

Quality Report



Generated with PIX4Dmapper version 4.8.1 Preview



Important: Click on the different icons for:



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Additional information about the sections



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Summary



Project	M1-Páty_szeptember_1
Processed	2022-10-06 21:56:47
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.86 cm / 0.73 in
Area Covered	0.095 km ² / 9.4687 ha / 0.04 sq. mi. / 23.4099 acres

Quality Check



Images	median of 55626 keypoints per image	
Dataset	235 out of 235 images calibrated (100%), all images enabled	
Camera Optimization	0.25% relative difference between initial and optimized internal camera parameters	
Matching	median of 25157.1 matches per calibrated image	
Georeferencing	yes, 5 GCPs (5 3D), mean RMS error = 0.049 m	

Preview

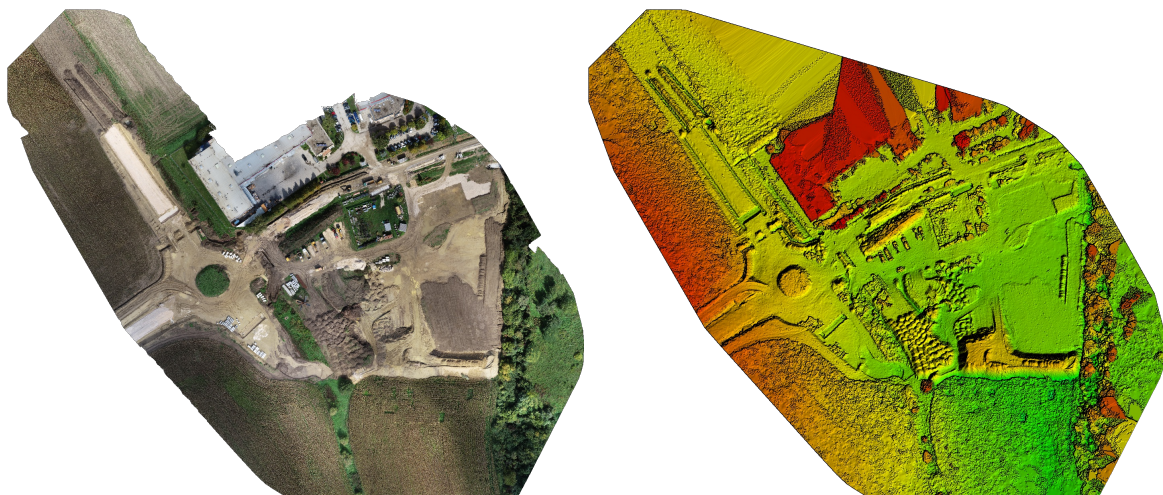


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	235 out of 235
Number of Geolocated Images	235 out of 235

