Picea_abies_1F

Processing Report

07 November 2018

Survey Data

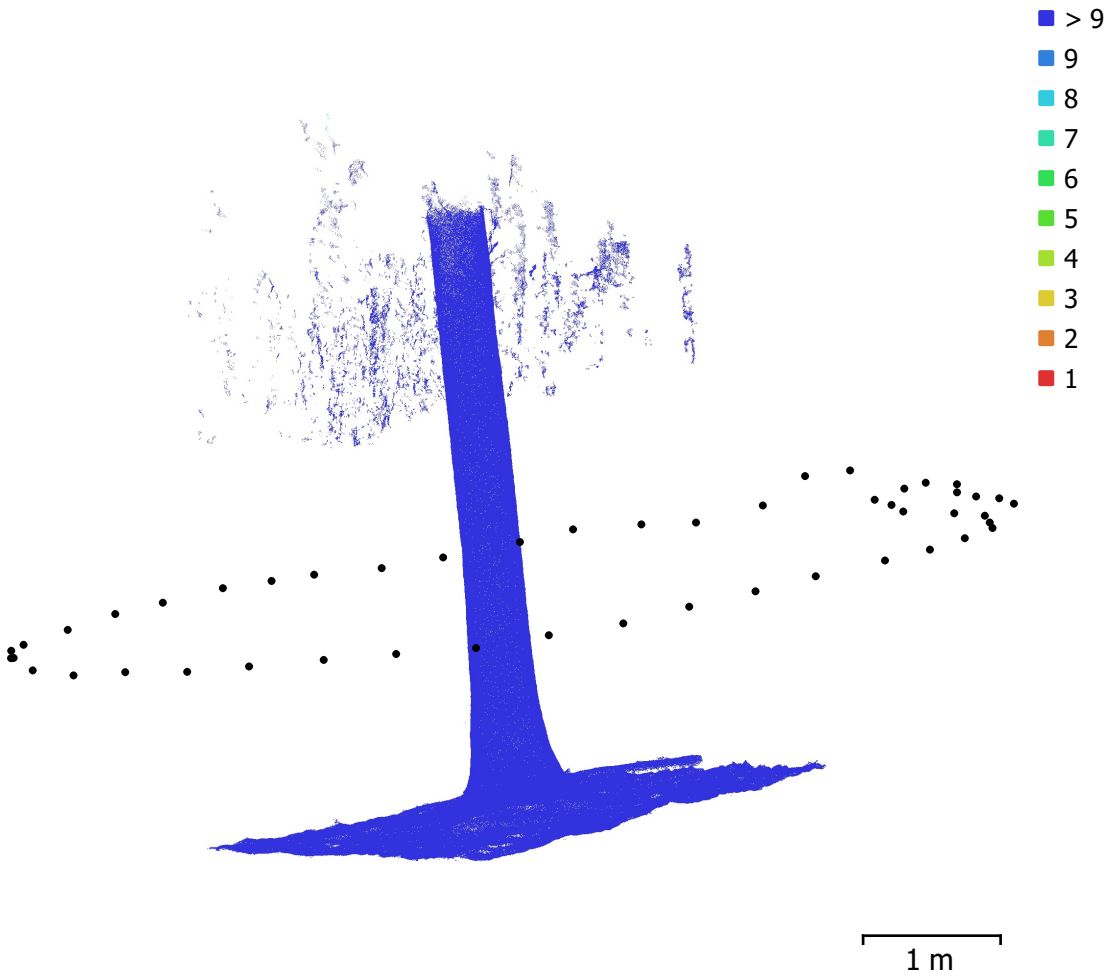

Fig. 1. Camera locations and image overlap.

Number of images:	49	Camera stations:	49
Flying altitude:	3.58 m	Tie points:	61,246
Ground resolution:	0.822 mm/pix	Projections:	165,902
Coverage area:	3.5 m²	Reprojection error:	0.469 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Canon EOS 70D (15 mm)	5472 x 3648	15 mm	4.17 x 4.17 µm	No

Table 1. Cameras.

