

Quality Report



Generated with Pix4Dmapper version 4.3.27



Important: Click on the different icons for:



Help to analyze the results in the Quality Report



Additional information about the sections



Click [here](#) for additional tips to analyze the Quality Report

Summary



Project	sequ_4k_2_x3
Processed	2018-10-04 22:09:19
Camera Model Name(s)	FC350_3.6_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	5.40 cm / 2.13 in
Area Covered	0.686 km ² / 68.5860 ha / 0.26 sq. mi. / 169.5674 acres
Time for Initial Processing (without report)	22m:33s

Quality Check



Images	median of 11290 keypoints per image	
Dataset	1309 out of 1311 images calibrated (99%), all images enabled, 2 blocks	
Camera Optimization	2.39% relative difference between initial and optimized internal camera parameters	
Matching	median of 947.932 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

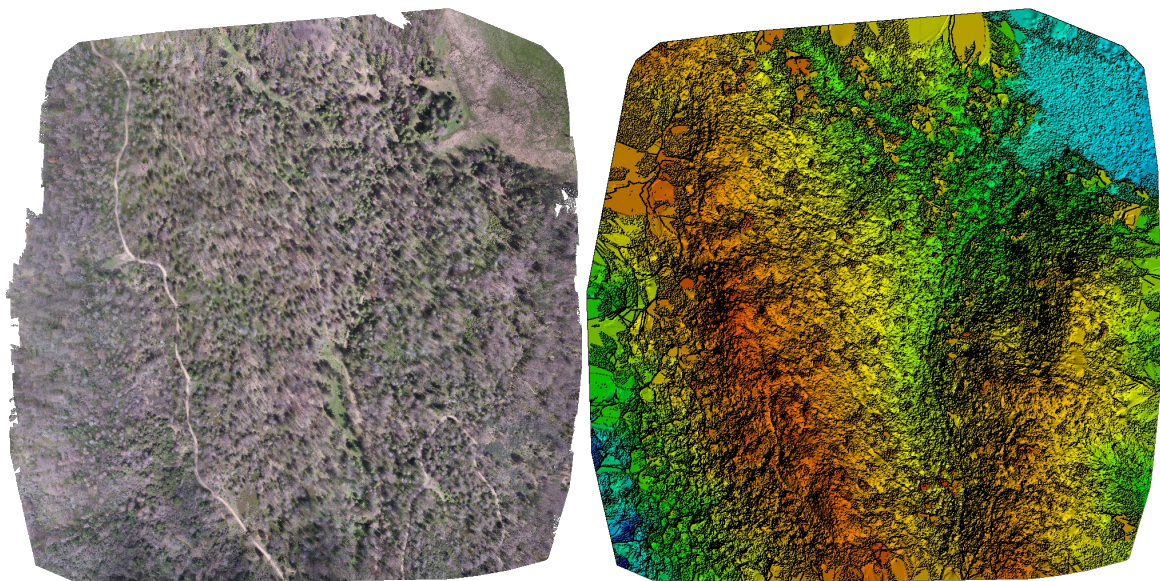


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	1309 out of 1311
Number of Geolocated Images	1311 out of 1311

