

Kewaunee(1) Photoscan Report

Processing Report

14 October 2019



Survey Data

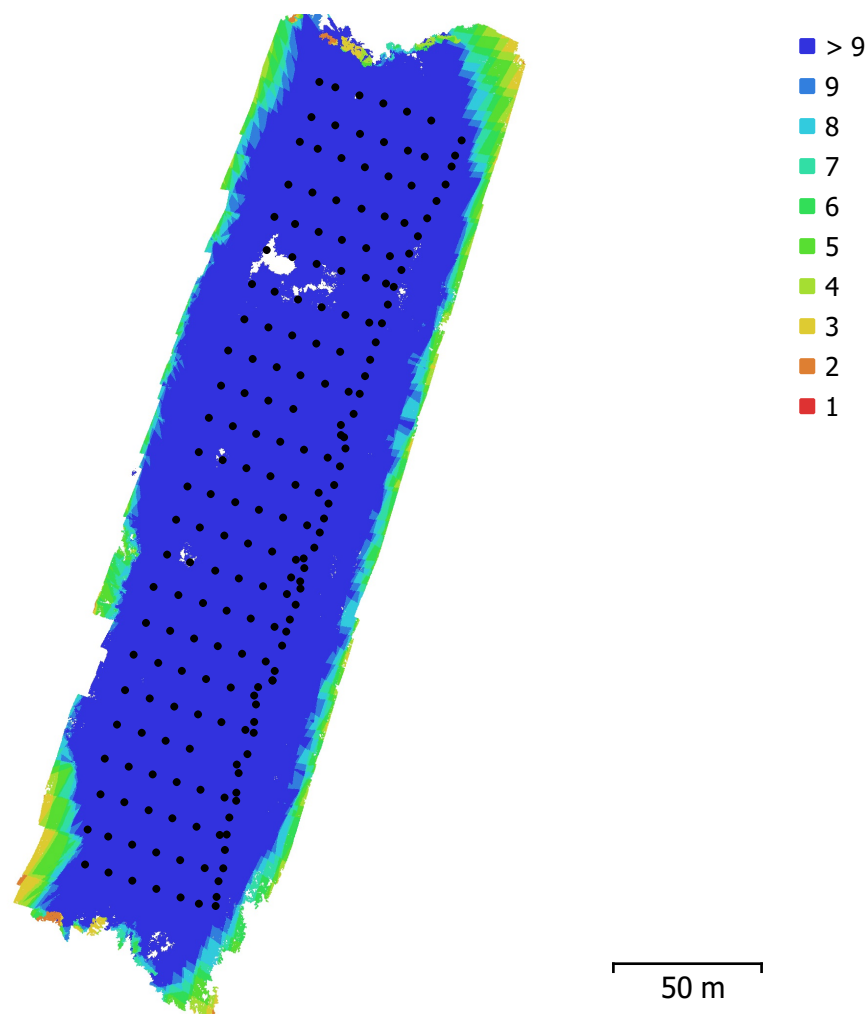


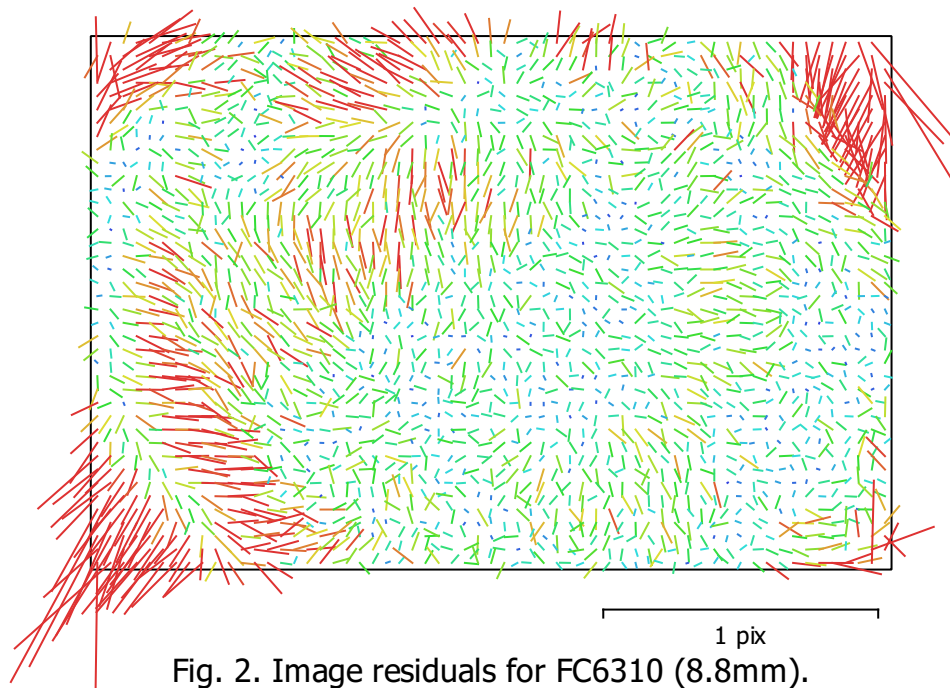
Fig. 1. Camera locations and image overlap.

Number of images:	195	Camera stations:	194
Flying altitude:	44.8 m	Tie points:	297,580
Ground resolution:	1.09 cm/pix	Projections:	1,151,395
Coverage area:	0.0269 km ²	Reprojection error:	0.907 pix

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

Table 1. Cameras.

Camera Calibration



FC6310 (8.8mm)

142 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	B1	B2	K1	K2	K3	K4	P1	P2	P3	P4
F	3658.38	0.094	1.00	0.08	-0.06	-0.26	0.06	-0.53	0.22	-0.15	0.11	-0.02	0.04	-0.01	0.02
Cx	-8.22331	0.02		1.00	0.01	-0.15	0.04	-0.04	0.04	-0.04	0.03	0.21	0.20	-0.14	0.09
Cy	40.3807	0.013			1.00	0.03	-0.25	0.01	0.01	-0.02	0.03	0.32	0.21	-0.31	0.25
B1	0.439486	0.036				1.00	-0.00	0.00	-0.05	0.04	-0.03	0.11	-0.00	0.01	-0.02
B2	-1.73102	0.029					1.00	-0.02	0.01	-0.00	0.00	0.01	0.09	0.00	-0.00
K1	-0.271307	2.7e-05						1.00	-0.91	0.84	-0.78	-0.05	-0.05	0.05	-0.05
K2	0.128204	8.5e-05							1.00	-0.98	0.95	0.05	0.04	-0.06	0.07
K3	-0.0591633	0.00011								1.00	-0.99	-0.06	-0.04	0.07	-0.08
K4	0.0137466	5.1e-05									1.00	0.07	0.04	-0.08	0.10
P1	0.00027163	1.3e-06										1.00	0.86	-0.86	0.74
P2	0.000354483	1.6e-06											1.00	-0.88	0.77
P3	-0.320302	0.011												1.00	-0.97
P4	0.257163	0.0082													1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

