

Warnimont_20181207

Processing Report
30 January 2020



Survey Data

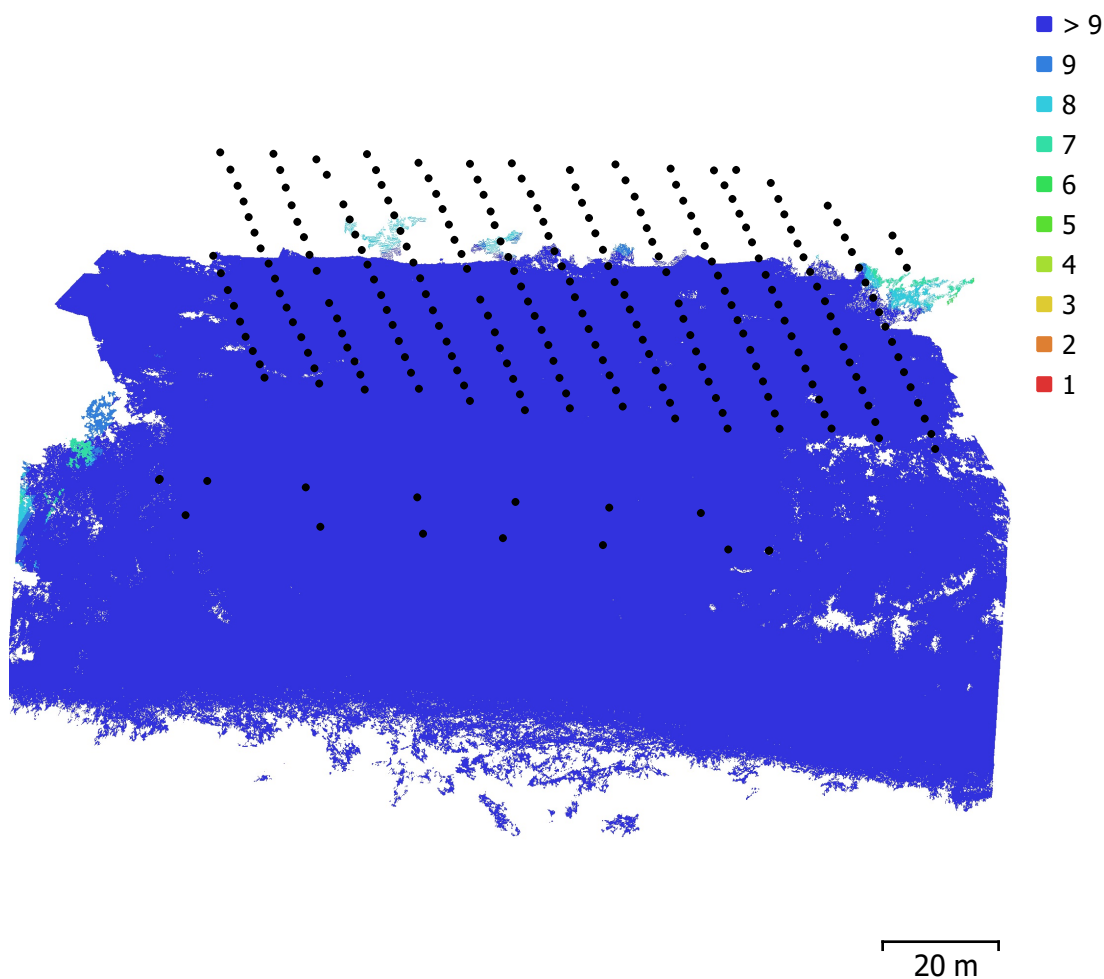


Fig. 1. Camera locations and image overlap.

Number of images:	247	Camera stations:	247
Flying altitude:	45.9 m	Tie points:	375,425
Ground resolution:	1.08 cm/pix	Projections:	1,255,363
Coverage area:	0.0133 km ²	Reprojection error:	0.656 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
FC6310 (8.8mm)	5464 x 3640	8.8 mm	2.42 x 2.42 μ m	No

Table 1. Cameras.