? Initial Image Positions

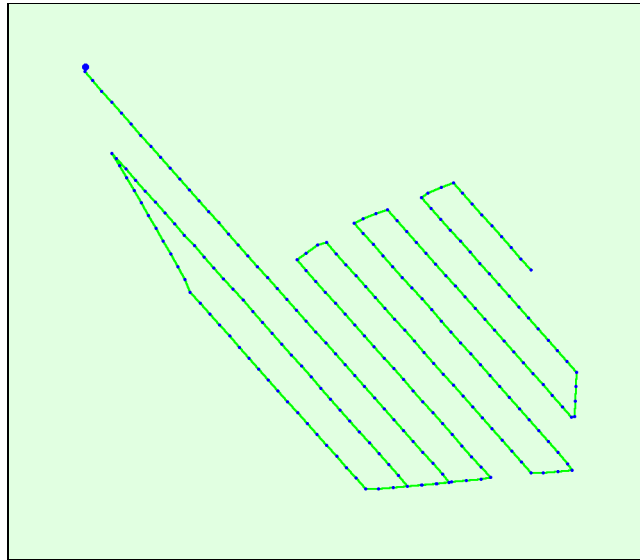
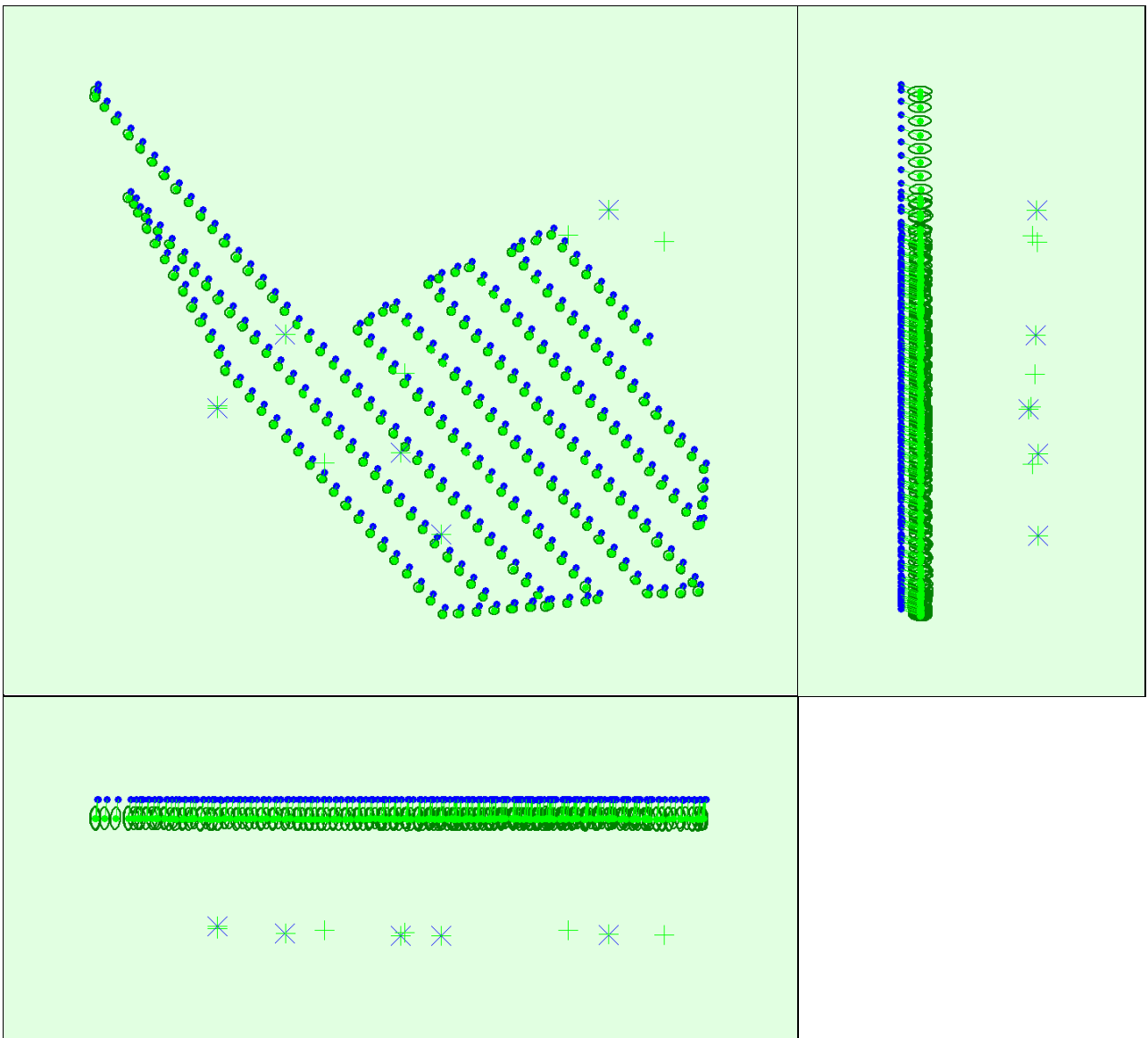


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

? Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 1000x magnified

Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Dark green ellipses indicate the absolute position uncertainty of the bundle block adjustment result.

