Picea_abies_2F

Processing Report

07 November 2018

Survey Data

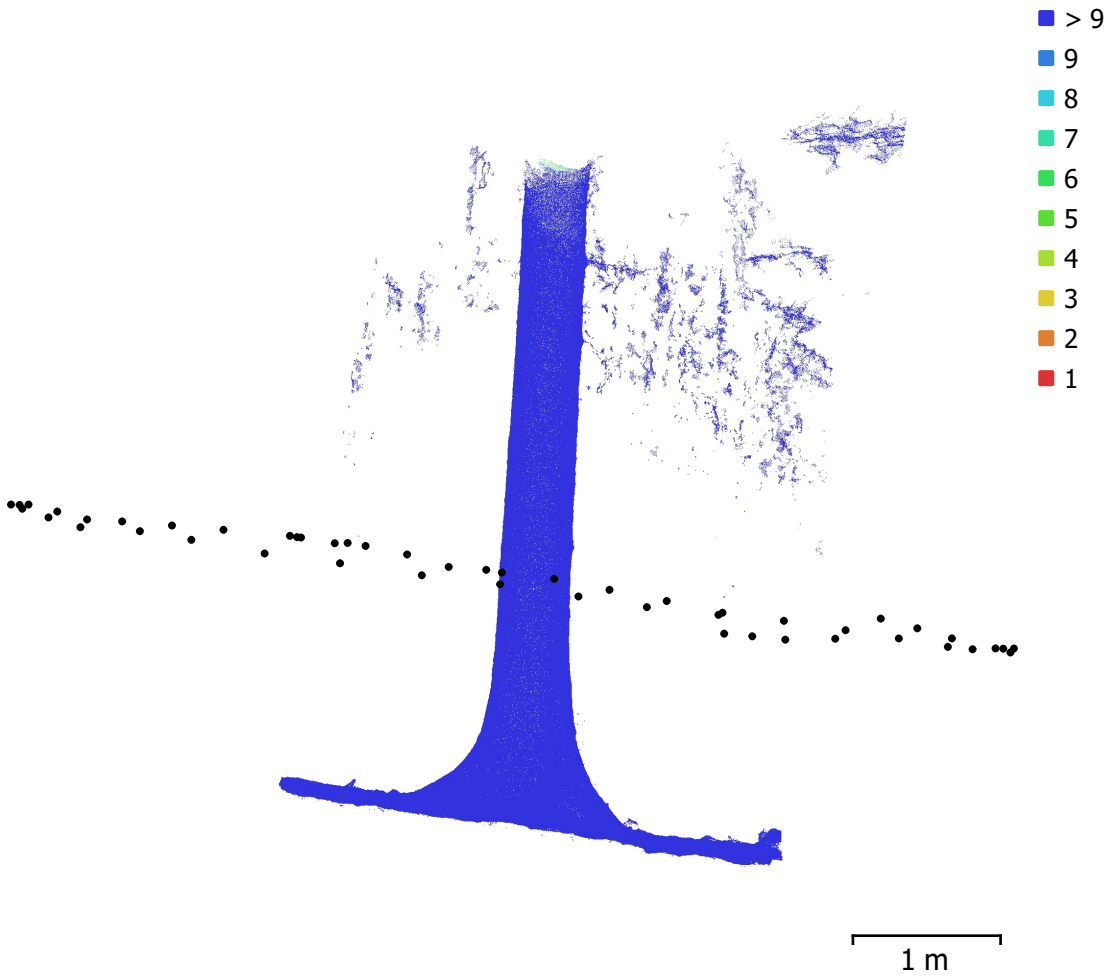

Fig. 1. Camera locations and image overlap.

Number of images:	50	Camera stations:	50
Flying altitude:	3.38 m	Tie points:	56,874
Ground resolution:	0.788 mm/pix	Projections:	167,291
Coverage area:	3.04 m²	Reprojection error:	0.463 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