Initial Image Positions

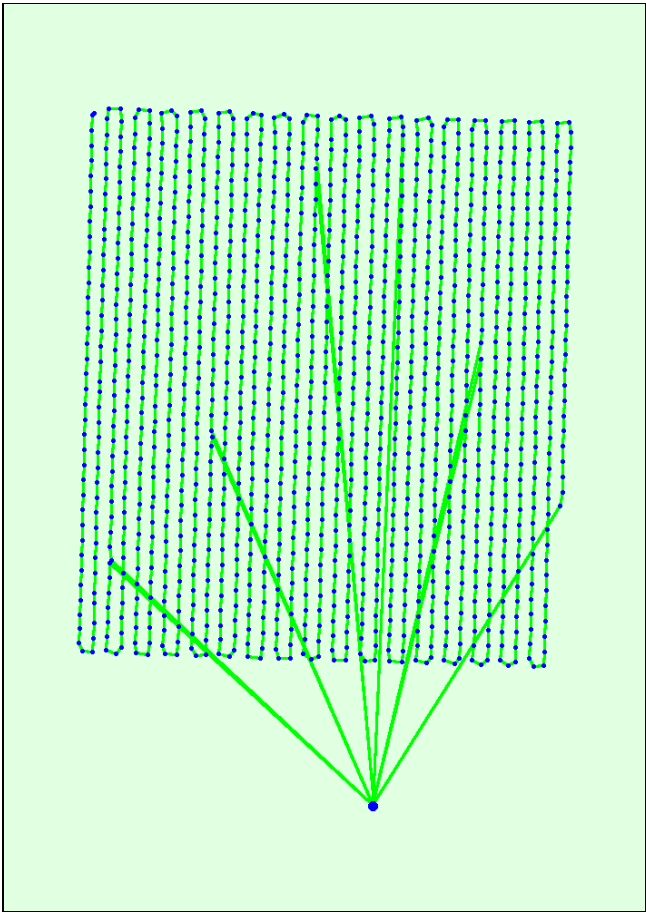


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions



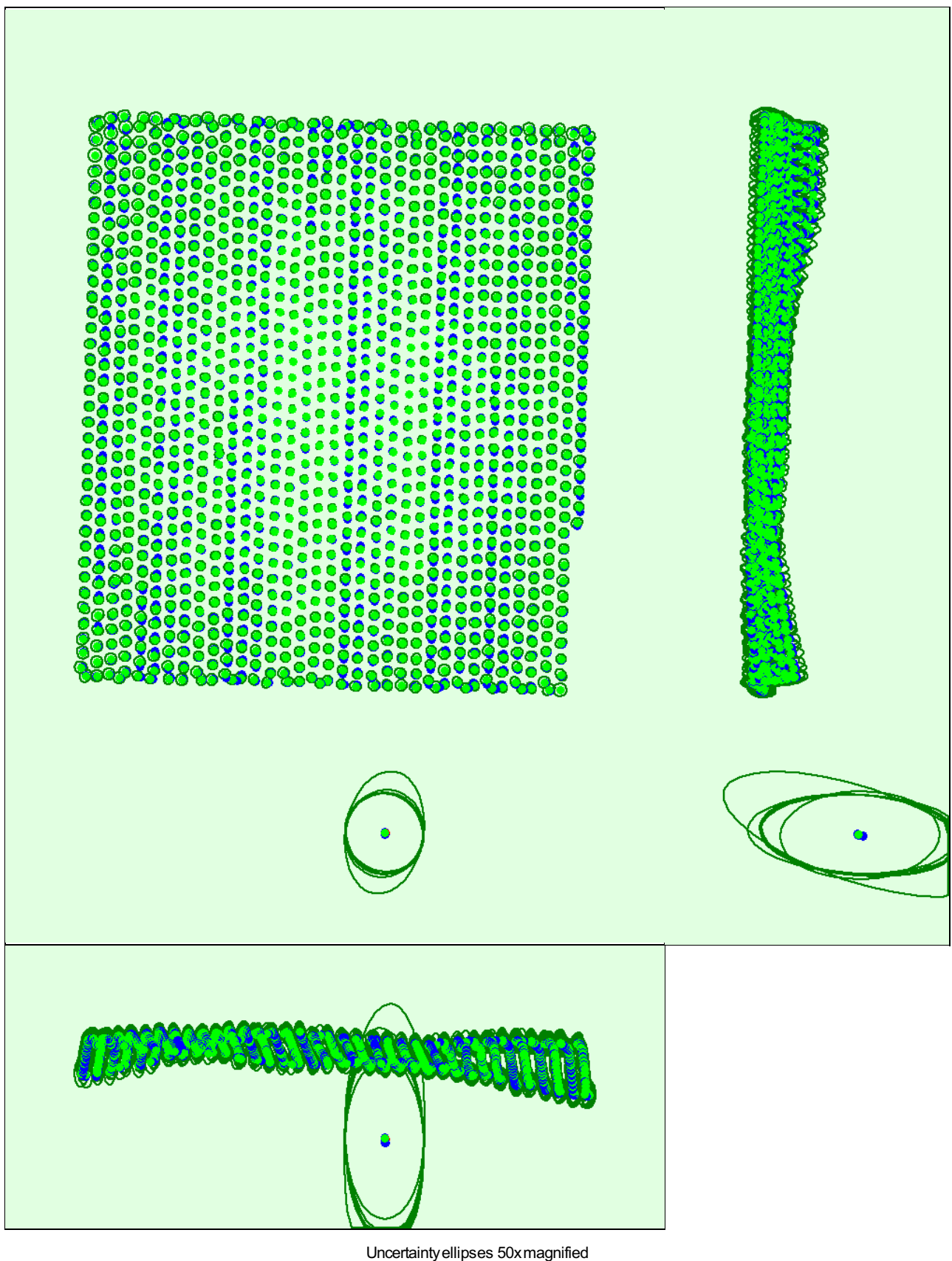


Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Red dots indicate disabled or uncalibrated images. 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	0.115	0.117	0.226	0.047	0.043	0.022
Sigma	0.067	0.075	0.179	0.068	0.013	0.058

