Picea_abies_5N

Processing Report

07 November 2018

Survey Data

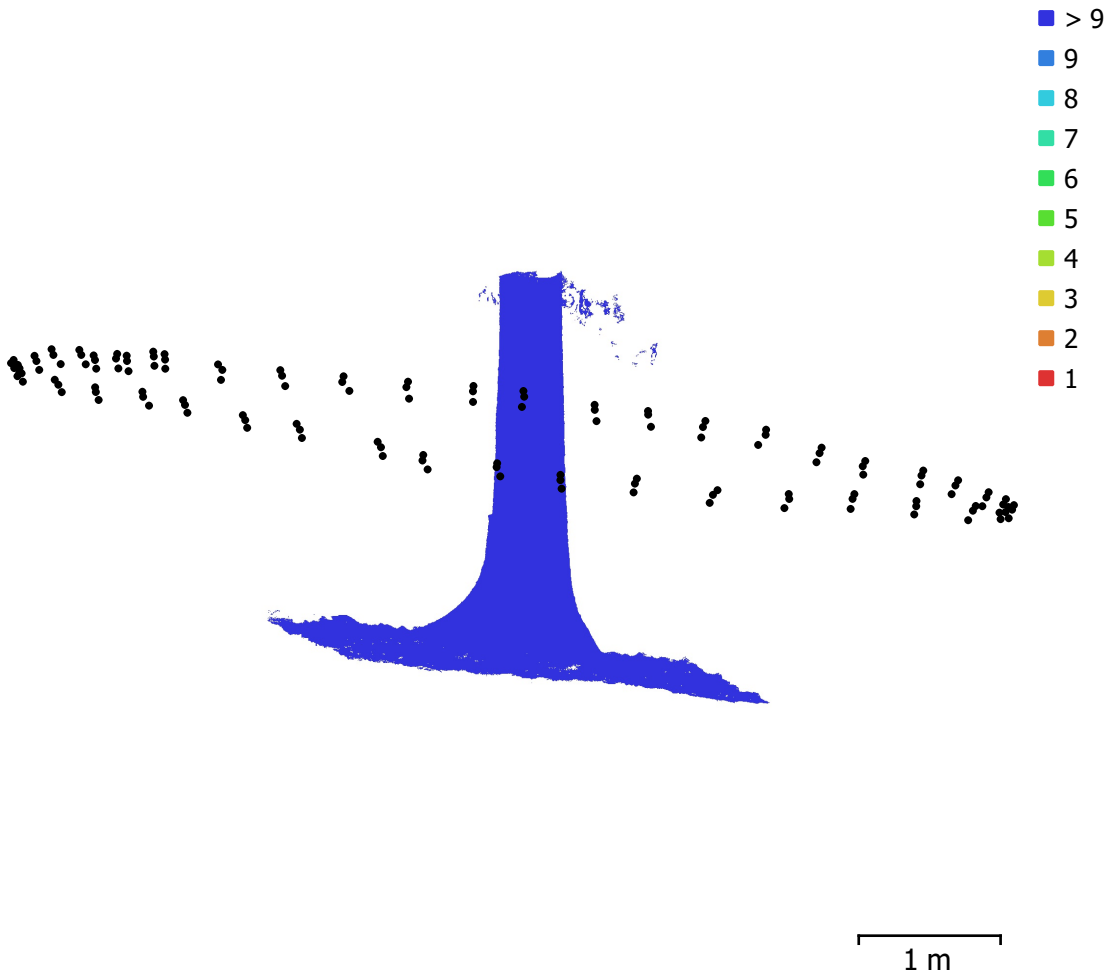

Fig. 1. Camera locations and image overlap.

Number of images:	135	Camera stations:	135
Flying altitude:	3.84 m	Tie points:	106,555
Ground resolution:	0.378 mm/pix	Projections:	430,273
Coverage area:	2.23 m²	Reprojection error:	0.762 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Canon EOS 70D (35 mm)	5472 x 3648	35 mm	4.17 x 4.17 µm	No

Table 1. Cameras.

