Picea_abies_10F

Processing Report

07 November 2018

Survey Data

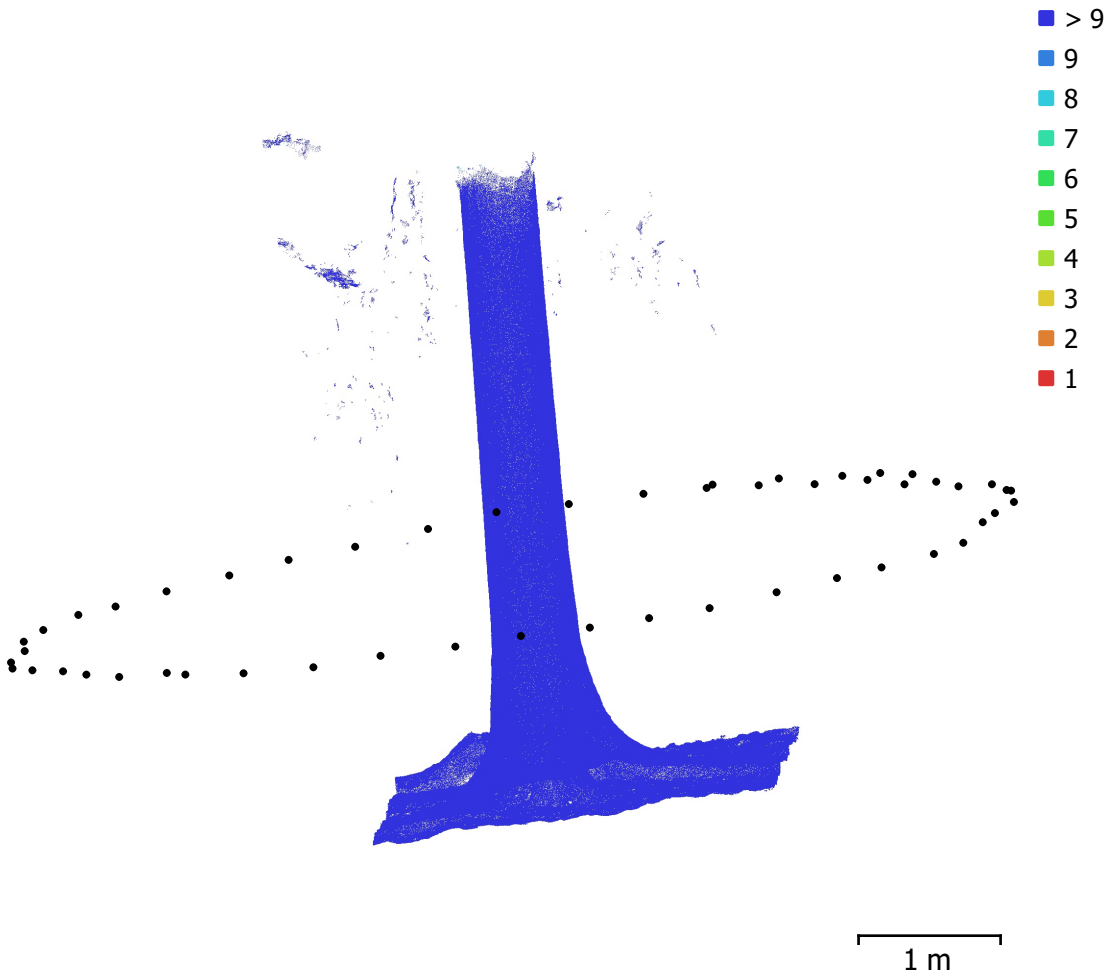

Fig. 1. Camera locations and image overlap.

Number of images:	52	Camera stations:	52
Flying altitude:	3.34 m	Tie points:	61,604
Ground resolution:	0.803 mm/pix	Projections:	178,484
Coverage area:	3.74 m²	Reprojection error:	0.39 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