Absolute camera position and orientation uncertainties

	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.002	0.002	0.006	0.002	0.002	0.001
Sigma	0.000	0.000	0.000	0.000	0.000	0.001

Overlap

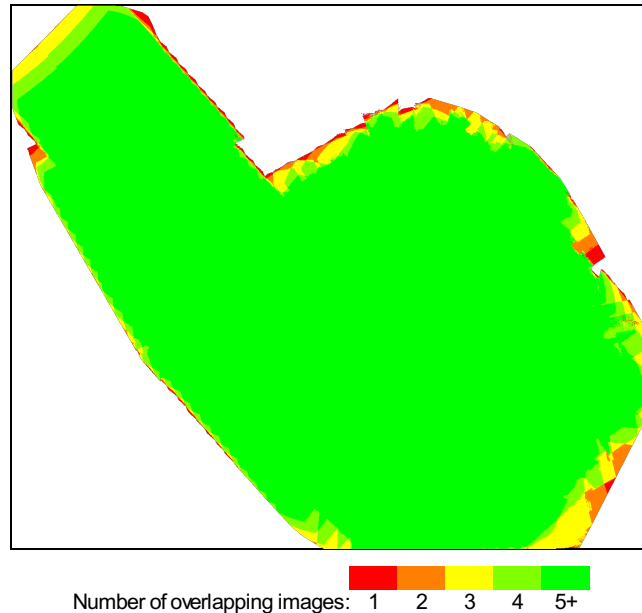


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint matches is also sufficient for these areas (see Figure 5 for keypoint matches).

Bundle Block Adjustment Details

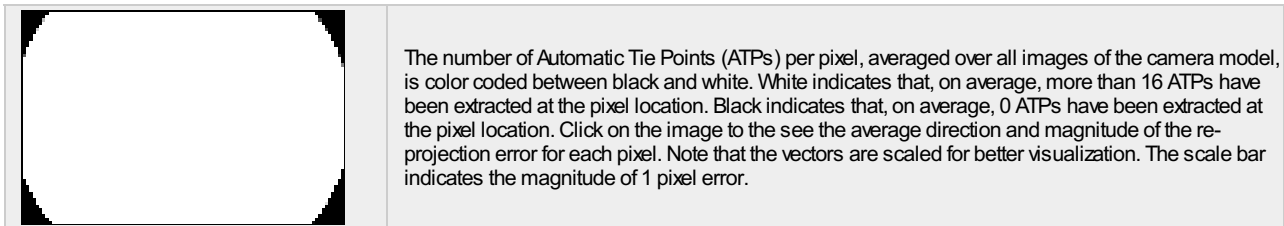
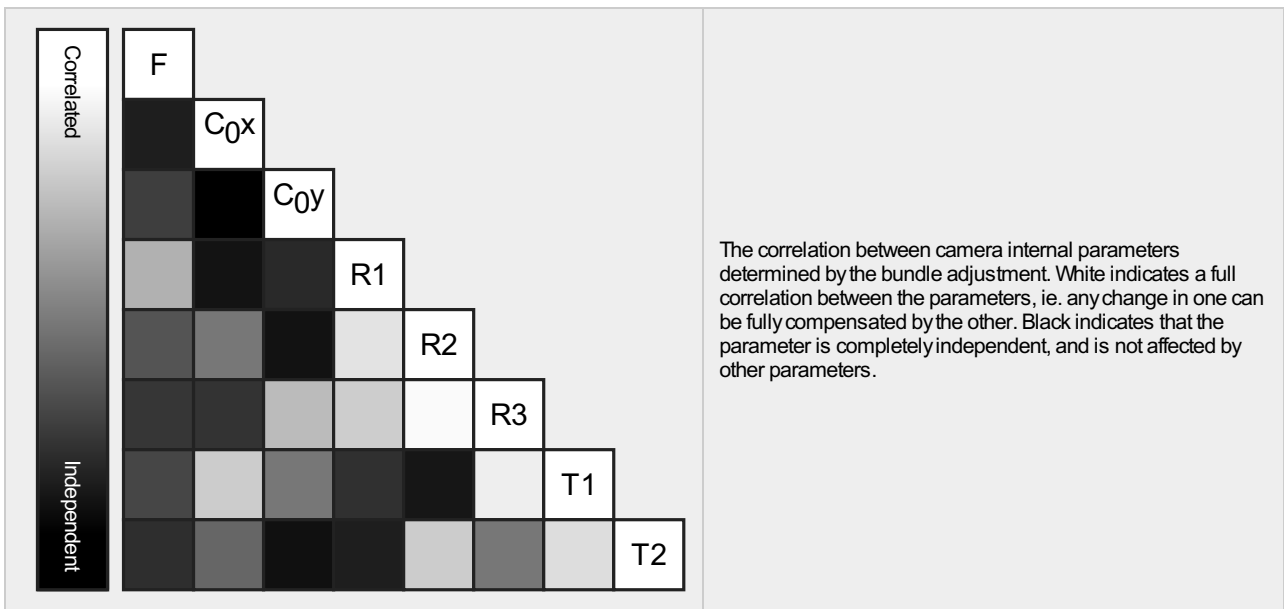
Number of 2D Keypoint Observations for Bundle Block Adjustment	5757681
Number of 3D Points for Bundle Block Adjustment	1679212
Mean Reprojection Error [pixels]	0.151