Camera Calibration

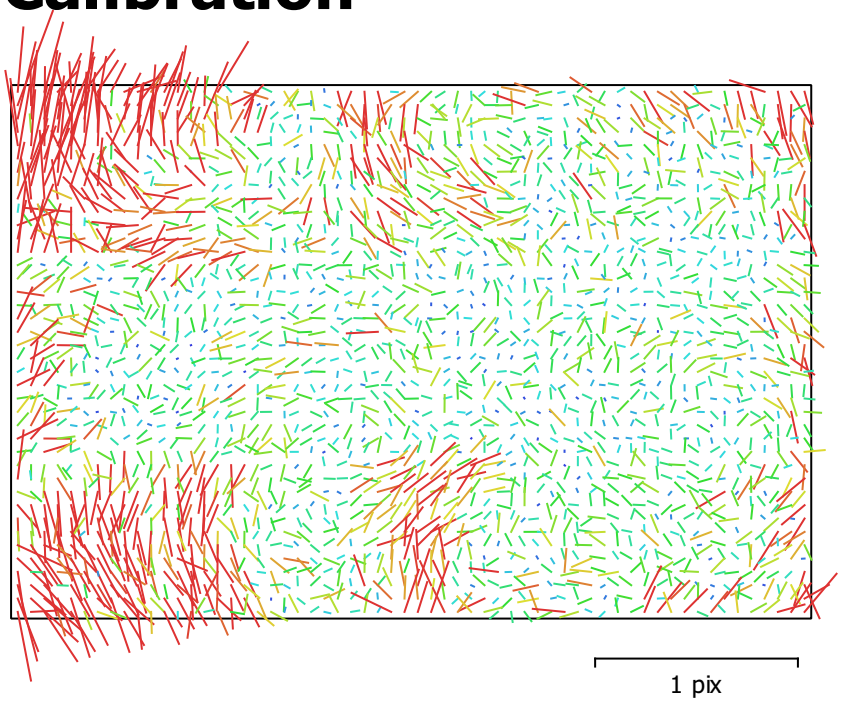

Fig. 2. Image residuals for Canon EOS 70D (35 mm).

Canon EOS 70D (35 mm)

135 images

Type	Resolution	Focal Length	Pixel Size
Frame	**5472 x 3648**	**35 mm**	**4.17 x 4.17 µm**

	Value	Error	F	B1	B2	K1	K2	P1	P2
F	**8452.9**	0.36	1.00	-0.30	0.03	0.12	0.04	-0.09	0.07
B1	**14.3916**	0.41		1.00	0.18	0.25	-0.03	-0.25	-0.10
B2	**2.18909**	0.064			1.00	0.07	-0.01	-0.06	-0.06
K1	**-0.0771074**	8.9e-05				1.00	-0.91	-0.08	-0.02
K2	**0.0886342**	0.00059					1.00	0.01	0.01
P1	**0.0011071**	3.5e-06						1.00	0.03
P2	**0.000511023**	3.1e-06							1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