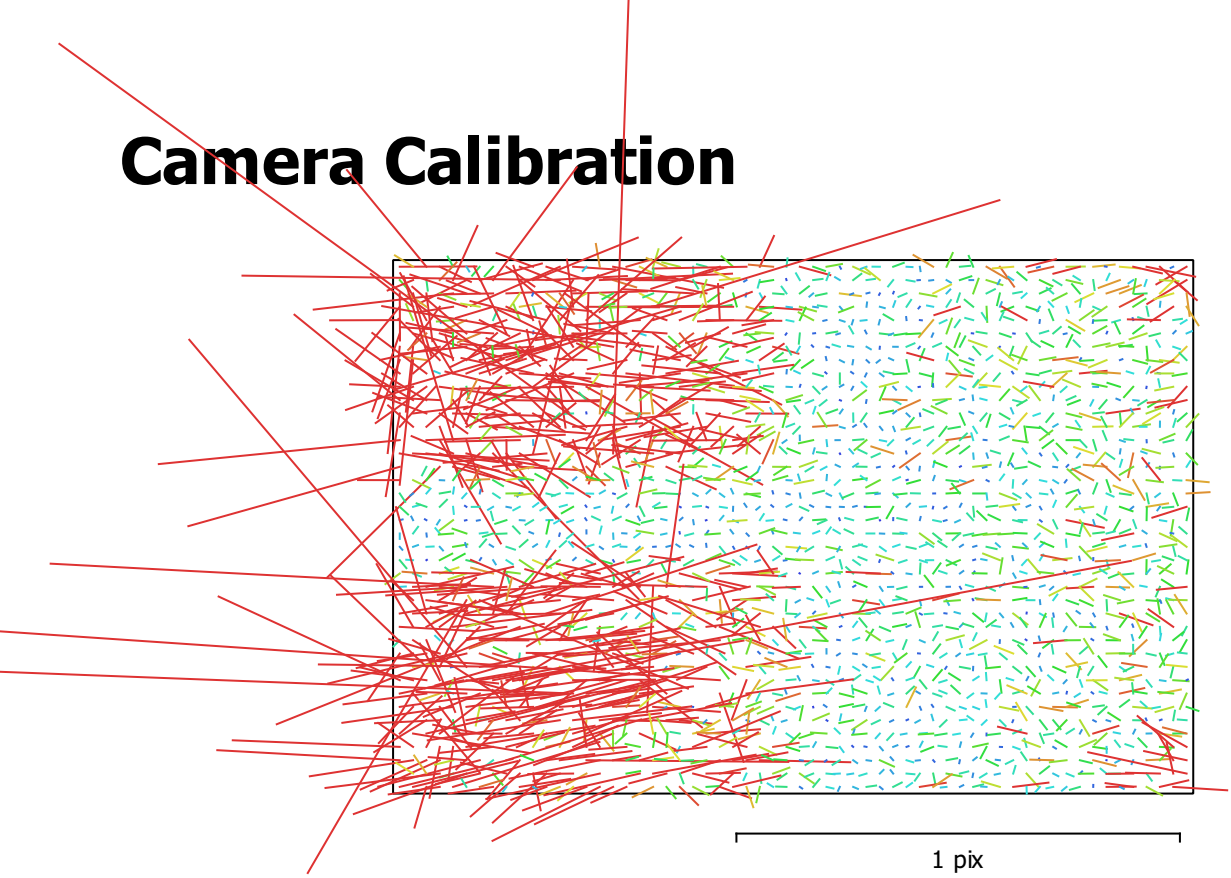

Fig. 2. Image residuals for Canon EOS 70D (15 mm).

Canon EOS 70D (15 mm)

52 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	**3751.52**	0.13	1.00	-0.66	0.07	0.05	-0.34	0.24	0.33	-0.05
Cx	**9.99688**	0.26		1.00	-0.06	-0.02	-0.02	0.04	-0.75	0.04
Cy	**-51.8781**	0.16			1.00	0.36	-0.04	-0.01	0.10	-0.02
B2	**0.15552**	0.029				1.00	-0.04	0.00	0.03	-0.40
K1	**-0.0369753**	5.1e-05					1.00	-0.91	0.04	0.02
K2	**0.00324589**	5.7e-05						1.00	-0.03	0.02
P1	**0.000166095**	1.3e-05							1.00	-0.08
P2	**-0.000163808**	4.5e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