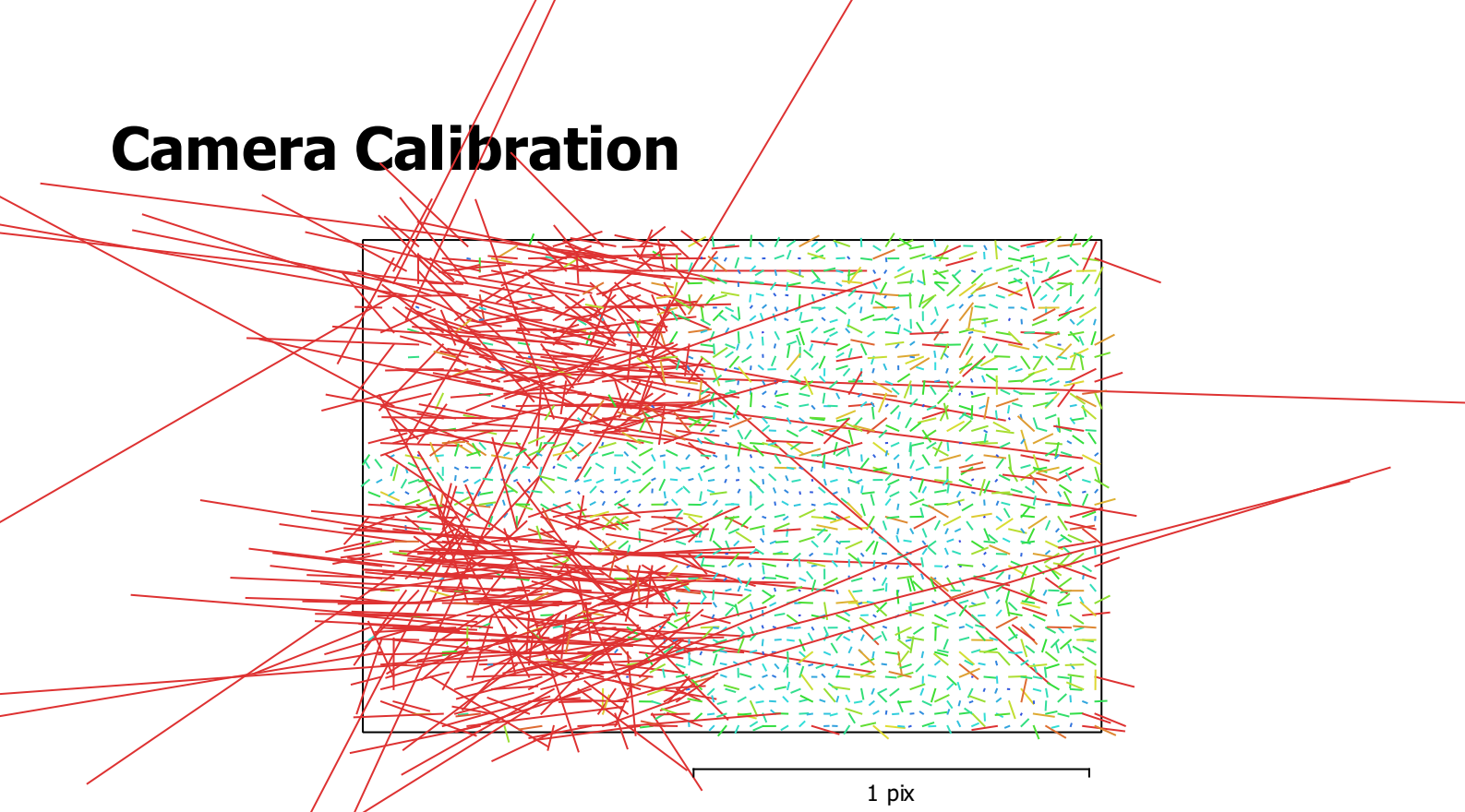

Fig. 2. Image residuals for Canon EOS 70D (15 mm).

Canon EOS 70D (15 mm)

50 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	**3747.77**	0.16	1.00	-0.74	-0.04	0.02	-0.46	0.25	0.46	-0.01
Cx	**15.0998**	0.3		1.00	0.03	-0.05	0.13	0.00	-0.82	-0.00
Cy	**-45.5724**	0.24			1.00	0.42	-0.02	0.04	-0.00	-0.27
B2	**0.324092**	0.037				1.00	0.01	-0.02	0.07	-0.57
K1	**-0.0372884**	5.8e-05					1.00	-0.87	-0.03	-0.03
K2	**0.00394449**	6.9e-05						1.00	-0.13	0.02
P1	**-3.34347e-05**	1.6e-05							1.00	0.03
P2	**-9.83189e-05**	5.4e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

