Picea_abies_6F

Processing Report

07 November 2018

Survey Data

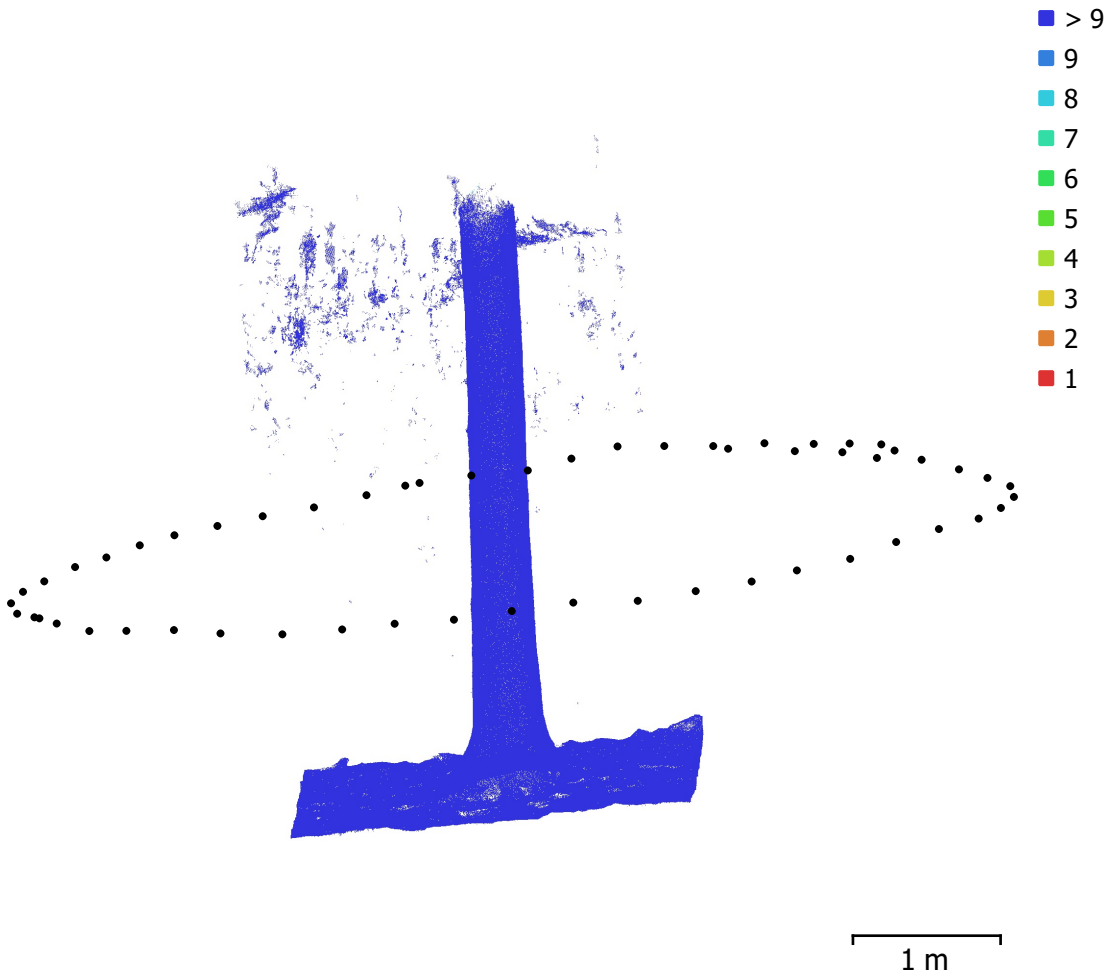

Fig. 1. Camera locations and image overlap.

Number of images:	56	Camera stations:	56
Flying altitude:	3.5 m	Tie points:	68,090
Ground resolution:	0.778 mm/pix	Projections:	188,980
Coverage area:	3 m²	Reprojection error:	0.455 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

