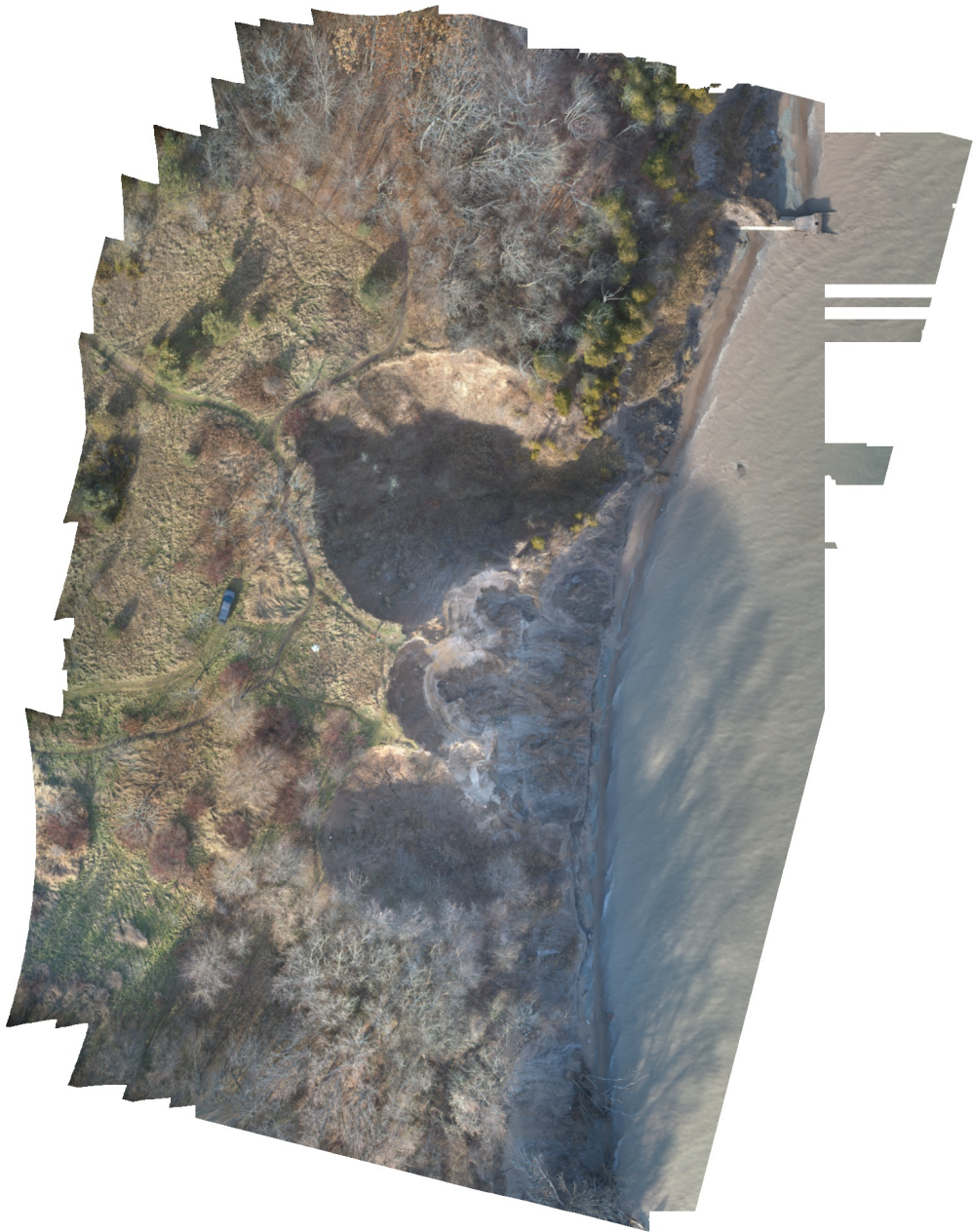


Warnimont_20191123

Processing Report
30 January 2020



Survey Data