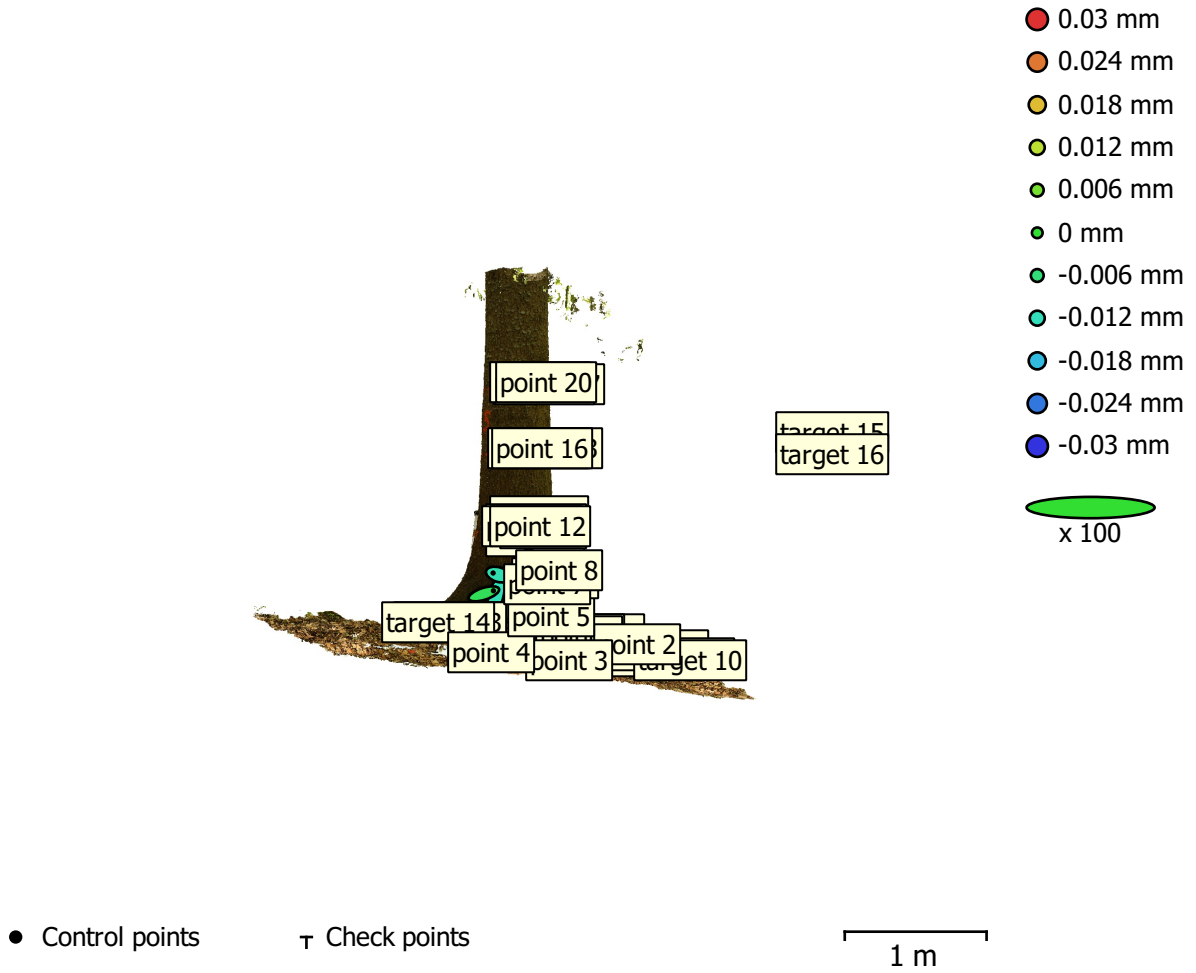

Fig. 3. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
4	0.799297	0.924122	0.0152877	1.22183	1.22193

Table 3. Control points RMSE.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 5	-0.202108	0.885012	0.0258726	0.908165	0.004 (102)
point 6	-0.407008	-1.54629	-0.01157	1.599	0.004 (114)
point 7	1.34463	0.438129	-0.00332225	1.41421	0.004 (121)
point 8	-0.73551	0.223147	-0.0109803	0.768694	0.004 (124)
Total	**0.799297**	**0.924122**	**0.0152877**	**1.22193**	**0.004**

Table 4. Control points.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 1					0.769 (8)
target 2					1.208 (10)
target 4					2.346 (4)
target 5					0.788 (7)
target 6					0.674 (8)
target 8					1.283 (23)
target 9					0.991 (17)
target 10					0.884 (18)
target 11					2.242 (26)
target 12					1.277 (23)
target 13					0.077 (2)
target 15					0.362 (6)
target 16					0.275 (6)
target 14					0.003 (45)
target 7					0.004 (120)
point 1					1.116 (36)
point 2					0.582 (35)
point 3					0.528 (37)
point 4					10.702 (34)
point 9					0.004 (135)
point 10					0.004 (135)
point 11					0.004 (135)
point 12					0.004 (135)

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 13					0.004 (90)
point 14					0.004 (90)
point 15					0.004 (90)
point 16					0.004 (90)
point 17					0.003 (89)
point 18					0.003 (89)
point 19					0.004 (90)
point 20					0.003 (90)
Total					

Table 5. Check points.

Scale Bars

Label	Distance (m)	Error (m)
target 5_target 6	0.147106	-0.000893647
target 8_target 7	0.147812	-0.000187959
target 9_target 10	0.146787	-0.00121347
target 11_target 12	0.146945	-0.00105526
target 13_target 14	0.148532	0.000532499
target 15_target 16	0.146471	-0.00152923
point 1_point 2	0.399354	-0.0026463
point 3_point 4	0.605689	0.00268889
point 5_point 6	0.115583	
point 5_point 7	0.228108	
point 5_point 8	0.353058	
Total		**0.00159198**

Table 6. Check scale bars.

