Picea_abies_4N

Processing Report

07 November 2018

Survey Data

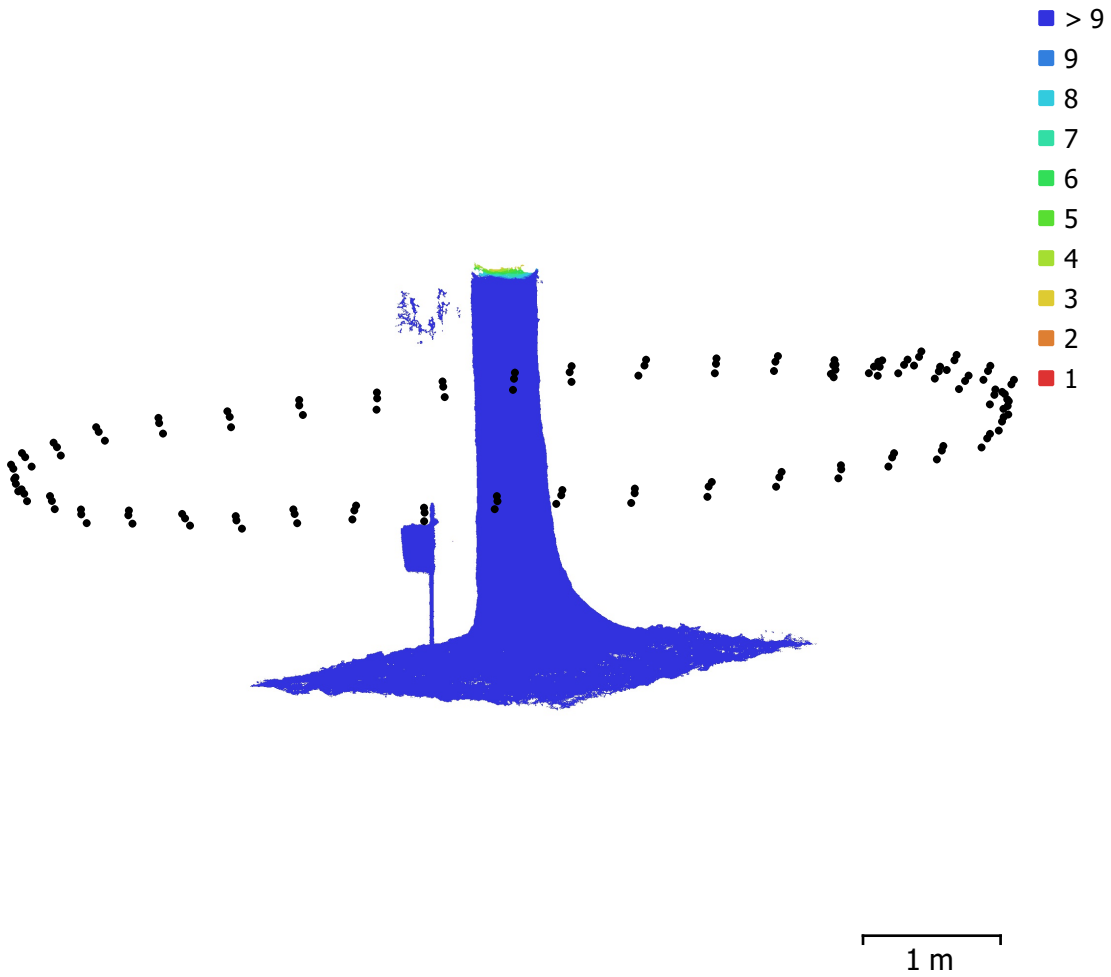

Fig. 1. Camera locations and image overlap.

