Picea_abies_9N

Processing Report

07 November 2018

Survey Data

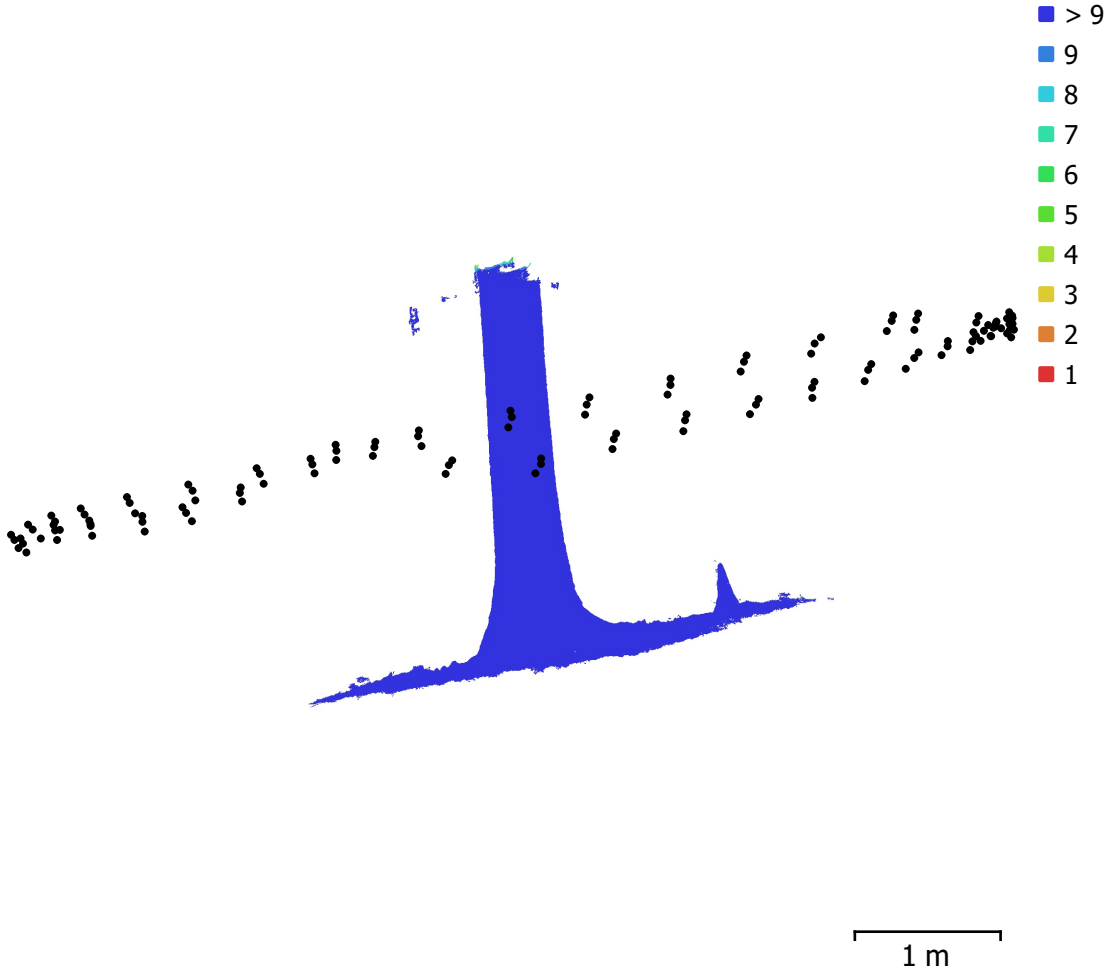

Fig. 1. Camera locations and image overlap.