Internal Camera Parameters

FC6310R_8.8_5472x3648 (RGB). Sensor Dimensions: 12.833 [mm] x 8.556 [mm]

EXIF ID: FC6310R_8.8_5472x3648

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3658.300 [pixel] 8.580 [mm]	2722.500 [pixel] 6.385 [mm]	1835.100 [pixel] 4.304 [mm]	-0.269	0.112	-0.033	0.000	-0.001
Optimized Values	3667.776 [pixel] 8.602 [mm]	2705.082 [pixel] 6.344 [mm]	1802.769 [pixel] 4.228 [mm]	-0.277	0.121	-0.035	-0.000	0.000
Uncertainties (Sigma)	0.331 [pixel] 0.001 [mm]	0.048 [pixel] 0.000 [mm]	0.036 [pixel] 0.000 [mm]	0.000	0.000	0.000	0.000	0.000



? 2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	55626	25157
Mn	37632	6410
Max	83372	35679
Mean	57579	24501

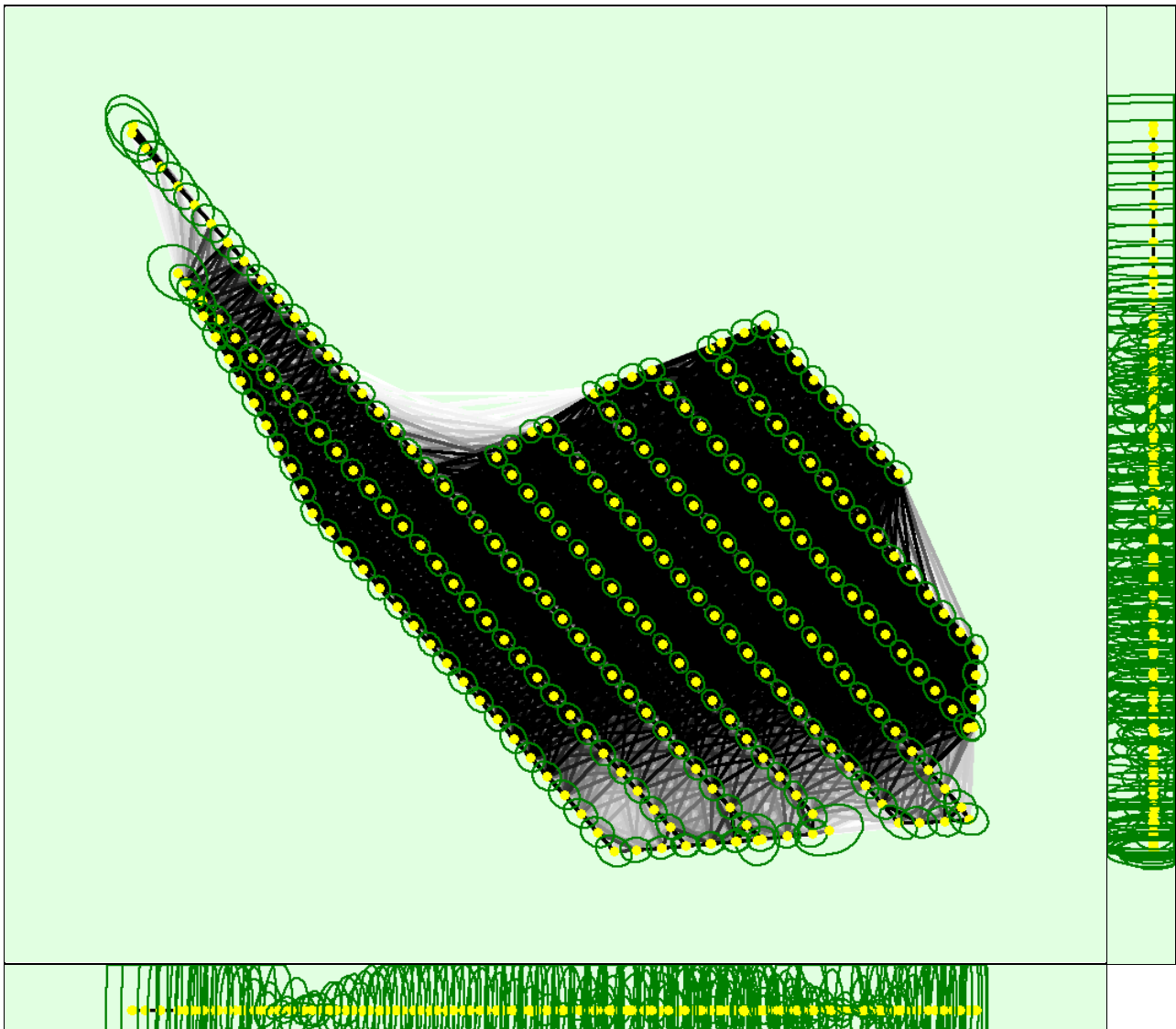
? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	1039561
In 3 Images	258363
In 4 Images	115656
In 5 Images	66357
In 6 Images	43367
In 7 Images	30506
In 8 Images	22030
In 9 Images	17170
In 10 Images	13778
In 11 Images	11388
In 12 Images	9613
In 13 Images	7951
In 14 Images	6703
In 15 Images	5623
In 16 Images	4970
In 17 Images	4046
In 18 Images	3482
In 19 Images	3175
In 20 Images	2742
In 21 Images	2298
In 22 Images	1837
In 23 Images	1499

In 24 Images	1346
In 25 Images	1112
In 26 Images	921
In 27 Images	745
In 28 Images	677
In 29 Images	548
In 30 Images	477
In 31 Images	359
In 32 Images	289
In 33 Images	187
In 34 Images	164
In 35 Images	109
In 36 Images	75