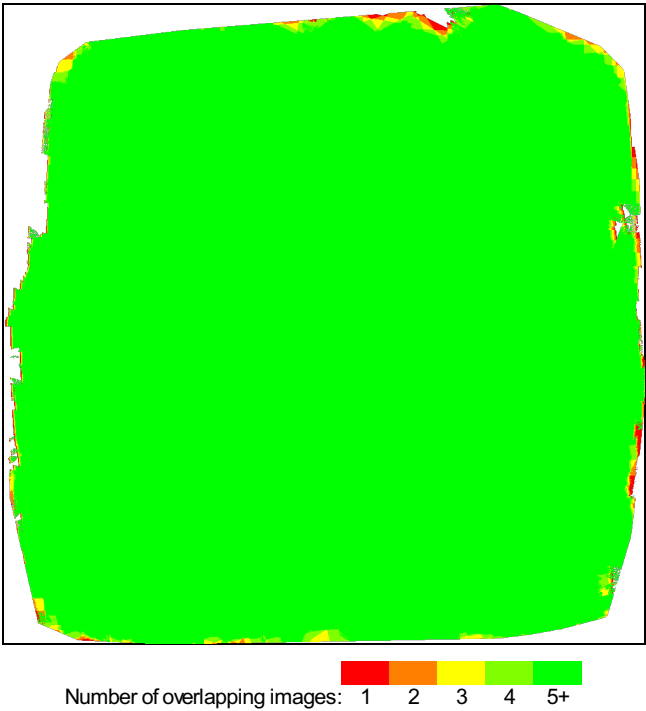


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

Bundle Block Adjustment Details

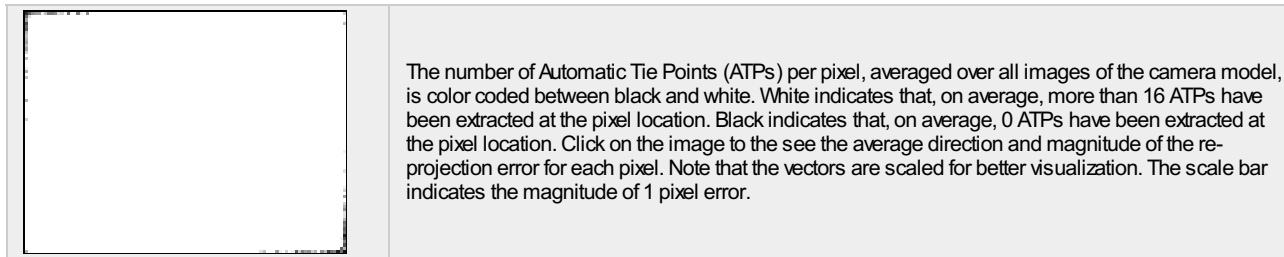
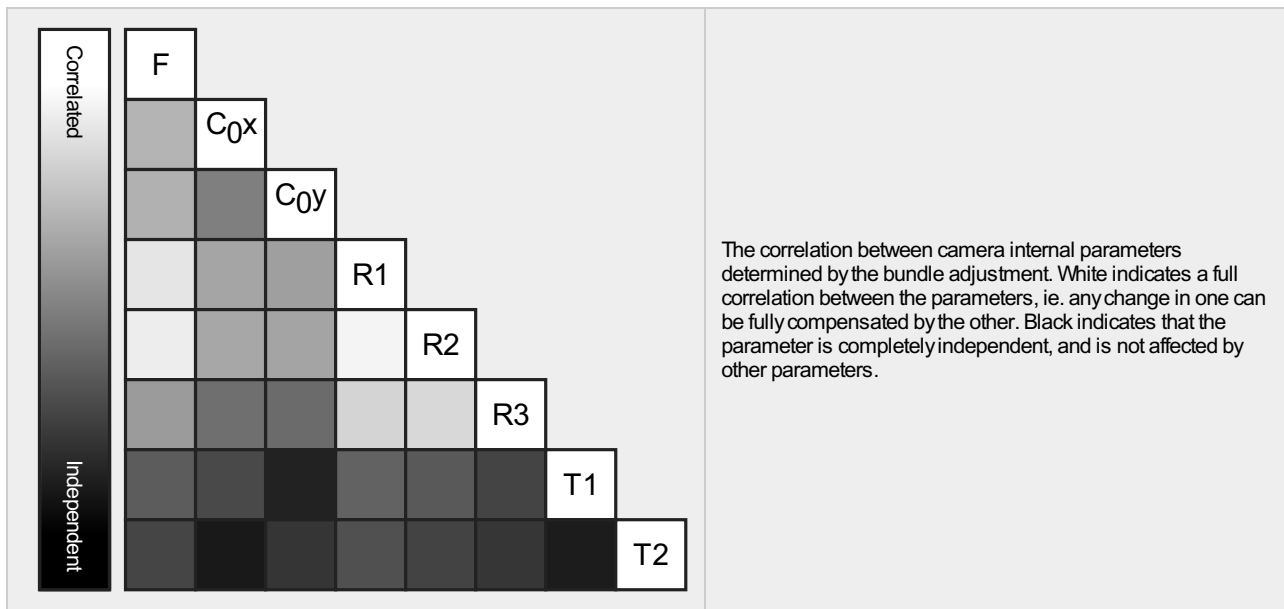
Number of 2D Keypoint Observations for Bundle Block Adjustment	1358772
Number of 3D Points for Bundle Block Adjustment	423181
Mean Reprojection Error [pixels]	0.139

Internal Camera Parameters

FC350_3.6_4000x3000 (RGB). Sensor Dimensions: 6.317 [mm] x 4.738 [mm]

EXIF ID: FC350_3.6_4000x3000

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	2285.722 [pixel] 3.610 [mm]	2000.006 [pixel] 3.159 [mm]	1500.003 [pixel] 2.369 [mm]	-0.130	0.106	-0.016	-0.000	0.000
Optimized Values	2340.419 [pixel] 3.696 [mm]	1985.790 [pixel] 3.136 [mm]	1503.182 [pixel] 2.374 [mm]	-0.131	0.115	-0.015	0.001	0.000
Uncertainties (Sigma)	2.915 [pixel] 0.005 [mm]	0.084 [pixel] 0.000 [mm]	0.074 [pixel] 0.000 [mm]	0.000	0.001	0.000	0.000	0.000



2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	11290	948
Mn	5758	161
Max	13534	5585
Mean	11276	1038

3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	257507
In 3 Images	74374
In 4 Images	33620
In 5 Images	18084
In 6 Images	10959
In 7 Images	7138
In 8 Images	4875
In 9 Images	3398
In 10 Images	2482
In 11 Images	1874
In 12 Images	1445
In 13 Images	1169
In 14 Images	966
In 15 Images	743
In 16 Images	636
In 17 Images	534
In 18 Images	443
In 19 Images	370
In 20 Images	325
In 21 Images	227
In 22 Images	240