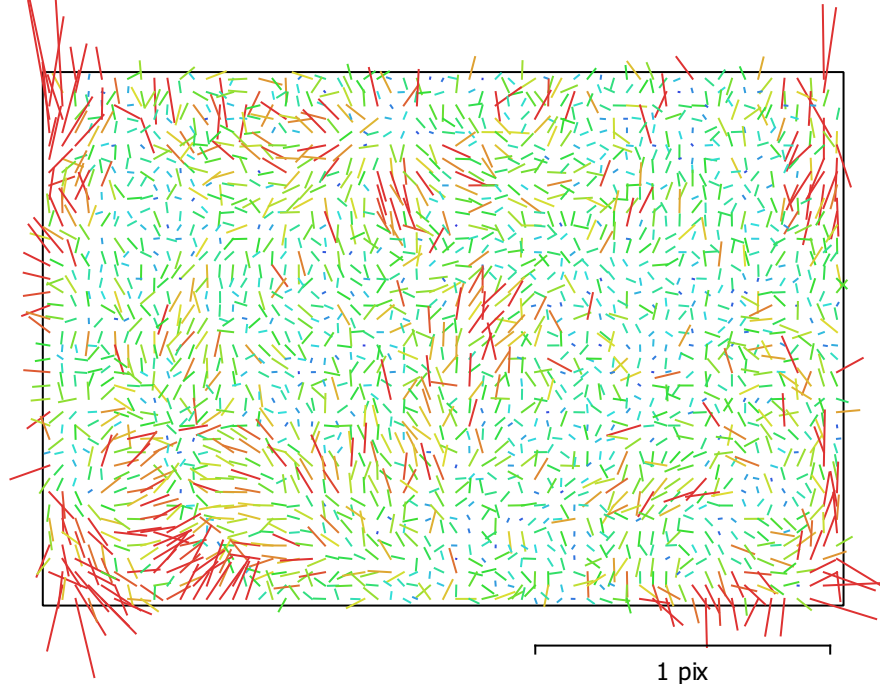


Fig. 3. Image residuals for FC6310 (8.8mm).

FC6310 (8.8mm)

53 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	3658.11	0.13	1.00	0.08	-0.10	-0.55	-0.01	-0.45	0.19	-0.14	0.13	-0.06	0.01	0.04	-0.00
Cx	-8.81232	0.072		1.00	0.07	0.02	0.31	-0.03	0.00	0.00	-0.00	-0.58	-0.14	0.29	0.09
Cy	46.3595	0.054			1.00	-0.21	0.04	0.04	0.01	-0.02	0.02	-0.05	-0.84	0.02	0.04
B1	-0.10164	0.045				1.00	0.12	0.12	-0.06	0.05	-0.04	0.01	0.34	-0.00	-0.01
B2	-1.02951	0.025					1.00	-0.02	0.00	0.00	-0.01	-0.15	-0.01	0.09	-0.01
K1	-0.271601	4e-05						1.00	-0.94	0.88	-0.83	0.03	-0.02	-0.03	0.01
K2	0.130403	0.00013							1.00	-0.99	0.96	-0.01	-0.03	0.02	-0.01
K3	-0.0629669	0.00018								1.00	-0.99	0.01	0.04	-0.01	0.01
K4	0.015735	8.7e-05									1.00	-0.00	-0.04	0.01	-0.01
P1	0.000154288	4.7e-06										1.00	0.26	-0.87	0.42
P2	1.23125e-05	1.4e-06											1.00	-0.22	0.08
P3	0.515142	0.058												1.00	-0.80
P4	0.240663	0.028													1.00

Table 3. Calibration coefficients and correlation matrix.