Number of images:	144	Camera stations:	144
Flying altitude:	4.24 m	Tie points:	119,961
Ground resolution:	0.403 mm/pix	Projections:	449,035
Coverage area:	2.89 m²	Reprojection error:	0.716 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

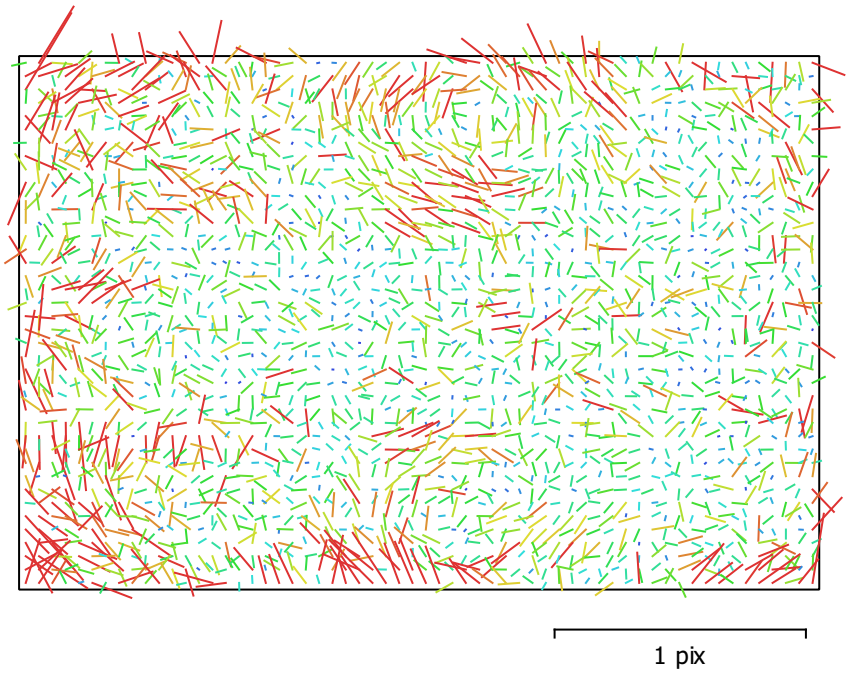

Fig. 2. Image residuals for Canon EOS 70D (35 mm).

Canon EOS 70D (35 mm)

144 images

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

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	P1	P2
F	**8471.74**	0.47	1.00	-0.18	-0.05	-0.36	-0.08	0.22	0.01	-0.23	-0.06
Cx	**-21.6875**	0.26		1.00	-0.01	0.13	0.01	-0.13	0.03	0.85	0.01
Cy	**-26.4741**	0.37			1.00	0.01	0.30	-0.01	-0.00	-0.01	0.94
B1	**3.85035**	0.46				1.00	0.31	0.23	-0.03	-0.03	0.06
B2	**1.59801**	0.087					1.00	0.08	-0.01	-0.05	0.29
K1	**-0.0757186**	9e-05						1.00	-0.88	-0.18	0.00
K2	**0.0891522**	0.00056							1.00	0.04	-0.01
P1	**0.000614923**	6.9e-06								1.00	-0.01
P2	**-0.000136109**	9e-06									1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