In 23 Images	201
In 24 Images	184
In 25 Images	155
In 26 Images	134
In 27 Images	105
In 28 Images	90
In 29 Images	74
In 30 Images	74
In 31 Images	74
In 32 Images	67
In 33 Images	65
In 34 Images	49
In 35 Images	43
In 36 Images	39
In 37 Images	41
In 38 Images	33
In 39 Images	26
In 40 Images	27
In 41 Images	20
In 42 Images	24
In 43 Images	17
In 44 Images	21
In 45 Images	16
In 46 Images	16
In 47 Images	19
In 48 Images	14
In 49 Images	19
In 50 Images	12
In 51 Images	8
In 52 Images	12
In 53 Images	12
In 54 Images	11
In 55 Images	6
In 56 Images	9
In 57 Images	5
In 58 Images	4
In 59 Images	3
In 60 Images	2
In 61 Images	2
In 62 Images	3
In 63 Images	6
In 64 Images	4
In 66 Images	3
In 67 Images	2
In 68 Images	2
In 69 Images	2
In 70 Images	2
In 72 Images	1
In 73 Images	3
In 74 Images	1
In 78 Images	1
In 79 Images	1
In 82 Images	2
In 83 Images	1
In 85 Images	2
In 89 Images	1
In 91 Images	1
In 95 Images	1