Camera Calibration

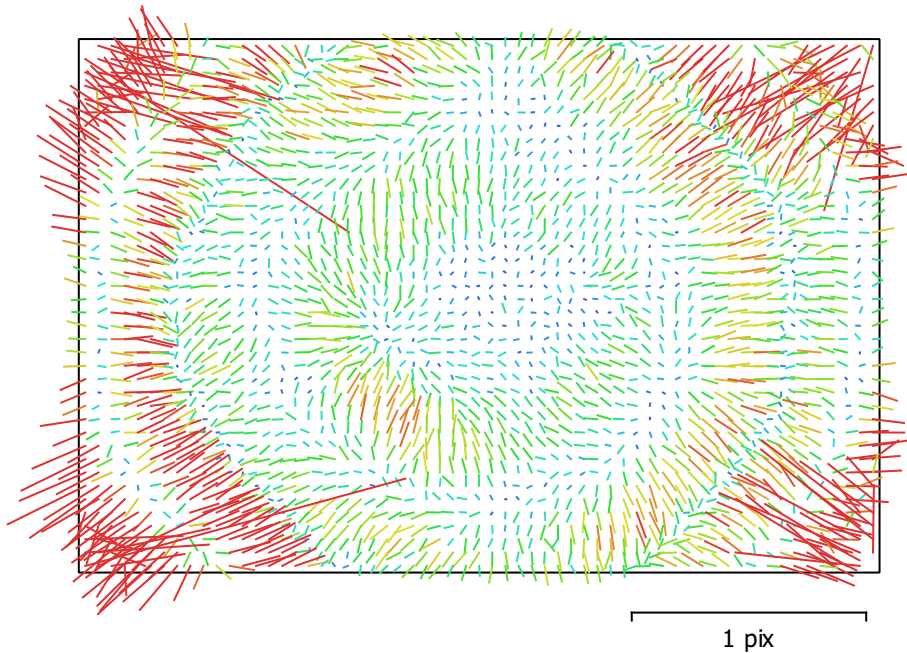


Fig. 2. Image residuals for FC6310 (8.8mm).

FC6310 (8.8mm)

247 images

Type
Frame

Resolution
5464 x 3640

Focal Length
8.8 mm

Pixel Size
2.42 x 2.42 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	3653.45	0.13	1.00	0.04	-0.04	-0.86	0.56	-0.43	-0.02	0.07
Cx	-11.162	0.014		1.00	0.04	-0.03	0.02	-0.02	0.05	0.06
Cy	39.9271	0.01			1.00	0.02	-0.02	0.01	0.07	-0.34
K1	-0.266481	2e-05				1.00	-0.88	0.76	0.04	-0.08
K2	0.108111	2.5e-05					1.00	-0.97	-0.04	0.05
K3	-0.030018	1.4e-05						1.00	0.03	-0.04
P1	0.000155121	3.6e-07							1.00	-0.09
P2	0.000310957	4.4e-07								1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