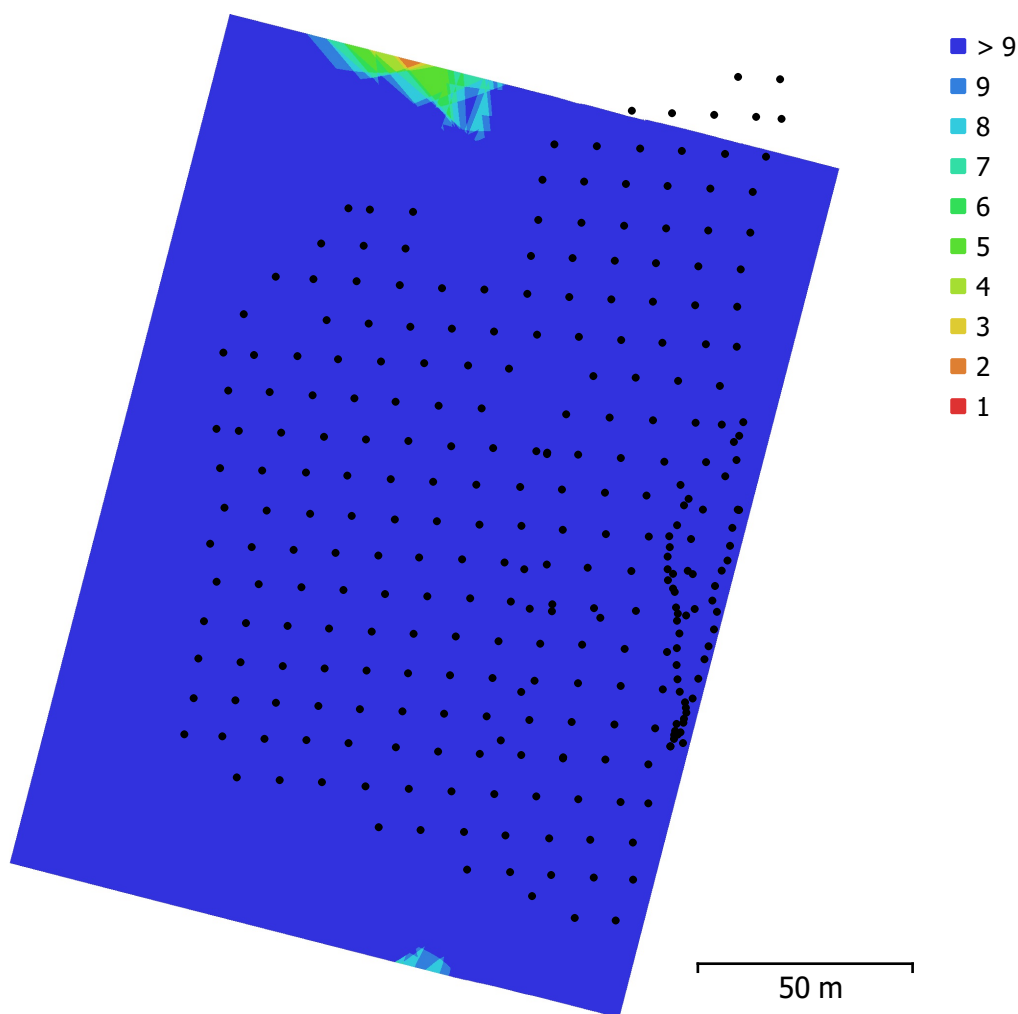


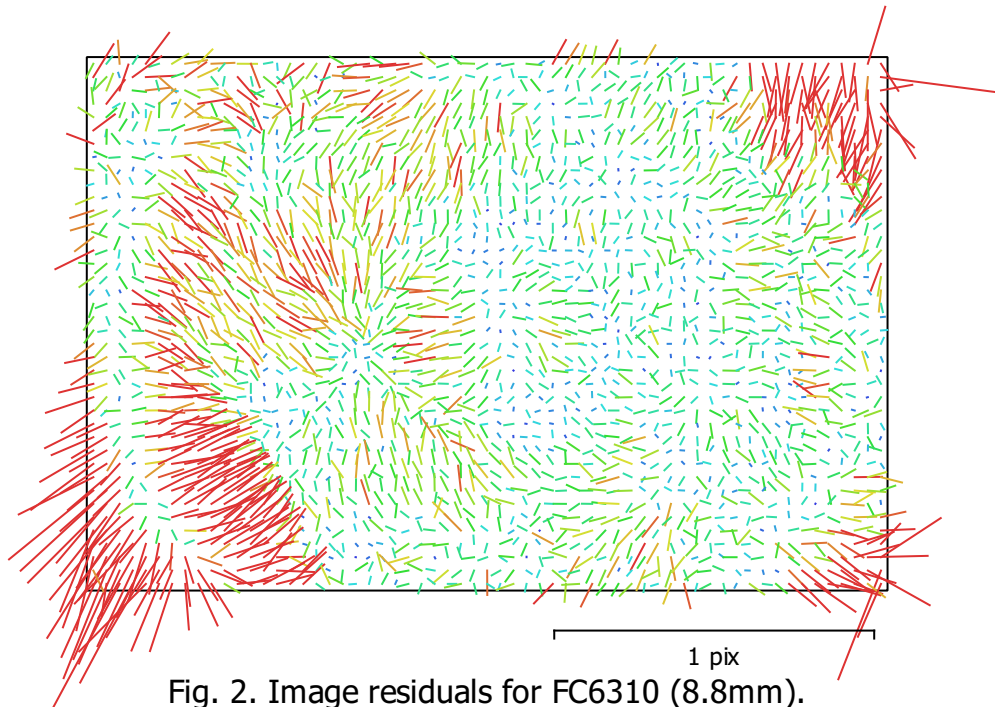
Fig. 1. Camera locations and image overlap.