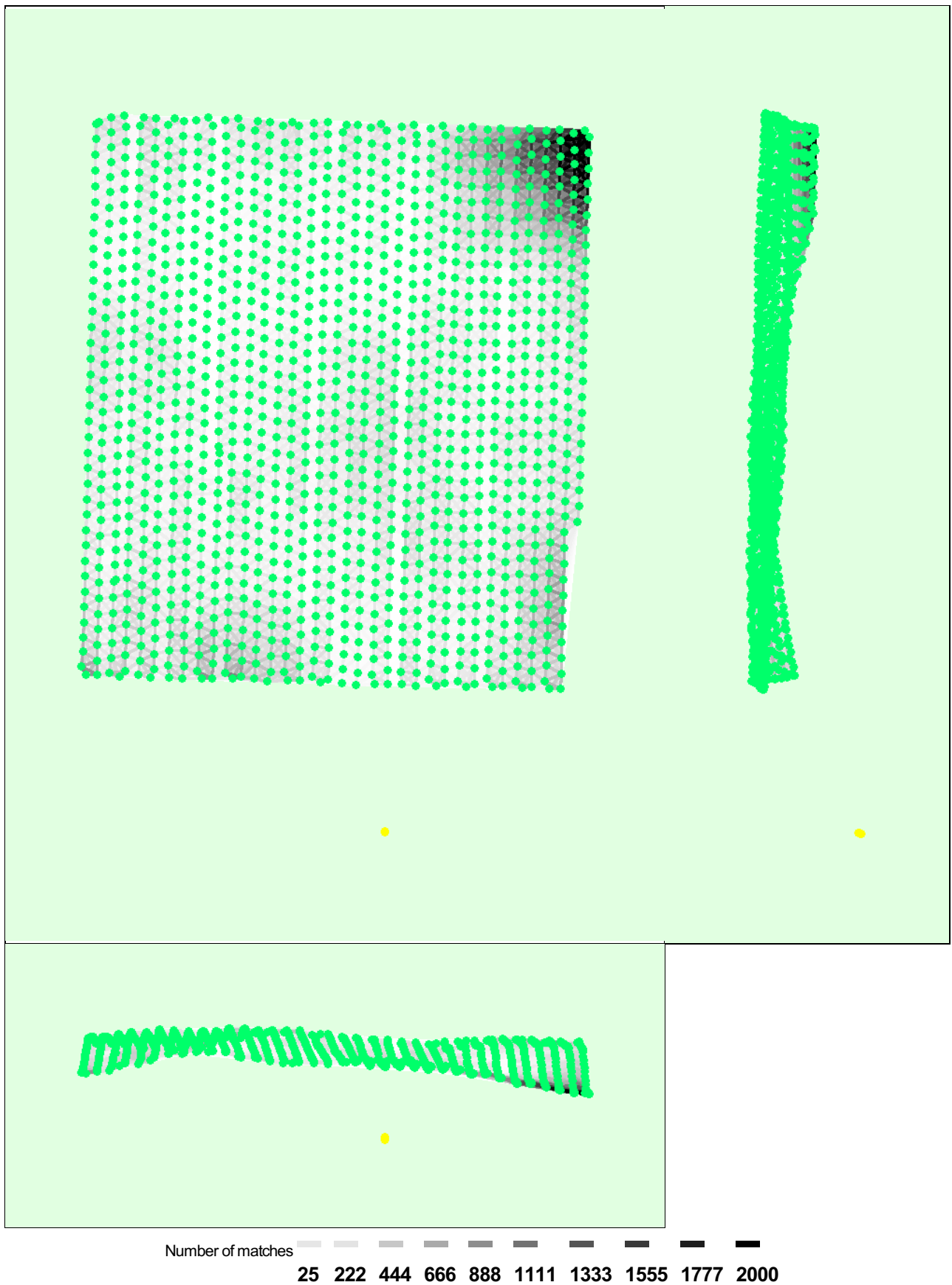


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

? Absolute Geolocation Variance



Mn Error [m]	Max Error [m]	Geolocation Error X[%]	Geolocation Error Y[%]	Geolocation Error Z[%]
-	-15.00	0.00	0.00	0.00
-15.00	-12.00	0.00	0.00	0.00
-12.00	-9.00	0.00	0.00	0.00
-9.00	-6.00	0.00	0.00	0.00
-6.00	-3.00	0.00	13.06	0.61
-3.00	0.00	54.85	40.49	49.12
0.00	3.00	44.31	29.64	50.11
3.00	6.00	0.84	16.65	0.15
6.00	9.00	0.00	0.15	0.00
9.00	12.00	0.00	0.00	0.00
12.00	15.00	0.00	0.00	0.00
15.00	-	0.00	0.00	0.00
Mean [m]		0.008080	0.003169	-0.035973
Sigma [m]		0.607794	2.597889	0.889726
RMS Error [m]		0.607848	2.597890	0.890453

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.

? Relative Geolocation Variance



Relative Geolocation Error	Images X[%]	Images Y[%]	Images Z[%]
[-1.00, 1.00]	99.85	97.10	100.00
[-2.00, 2.00]	100.00	100.00	100.00
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	5.000000	5.000000	10.000000
Sigma of Geolocation Accuracy [m]	0.000000	0.000000	0.000000

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

Geolocation Orientational Variance	RMS [degree]
Omega	10.756
Phi	4.706
Kappa	10.692

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) i7-8700K CPU @ 3.70GHz RAM: 64GB GPU: NVIDIA GeForce GTX 1080 Ti (Driver: 24.21.13.9882), Intel(R) UHD Graphics 630 (Driver: 22.20.16.4758)
Operating System	Windows 10 Education, 64-bit


Coordinate Systems



Image Coordinate System	WGS 84 (EGM96 Geoid)
