

Quality Report



Generated with Pix4Dmapper Pro version 4.2.27



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	stan_4k_1_x3
Processed	2018-09-30 22:38:10
Camera Model Name(s)	FC350_3.6_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	5.26 cm / 2.07 in
Area Covered	0.644 km ² / 64.3773 ha / 0.25 sq. mi. / 159.1622 acres
Time for Initial Processing (without report)	01h:51m:16s

Quality Check



Images	median of 11821 keypoints per image	
Dataset	1916 out of 1918 images calibrated (99%), all images enabled, 2 blocks	
Camera Optimization	0.58% relative difference between initial and optimized internal camera parameters	
Matching	median of 1114.63 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

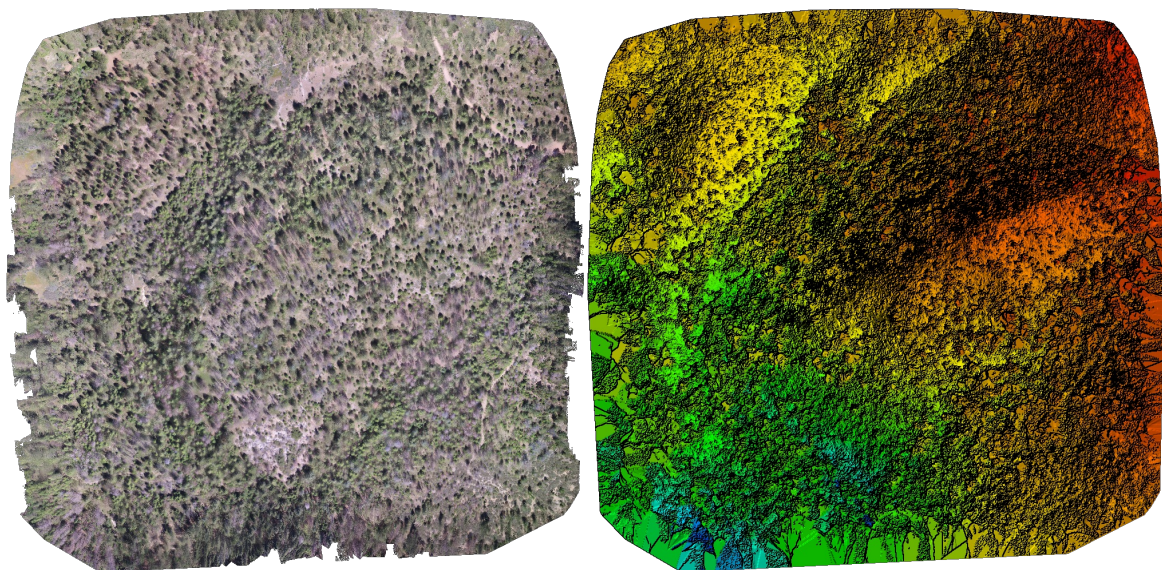


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	1916 out of 1918
Number of Geolocated Images	1918 out of 1918