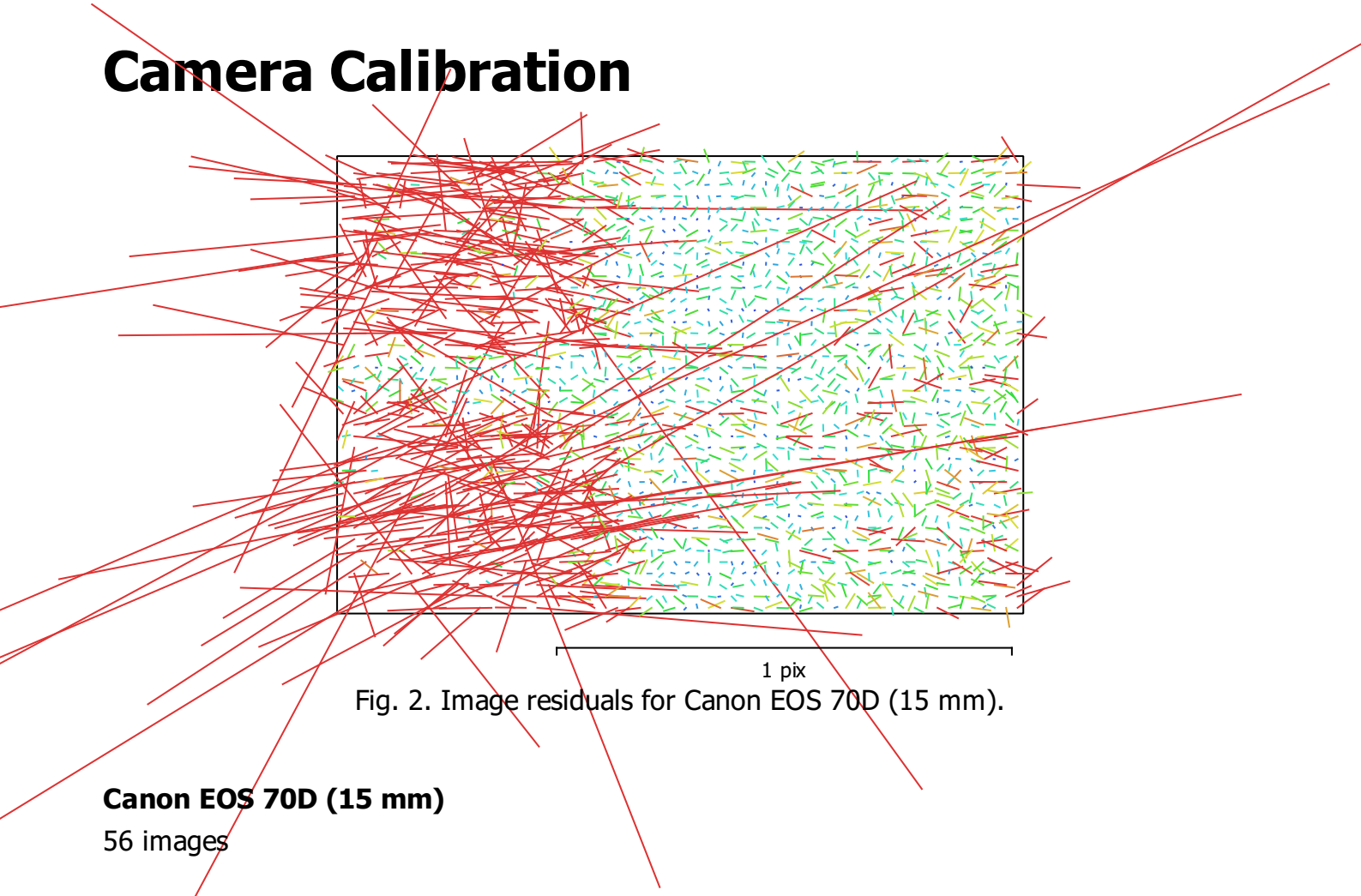

Fig. 2. Image residuals for Canon EOS 70D (15 mm).

Canon EOS 70D (15 mm)

56 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	**3752.92**	0.19	1.00	-0.80	-0.02	0.02	-0.50	0.23	0.47	0.06
Cx	**20.3894**	0.29		1.00	0.05	-0.01	0.27	-0.05	-0.77	-0.05
Cy	**-51.4045**	0.26			1.00	0.33	-0.01	0.00	-0.03	-0.15
B2	**0.121386**	0.038				1.00	0.01	-0.02	0.02	-0.51
K1	**-0.0369423**	5.7e-05					1.00	-0.86	0.00	-0.02
K2	**0.00366266**	6.8e-05						1.00	-0.19	0.01
P1	**-3.43436e-05**	1.6e-05							1.00	0.05
P2	**-8.09614e-05**	4.9e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