Number of images:	126	Camera stations:	126
Flying altitude:	4.19 m	Tie points:	107,979
Ground resolution:	0.39 mm/pix	Projections:	404,720
Coverage area:	1.75 m²	Reprojection error:	0.674 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

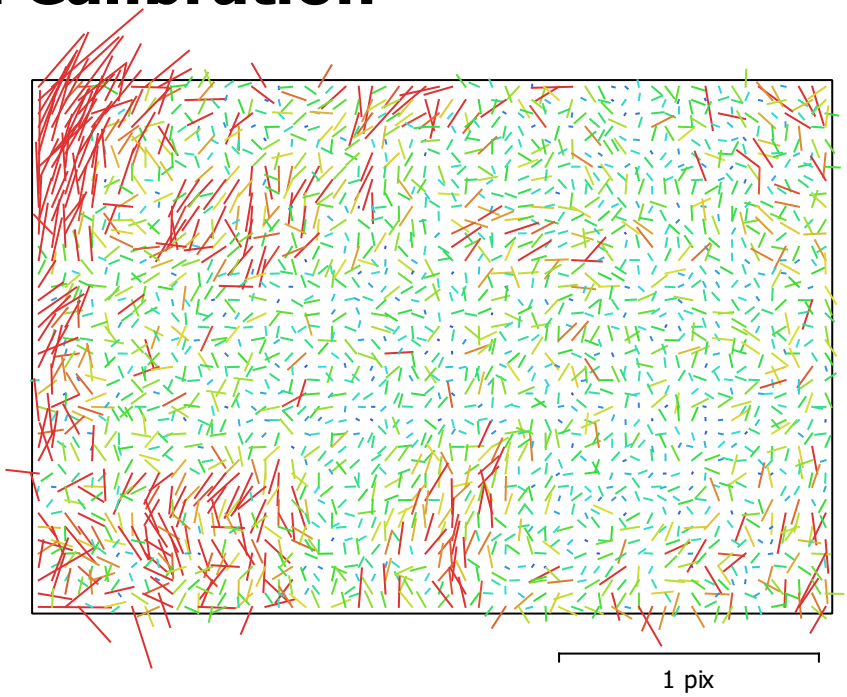

Fig. 2. Image residuals for Canon EOS 70D (35 mm).

Canon EOS 70D (35 mm)

126 images

Type	Resolution	Focal Length	Pixel Size
Frame	**5472 x 3648**	**35 mm**	**4.17 x 4.17 µm**

	Value	Error	F	Cx	Cy	B2	K1	K2	P1	P2
F	**8471.7**	0.41	1.00	-0.19	-0.09	0.08	0.33	0.00	-0.27	-0.08
Cx	**-29.223**	0.26		1.00	0.00	-0.01	-0.14	0.03	0.88	-0.01
Cy	**-37.8688**	0.34			1.00	0.23	-0.03	0.00	0.01	0.94
B2	**-0.164882**	0.082				1.00	0.03	0.00	-0.01	0.21
K1	**-0.0758103**	8.3e-05					1.00	-0.91	-0.16	-0.02
K2	**0.0845936**	0.00054						1.00	0.03	-0.01
P1	**-6.72991e-05**	6.9e-06							1.00	0.00
P2	**-0.000500363**	8.4e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