? Initial Image Positions

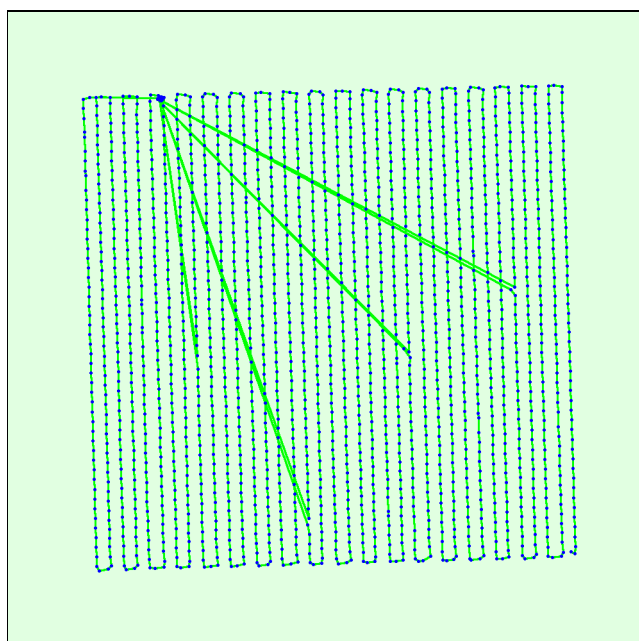
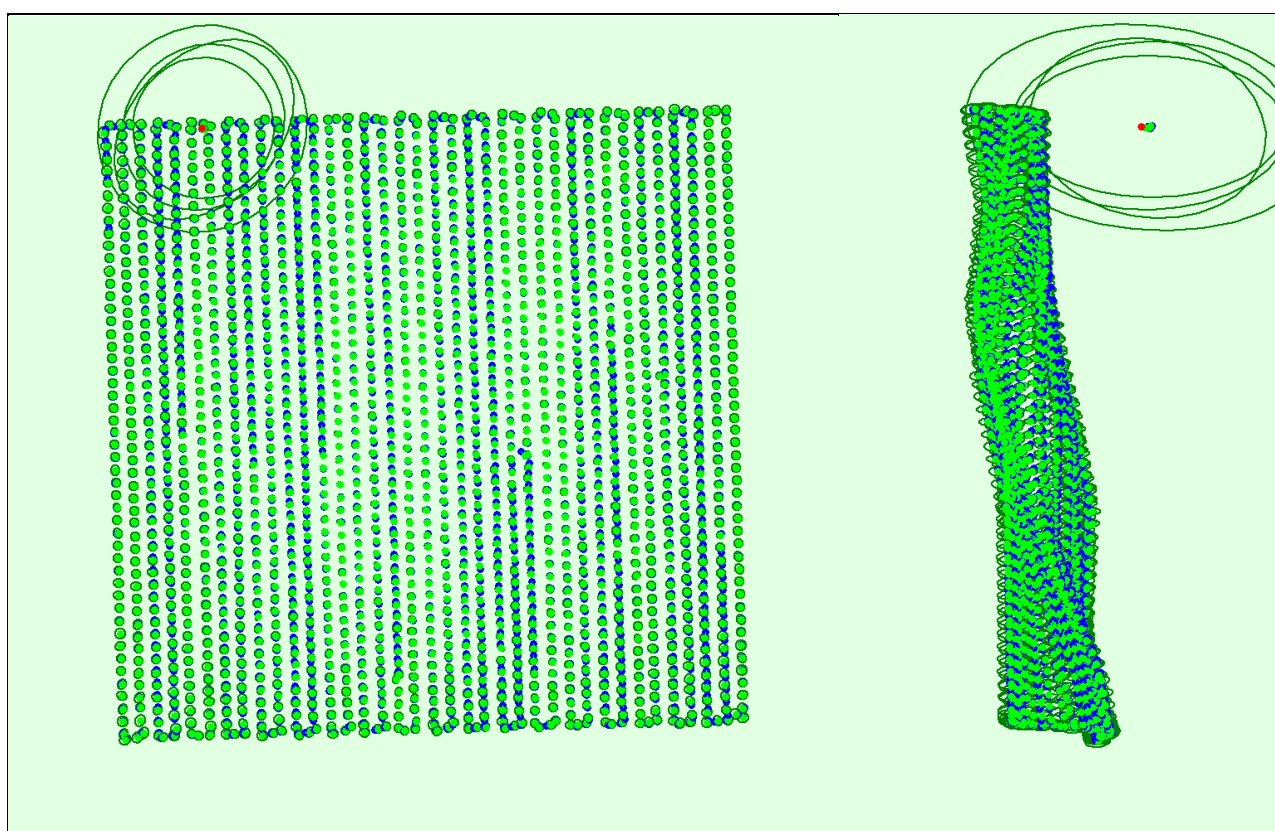
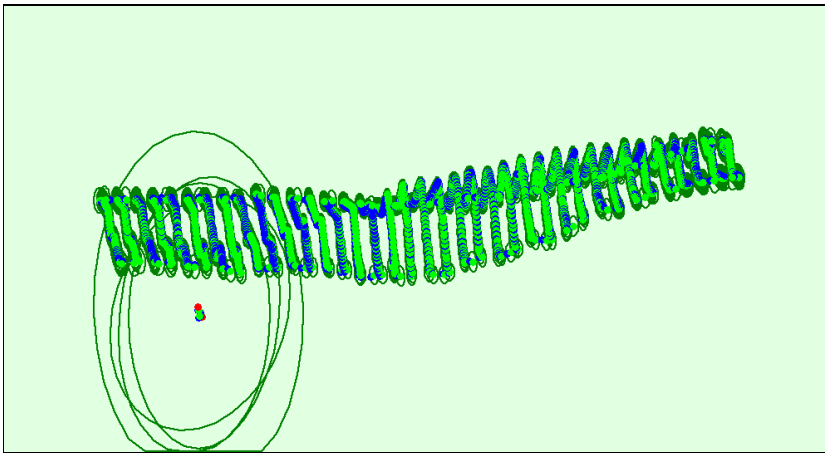