Number of images:	293	Camera stations:	284
Flying altitude:	51.5 m	Tie points:	190,447
Ground resolution:	1.22 cm/pix	Projections:	789,883
Coverage area:	0.0299 km ²	Reprojection error:	0.839 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



FC6310 (8.8mm)

293 images

Type	Resolution	Focal Length	Pixel Size
Frame	5464 x 3640	8.8 mm	2.42 x 2.42 μm

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2	P3	P4
F	3655.53	0.026	1.00	-0.00	-0.15	-0.34	-0.04	-0.32	0.24	-0.21	0.19	0.03	0.00	-0.03	0.06
Cx	-10.1083	0.018		1.00	0.09	-0.04	0.12	-0.00	0.00	0.00	-0.00	0.25	0.19	-0.15	0.09
Cy	39.6204	0.014			1.00	-0.06	0.02	0.01	-0.01	0.01	-0.01	0.28	0.11	-0.24	0.18
B1	0.148578	0.015				1.00	0.00	-0.04	0.00	0.00	-0.00	-0.04	0.04	0.02	-0.04
B2	0.0692644	0.012					1.00	-0.02	0.01	-0.01	-0.00	0.03	0.02	-0.04	0.05
K1	-0.270422	1.7e-05						1.00	-0.97	0.91	-0.86	0.00	-0.01	-0.00	-0.01
K2	0.126037	5.6e-05							1.00	-0.98	0.95	-0.00	-0.00	0.01	0.01
K3	-0.0565738	6.9e-05								1.00	-0.99	0.00	0.01	-0.01	-0.00
K4	0.0126824	2.9e-05									1.00	-0.00	-0.01	0.02	-0.00
P1	0.00019297	8.7e-07										1.00	0.81	-0.81	0.63
P2	0.000311356	1.3e-06											1.00	-0.85	0.67
P3	-0.237863	0.009												1.00	-0.94
P4	0.284262	0.0061													1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

