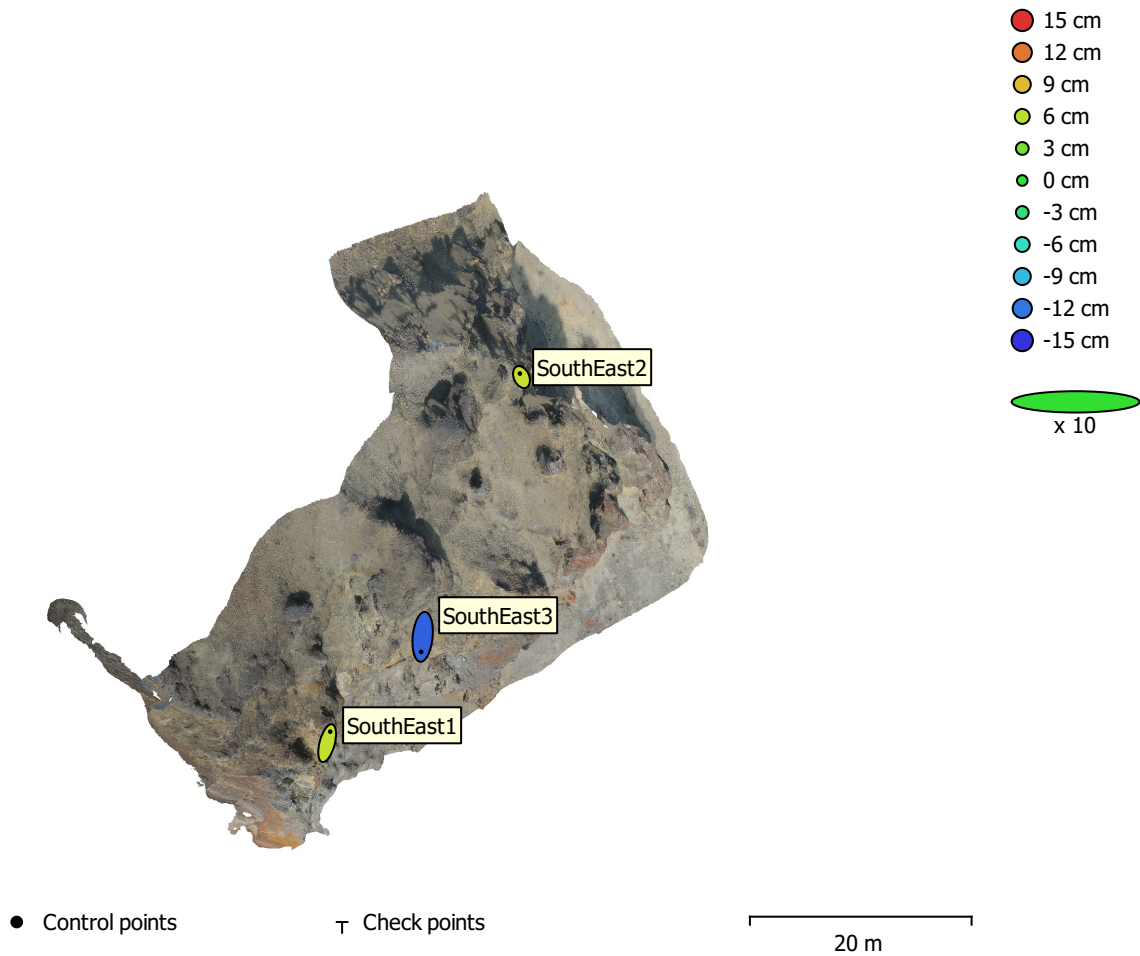


Fig. 5. GCP locations and error estimates.

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)
3	3.94539	20.0947	9.15443	20.4784	22.4314

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)
SouthEast2	-2.92909	6.39337	6.58734	9.63576	0.576 (47)
SouthEast1	5.57639	20.7847	6.33311	22.4323	0.396 (65)
SouthEast3	-2.65	-27.1756	-12.958	30.2232	0.479 (107)
Total	3.94539	20.0947	9.15443	22.4314	0.479

