

Canon S100 30m

Baseline

10 December 2017



Survey Data

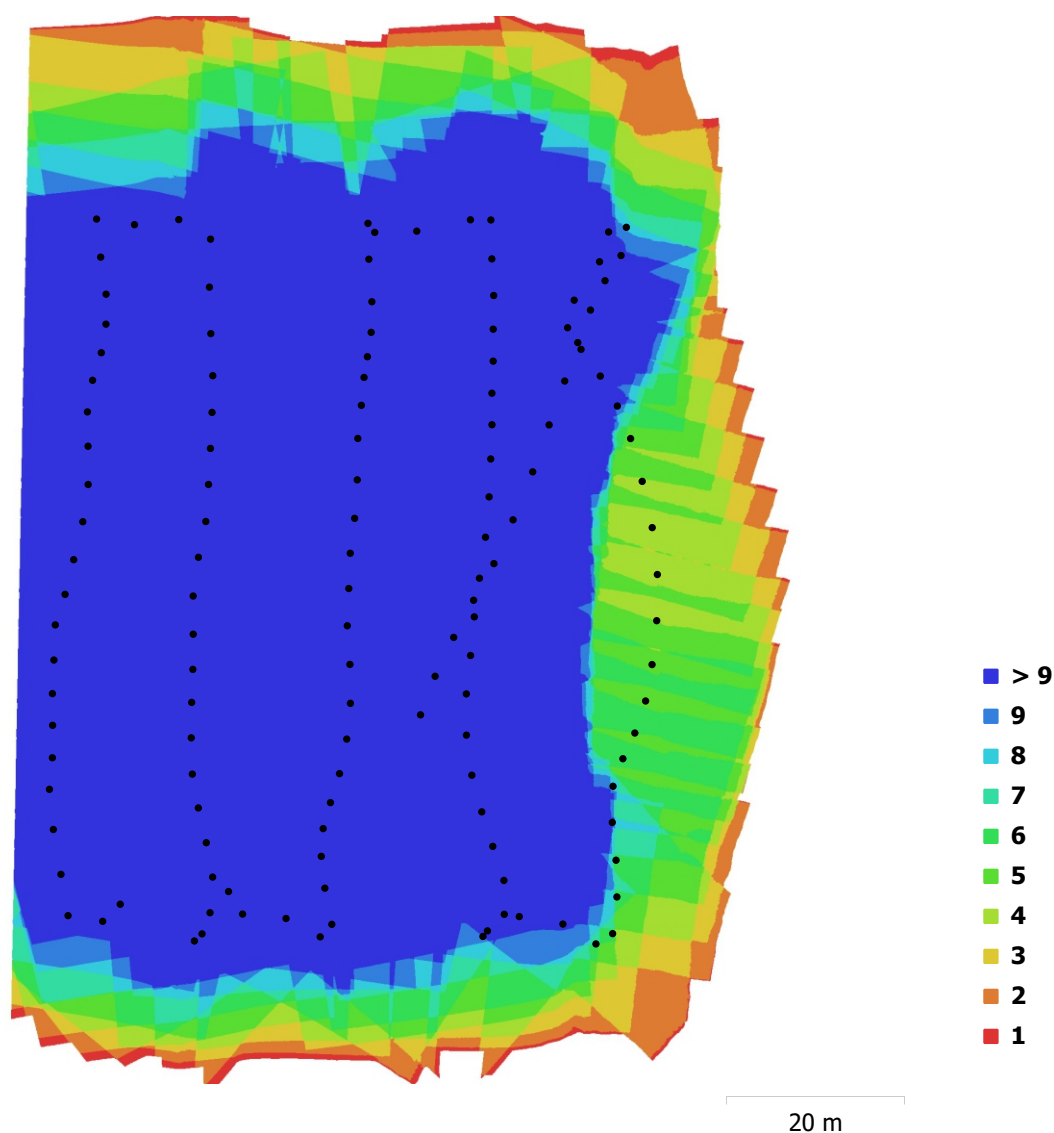


Fig. 1. Camera locations and image overlap.

Number of images:	136	Camera stations:	135
Flying altitude:	28 m	Tie points:	81,384
Ground resolution:	8.26 mm/pix	Projections:	499,306
Coverage area:	9.29e+03 m ²	Reprojection error:	1.19 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Canon PowerShot S100 (5.2 mm)	4000 x 3000	5.2 mm	1.86 x 1.86 μm	No

Table 1. Cameras.