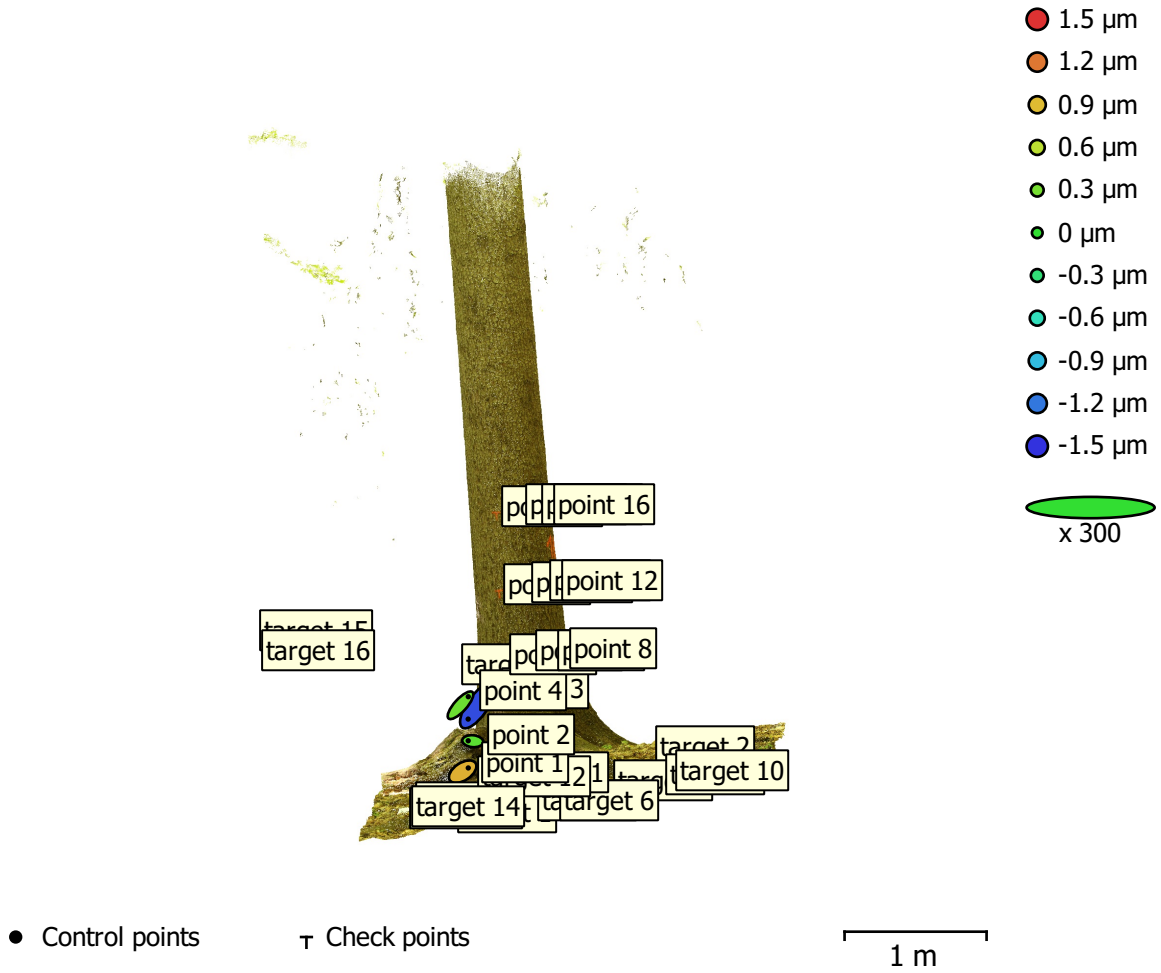

Fig. 3. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
4	0.323716	0.370796	0.000856057	0.492222	0.492222

Table 3. Control points RMSE.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 1	0.262872	0.175395	0.000956487	0.316016	0.004 (52)
point 2	-0.215262	0.0201722	0.000178268	0.216205	0.004 (52)
point 3	-0.412776	-0.597616	-0.00138617	0.726313	0.004 (52)
point 4	0.365165	0.402049	0.000251426	0.543129	0.004 (52)
Total	**0.323716**	**0.370796**	**0.000856057**	**0.492222**	**0.004**

Table 4. Control points.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 1					0.189 (21)
target 2					0.224 (27)
target 3					0.197 (9)
target 4					0.239 (7)
target 5					0.154 (21)
target 6					0.121 (14)
target 8					0.259 (21)
target 9					0.189 (19)
target 10					0.127 (13)
target 11					0.207 (8)
target 12					0.125 (12)
target 13					0.152 (17)
target 14					0.462 (4)
target 15					0.381 (21)
target 16					0.400 (22)
point 5					0.004 (52)
point 6					0.004 (52)
point 7					0.004 (52)
point 8					0.004 (52)
point 9					0.004 (52)
point 10					0.004 (52)
point 11					0.004 (52)
point 12					0.004 (52)

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 13					0.004 (52)
point 14					0.004 (52)
point 15					0.004 (52)
point 16					0.004 (52)
Total					

Table 5. Check points.