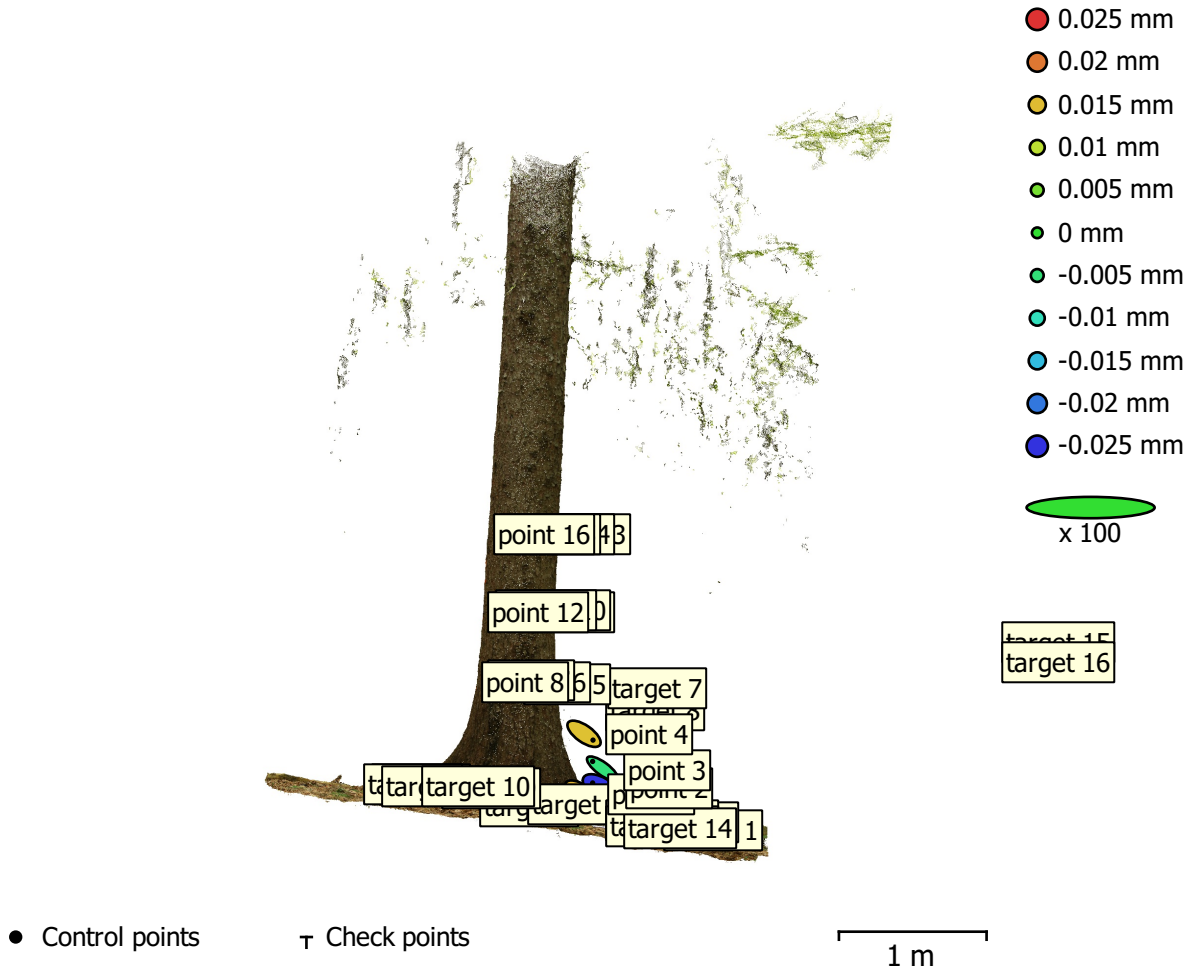

Fig. 3. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
4	1.2784	0.875195	0.0166149	1.54929	1.54937

Table 3. Control points RMSE.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 1	1.33839	-0.88866	0.0157165	1.60662	0.004 (50)
point 2	-1.22269	0.764891	-0.0248447	1.44245	0.004 (50)
point 3	-1.33121	0.978659	-0.00514204	1.65225	0.004 (50)
point 4	1.2161	-0.855171	0.0146119	1.48675	0.004 (50)
Total	**1.2784**	**0.875195**	**0.0166149**	**1.54937**	**0.004**

Table 4. Control points.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 1					0.341 (21)
target 2					0.116 (22)
target 3					0.180 (31)
target 4					0.096 (13)
target 5					0.164 (22)
target 6					0.142 (15)
target 8					0.238 (22)
target 9					0.115 (19)
target 10					0.202 (13)
target 11					0.127 (19)
target 12					0.182 (18)
target 13					0.233 (31)
target 14					0.255 (29)
target 15					0.121 (11)
target 16					0.124 (10)
target 7					0.016 (50)
point 5					0.004 (50)
point 6					0.004 (50)
point 7					0.004 (50)
point 8					0.004 (50)
point 9					0.004 (50)
point 10					0.004 (50)
point 11					0.004 (50)

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 12					0.004 (50)
point 13					0.004 (50)
point 14					0.004 (50)
point 15					0.004 (50)
point 16					0.004 (50)
Total					

Table 5. Check points.

