

Quality Report



Generated with PIX4Dmapper version 4.8.1 Preview



Important: Click on the different icons for:



Help to analyze the results in the Quality Report



Additional information about the sections



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Summary



Project	M1-Páty_szeptember_2
Processed	2022-10-06 16:09:24
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.77 cm / 0.69 in
Area Covered	0.321 km ² / 32.0774 ha / 0.12 sq. mi. / 79.3060 acres

Quality Check



Images	median of 53495 keypoints per image	
Dataset	802 out of 802 images calibrated (100%), all images enabled	
Camera Optimization	1.2% relative difference between initial and optimized internal camera parameters	
Matching	median of 14653.9 matches per calibrated image	
Georeferencing	yes, 5 GCPs (5 3D), mean RMS error = 0.015 m	

Preview

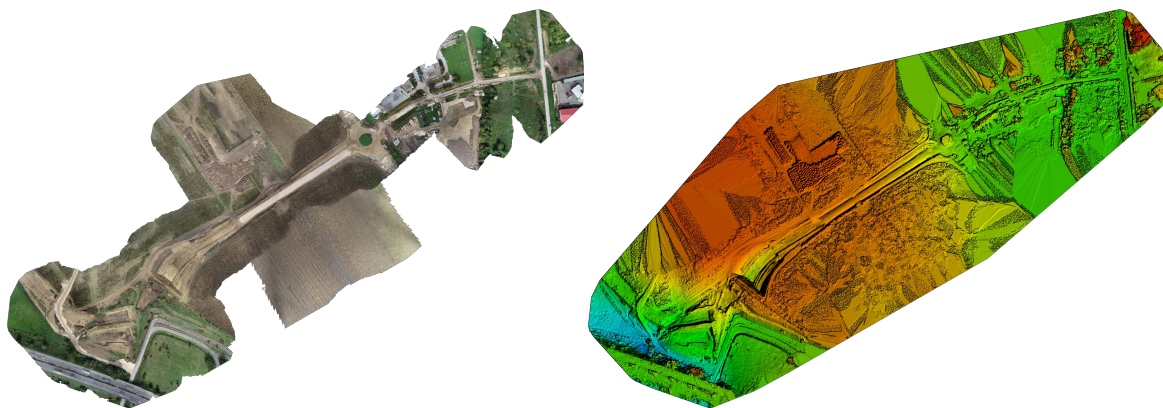


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	802 out of 802
Number of Geolocated Images	802 out of 802