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

? Computed Image/GCPs/Manual Tie Points Positions





Uncertainty ellipses 50x 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). 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	0.080	0.081	0.172	0.109	0.127	0.130
Sigma	0.077	0.078	0.128	1.625	2.045	2.578

? Overlap

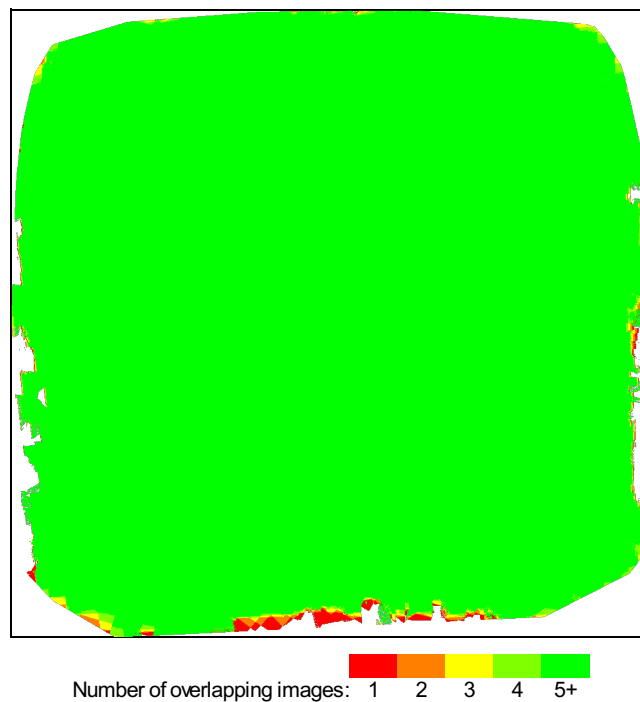


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

Bundle Block Adjustment Details



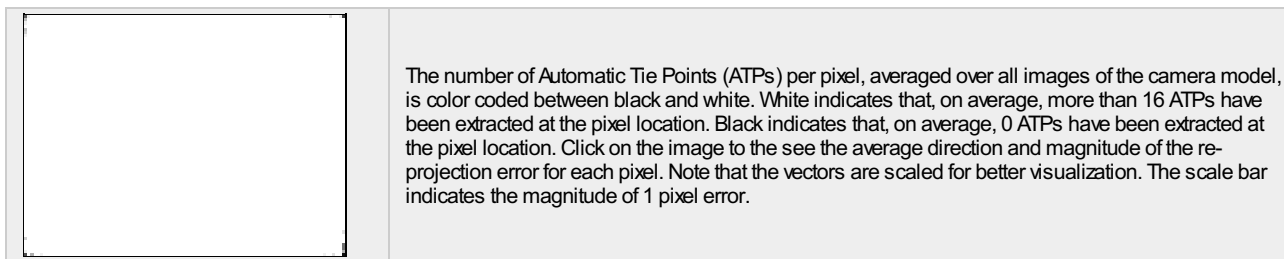
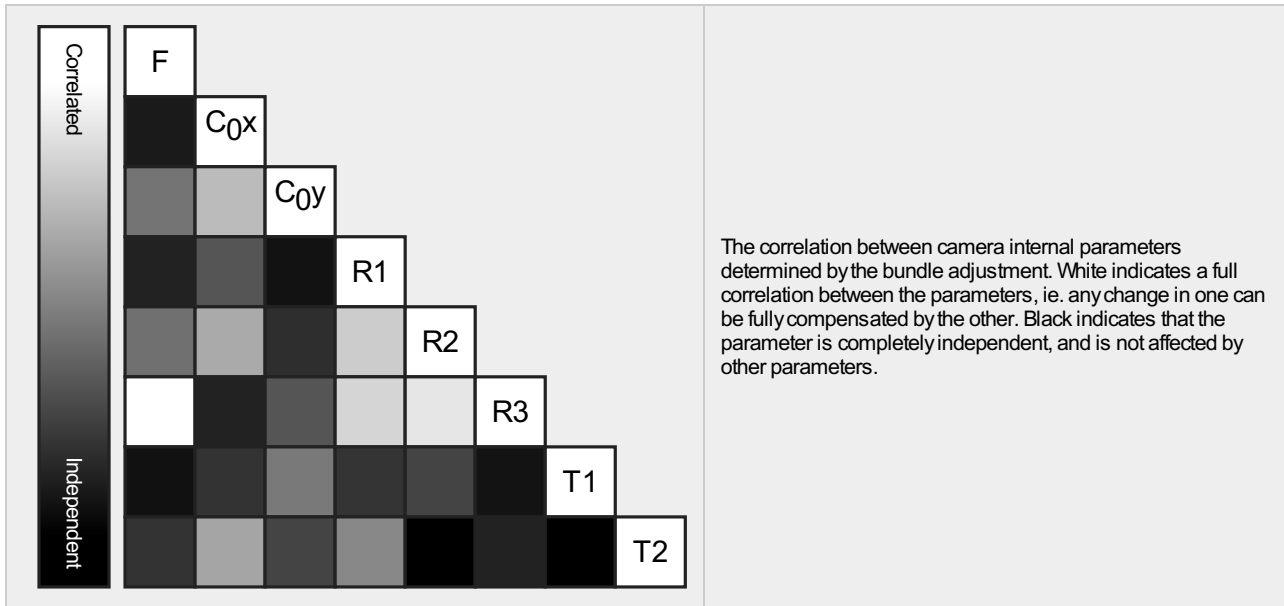
Number of 2D Keypoint Observations for Bundle Block Adjustment	2252676
Number of 3D Points for Bundle Block Adjustment	727969
Mean Reprojection Error [pixels]	0.134

