Picea_abies_1N

Processing Report

07 November 2018

Survey Data

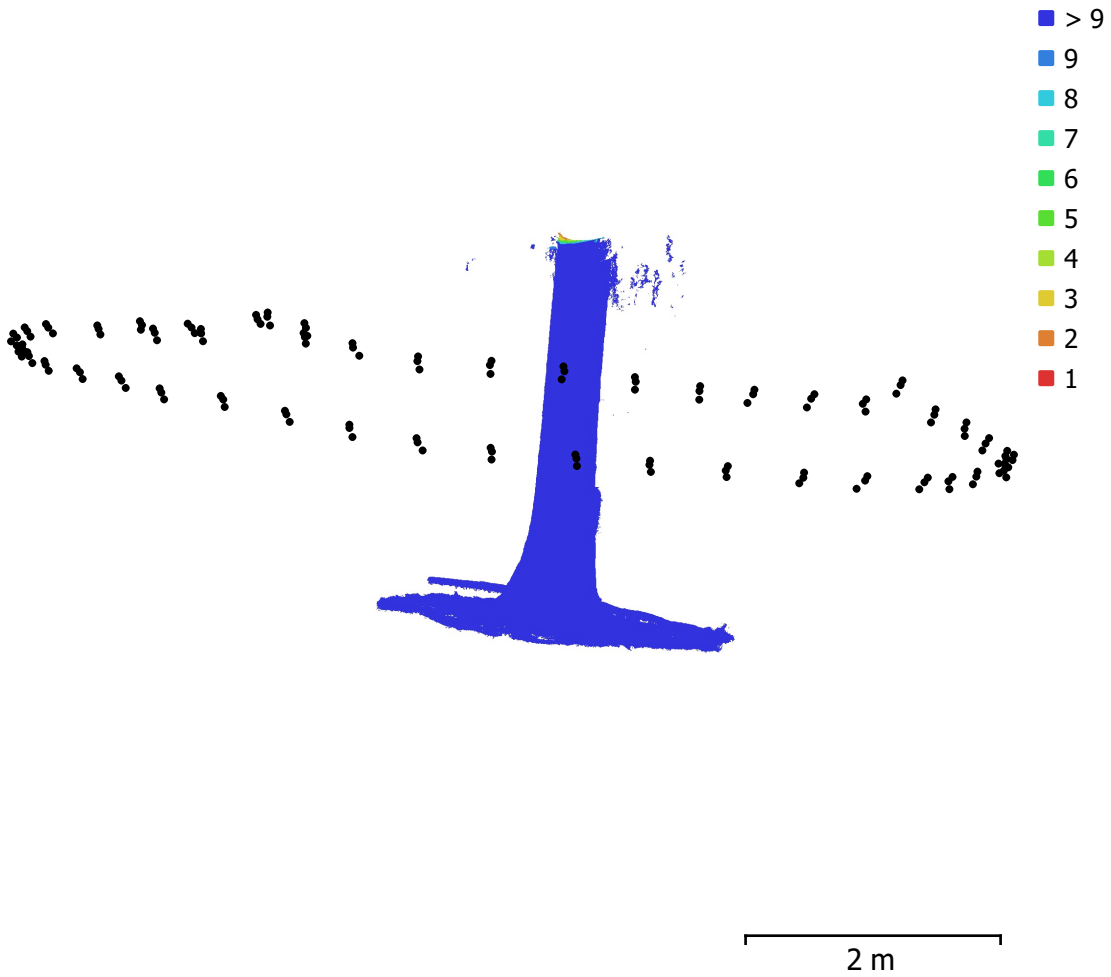

Fig. 1. Camera locations and image overlap.