Ground Control Points

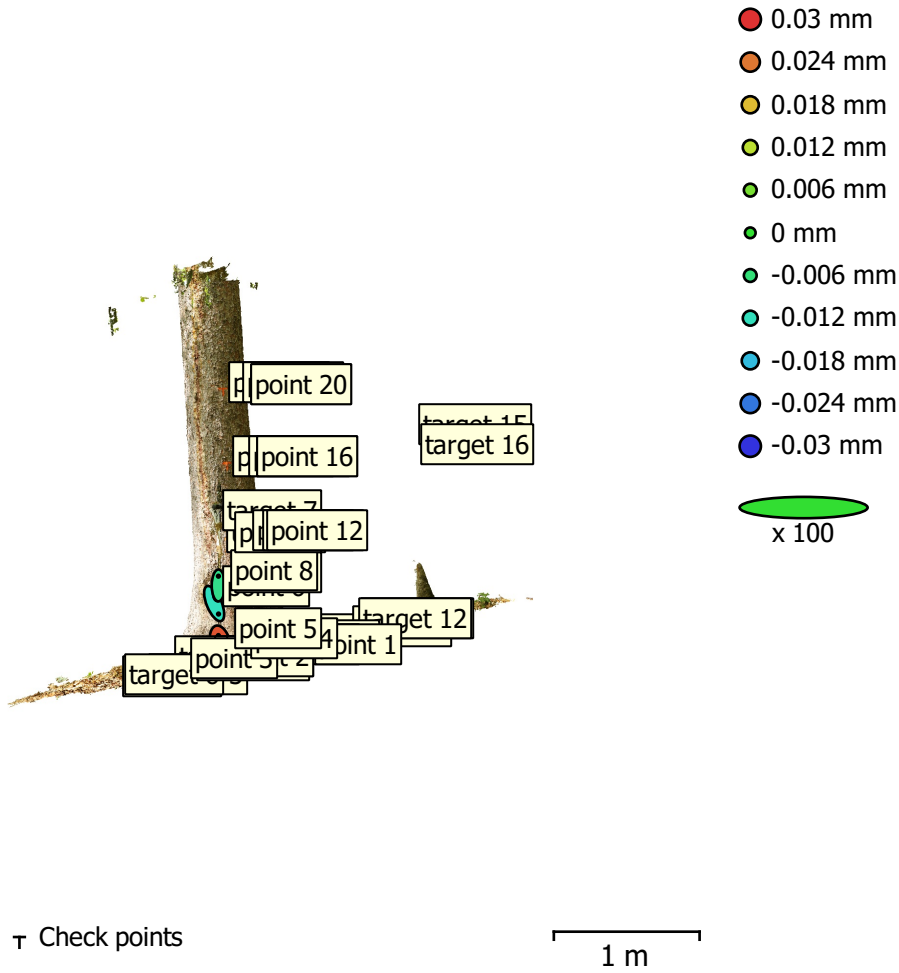

Fig. 3. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
4	0.368409	1.2664	0.015745	1.3189	1.31899

Table 3. Control points RMSE.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 5	-0.283156	1.25066	0.0270638	1.2826	0.004 (86)
point 6	0.600034	-1.43319	-0.0121713	1.55378	0.004 (104)
point 7	-0.320424	-1.08776	-0.00718331	1.134	0.004 (112)
point 8	0.00354481	1.27029	-0.00770922	1.27032	0.004 (116)
Total	**0.368409**	**1.2664**	**0.015745**	**1.31899**	**0.004**

Table 4. Control points.

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
target 1					0.160 (3)
target 2					0.643 (41)
target 3					1.023 (7)
target 4					0.263 (5)
target 5					0.513 (8)
target 6					0.279 (4)
target 8					0.956 (17)
target 9					0.375 (10)
target 10					0.741 (9)
target 11					0.426 (16)
target 12					0.617 (19)
target 13					0.780 (10)
target 14					1.143 (19)
target 15					0.364 (10)
target 16					0.335 (10)
target 7					0.302 (112)
point 1					1.166 (27)
point 2					2.323 (31)
point 3					4.018 (37)
point 4					11.358 (42)
point 9					0.004 (126)
point 10					0.004 (126)
point 11					0.004 (126)

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 12					0.004 (126)
point 13					0.004 (86)
point 14					0.004 (87)
point 15					0.004 (87)
point 16					0.004 (87)
point 17					0.003 (84)
point 18					0.003 (84)
point 19					0.003 (84)
point 20					0.003 (84)
Total					

Table 5. Check points.

Scale Bars

Label	Distance (m)	Error (m)
target 5_target 6	0.146774	-0.00122556
target 8_target 7	0.14915	0.00114994
target 9_target 10	0.147143	-0.000856642
target 11_target 12	0.147291	-0.000708644
target 13_target 14	0.147289	-0.000710563
target 15_target 16	0.146898	-0.00110247
point 1_point 2	0.603766	0.00076575
point 5_point 6	0.147725	
point 5_point 7	0.281139	
point 5_point 8	0.407411	
Total		**0.000953722**

Table 6. Check scale bars.