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	2299.160 [pixel] 3.631 [mm]	1986.174 [pixel] 3.137 [mm]	1503.751 [pixel] 2.375 [mm]	-0.127	0.108	-0.014	0.001	0.000
Uncertainties (Sigma)	0.416 [pixel] 0.001 [mm]	0.040 [pixel] 0.000 [mm]	0.041 [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	11821	1115
Min	5849	82
Max	13363	2342
Mean	11893	1176

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	475163
In 3 Images	117086
In 4 Images	49517
In 5 Images	26203
In 6 Images	15881
In 7 Images	10305
In 8 Images	7025

In 9 Images	5113
In 10 Images	3880
In 11 Images	2996
In 12 Images	2381
In 13 Images	1935
In 14 Images	1497
In 15 Images	1186
In 16 Images	1061
In 17 Images	894
In 18 Images	764
In 19 Images	606
In 20 Images	539
In 21 Images	447
In 22 Images	393
In 23 Images	337
In 24 Images	293
In 25 Images	270
In 26 Images	217
In 27 Images	207
In 28 Images	166
In 29 Images	140
In 30 Images	126
In 31 Images	147
In 32 Images	102
In 33 Images	103
In 34 Images	98
In 35 Images	75
In 36 Images	60
In 37 Images	61
In 38 Images	60
In 39 Images	48
In 40 Images	52
In 41 Images	46
In 42 Images	44
In 43 Images	38
In 44 Images	30
In 45 Images	29
In 46 Images	35
In 47 Images	23
In 48 Images	18
In 49 Images	18
In 50 Images	17
In 51 Images	16
In 52 Images	19
In 53 Images	15
In 54 Images	12
In 55 Images	15
In 56 Images	11
In 57 Images	13
In 58 Images	7
In 59 Images	10
In 60 Images	7
In 61 Images	8
In 62 Images	4
In 63 Images	7
In 64 Images	4
In 65 Images	6
In 66 Images	2
In 67 Images	4

In 68 Images	2
In 69 Images	2
In 70 Images	7
In 71 Images	4
In 72 Images	5
In 73 Images	1
In 74 Images	4
In 75 Images	3
In 76 Images	3
In 77 Images	4
In 78 Images	3
In 79 Images	1
In 80 Images	3
In 81 Images	1
In 82 Images	3
In 83 Images	1
In 84 Images	4
In 85 Images	2
In 86 Images	2
In 88 Images	1
In 89 Images	3
In 91 Images	1
In 92 Images	1
In 96 Images	1
In 98 Images	1
In 100 Images	1
In 101 Images	1
In 102 Images	1
In 105 Images	1
In 106 Images	2
In 107 Images	1
In 110 Images	1
In 115 Images	2
In 117 Images	1
In 121 Images	1
In 122 Images	1
In 123 Images	1