Number of images:	147	Camera stations:	147
Flying altitude:	4.96 m	Tie points:	99,420
Ground resolution:	0.49 mm/pix	Projections:	440,582
Coverage area:	2.18 m²	Reprojection error:	0.75 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

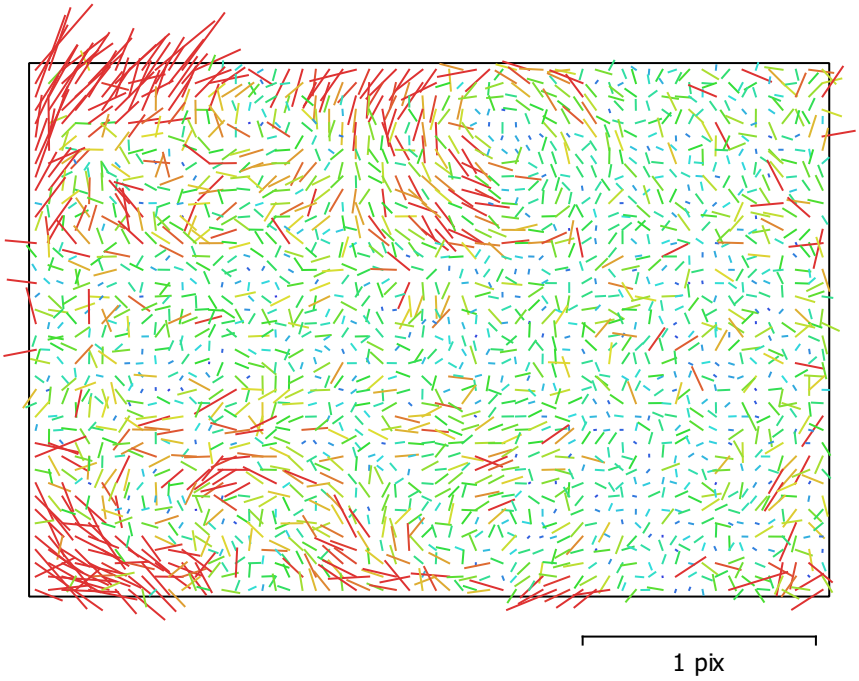

Fig. 2. Image residuals for Canon EOS 70D (35 mm).

Canon EOS 70D (35 mm)

147 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	**8462.56**	0.37	1.00	-0.23	-0.00	-0.43	-0.05	0.14	0.03	-0.27	0.01
Cx	**-11.721**	0.25		1.00	-0.01	0.19	0.02	-0.10	-0.00	0.85	-0.03
Cy	**-26.7307**	0.27			1.00	-0.08	0.28	-0.03	0.01	0.00	0.92
B1	**9.20542**	0.38				1.00	0.14	0.21	-0.05	0.04	-0.11
B2	**0.429254**	0.061					1.00	0.03	-0.00	0.01	0.23
K1	**-0.0762388**	8.1e-05						1.00	-0.91	-0.14	-0.04
K2	**0.0935296**	0.00052							1.00	0.02	0.01
P1	**0.000809225**	6.5e-06								1.00	-0.01
P2	**8.30699e-06**	7.2e-06									1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