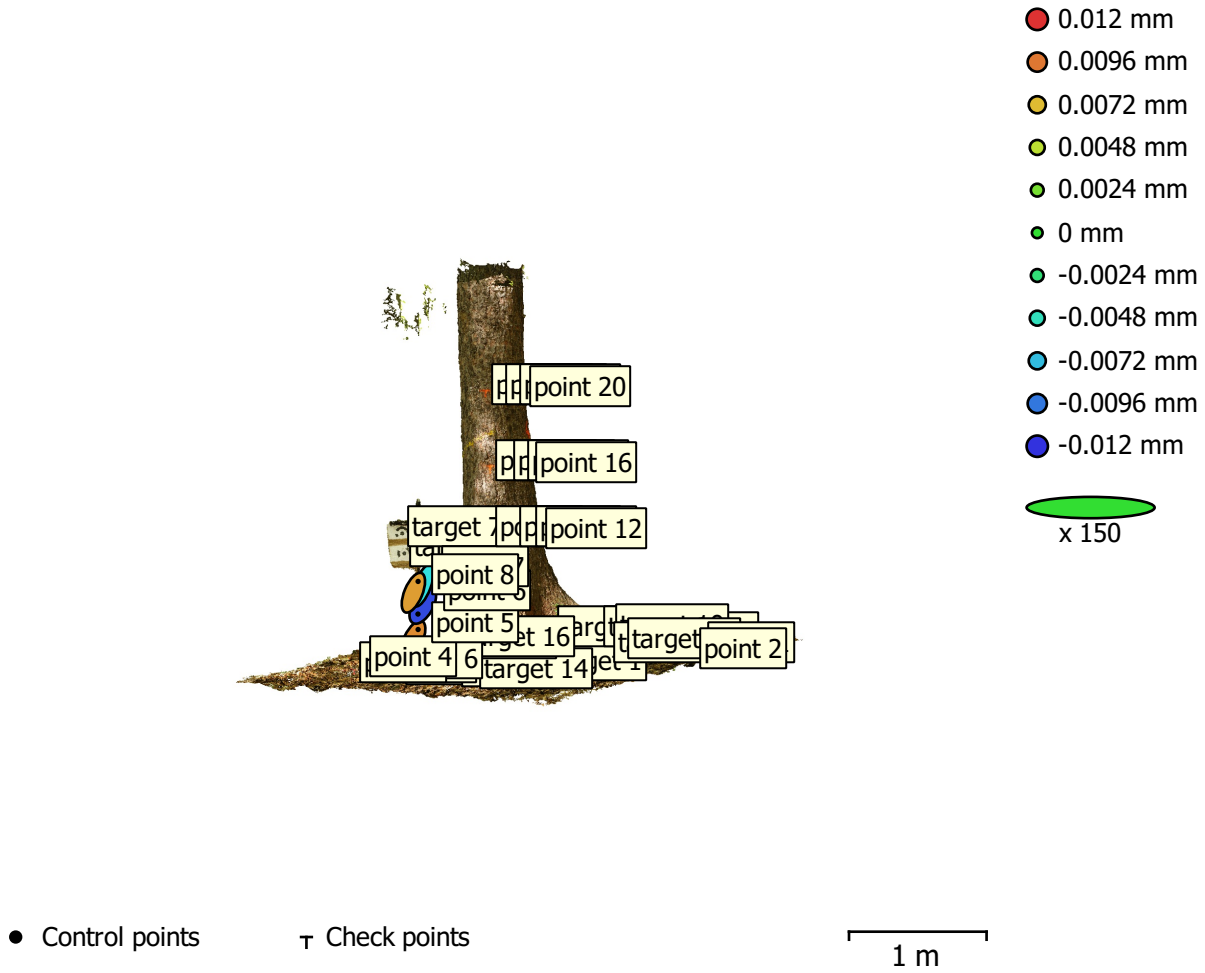

Fig. 3. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
4	0.47309	1.07615	0.00877027	1.17554	1.17558

Table 3. Control points RMSE.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 5	0.489455	1.03506	0.00888243	1.14499	0.004 (110)
point 6	-0.466384	-0.840602	-0.0111615	0.961379	0.004 (117)
point 7	-0.479462	-1.28792	-0.00598776	1.37429	0.004 (127)
point 8	0.45639	1.09346	0.00826683	1.18491	0.004 (134)
Total	**0.47309**	**1.07615**	**0.00877027**	**1.17558**	**0.004**

Table 4. Control points.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 1					1.121 (10)
target 2					0.766 (5)
target 3					0.707 (11)
target 4					0.259 (3)
target 8					0.886 (19)
target 9					0.369 (7)
target 10					0.588 (11)
target 11					0.715 (8)
target 13					0.757 (11)
target 14					0.641 (2)
target 15					0.917 (8)
target 16					1.563 (16)
target 12					0.004 (49)
target 5					1.751 (60)
target 6					0.087 (61)
target 7					0.004 (118)
point 1					6.663 (34)
point 2					1.417 (31)
point 3					4.878 (54)
point 4					3.042 (52)
point 9					0.004 (144)
point 10					0.004 (144)
point 11					0.004 (144)

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 12					0.004 (144)
point 13					0.004 (96)
point 14					0.004 (96)
point 15					0.004 (96)
point 16					0.004 (96)
point 17					0.004 (96)
point 18					0.003 (96)
point 19					0.003 (96)
point 20					0.003 (96)
Total					

Table 5. Check points.

Scale Bars

Label	Distance (m)	Error (m)
target 5_target 6	0.148329	0.000328921
target 8_target 7	0.14952	0.00151986
target 9_target 10	0.14674	-0.00125985
target 11_target 12	0.146532	-0.00146837
target 13_target 14	0.146748	-0.00125237
target 15_target 16	0.145729	-0.00227056
point 1_point 2	0.403581	0.00158054
Total		**0.00148244**

Table 6. Control scale bars.