Initial Image Positions



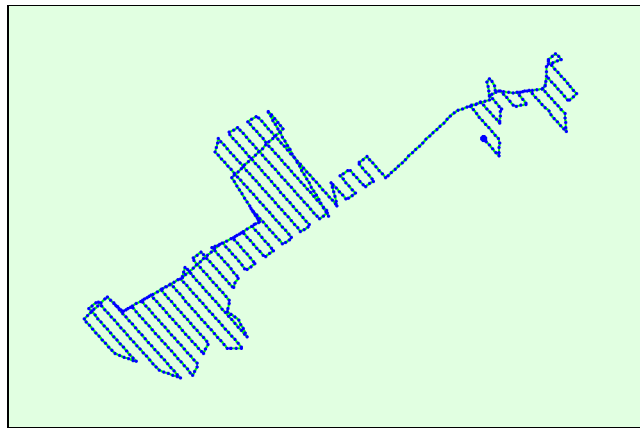
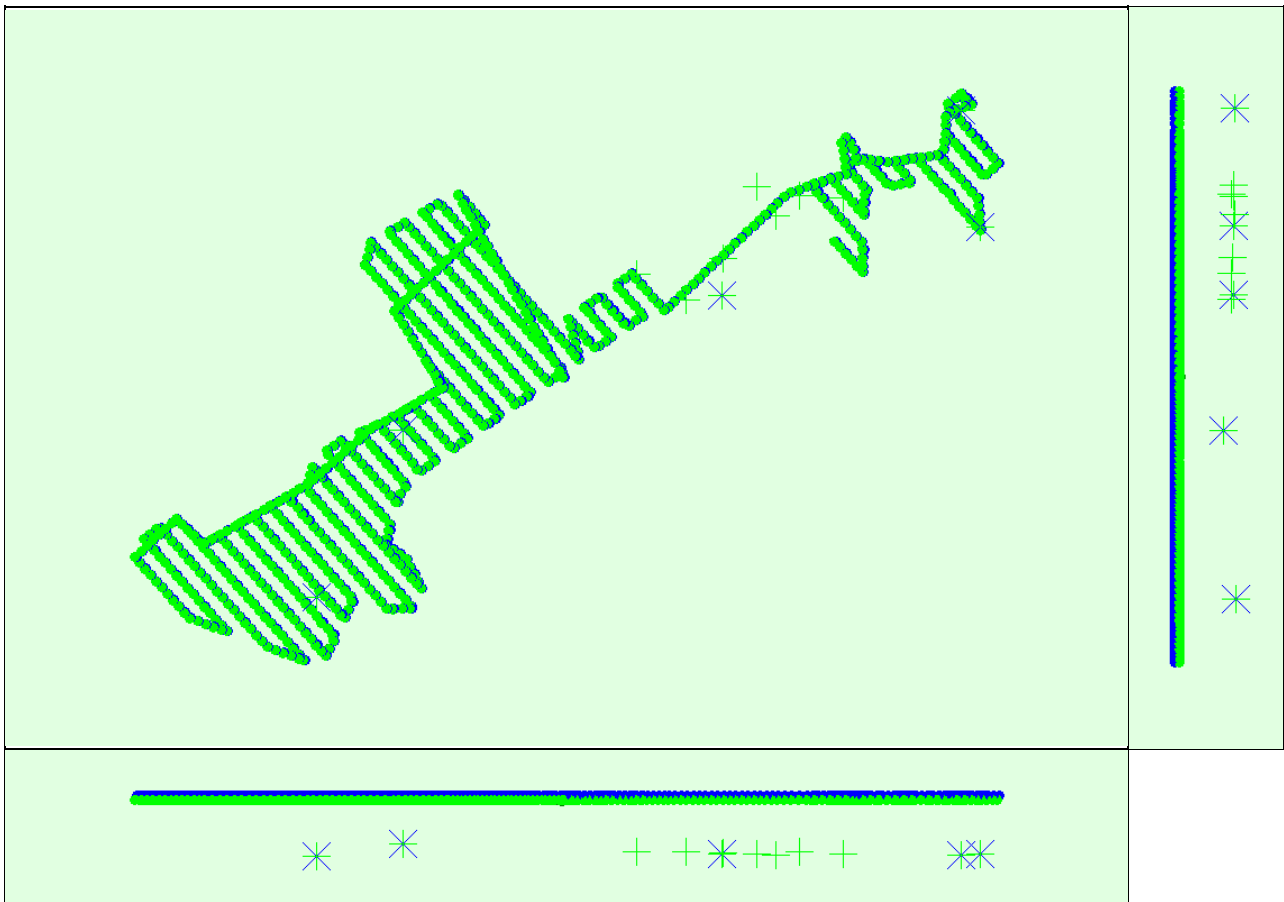


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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	0.003	0.003	0.003	0.003	0.003	0.002
Sigma	0.000	0.000	0.000	0.000	0.000	0.000

Overlap



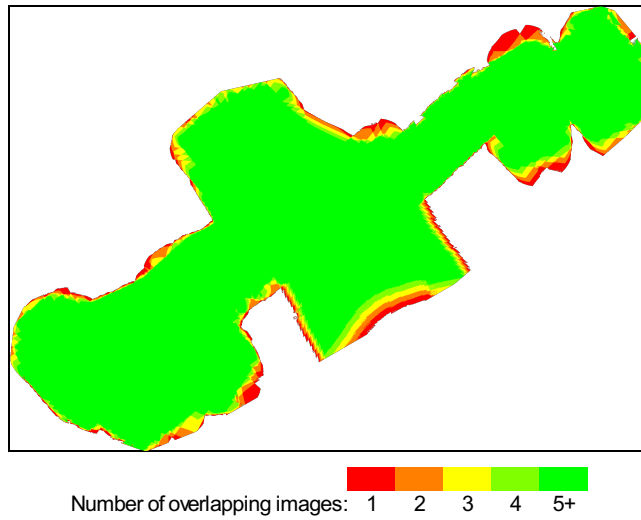


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint 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	11949347
Number of 3D Points for Bundle Block Adjustment	3538704
Mean Reprojection Error [pixels]	0.110