Camera Calibration

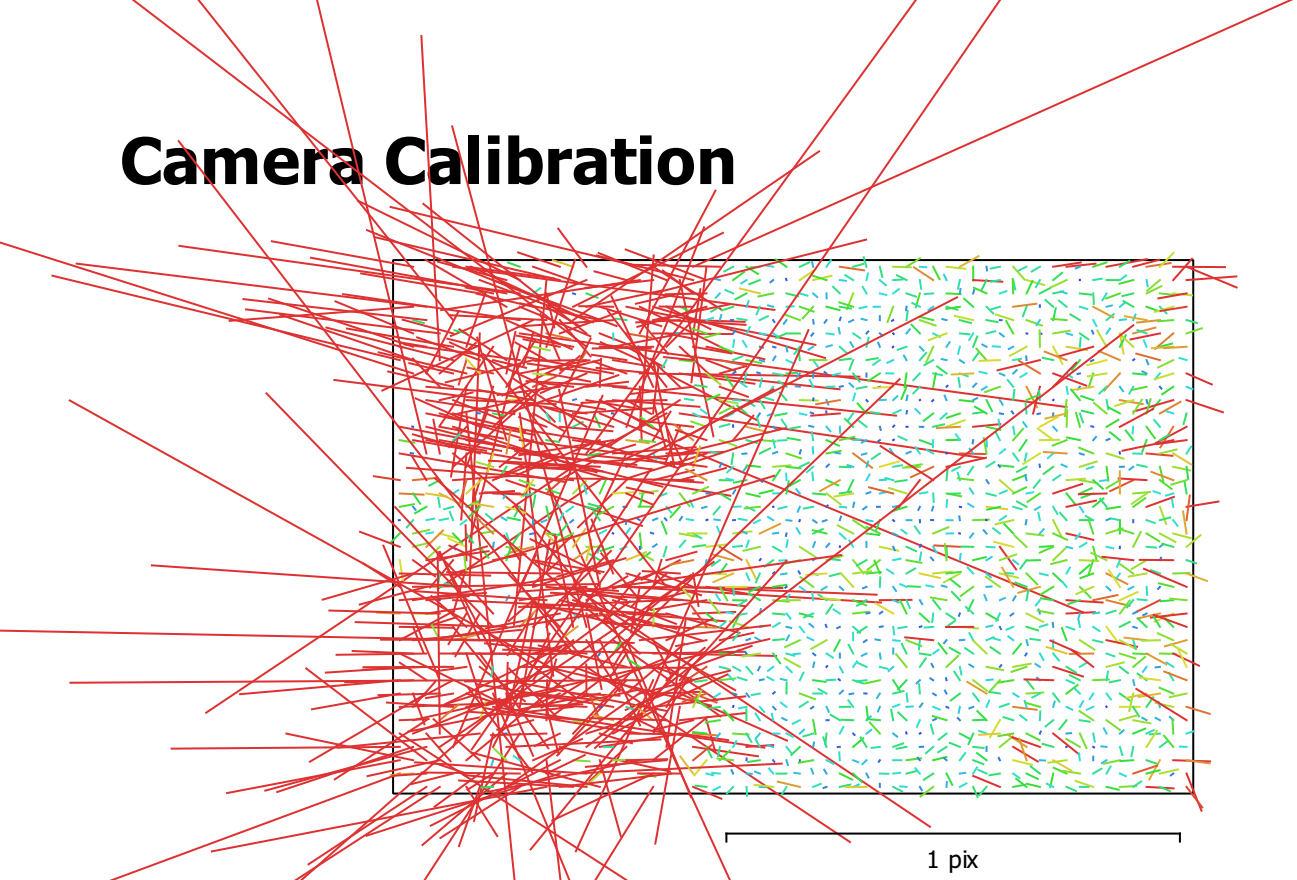

Fig. 2. Image residuals for Canon EOS 70D (15 mm).

Canon EOS 70D (15 mm)

49 images

Type	Resolution	Focal Length	Pixel Size
Fisheye	**5472 x 3648**	**15 mm**	**4.17 x 4.17 µm**

	Value	Error	F	Cx	Cy	B2	K1	K2	P1	P2
F	**3750**	0.17	1.00	-0.78	-0.08	0.01	-0.55	0.34	0.49	0.10
Cx	**14.7395**	0.27		1.00	0.04	-0.05	0.26	-0.09	-0.78	-0.09
Cy	**-47.4063**	0.24			1.00	0.31	0.05	-0.02	-0.06	-0.15
B2	**0.118992**	0.04				1.00	0.05	-0.05	0.05	-0.46
K1	**-0.0372085**	6.1e-05					1.00	-0.88	-0.04	-0.09
K2	**0.00382096**	6.8e-05						1.00	-0.13	0.04
P1	**7.94737e-05**	1.2e-05							1.00	0.07
P2	**-0.000108165**	5.6e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