Digital Elevation Model

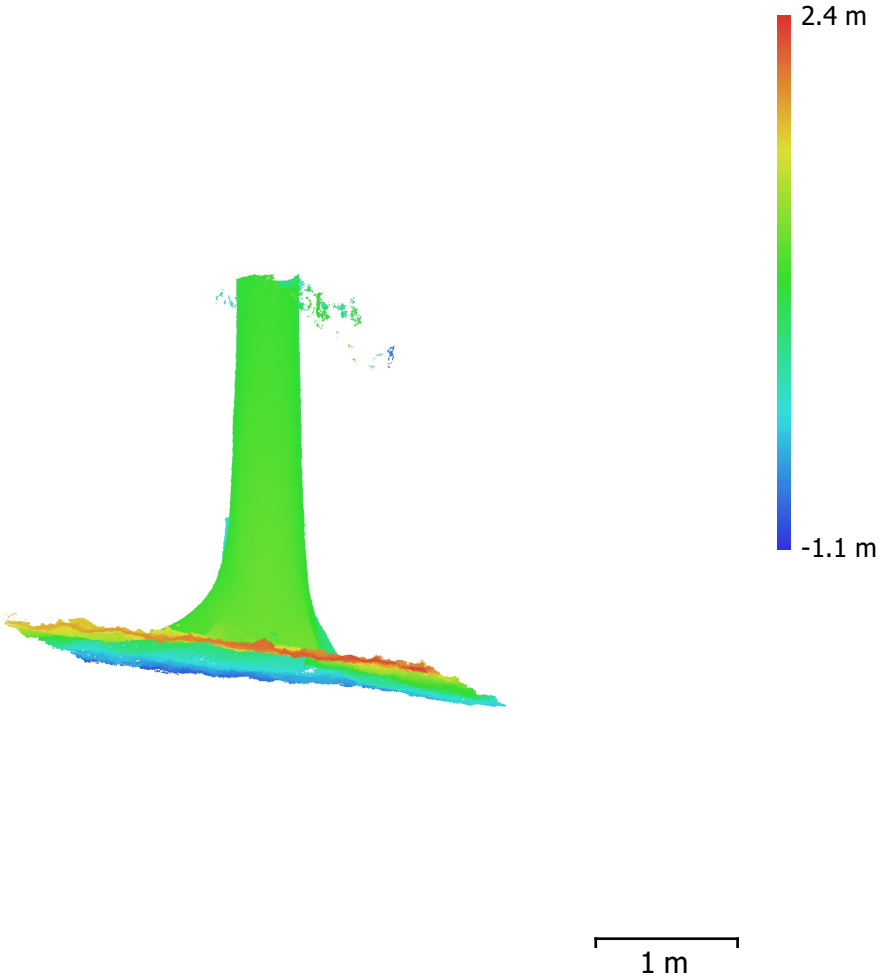

Fig. 4. Reconstructed digital elevation model.

Resolution:	unknown
Point density:	unknown

Processing Parameters

General	
Cameras	135
Aligned cameras	135
Markers	36
Scale bars	11
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	106,555 of 141,262
RMS reprojection error	0.1798 (0.761984 pix)
Max reprojection error	0.544026 (29.4418 pix)
Mean key point size	4.24625 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.27832
Alignment parameters	
Accuracy	High
Generic preselection	Yes
Key point limit	40,000
Tie point limit	4,000
Adaptive camera model fitting	Yes
Matching time	58 minutes 58 seconds
Alignment time	1 minutes 49 seconds
Depth Maps	
Count	135
Reconstruction parameters	
Quality	Medium
Filtering mode	Aggressive
Processing time	5 hours 50 minutes
Dense Point Cloud	
Points	7,200,284
Point colors	3 bands, uint8
Reconstruction parameters	
Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	5 hours 50 minutes
Dense cloud generation time	50 minutes 58 seconds
Software	
Version	1.4.4 build 6848
Platform	Windows 64