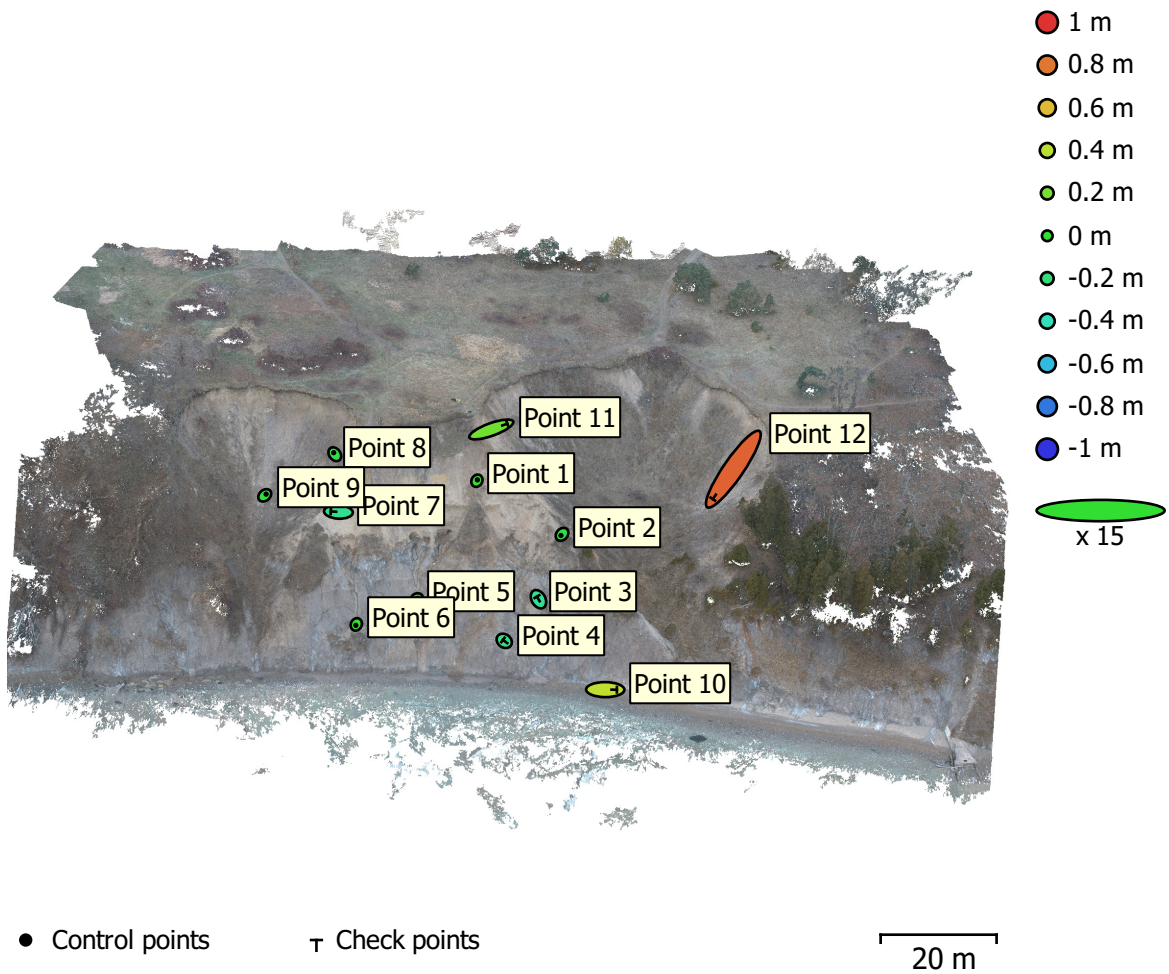


Fig. 3. GCP locations and error estimates.

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)
6	2.20398	2.48436	3.29563	3.32108	4.67876

Table 3. Control points RMSE.
 X - Longitude, Y - Latitude, Z - Altitude.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
6	27.8011	28.7051	43.8582	39.961	59.3332

Table 4. Check points RMSE.
 X - Longitude, Y - Latitude, Z - Altitude.

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
Point 1	1.15224	2.05352	0.64179	2.44059	1.170 (60)
Point 2	-2.49715	-2.67284	-5.00477	6.19899	0.640 (83)
Point 5	1.89103	1.16249	-1.57333	2.7208	0.524 (102)
Point 6	-1.03618	-2.12165	1.8235	2.98332	0.360 (85)
Point 8	-2.61655	3.53333	-5.6839	7.18592	0.360 (39)
Point 9	3.17582	2.70815	-1.26502	4.36121	0.412 (57)
Total	2.20398	2.48436	3.29563	4.67876	0.632

Table 5. Control points.
X - Longitude, Y - Latitude, Z - Altitude.

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
Point 3	-3.49766	5.98238	-28.8191	29.6406	0.561 (101)
Point 4	-2.92113	2.17062	-23.621	23.8997	0.622 (111)
Point 7	-17.5825	0.995791	-27.17	32.3781	0.862 (68)
Point 10	26.7634	-0.210413	40.9323	48.9058	0.369 (107)
Point 11	36.8377	13.3294	18.3767	43.2711	0.324 (47)
Point 12	-47.2672	-68.7365	86.0315	119.834	0.444 (64)
Total	27.8011	28.7051	43.8582	59.3332	0.562

Table 6. Check points.
X - Longitude, Y - Latitude, Z - Altitude.