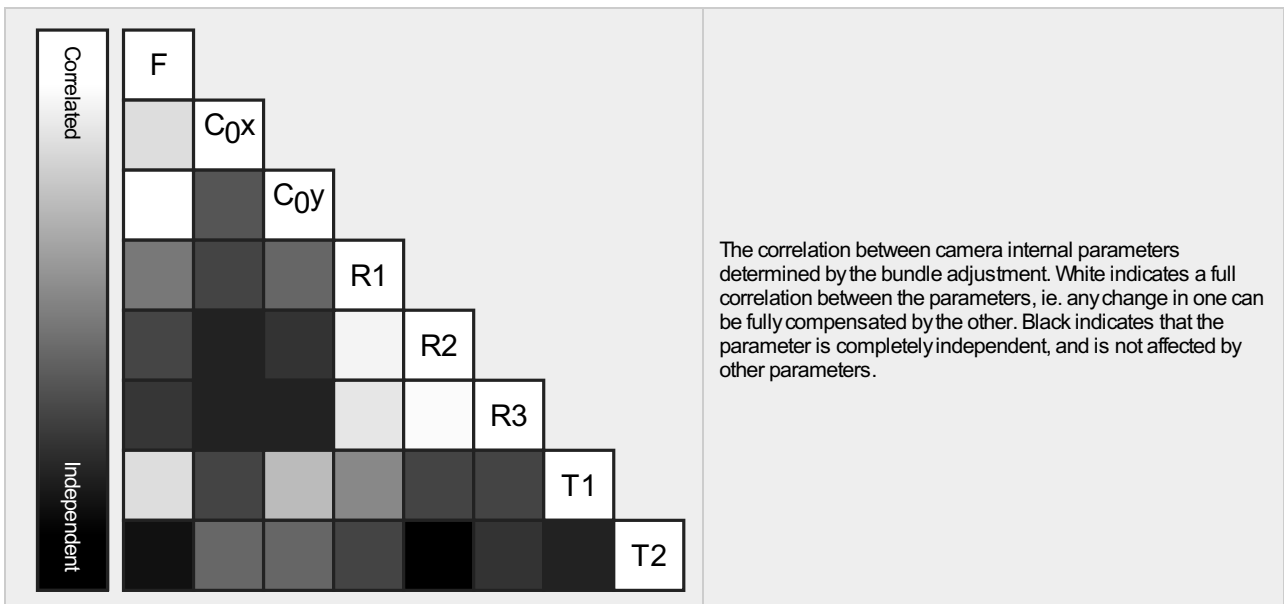
Internal Camera Parameters

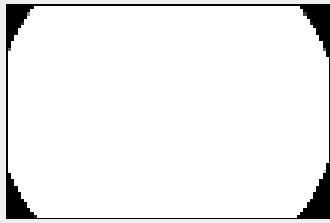
FC6310R_8.8_5472x3648 (RGB). Sensor Dimensions: 12.833 [mm] x 8.556 [mm]



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	3702.247 [pixel] 8.683 [mm]	2705.971 [pixel] 6.346 [mm]	1802.185 [pixel] 4.227 [mm]	-0.282	0.126	-0.037	-0.000	0.000
Uncertainties (Sigma)	0.099 [pixel] 0.000 [mm]	0.037 [pixel] 0.000 [mm]	0.026 [pixel] 0.000 [mm]	0.000	0.000	0.000	0.000	0.000





The number of Automatic Tie Points (ATPs) per pixel, averaged over all images of the camera model, is color coded between black and white. White indicates that, on average, more than 16 ATPs have been extracted at the pixel location. Black indicates that, on average, 0 ATPs have been extracted at the pixel location. Click on the image to see the average direction and magnitude of the re-projection error for each pixel. Note that the vectors are scaled for better visualization. The scale bar indicates the magnitude of 1 pixel error.