 2D Keypoint Matches



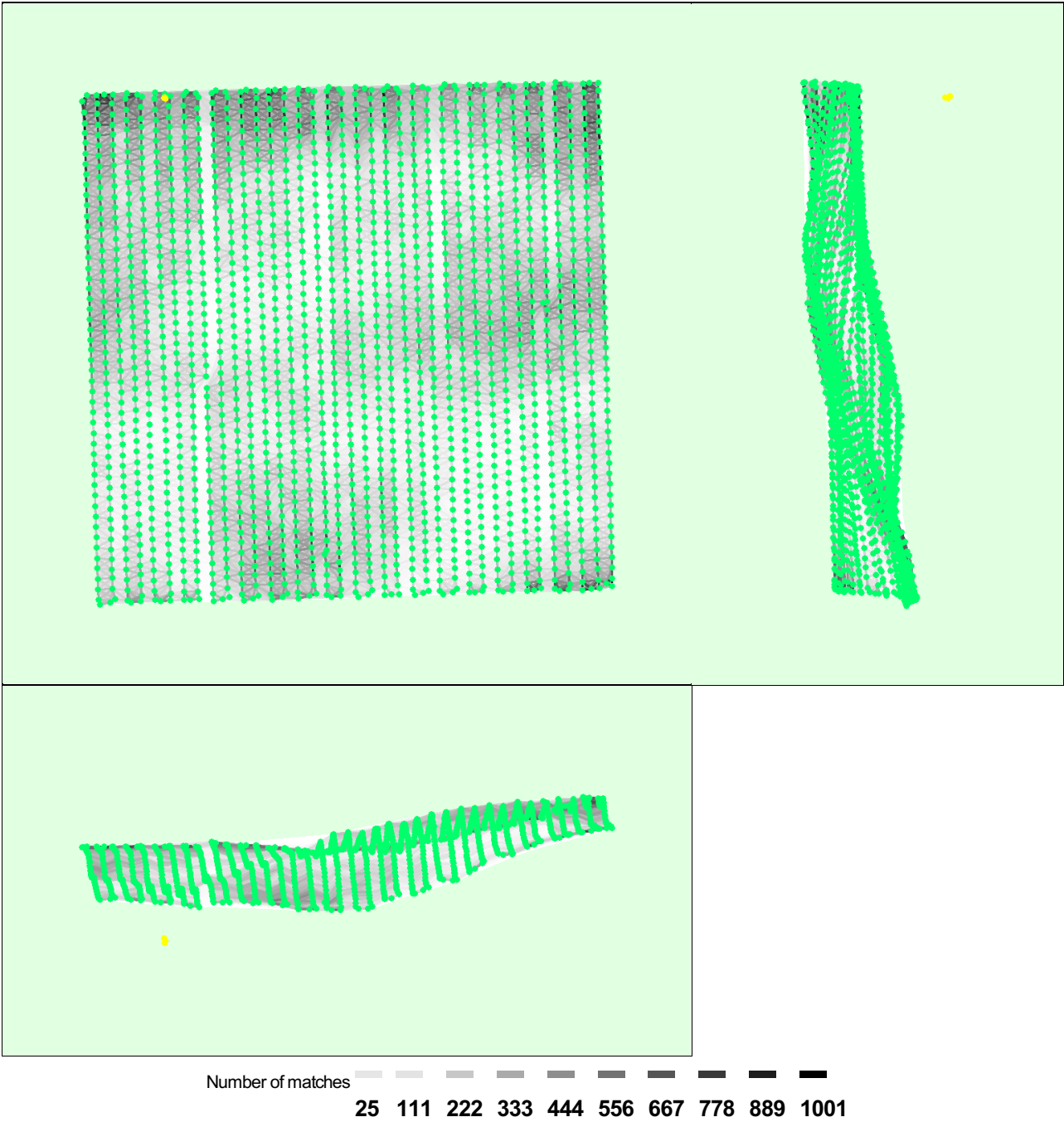


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

Geolocation Details

? 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	0.05	0.00
-6.00	-3.00	0.78	14.25	0.84
-3.00	0.00	47.55	36.33	40.55
0.00	3.00	51.62	34.39	58.46
3.00	6.00	0.05	14.98	0.16

6.00	9.00	0.00	0.00	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]		0.000000	-0.000000	-0.000000
Sigma [m]		0.663624	2.541993	1.361809
RMS Error [m]		0.663624	2.541993	1.361809

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]	100.00	98.43	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	3.121
Phi	2.452
Kappa	5.757

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	WGS84 (egm96)
Output Coordinate System	WGS 84 / UTM zone 10N (egm96)

Processing Options



Detected Template	No Template Available
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	07h:16m:07s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	38m:47s

Results



Number of Generated Tiles	4
Number of 3D Densified Points	75131023
Average Density (per m ³)	24.55

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (5.26 [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	07m:17s
Time for Orthomosaic Generation	14h:47m:48s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s