Output Coordinate System	WGS 84 / UTM zone 11N (EGM96 Geoid)

Processing Options



Detected Template	 RGB Local structure bark beetle severity*
Keypoints Image Scale	Custom, Image Scale: 0.5
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: Standard Internal Parameters Optimization: All External Parameters Optimization: All Rematch: Auto, no

Point Cloud Densification details



Processing Options



Image Scale	multiscale, 1/2 (Half image size, Default)
Point Density	Optimal
Minimum Number of Matches	3
3D Textured Mesh Generation	yes
3D Textured Mesh Settings:	Resolution: Medium Resolution (default) Color Balancing: no
LOD	Generated: no
Advanced: 3D Textured Mesh Settings	Sample Density Divider: 1
Advanced: Image Groups	group1
Advanced: Use Processing Area	yes
Advanced: Use Annotations	yes
Time for Point Cloud Densification	03h:27m:43s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	28m:06s

Results



Number of Generated Tiles	4
Number of 3D Densified Points	60619690
Average Density (per m ³)	21.79

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (5.4 [cm/pixel])
DSM Filters	Noise Filtering: yes Surface Smoothing: yes, Type: Sharp
Raster DSM	Generated: yes Method: Triangulation Merge Tiles: yes
Orthomosaic	Generated: yes Merge Tiles: yes GeoTIFF Without Transparency: no Google Maps Tiles and KML: no
Time for DSM Generation	04m:05s
Time for Orthomosaic Generation	07h:07m:29s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s