Scale Bars

Label	Distance (m)	Error (m)
target 5_target 6	0.147103	-0.000897251
target 9_target 10	0.147889	-0.000111111
target 11_target 12	0.148425	0.000424561
target 13_target 14	0.148336	0.000336211
target 15_target 16	0.148241	0.000241439
Total		**0.000483526**

Table 6. Control scale bars.

Label	Distance (m)	Error (m)
point 1_point 2	0.191424	
point 1_point 3	0.343909	
point 1_point 4	0.501591	
Total		

Table 7. Check scale bars.

Digital Elevation Model

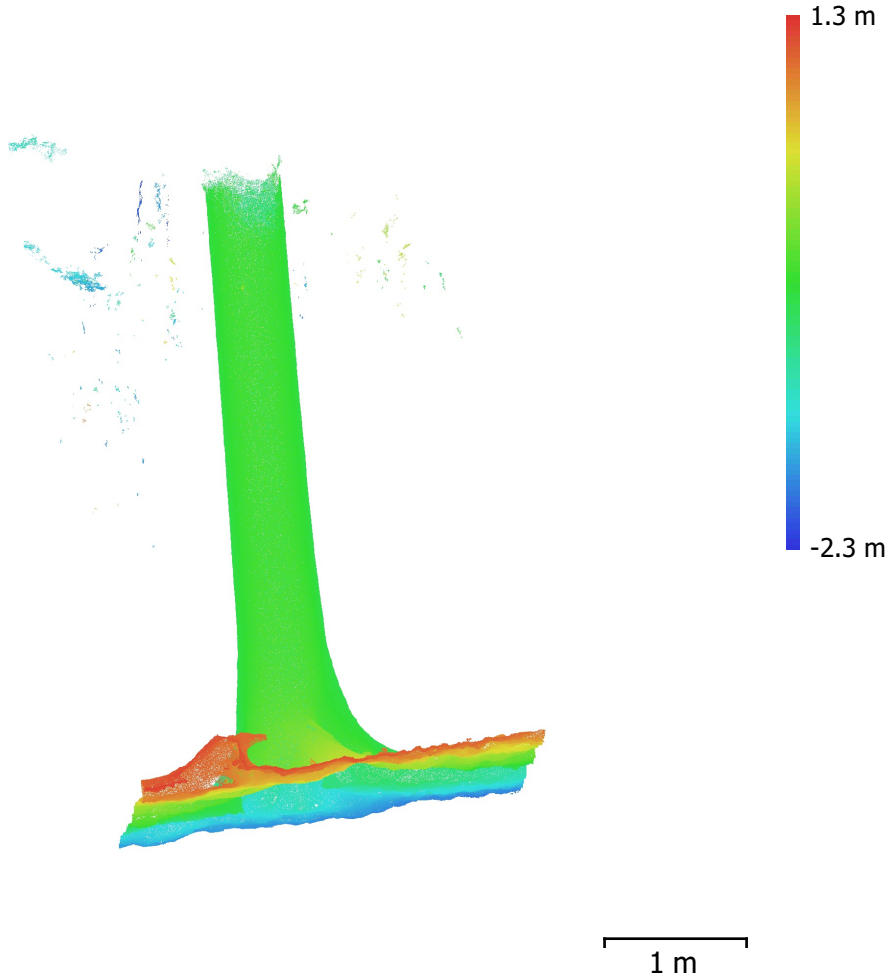

Fig. 4. Reconstructed digital elevation model.

Resolution:	unknown
Point density:	unknown

Processing Parameters

General	
Cameras	52
Aligned cameras	52
Markers	31
Scale bars	8
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	61,604 of 67,054
RMS reprojection error	0.0966905 (0.390464 pix)
Max reprojection error	0.292669 (13.9435 pix)
Mean key point size	3.40426 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	3.0882
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 36 seconds
Alignment time	24 seconds
Depth Maps	
Count	52
Reconstruction parameters	
Quality	Medium
Filtering mode	Aggressive
Processing time	1 hours 30 minutes
Dense Point Cloud	
Points	2,174,305
Point colors	3 bands, uint8
Reconstruction parameters	
Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	1 hours 30 minutes
Dense cloud generation time	27 minutes 39 seconds
Software	
Version	1.4.4 build 6848
Platform	Windows 64