Picea_abies_3N

Processing Report

07 November 2018

Survey Data

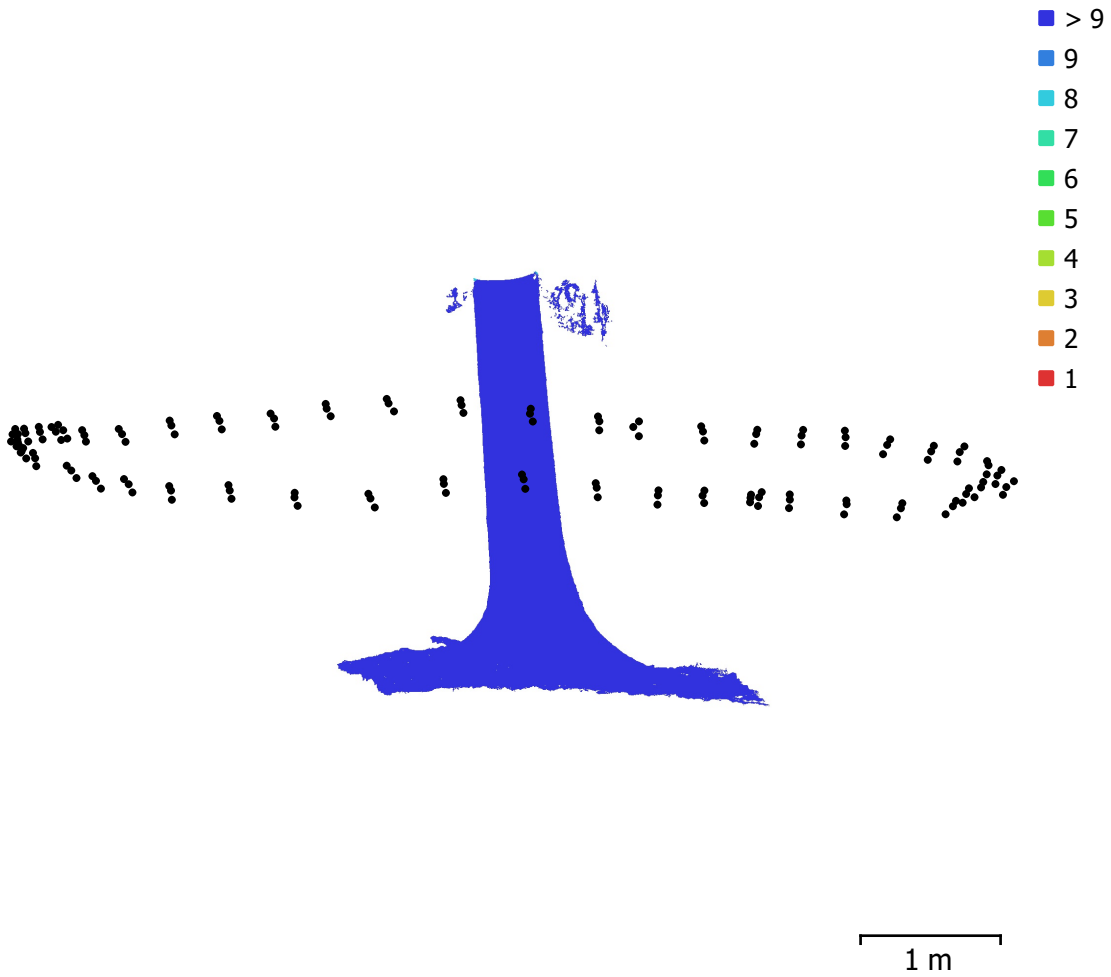

Fig. 1. Camera locations and image overlap.