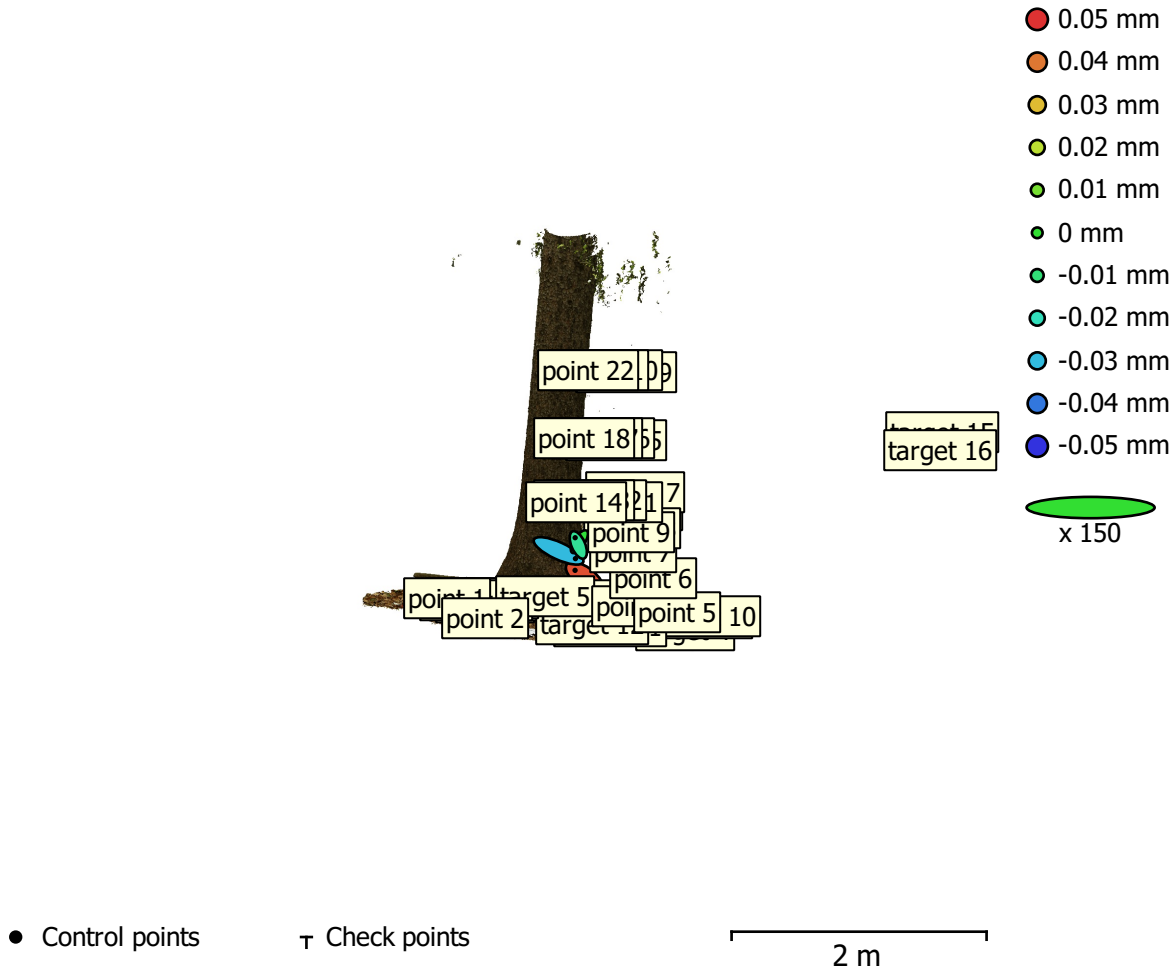

Fig. 3. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
4	1.04721	0.74908	0.0283245	1.28754	1.28786

Table 3. Control points RMSE.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 6	-0.987094	0.738891	0.0456758	1.23386	0.004 (129)
point 7	1.76209	-0.810752	-0.0302667	1.9399	0.004 (132)
point 8	-0.446515	-0.684703	-0.00107009	0.817432	0.004 (133)
point 9	-0.32848	0.756564	-0.0143391	0.82492	0.004 (139)
Total	**1.04721**	**0.74908**	**0.0283245**	**1.28786**	**0.004**

Table 4. Control points.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 1					0.382 (9)
target 3					0.574 (22)
target 4					0.413 (11)
target 6					0.845 (23)
target 8					0.623 (57)
target 9					0.950 (20)
target 10					0.812 (23)
target 11					0.817 (26)
target 12					0.819 (9)
target 13					0.537 (21)
target 14					0.642 (14)
target 15					0.523 (18)
target 16					0.452 (18)
target 5					0.004 (66)
target 7					0.542 (145)
point 1					0.312 (36)
point 2					0.109 (32)
point 4					1.622 (50)
point 5					2.869 (56)
point 11					0.004 (147)
point 12					0.004 (147)
point 13					0.004 (147)
point 14					0.004 (147)

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 15					0.004 (117)
point 16					0.004 (117)
point 17					0.004 (117)
point 18					0.004 (117)
point 19					0.004 (98)
point 20					0.004 (98)
point 21					0.004 (98)
point 22					0.003 (98)
Total					

Table 5. Check points.