? 2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	53495	14654
Mn	37717	392
Max	79180	30423
Mean	53440	14899

? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	1972999
In 3 Images	675494
In 4 Images	315562
In 5 Images	176738
In 6 Images	109244
In 7 Images	72843
In 8 Images	47750
In 9 Images	34385
In 10 Images	25718
In 11 Images	19990
In 12 Images	15605
In 13 Images	12493
In 14 Images	9746
In 15 Images	7935
In 16 Images	6720
In 17 Images	5746
In 18 Images	4662
In 19 Images	3968
In 20 Images	3326
In 21 Images	2846
In 22 Images	2375
In 23 Images	2021
In 24 Images	1694
In 25 Images	1453
In 26 Images	1198
In 27 Images	1060
In 28 Images	851
In 29 Images	748
In 30 Images	610
In 31 Images	501
In 32 Images	431
In 33 Images	404
In 34 Images	315
In 35 Images	277
In 36 Images	203
In 37 Images	184
In 38 Images	149
In 39 Images	124
In 40 Images	116

In 41 Images	69
In 42 Images	48
In 43 Images	26
In 44 Images	28
In 45 Images	15
In 46 Images	12
In 47 Images	10
In 48 Images	5
In 49 Images	3
In 50 Images	4

2D Keypoint Matches

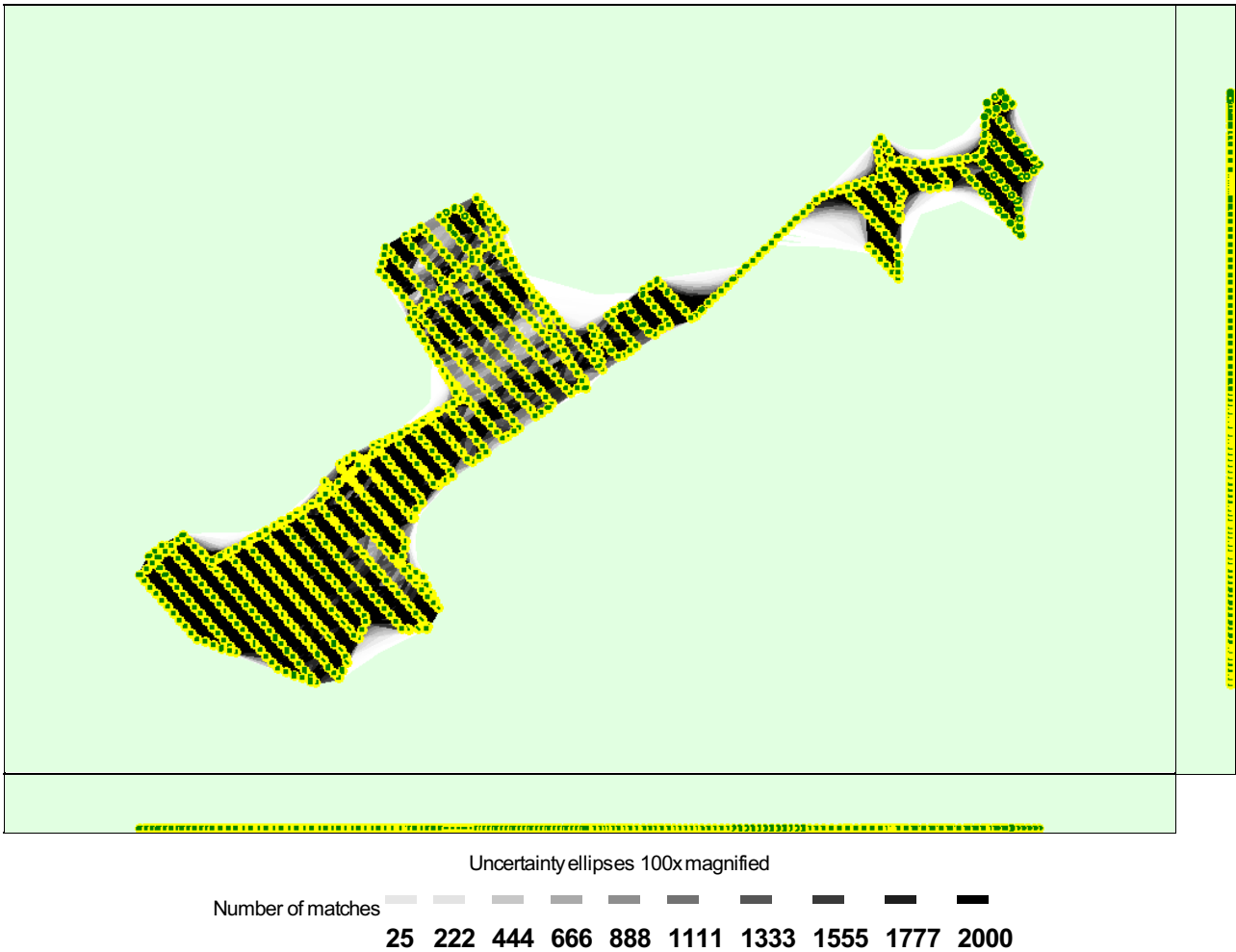


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.014	0.014	0.008	0.007	0.008	0.004
Sigma	0.005	0.005	0.004	0.002	0.002	0.002

Manual Tie Points

MTP Name	Projection Error [pixel]	Verified/Marked
s1	0.140	6 / 6
s2	0.447	10 / 10
mtp100	0.240	12 / 12
mtp101	0.484	40 / 40

mtp103	0.128	6 / 6
mtp104	0.134	9 / 9
mtp105	0.270	8 / 8

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