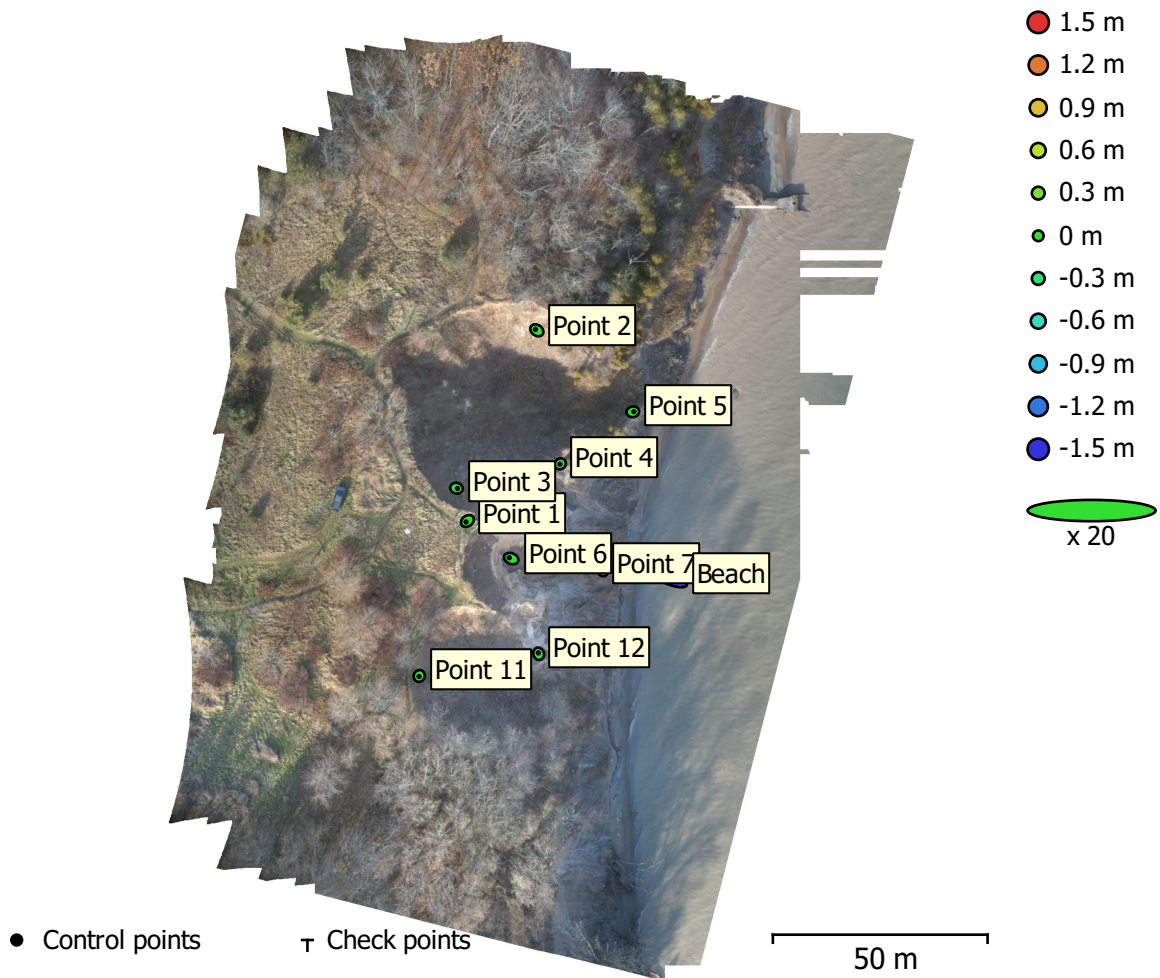


Fig. 3. GCP locations and error estimates.

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 (m)	Y error (m)	Z error (m)	XY error (m)	Total (m)
9	0.0243726	0.0155609	0.0169285	0.0289166	0.0335073

Table 3. Control points RMSE.

X - Longitude, Y - Latitude, Z - Altitude.

Count	X error (m)	Y error (m)	Z error (m)	XY error (m)	Total (m)
1	0.550315	0.328187	1.43624	0.640744	1.57269

Table 4. Check points RMSE.

X - Longitude, Y - Latitude, Z - Altitude.

Label	X error (m)	Y error (m)	Z error (m)	Total (m)	Image (pix)
Point 1	-0.0319037	-0.0238628	0.00240844	0.0399134	0.199 (57)
Point 2	-0.0321415	0.0226906	-0.0203994	0.0443178	0.209 (24)
Point 3	0.0223827	-0.00550191	-0.0152367	0.0276299	0.206 (45)
Point 4	-0.0074737	-0.00644912	0.0188008	0.0212348	0.254 (65)
Point 5	0.022687	0.00461859	-0.0102168	0.0253064	0.179 (89)
Point 6	-0.0460505	0.0184411	0.00350233	0.0497292	0.173 (93)
Point 7	-0.00581753	0.0103028	-0.00709196	0.0137944	0.305 (118)
Point 11	-0.00425805	-0.0114045	0.0371206	0.0390657	0.161 (70)
Point 12	-0.00715158	0.0206278	0.00516809	0.0224357	0.150 (89)
Total	0.0243726	0.0155609	0.0169285	0.0335073	0.214

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

Label	X error (m)	Y error (m)	Z error (m)	Total (m)	Image (pix)
Beach	-0.550315	0.328187	-1.43624	1.57269	0.190 (137)
Total	0.550315	0.328187	1.43624	1.57269	0.190