Camera Calibration

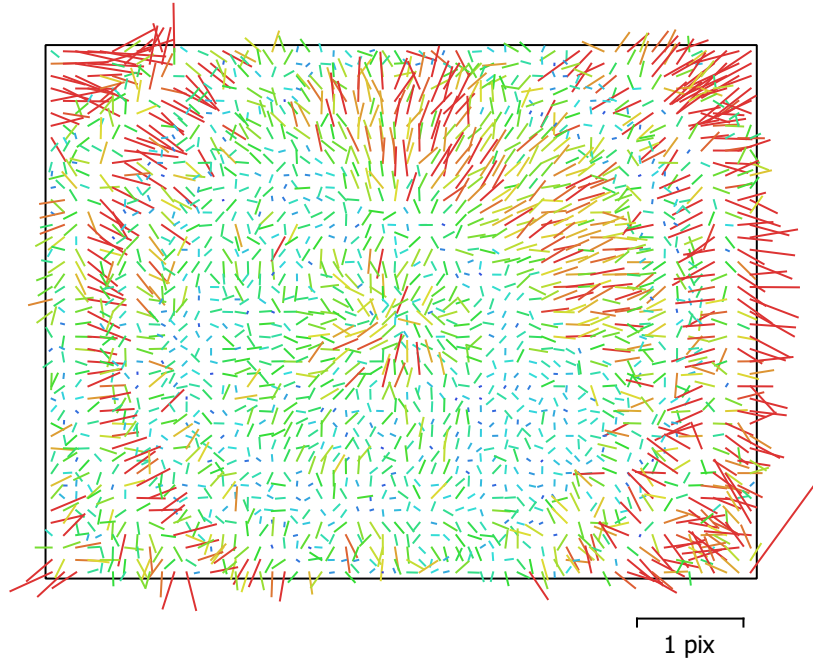


Fig. 2. Image residuals for Canon PowerShot S100 (5.2 mm).

Canon PowerShot S100 (5.2 mm)

136 images

Type	Resolution	Focal Length	Pixel Size
Frame	4000 x 3000	5.2 mm	1.86 x 1.86 μm

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	P1	P2
F	2942.75	0.69	1.00	-0.27	0.03	0.16	0.17	-0.18	0.07	0.01	0.26	-0.12
Cx	43.2948	0.059		1.00	0.03	-0.12	0.00	-0.01	0.00	-0.02	0.30	0.09
Cy	-40.3909	0.063			1.00	-0.20	-0.04	0.02	-0.01	0.01	0.08	0.44
B1	0.125688	0.013				1.00	0.04	-0.03	-0.03	0.05	0.16	0.08
B2	-0.610744	0.013					1.00	-0.03	-0.01	0.02	-0.00	0.06
K1	-0.0419028	8e-05						1.00	-0.82	0.76	-0.06	-0.01
K2	0.0125614	0.00021							1.00	-0.98	0.02	0.00
K3	0.00348592	0.00019								1.00	0.02	-0.01
P1	0.00461493	4.4e-06									1.00	0.03
P2	-0.00349864	4.8e-06										1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