In 37 Images	45
In 38 Images	19
In 39 Images	14
In 40 Images	4
In 41 Images	6

2D Keypoint Matches



Uncertainty ellipses 1000x magnified

Number of matches



Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty of the bundle block adjustment result.

Relative camera position and orientation uncertainties



	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.005	0.005	0.023	0.024	0.017	0.002
Sigma	0.001	0.001	0.017	0.015	0.011	0.001

Manual Tie Points



MTP Name	Projection Error [pixel]	Verified/Marked
mtp100	0.448	4 / 4
mtp101	0.264	8 / 8
mtp103	0.585	36 / 36
mtp104	0.320	10 / 10
mtp105	0.496	9 / 9

Projection errors for manual tie points. The last column counts the number of images where the manual tie point has been automatically verified vs. manually marked.

Geolocation Details



Ground Control Points



GCP Name	Accuracy XY/Z [m]	Error X [m]	Error Y [m]	Error Z [m]	Projection Error [pixel]	Verified/Marked
7 (3D)	0.011/ 0.024	0.091	-0.010	-0.009	0.419	17 / 17
6 (3D)	0.011/ 0.025	-0.130	0.029	-0.012	0.879	18 / 18
geod_4 (3D)	0.020/ 0.020	0.102	-0.000	0.078	0.572	13 / 13
geod_5 (3D)	0.020/ 0.020	0.020	-0.027	0.060	0.498	18 / 18
geod_7 (3D)	0.020/ 0.020	0.033	-0.034	-0.032	1.018	9 / 9
Mean [m]		0.022905	-0.008373	0.017024		
Sigma [m]		0.082771	0.022260	0.043631		
RMS Error [m]		0.085882	0.023783	0.046835		

0 out of 2 check points have been labeled as inaccurate.