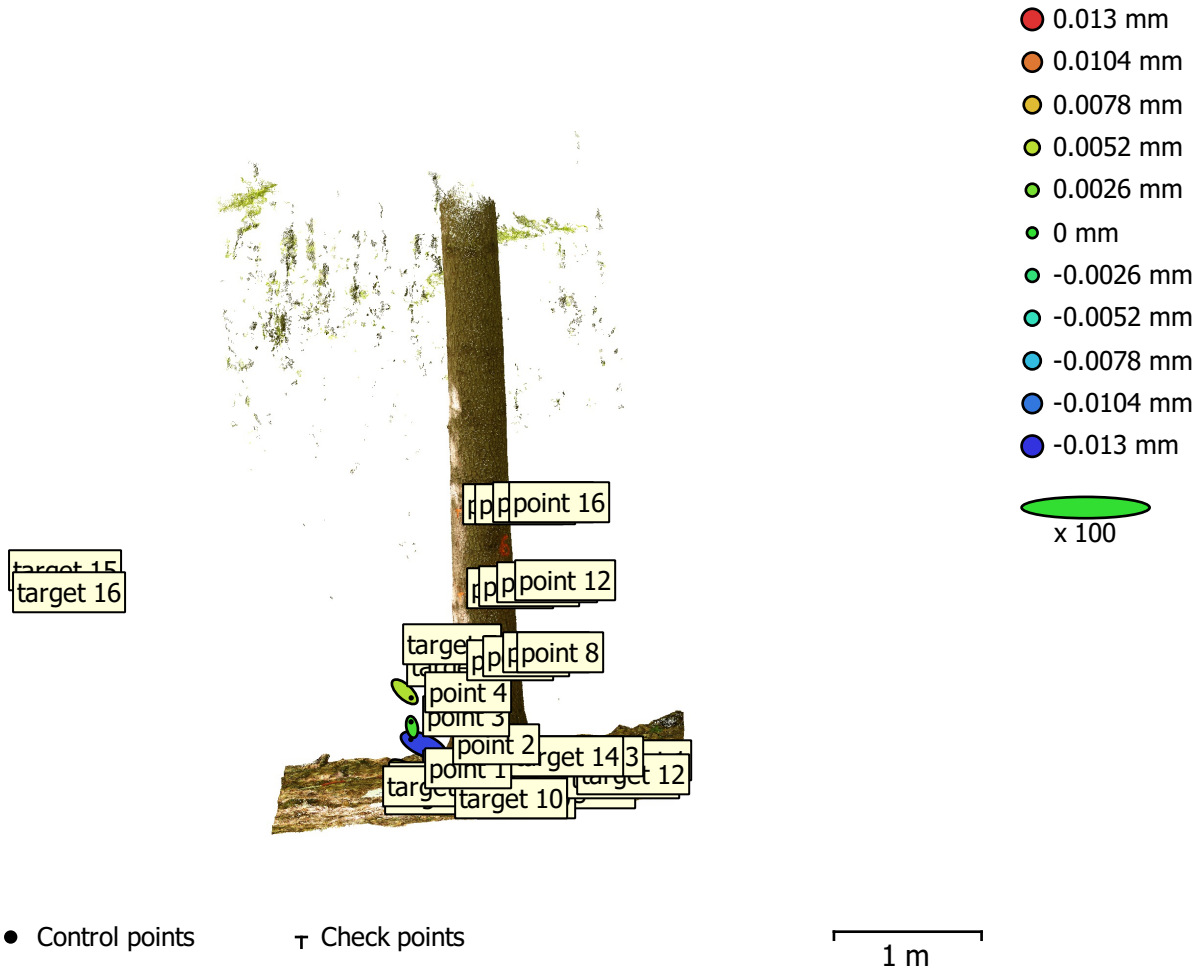

Fig. 3. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
4	1.08157	0.727283	0.0072853	1.30335	1.30337

Table 3. Control points RMSE.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 1	0.966162	-0.620028	0.00597119	1.14802	0.004 (56)
point 2	-1.71691	0.749367	-0.0123905	1.87337	0.004 (56)
point 3	-0.13281	0.69765	0.000846724	0.71018	0.004 (56)
point 4	0.883322	-0.826474	0.00473357	1.20969	0.004 (56)
Total	**1.08157**	**0.727283**	**0.0072853**	**1.30337**	**0.004**

Table 4. Control points.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 1					0.133 (26)
target 2					0.534 (13)
target 3					0.142 (38)
target 4					0.537 (15)
target 5					0.217 (24)
target 6					0.370 (27)
target 8					0.221 (28)
target 9					0.363 (6)
target 10					0.284 (9)
target 11					0.256 (11)
target 12					0.170 (27)
target 13					0.204 (44)
target 14					0.130 (42)
target 15					0.111 (12)
target 16					0.136 (12)
target 7					0.004 (56)
point 5					0.004 (56)
point 6					0.004 (56)
point 7					0.004 (56)
point 8					0.004 (56)
point 9					0.004 (56)
point 10					0.004 (56)
point 11					0.004 (56)

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 12					0.004 (56)
point 13					0.004 (56)
point 14					0.004 (56)
point 15					0.004 (56)
point 16					0.004 (56)
Total					

Table 5. Check points.