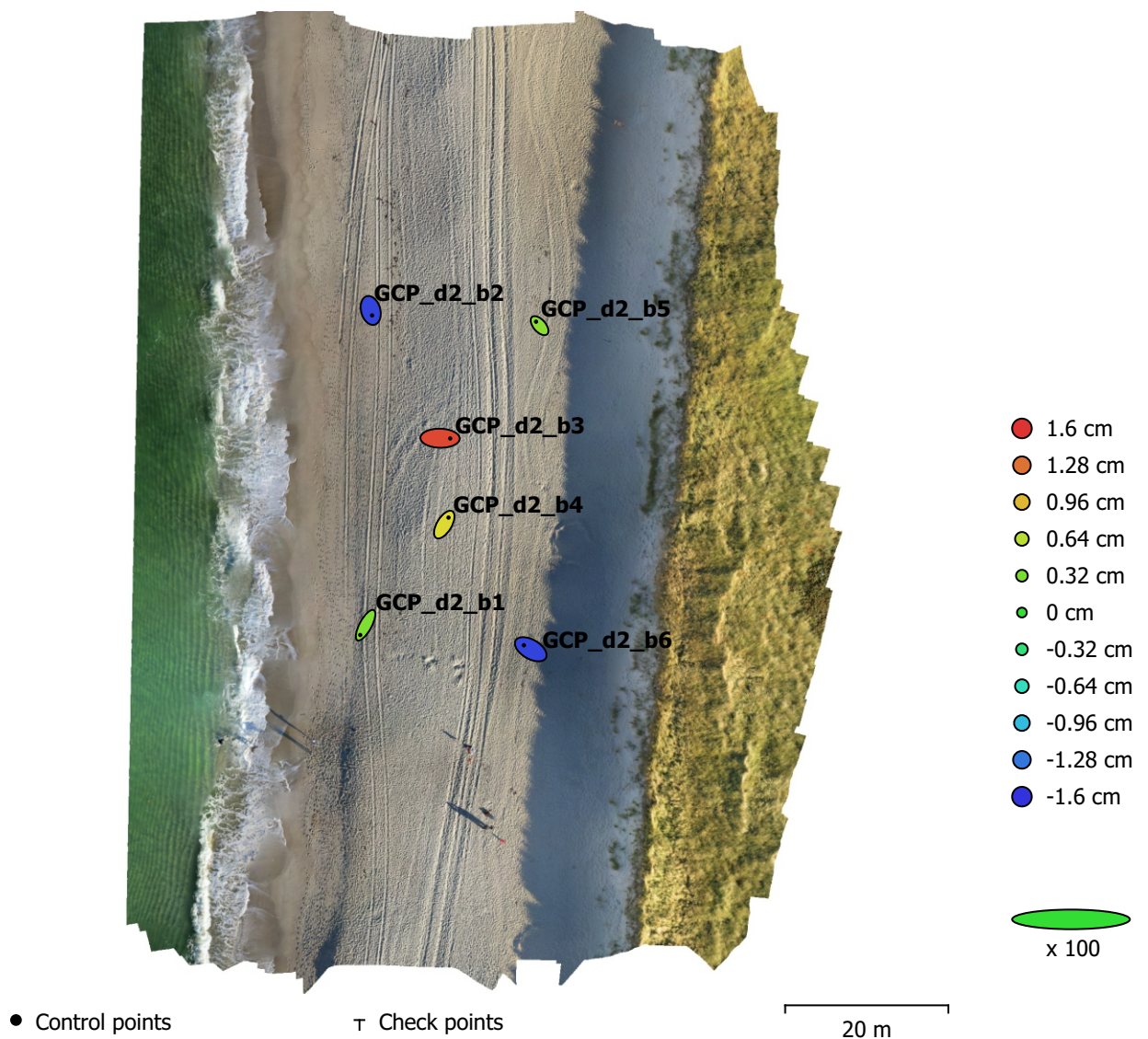


Fig. 3. GCP locations and error estimates.

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	1.45227	1.41995	1.14436	2.0311	2.33129

Table 3. Control points RMSE.

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

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
GCP_d2_b1	-1.30764	-2.39928	0.358205	2.75586	0.557 (19)
GCP_d2_b2	0.337663	-1.21767	-1.52883	1.98345	0.373 (17)
GCP_d2_b3	2.48686	-0.0547029	1.49861	2.90401	0.571 (13)
GCP_d2_b4	1.04014	1.71885	0.808606	2.16568	0.364 (14)
GCP_d2_b5	-0.861997	0.974176	0.414264	1.36516	0.314 (27)
GCP_d2_b6	-1.67964	0.975639	-1.5233	2.46851	0.503 (16)
Total	1.45227	1.41995	1.14436	2.33129	0.446

Table 4. Control points.
X - Easting, Y - Northing, Z - Altitude.