Check Point Name	Accuracy XY/Z [m]	Error X [m]	Error Y [m]	Error Z [m]	Projection Error [pixel]	Verified/Marked
s1		0.0212	-0.0202	-0.0252	0.5509	10 / 10
s2		0.0734	-0.0331	-0.0016	0.4753	26 / 26
Mean [m]		0.047302	-0.026630	-0.013378		
Sigma [m]		0.026098	0.006441	0.011785		
RMS Error [m]		0.054024	0.027398	0.017828		

Localisation accuracy per GCP and mean errors in the three coordinate directions. The last column counts the number of calibrated images where the GCP has been automatically verified vs. manually marked.

Absolute Geolocation Variance



Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-0.03	0.00	0.00	2.13
-0.03	-0.03	0.00	0.00	5.11
-0.03	-0.02	0.00	0.00	3.40
-0.02	-0.01	0.00	0.00	11.49
-0.01	-0.01	9.79	3.40	11.06
-0.01	0.00	45.53	45.53	17.45

0.00	0.01	31.91	48.51	11.49
0.01	0.01	8.51	2.55	16.17
0.01	0.02	2.55	0.00	11.06
0.02	0.03	1.28	0.00	6.38
0.03	0.03	0.43	0.00	3.83
0.03	-	0.00	0.00	0.43
Mean [m]		1.320133	3.633209	10.302221
Sigma [m]		0.006371	0.003676	0.015656
RMS Error [m]		1.320148	3.633211	10.302232

Min Error and Max Error represent geolocation error intervals between -1.5 and 1.5 times the maximum accuracy of all the images. Columns X, Y, Z show the percentage of images with geolocation errors within the predefined error intervals. The geolocation error is the difference between the initial and computed image positions. Note that the image geolocation errors do not correspond to the accuracy of the observed 3D points.

Geolocation Bias	X	Y	Z
Translation [m]	1.320087	3.633213	10.302193

Bias between image initial and computed geolocation given in output coordinate system.

Relative Geolocation Variance

Relative Geolocation Error	Images X [%]	Images Y [%]	Images Z [%]
[-1.00, 1.00]	92.34	99.15	81.28
[-2.00, 2.00]	98.72	100.00	100.00
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	0.010712	0.010712	0.020788
Sigma of Geolocation Accuracy [m]	0.000368	0.000368	0.000416

Images X, Y, Z represent the percentage of images with a relative geolocation error in X, Y, Z.

Geolocation Orientational Variance	RMS [degree]
Omega	0.646
Phi	0.443
Kappa	3.095

Geolocation RMS error of the orientation angles given by the difference between the initial and computed image orientation angles.

Initial Processing Details

System Information

Hardware	CPU: Intel(R) Core(TM) i7-10750H CPU @ 2.60GHz RAM: 16GB GPU: Intel(R) UHD Graphics (Driver: 27.20.100.9664), NVIDIA GeForce RTX 3060 Laptop GPU (Driver: 30.0.14.7219)
Operating System	Windows 10 Pro, 64-bit

Coordinate Systems

Image Coordinate System	WGS 84
Ground Control Point (GCP) Coordinate System	HD72 / EOVS
Output Coordinate System	HD72 / EOVS

Processing Options

Detected Template	No Template Available
Keypoints Image Scale	Full, Image Scale: 1

Advanced: Matching Image Pairs	Aerial Grid or Corridor
Advanced: Matching Strategy	Use Geometrically Verified Matching: no
Advanced: Keypoint Extraction	Targeted Number of Keypoints: Automatic
Advanced: Calibration	Calibration Method: Geolocation Based Internal Parameters Optimization: All prior External Parameters Optimization: All Rematch: Auto, yes