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

Digital Elevation Model

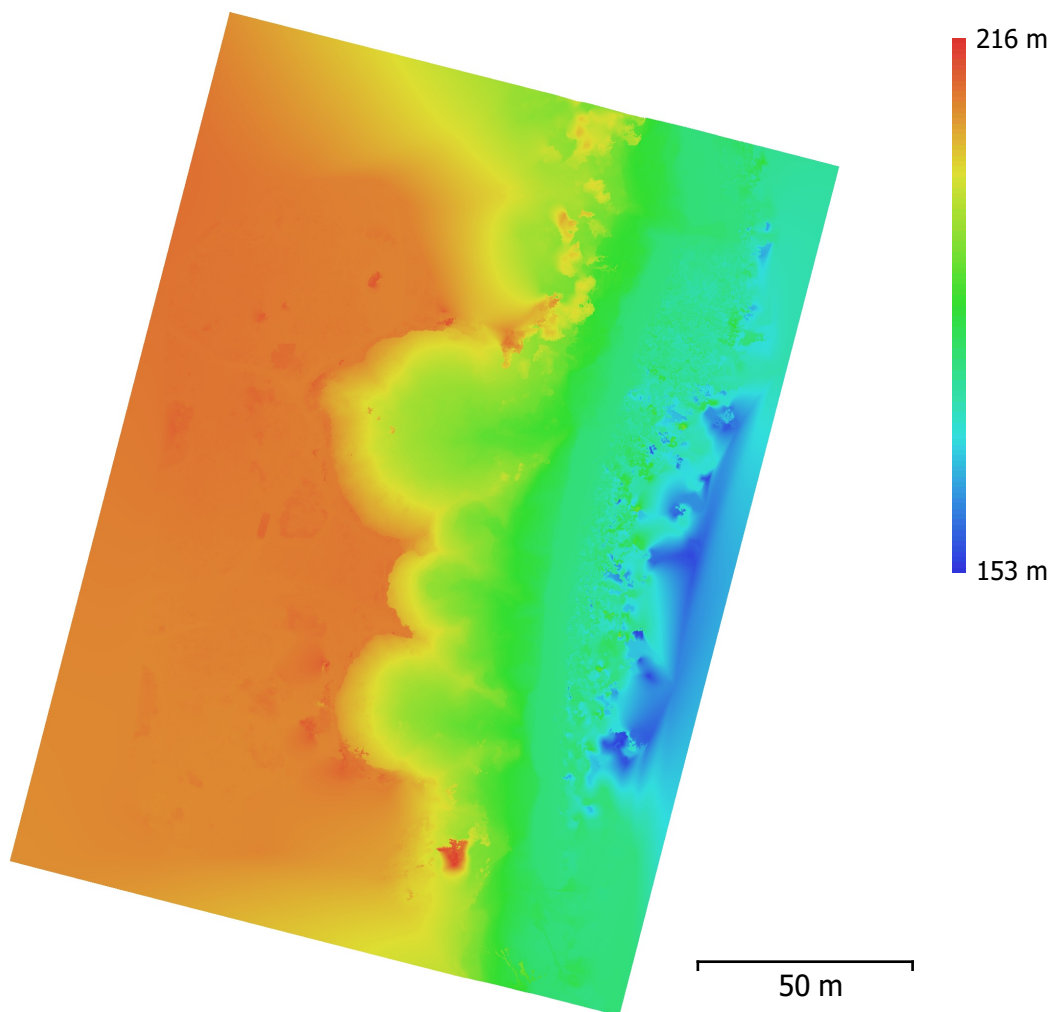


Fig. 4. Reconstructed digital elevation model.

Resolution: 1.22 cm/pix
Point density: 67.1 points/cm²

Processing Parameters

General

Cameras	293
Aligned cameras	284
Markers	10
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	190,447 of 213,998
RMS reprojection error	0.136848 (0.839004 pix)
Max reprojection error	0.970103 (35.528 pix)
Mean key point size	4.46674 pix
Point colors	3 bands, uint16
Key points	No
Average tie point multiplicity	5.68525

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	1 hours 14 minutes
Alignment time	2 minutes 51 seconds

Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k4, p1-p4
Adaptive camera model fitting	No
Optimization time	9 seconds

Depth Maps

Count	284
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Reconstruction parameters

Quality	Ultra High
Filtering mode	Aggressive
Processing time	1 days 16 hours

Dense Point Cloud

Points	182,815,879
Point colors	3 bands, uint16

Reconstruction parameters

Quality	Ultra High
Depth filtering	Aggressive
Depth maps generation time	1 days 16 hours
Dense cloud generation time	1 days 20 hours

Model

Faces	36,561,505
Vertices	18,281,556
Vertex colors	3 bands, uint8

Reconstruction parameters

Surface type	Height field
Source data	Dense
Interpolation	Enabled
Quality	Ultra High
Depth filtering	Aggressive
Face count	36,563,113
Processing time	7 minutes 23 seconds

Orthomosaic

Size	15,818 x 19,129
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Coordinate system	WGS 84 (EPSG::4326)
Colors	3 bands, uint16
Reconstruction parameters	
Blending mode	Mosaic
Surface	Mesh
Enable hole filling	Yes
Processing time	1 hours 57 minutes
Software	
Version	1.4.3 build 6529
Platform	Windows 64