Digital Elevation Model

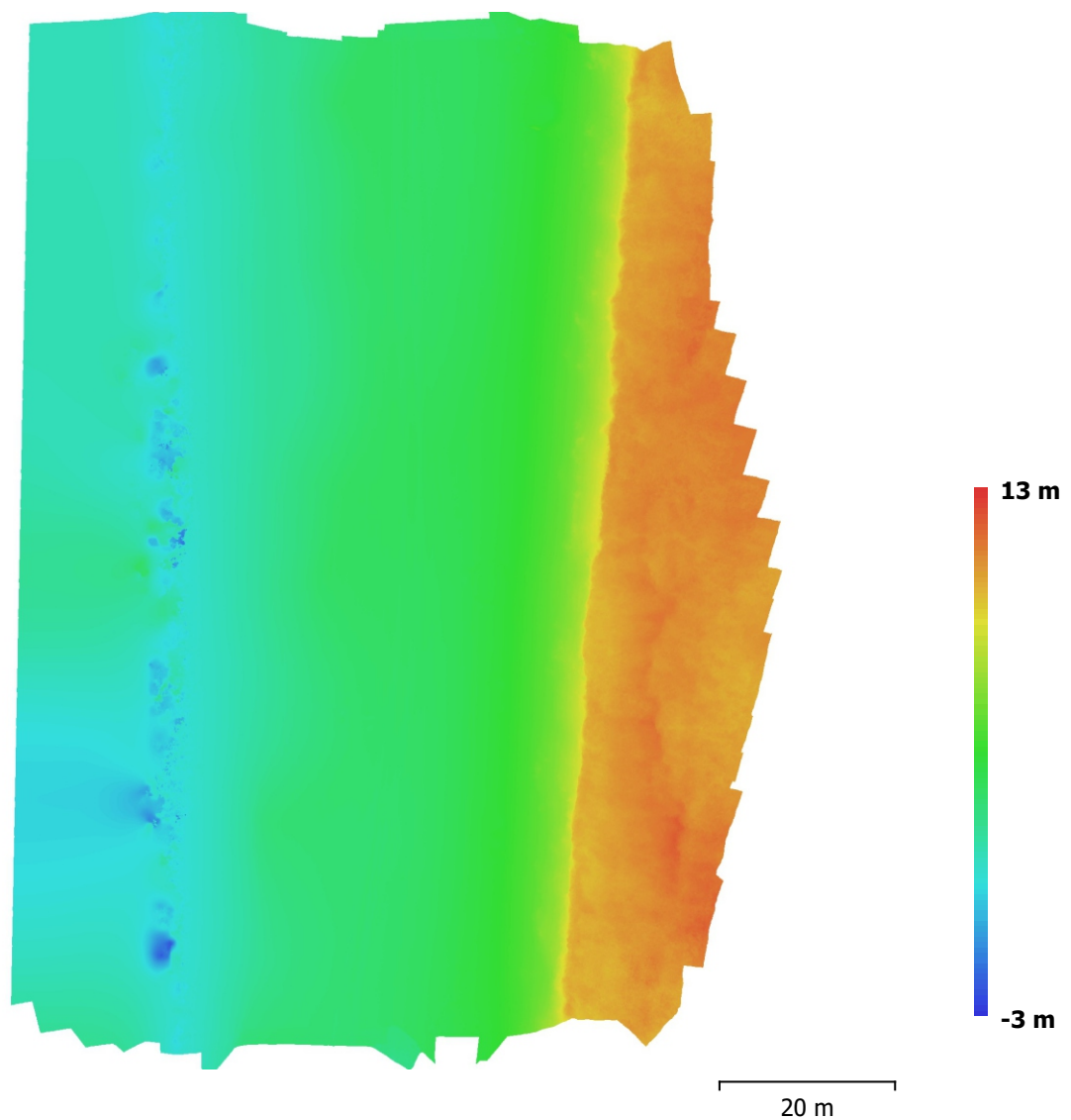


Fig. 4. Reconstructed digital elevation model.

Resolution: 1.65 cm/pix
Point density: 36.7 points/cm²

Processing Parameters

General

Cameras	136
Aligned cameras	135
Markers	6
Coordinate system	ETRS89 / UTM zone 32N (EPSG::25832)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	81,384 of 94,221
RMS reprojection error	0.237472 (1.19079 pix)
Max reprojection error	1.26994 (34.2336 pix)
Mean key point size	5.3536 pix
Effective overlap	6.83865

Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	No
Key point limit	40,000
Tie point limit	4,000
Adaptive camera model fitting	Yes
Matching time	1 minutes 54 seconds
Alignment time	48 seconds

Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k3, p1, p2
Fit rolling shutter	No
Optimization time	2 seconds

Depth Maps

Count	135
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Reconstruction parameters

Quality	High
Filtering mode	Aggressive
Processing time	8 minutes 46 seconds

Dense Point Cloud

Points	32,857,208
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Reconstruction parameters

Quality	High
Depth filtering	Aggressive
Depth maps generation time	8 minutes 46 seconds
Dense cloud generation time	9 minutes 39 seconds

DEM

Size	6,032 x 8,766
Coordinate system	ETRS89 / UTM zone 32N (EPSG::25832)

Reconstruction parameters

Source data	Dense cloud
Interpolation	Enabled
Processing time	1 minutes 26 seconds

Orthomosaic

Size	10,797 x 14,569
Coordinate system	ETRS89 / UTM zone 32N (EPSG::25832)
Channels	3, uint8

Reconstruction parameters

Blending mode	Mosaic
Surface	DEM
Enable color correction	No
Enable hole filling	Yes
Processing time	2 minutes 7 seconds

Software

Version
Platform

1.3.4 build 5067
Windows 64