Label	Distance (m)	Error (m)
point 3_point 4	0.205816	0.00481628
point 5_point 6	0.112291	
point 5_point 7	0.22332	
point 5_point 8	0.349359	
Total		**0.00481628**

Table 7. Check scale bars.

Digital Elevation Model

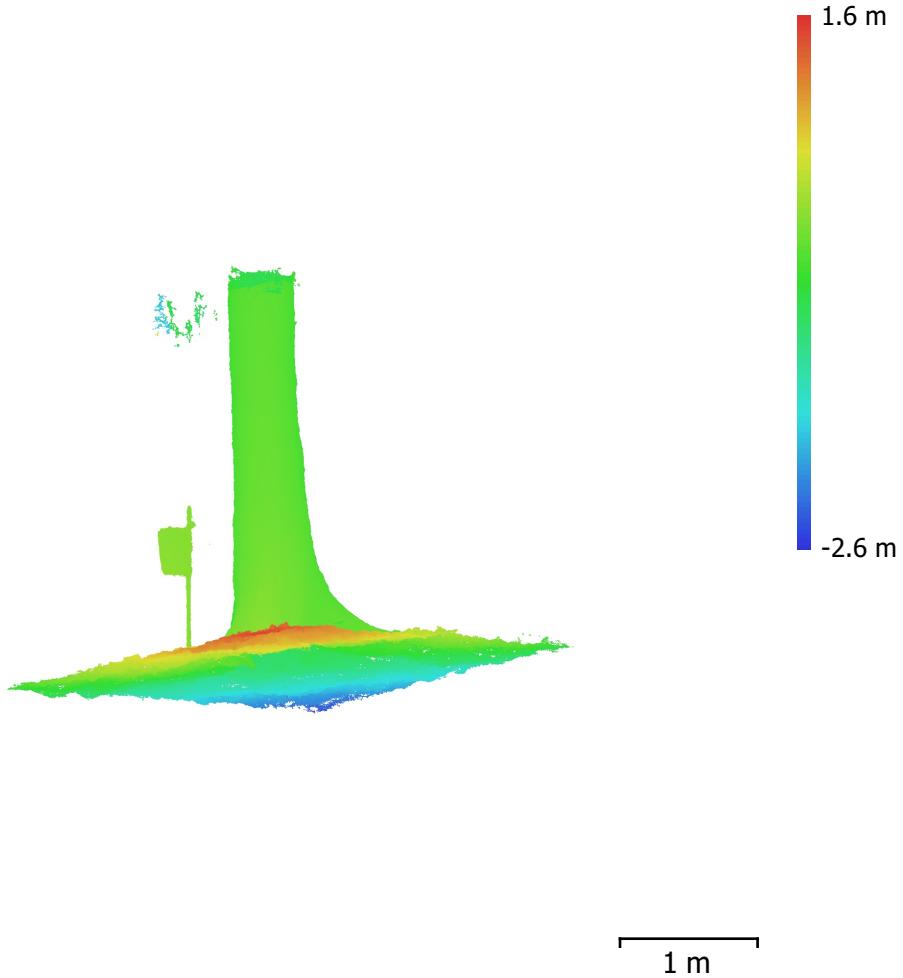

Fig. 4. Reconstructed digital elevation model.

Resolution:	unknown
Point density:	unknown

Processing Parameters

General	
Cameras	144
Aligned cameras	144
Markers	36
Scale bars	11
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	119,961 of 162,686
RMS reprojection error	0.177673 (0.71561 pix)
Max reprojection error	0.54017 (21.3812 pix)
Mean key point size	4.02595 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.01282
Alignment parameters	
Accuracy	High
Generic preselection	Yes
Key point limit	40,000
Tie point limit	4,000
Adaptive camera model fitting	Yes
Matching time	1 hours 9 minutes
Alignment time	1 minutes 57 seconds
Depth Maps	
Count	144
Reconstruction parameters	
Quality	Medium
Filtering mode	Aggressive
Processing time	5 hours 23 minutes
Dense Point Cloud	
Points	6,646,515
Point colors	3 bands, uint8
Reconstruction parameters	
Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	5 hours 23 minutes
Dense cloud generation time	1 hours 3 minutes
Software	
Version	1.4.4 build 6848
Platform	Windows 64