Scale Bars

Label	Distance (m)	Error (m)
target 5_target 6	0.147935	-6.49565e-05
target 8_target 7	0.149294	0.00129417
target 9_target 10	0.147545	-0.000455055
target 11_target 12	0.147714	-0.000285951
target 13_target 14	0.1476	-0.000399686
target 15_target 16	0.14789	-0.000109778
Total		**0.000597179**

Table 6. Control scale bars.

Label	Distance (m)	Error (m)
point 1_point 2	0.24113	
point 1_point 3	0.36058	
point 1_point 4	0.52278	
Total		

Table 7. Check scale bars.

Digital Elevation Model

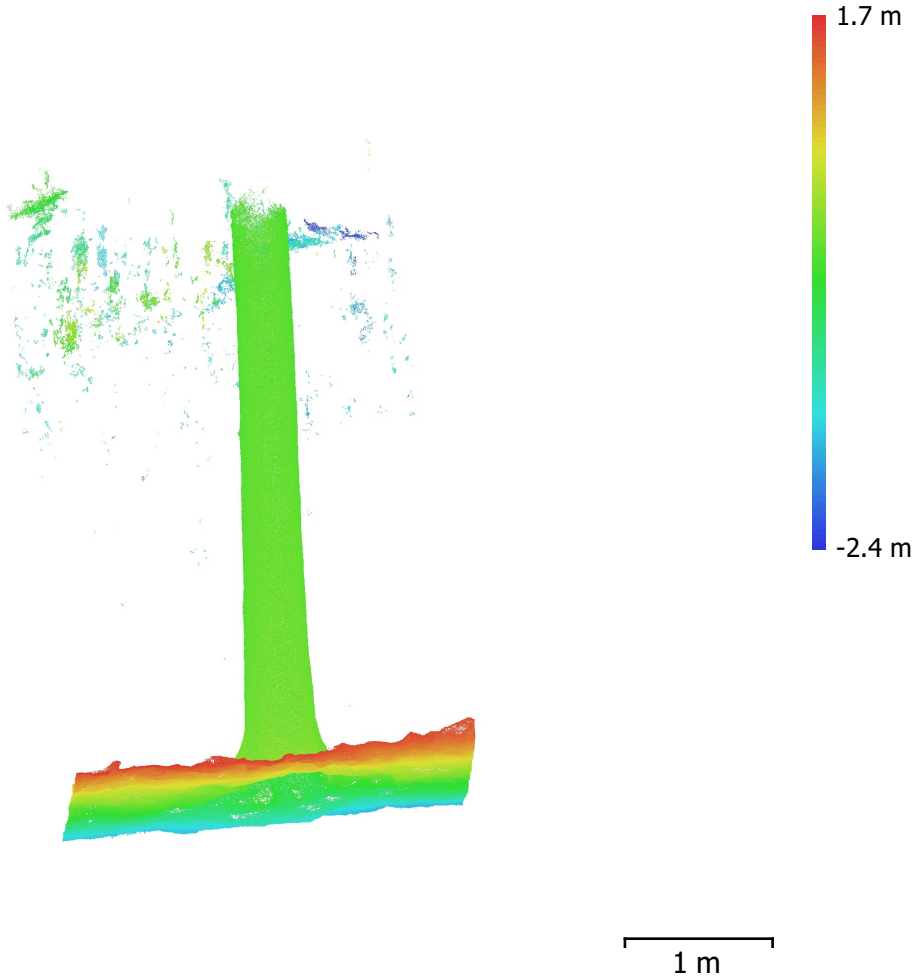

Fig. 4. Reconstructed digital elevation model.

Resolution:	unknown
Point density:	unknown

Processing Parameters

General	
Cameras	56
Aligned cameras	56
Markers	32
Scale bars	9
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	68,090 of 73,203
RMS reprojection error	0.0923723 (0.455452 pix)
Max reprojection error	0.279356 (20.5829 pix)
Mean key point size	3.73145 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.96168
Alignment parameters	
Accuracy	High
Generic preselection	Yes
Key point limit	40,000
Tie point limit	4,000
Adaptive camera model fitting	Yes
Matching time	10 minutes 34 seconds
Alignment time	31 seconds
Depth Maps	
Count	56
Reconstruction parameters	
Quality	Medium
Filtering mode	Aggressive
Processing time	2 hours 1 minutes
Dense Point Cloud	
Points	2,082,732
Point colors	3 bands, uint8
Reconstruction parameters	
Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	2 hours 1 minutes
Dense cloud generation time	51 minutes 23 seconds
Software	
Version	1.4.4 build 6848
Platform	Windows 64