5 (3D)	0.009/0.012	-0.001	-0.005	-0.007	0.378	37 / 37
11 (3D)	0.010/0.013	-0.001	-0.001	0.026	0.431	30 / 30
7 (3D)	0.011/0.024	0.010	-0.008	-0.017	0.153	7 / 7
6 (3D)	0.011/0.025	-0.319	0.079	-0.144	-1.000	1 / 3
8 (3D)	0.009/0.018	-0.007	0.010	-0.076	0.622	7 / 7
9 (3D)	0.009/0.020	-0.001	0.004	-0.041	0.243	21 / 21
Mean [m]		-0.000158	0.000202	-0.022947		
Sigma [m]		0.005461	0.006638	0.033959		
RMS Error [m]		0.005464	0.006641	0.040985		

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 [%]
-	-0.06	0.00	0.00	0.00
-0.06	-0.05	0.00	0.00	0.00
-0.05	-0.04	0.00	0.00	0.00
-0.04	-0.02	0.00	0.00	0.00
-0.02	-0.01	1.25	0.12	4.36
-0.01	0.00	46.76	53.74	45.64
0.00	0.01	52.00	44.01	45.64
0.01	0.02	0.00	1.50	4.36
0.02	0.04	0.00	0.50	0.00
0.04	0.05	0.00	0.12	0.00
0.05	0.06	0.00	0.00	0.00
0.06	-	0.00	0.00	0.00
Mean [m]		1.459191	0.315167	5.101619
Sigma [m]		0.003090	0.004135	0.006877
RMS Error [m]		1.459194	0.315194	5.101624

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]	1.459215	0.315146	5.101642

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]	98.38	97.76	99.63
[-2.00, 2.00]	100.00	99.25	100.00
[-3.00, 3.00]	100.00	99.88	100.00
Mean of Geolocation Accuracy [m]	0.010283	0.010283	0.018659
Sigma of Geolocation Accuracy [m]	0.000486	0.000486	0.000953

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

Geolocation Orientational Variance	RMS [degree]
Omega	0.483
Phi	0.475
Kappa	2.309

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, no