Number of images:	150	Camera stations:	150
Flying altitude:	4.11 m	Tie points:	96,694
Ground resolution:	0.401 mm/pix	Projections:	436,202
Coverage area:	2.29 m²	Reprojection error:	0.834 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

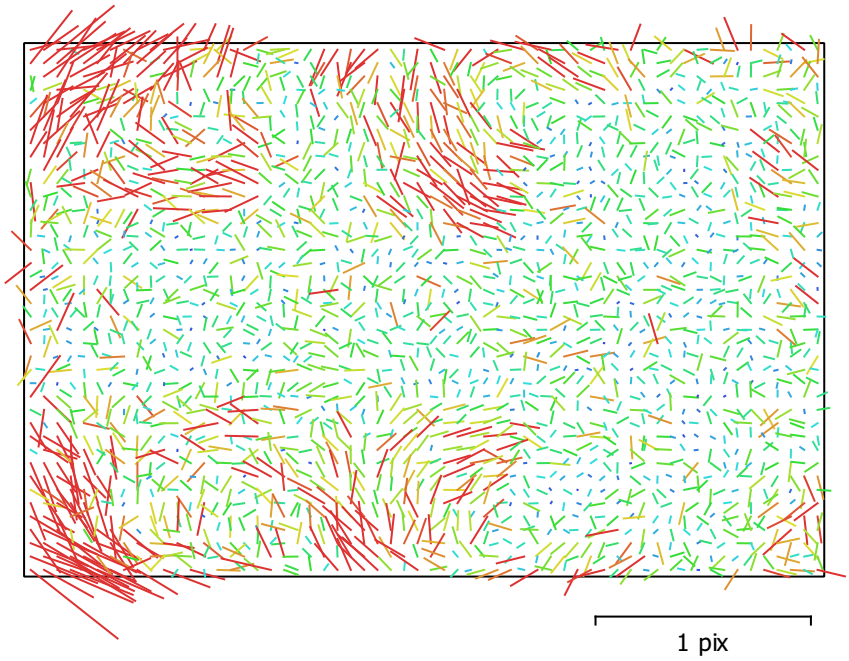

Fig. 2. Image residuals for Canon EOS 70D (35 mm).

Canon EOS 70D (35 mm)

150 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	**8464.73**	0.36	1.00	-0.23	0.00	-0.42	-0.07	0.13	0.03	-0.25	0.01
Cx	**-10.5139**	0.24		1.00	0.00	0.12	0.03	-0.11	0.01	0.85	-0.00
Cy	**-21.4027**	0.28			1.00	-0.00	0.41	-0.01	0.01	0.00	0.92
B1	**2.14376**	0.34				1.00	0.20	0.16	-0.03	0.01	-0.04
B2	**0.949017**	0.06					1.00	0.04	-0.01	0.01	0.34
K1	**-0.0766344**	8.7e-05						1.00	-0.93	-0.12	-0.01
K2	**0.0921841**	0.00057							1.00	0.02	-0.01
P1	**0.00105464**	6.7e-06								1.00	0.01
P2	**6.5082e-05**	7.4e-06									1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