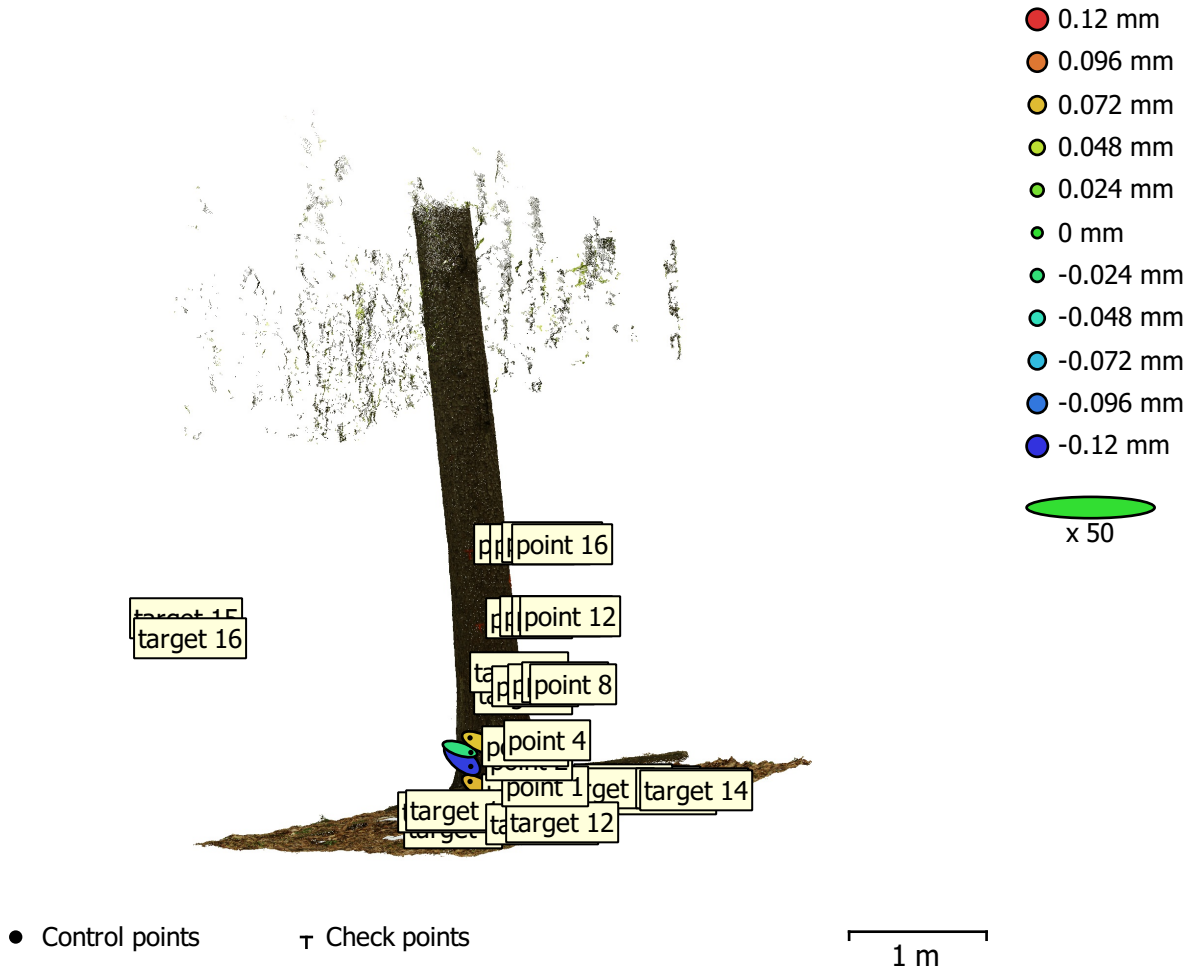

Fig. 3. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
4	2.84366	1.58491	0.0780899	3.25551	3.25645

Table 3. Control points RMSE.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 1	-2.69577	1.69112	0.073991	3.18317	0.004 (49)
point 2	2.50644	-2.07779	-0.116082	3.25775	0.004 (49)
point 3	3.15907	-0.988853	-0.0264787	3.31032	0.004 (49)
point 4	-2.96927	1.3758	0.0688571	3.27324	0.004 (49)
Total	**2.84366**	**1.58491**	**0.0780899**	**3.25645**	**0.004**

Table 4. Control points.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 1					0.225 (17)
target 2					0.286 (15)
target 3					0.099 (18)
target 4					0.179 (18)
target 5					0.139 (5)
target 6					0.221 (28)
target 8					0.290 (27)
target 9					0.178 (26)
target 10					0.229 (24)
target 11					0.127 (25)
target 12					0.212 (15)
target 13					0.221 (34)
target 14					0.159 (21)
target 15					0.167 (17)
target 16					0.156 (18)
target 7					0.065 (49)
point 5					0.004 (49)
point 6					0.004 (49)
point 7					0.004 (49)
point 8					0.004 (49)
point 9					0.004 (49)
point 10					0.004 (49)
point 11					0.004 (49)

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 12					0.004 (49)
point 13					0.004 (49)
point 14					0.004 (49)
point 15					0.004 (49)
point 16					0.004 (49)
Total					

Table 5. Check points.