Digital Elevation Model

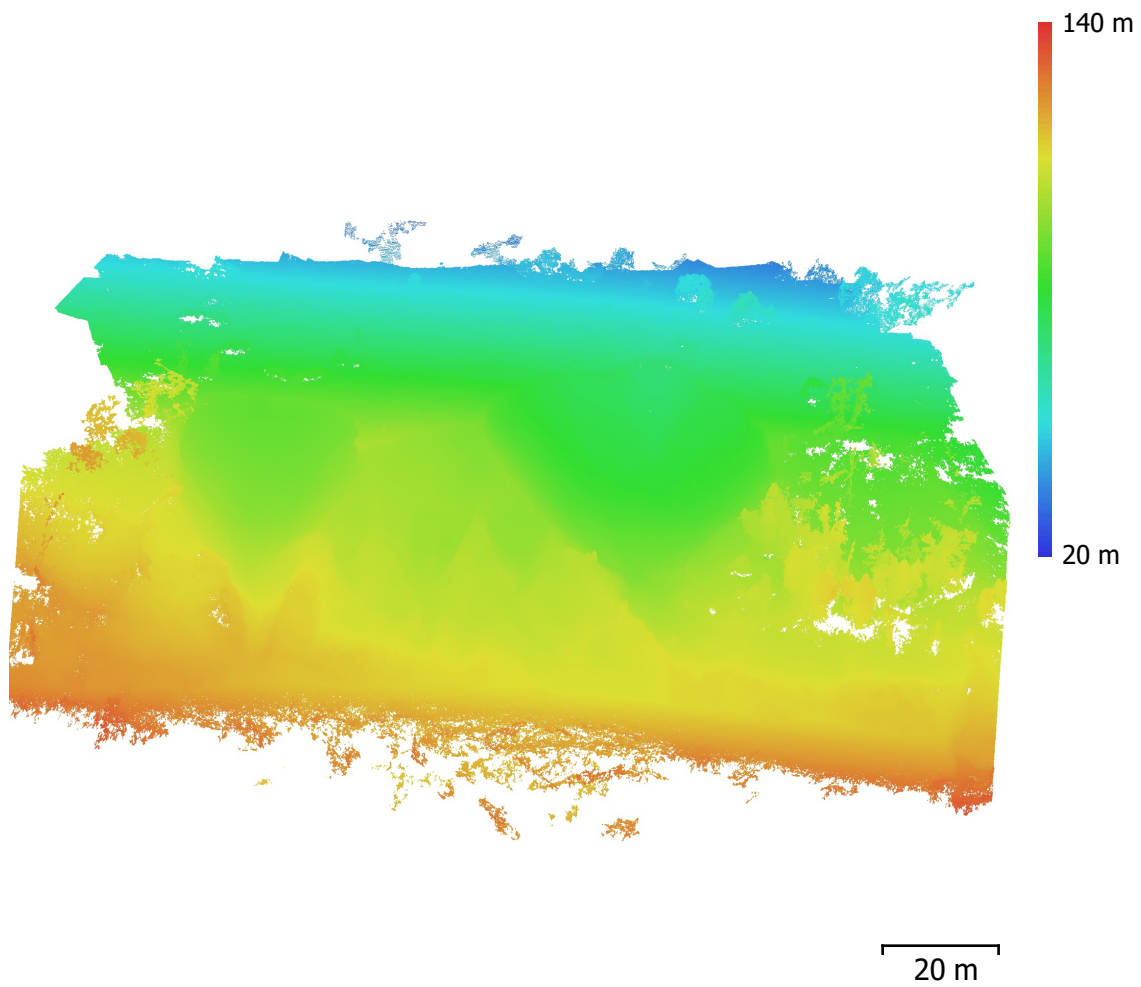


Fig. 4. Reconstructed digital elevation model.

Resolution: 10 cm/pix
Point density: 99.9 points/m²

Processing Parameters

General

Cameras	247
Aligned cameras	247
Markers	12
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	375,425 of 412,906
RMS reprojection error	0.13017 (0.656233 pix)
Max reprojection error	0.394975 (37.5786 pix)
Mean key point size	3.88783 pix
Point colors	3 bands, uint16
Key points	No
Average tie point multiplicity	4.10324

Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Yes
Key point limit	40,000
Tie point limit	10,000
Adaptive camera model fitting	No
Matching time	39 minutes 42 seconds
Alignment time	31 minutes 47 seconds

Depth Maps

Count	247
Reconstruction parameters	
Quality	High
Filtering mode	Aggressive
Processing time	7 hours 20 minutes

Dense Point Cloud

Points	57,117,998
Point colors	3 bands, uint16
Reconstruction parameters	
Quality	High
Depth filtering	Aggressive
Depth maps generation time	7 hours 20 minutes
Dense cloud generation time	7 hours 9 minutes

DEM

Size	1,139 x 1,181
Coordinate system	WGS 84 / UTM zone 16N (EPSG::32616)

Orthomosaic

Size	12,775,817 x 1,850,406,520
Coordinate system	WGS 84 / UTM zone 16N (EPSG::32616)
Colors	3 bands, uint16
Reconstruction parameters	
Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Processing time	42 minutes 29 seconds

Software

Version	1.4.3 build 6529
Platform	Windows 64