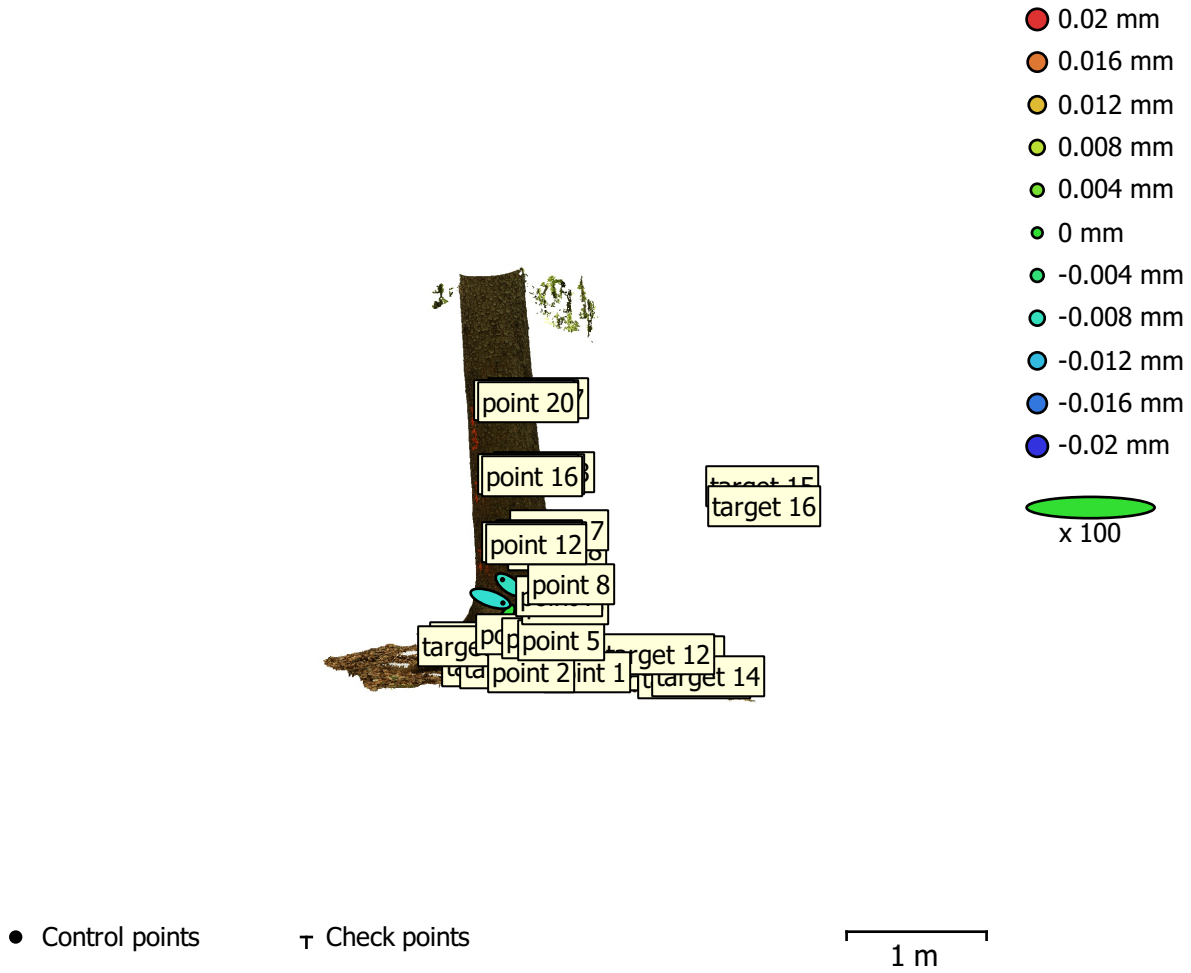

Fig. 3. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
4	1.04949	0.780671	0.010832	1.308	1.30805

Table 3. Control points RMSE.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 5	-0.249543	0.815789	0.0178677	0.853289	0.004 (110)
point 6	-0.564594	-0.932187	-0.000592956	1.08983	0.004 (125)
point 7	1.76598	-0.611326	-0.00914441	1.86882	0.004 (136)
point 8	-0.951841	0.727724	-0.00813029	1.19819	0.004 (150)
Total	**1.04949**	**0.780671**	**0.010832**	**1.30805**	**0.004**

Table 4. Control points.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 3					0.417 (9)
target 5					0.593 (11)
target 6					0.308 (10)
target 8					0.950 (47)
target 9					0.978 (8)
target 10					0.263 (6)
target 11					0.258 (2)
target 13					0.492 (8)
target 14					0.850 (7)
target 15					0.452 (9)
target 16					0.377 (10)
target 7					0.296 (148)
target 12					0.004 (48)
point 1					0.004 (46)
point 2					0.004 (44)
point 3					0.004 (52)
point 4					0.004 (47)
point 9					0.004 (150)
point 10					0.004 (150)
point 11					0.004 (150)
point 12					0.004 (150)
point 13					0.004 (102)
point 14					0.004 (103)

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 15					0.004 (106)
point 16					0.004 (108)
point 17					0.003 (100)
point 18					0.004 (100)
point 19					0.003 (100)
point 20					0.004 (100)
Total					

Table 5. Check points.