Scale Bars

Label	Distance (m)	Error (m)
target 5_target 6	0.147807	-0.000192736
target 5_target 6	0.147807	-0.000192736
target 8_target 7	0.148282	0.000282015
target 9_target 10	0.14805	4.96416e-05
target 11_target 12	0.148198	0.000197604
target 13_target 14	0.148022	2.15179e-05
target 15_target 16	0.147828	-0.000172033
Total		**0.000179442**

Table 6. Control scale bars.

Label	Distance (m)	Error (m)
point 1_point 2	0.118618	
point 1_point 3	0.2646	
point 1_point 4	0.408922	
Total		

Table 7. Check scale bars.

Digital Elevation Model

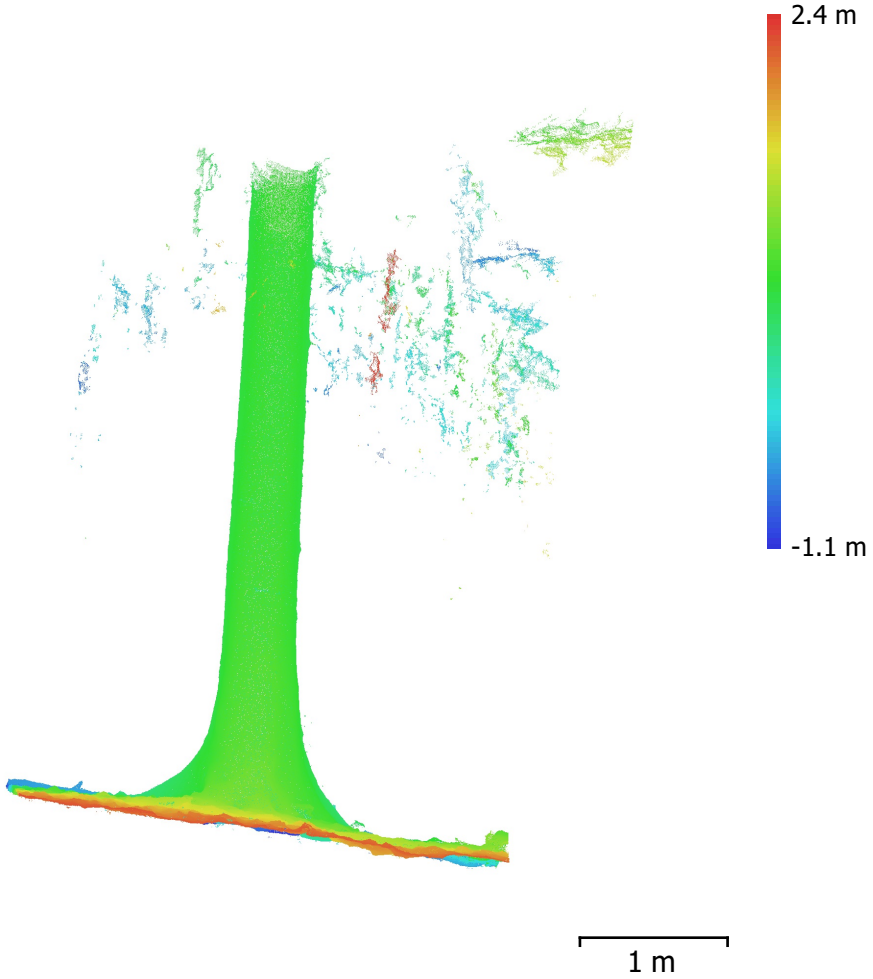

Fig. 4. Reconstructed digital elevation model.

Resolution:	unknown
Point density:	unknown

Processing Parameters

General	
Cameras	50
Aligned cameras	50
Markers	32
Scale bars	10
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	56,874 of 61,909
RMS reprojection error	0.0918014 (0.463009 pix)
Max reprojection error	0.277748 (16.9099 pix)
Mean key point size	4.21996 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	3.14029
Alignment parameters	
Accuracy	High
Generic preselection	Yes
Key point limit	40,000
Tie point limit	4,000
Adaptive camera model fitting	Yes
Matching time	9 minutes 49 seconds
Alignment time	27 seconds
Depth Maps	
Count	50
Reconstruction parameters	
Quality	Medium
Filtering mode	Aggressive
Processing time	1 hours 47 minutes
Dense Point Cloud	
Points	2,444,565
Point colors	3 bands, uint8
Reconstruction parameters	
Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	1 hours 47 minutes
Dense cloud generation time	33 minutes 4 seconds
Software	
Version	1.4.4 build 6848
Platform	Windows 64