Ground Control Points

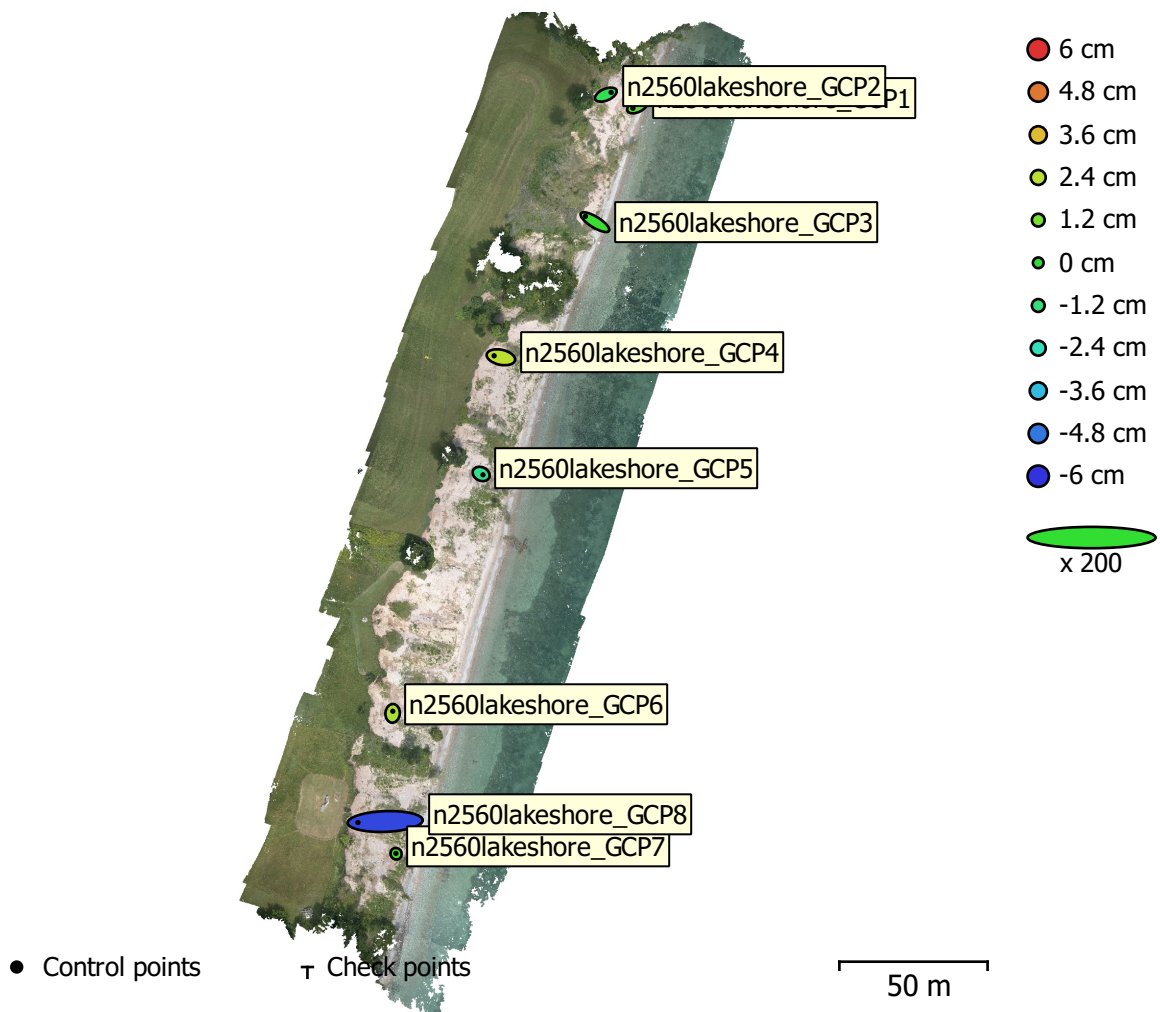


Fig. 4. GCP locations and error estimates.

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)
8	3.63079	0.868604	2.39572	3.73324	4.43583

Table 4. Control points RMSE.

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

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
n2560lakeshore_GCP1	-1.51107	-0.747309	0.786751	1.86031	0.159 (27)
n2560lakeshore_GCP2	1.77291	0.761577	-0.558218	2.00868	0.136 (18)
n2560lakeshore_GCP3	-3.19227	1.97873	0.0997298	3.75712	0.377 (48)
n2560lakeshore_GCP4	-2.28282	0.49473	2.46519	3.39606	0.170 (33)
n2560lakeshore_GCP5	0.622422	-0.294905	-1.62557	1.76546	0.190 (52)
n2560lakeshore_GCP6	0.0604703	0.725816	2.08275	2.20643	0.146 (42)
n2560lakeshore_GCP7	-0.0582223	0.110387	0.208825	0.243275	0.254 (37)
n2560lakeshore_GCP8	-9.17813	-0.333473	-5.64571	10.7807	0.175 (33)
Total	3.63079	0.868604	2.39572	4.43583	0.227