Digital Elevation Model

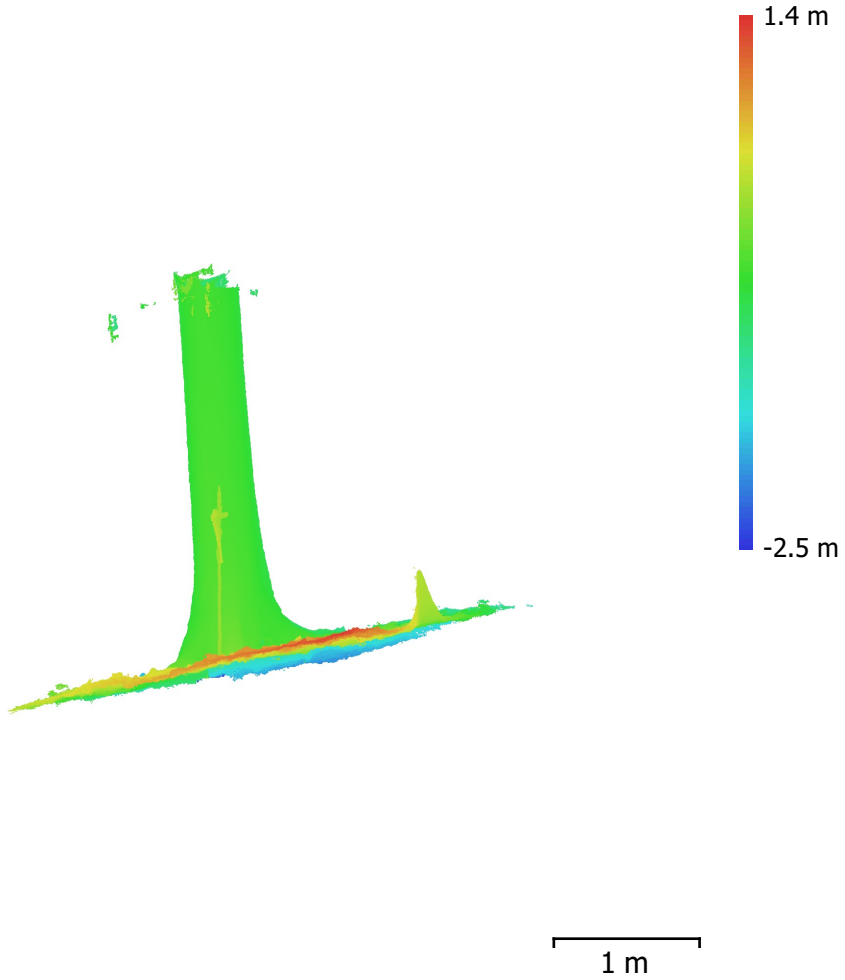

Fig. 4. Reconstructed digital elevation model.

Resolution:	unknown
Point density:	unknown

Processing Parameters

General	
Cameras	126
Aligned cameras	126
Markers	36
Scale bars	10
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	107,979 of 141,033
RMS reprojection error	0.162229 (0.673981 pix)
Max reprojection error	0.494808 (19.7439 pix)
Mean key point size	4.16353 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.08097
Alignment parameters	
Accuracy	High
Generic preselection	Yes
Key point limit	40,000
Tie point limit	4,000
Adaptive camera model fitting	Yes
Matching time	54 minutes 25 seconds
Alignment time	1 minutes 30 seconds
Depth Maps	
Count	126
Reconstruction parameters	
Quality	Medium
Filtering mode	Aggressive
Processing time	12 hours 47 minutes
Dense Point Cloud	
Points	6,118,247
Point colors	3 bands, uint8
Reconstruction parameters	
Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	12 hours 47 minutes
Dense cloud generation time	45 minutes 51 seconds
Software	
Version	1.4.4 build 6848
Platform	Windows 64