Scale Bars

Label	Distance (m)	Error (m)
target 5_target 6	0.148044	4.42482e-05
target 8_target 7	0.148105	0.000104743
target 9_target 10	0.148508	0.000508341
target 13_target 14	0.148171	0.000171397
target 15_target 16	0.147732	-0.000267666
target 11_target 12	0.147552	-0.000448197
point 1_point 2	0.404494	0.00249439
point 3_point 4	0.200907	-9.3381e-05
point 5_point 6	0.168999	
point 5_point 7	0.311959	
point 5_point 8	0.478544	
Total		**0.000922223**

Table 6. Check scale bars.

Digital Elevation Model

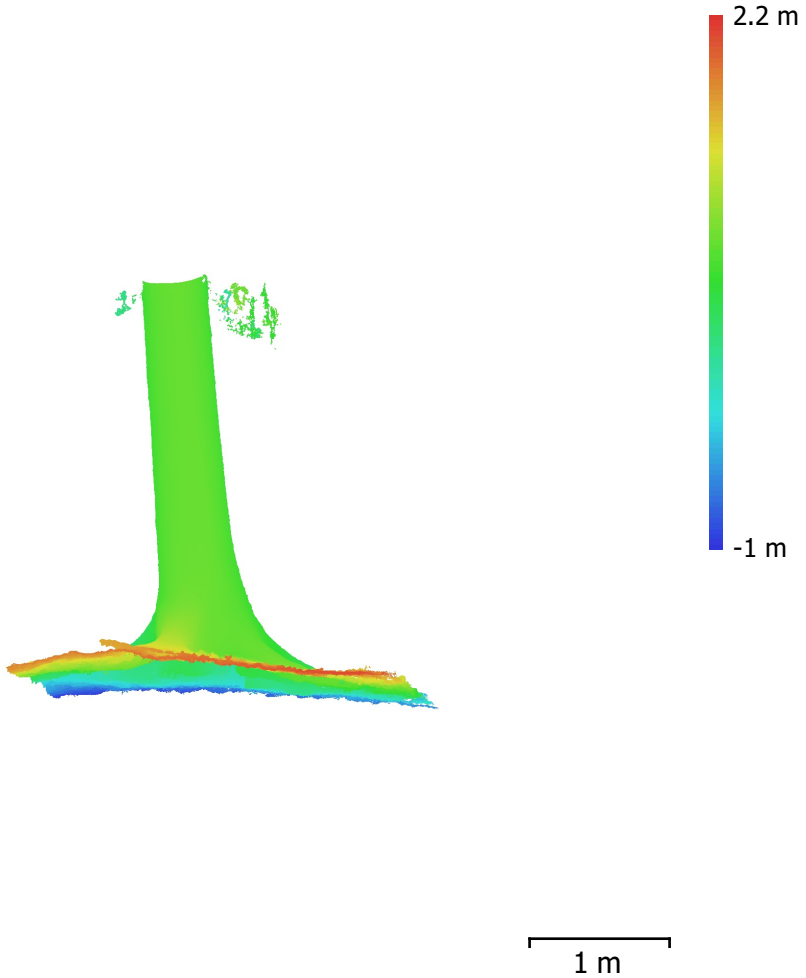

Fig. 4. Reconstructed digital elevation model.

Resolution:	unknown
Point density:	unknown

Processing Parameters

General	
Cameras	150
Aligned cameras	150
Markers	34
Scale bars	11
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	96,694 of 135,024
RMS reprojection error	0.1676 (0.834224 pix)
Max reprojection error	0.507389 (22.193 pix)
Mean key point size	4.92161 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.86017
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 24 minutes
Alignment time	2 minutes 8 seconds
Depth Maps	
Count	150
Reconstruction parameters	
Quality	Medium
Filtering mode	Aggressive
Processing time	8 hours 7 minutes
Dense Point Cloud	
Points	6,432,641
Point colors	3 bands, uint8
Reconstruction parameters	
Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	8 hours 7 minutes
Dense cloud generation time	1 hours 11 minutes
Software	
Version	1.4.4 build 6848
Platform	Windows 64