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

Digital Elevation Model

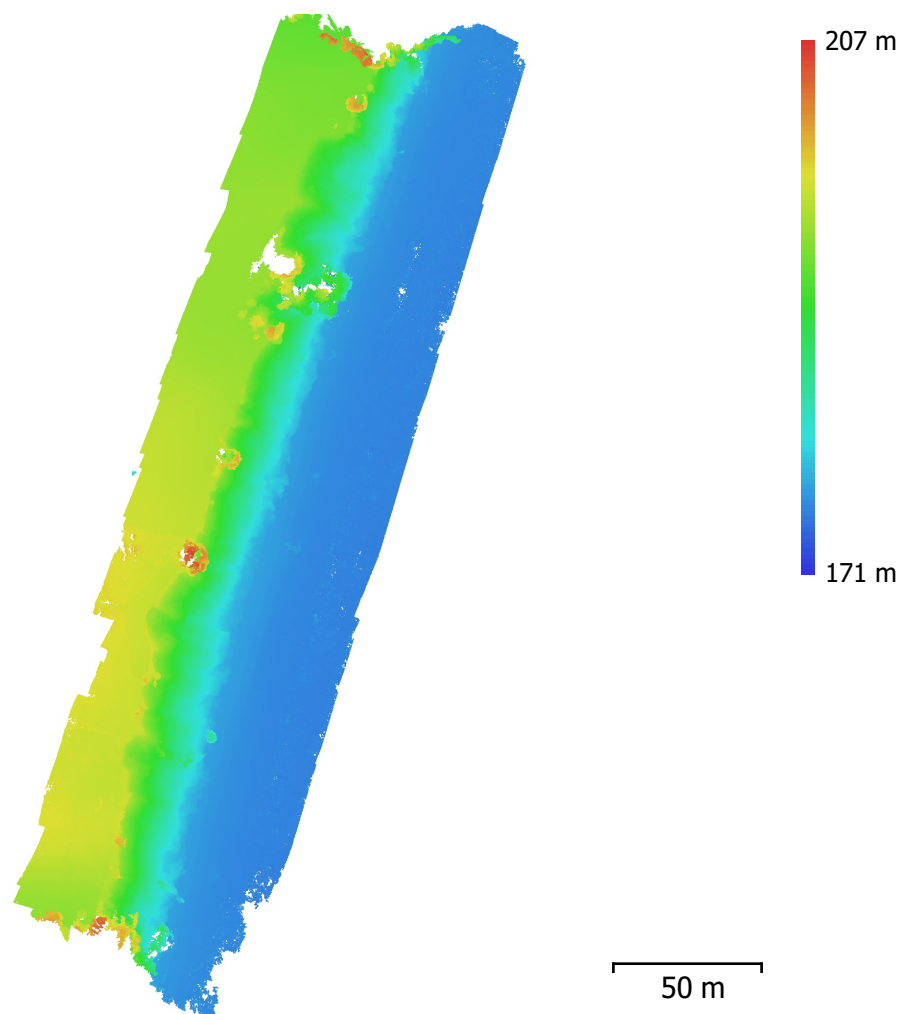


Fig. 5. Reconstructed digital elevation model.

Resolution: unknown

Point density: unknown

Processing Parameters

General

Cameras	195
Aligned cameras	194
Markers	8
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	297,580 of 324,932
RMS reprojection error	0.142262 (0.907197 pix)
Max reprojection error	0.714714 (38.4653 pix)
Mean key point size	4.6088 pix
Point colors	3 bands, uint16
Key points	No
Average tie point multiplicity	4.51524

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	15 minutes 25 seconds
Alignment time	2 minutes 13 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	194
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Reconstruction parameters

Quality	High
Filtering mode	Aggressive
Processing time	4 hours 51 minutes

Dense Point Cloud

Points	77,713,014
Point colors	3 bands, uint16

Reconstruction parameters

Quality	High
Depth filtering	Aggressive
Depth maps generation time	4 hours 51 minutes
Dense cloud generation time	1 hours 29 minutes

Software

Version	1.4.3 build 6529
Platform	Windows 64