Scale Bars

Label	Distance (m)	Error (m)
target 5_target 6	0.147583	-0.000416818
target 8_target 7	0.148448	0.000447574
target 9_target 10	0.147864	-0.00013579
target 11_target 12	0.148077	7.74416e-05
target 13_target 14	0.14793	-7.00403e-05
target 15_target 16	0.148079	7.94946e-05
Total		**0.000261318**

Table 6. Control scale bars.

Label	Distance (m)	Error (m)
point 1_point 2	0.10951	
point 1_point 3	0.211306	
point 1_point 4	0.317316	
Total		

Table 7. Check scale bars.

Digital Elevation Model

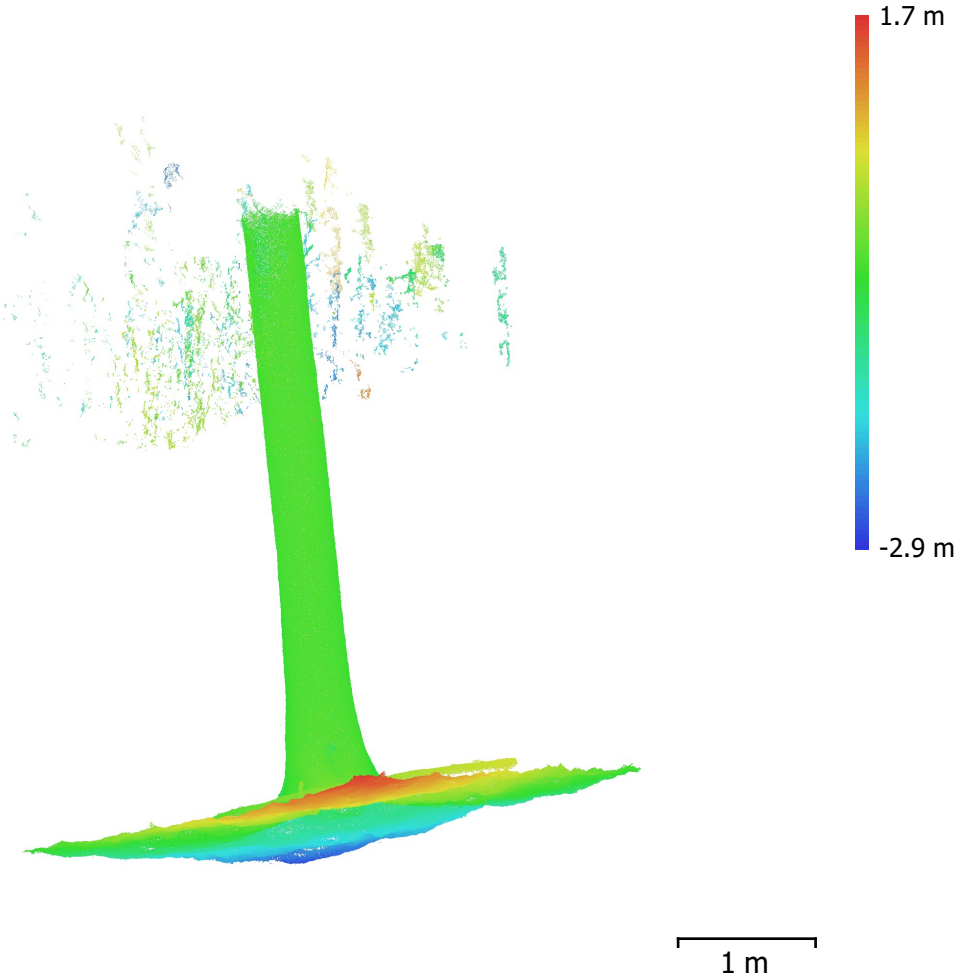

Fig. 4. Reconstructed digital elevation model.

Resolution:	unknown
Point density:	unknown

Processing Parameters

General	
Cameras	49
Aligned cameras	49
Markers	32
Scale bars	9
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	61,246 of 66,337
RMS reprojection error	0.0881559 (0.469442 pix)
Max reprojection error	0.266793 (21.7384 pix)
Mean key point size	4.16983 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.90193
Alignment parameters	
Accuracy	High
Generic preselection	Yes
Key point limit	40,000
Tie point limit	4,000
Adaptive camera model fitting	Yes
Matching time	8 minutes 59 seconds
Alignment time	22 seconds
Depth Maps	
Count	49
Reconstruction parameters	
Quality	Medium
Filtering mode	Aggressive
Processing time	1 hours 44 minutes
Dense Point Cloud	
Points	2,134,404
Point colors	3 bands, uint8
Reconstruction parameters	
Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	1 hours 44 minutes
Dense cloud generation time	31 minutes 4 seconds
Software	
Version	1.4.4 build 6848
Platform	Windows 64