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

Digital Elevation Model

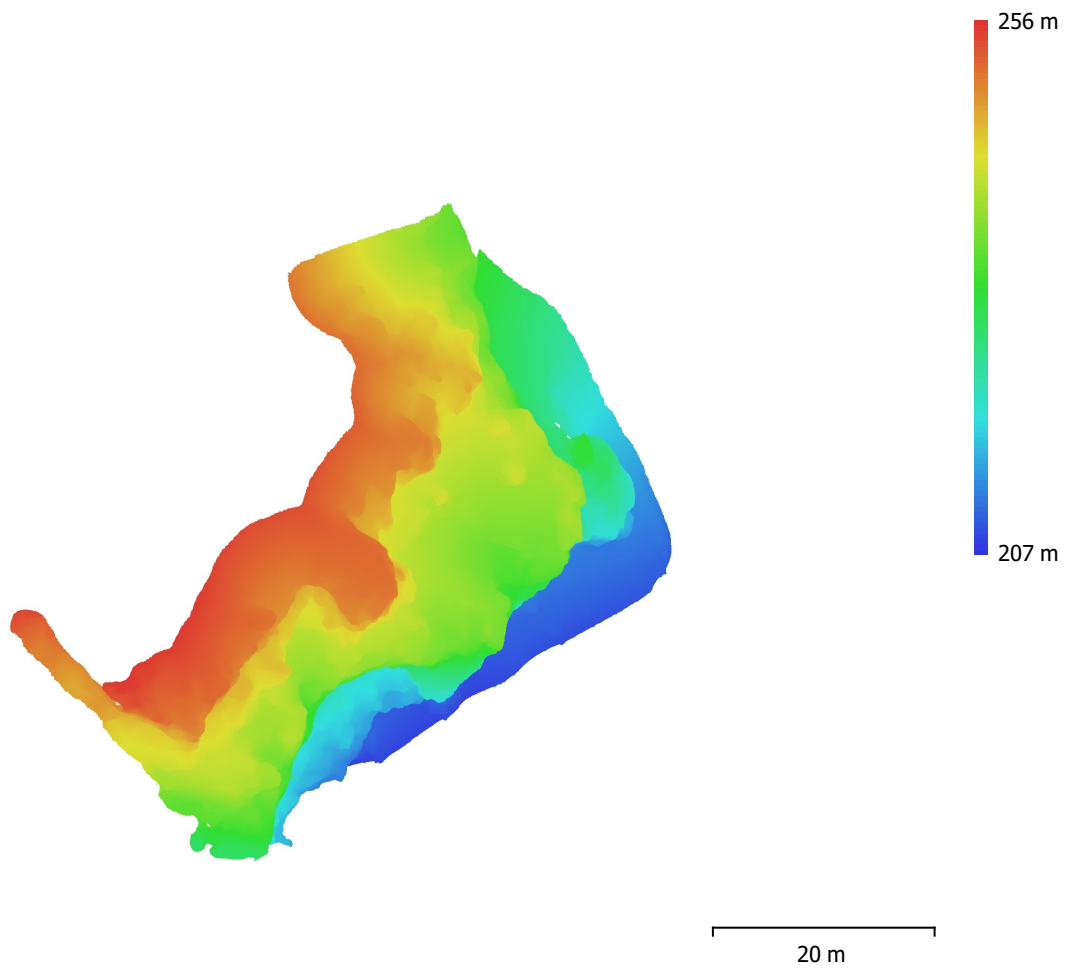


Fig. 6. Reconstructed digital elevation model.

Resolution: 2.39 cm/pix
Point density: 0.175 points/cm²

Processing Parameters

General

Cameras	677
Aligned cameras	538
Markers	3
Coordinate system	WGS 84 / UTM zone 33N (EPSG::32633)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	110,021 of 202,461
RMS reprojection error	0.348728 (0.564785 pix)
Max reprojection error	1.15189 (33.5005 pix)
Mean key point size	1.48807 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	19.372

Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Tie point limit	4,000
Guided image matching	No
Adaptive camera model fitting	No
Matching time	1 hours 44 minutes
Matching memory usage	653.61 MB
Alignment time	28 minutes 25 seconds
Alignment memory usage	577.12 MB
Software version	1.6.1.10009
File size	63.03 MB

Depth Maps

Count	538
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Depth maps generation parameters

Quality	High
Filtering mode	Mild
Processing time	3 hours 32 minutes
Memory usage	4.03 GB
Software version	1.6.1.10009
File size	822.43 MB

Dense Point Cloud

Points	11,173,559
Point colors	3 bands, uint8

Depth maps generation parameters

Quality	High
Filtering mode	Mild
Processing time	3 hours 32 minutes
Memory usage	4.03 GB

Dense cloud generation parameters

Processing time	1 hours 29 minutes
Memory usage	13.35 GB
Software version	1.6.1.10009
File size	298.78 MB

Model

Faces	2,164,511
Vertices	1,084,628
Vertex colors	3 bands, uint8
Texture	4,096 x 4,096 x 25, 4 bands, uint8

Depth maps generation parameters

Quality	High
Filtering mode	Mild
Processing time	3 hours 32 minutes
Memory usage	4.03 GB

Reconstruction parameters

Surface type	Arbitrary
Source data	Dense cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	8 minutes 59 seconds
Memory usage	5.80 GB

Texturing parameters

Mapping mode	Generic
Blending mode	Mosaic
Texture size	4,096
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	12 minutes 41 seconds
Blending time	22 minutes 29 seconds
Software version	1.6.1.10009
File size	515.12 MB

Tiled Model

Texture	3 bands, uint8
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Depth maps generation parameters

Quality	High
Filtering mode	Mild
Processing time	3 hours 32 minutes
Memory usage	4.03 GB

Reconstruction parameters

Source data	Dense cloud
Tile size	256
Face count	Medium
Enable ghosting filter	No
Processing time	8 minutes 32 seconds
Memory usage	3.66 GB
Software version	1.7.1.11797
File size	56.32 MB

Orthomosaic

Size	5,742 x 3,702
Coordinate system	WGS 84 (EPSG::4978)
Colors	3 bands, uint8

Reconstruction parameters

Blending mode	Mosaic
Surface	Mesh
Enable hole filling	Yes
Processing time	14 minutes 45 seconds
Memory usage	1.32 GB
Software version	1.6.1.10009
File size	1.53 GB

System

Software name	Agisoft Metashape Professional
Software version	1.7.1 build 11797
OS	Windows 64 bit
RAM	127.78 GB
CPU	Intel(R) Core(TM) i9-9900K CPU @ 3.60GHz
GPU(s)	GeForce RTX 2080