Scale Bars

Label	Distance (m)	Error (m)
target 6_target 5	0.147221	-0.000779088
target 8_target 7	0.147938	-6.16232e-05
target 9_target 10	0.14791	-9.04049e-05
target 11_target 12	0.14797	-3.04405e-05
target 13_target 14	0.148254	0.000253987
target 15_target 16	0.147557	-0.000442915
point 1_point 2	0.601442	-0.00155796
point 4_point 5	0.404361	0.00236089
point 6_point 8	0.174007	
point 6_point 9	0.255839	
point 6_point 7	0.0917853	
Total		**0.00105366**

Table 6. Check scale bars.

Digital Elevation Model

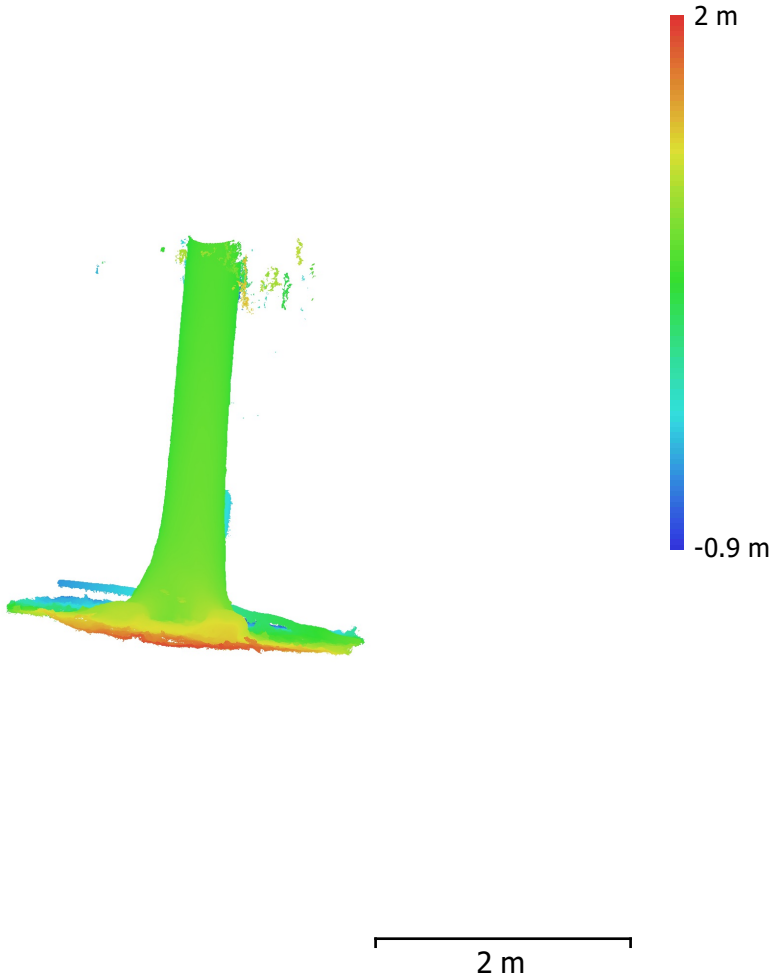

Fig. 4. Reconstructed digital elevation model.

Resolution:	unknown
Point density:	unknown

Processing Parameters

General	
Cameras	147
Aligned cameras	147
Markers	36
Scale bars	11
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	99,420 of 135,478
RMS reprojection error	0.165216 (0.749809 pix)
Max reprojection error	0.500687 (16.0304 pix)
Mean key point size	4.54808 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.78516
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 17 minutes
Alignment time	1 minutes 47 seconds
Depth Maps	
Count	147
Reconstruction parameters	
Quality	Medium
Filtering mode	Aggressive
Processing time	7 hours 53 minutes
Dense Point Cloud	
Points	4,126,949
Point colors	3 bands, uint8
Reconstruction parameters	
Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	7 hours 53 minutes
Dense cloud generation time	1 hours 18 minutes
Software	
Version	1.4.4 build 6848
Platform	Windows 64