

Quality Report



Generated with Pix4Denterprise version 4.4.12



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	tw_miaoli_zhunan_hsinggang-river_20191212
Processed	2019-12-15 03:01:27
Camera Model Name(s)	FC6310R_8.8_4864x3648 (RGB)
Average Ground Sampling Distance (GSD)	3.63 cm / 1.43 in
Area Covered	0.282 km ² / 28.2179 ha / 0.11 sq. mi. / 69.7640 acres
Time for Initial Processing (without report)	32m:15s

Quality Check



Images	median of 45728 keypoints per image	
Dataset	289 out of 289 images calibrated (100%), all images enabled	
Camera Optimization	0.47% relative difference between initial and optimized internal camera parameters	
Matching	median of 17751.2 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

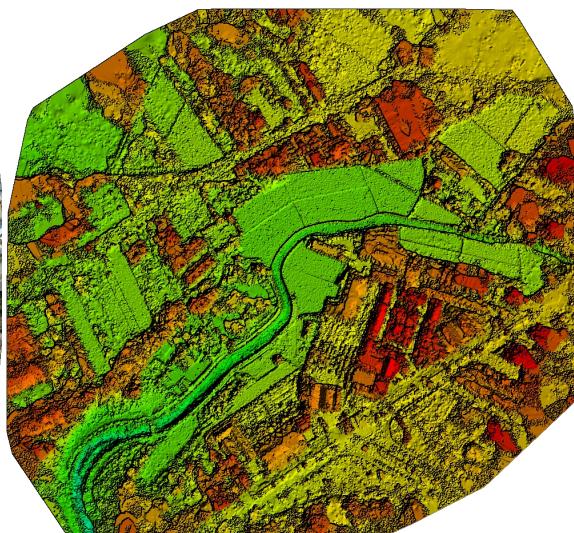


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	289 out of 289
Number of Geolocated Images	289 out of 289

ⓘ Initial Image Positions

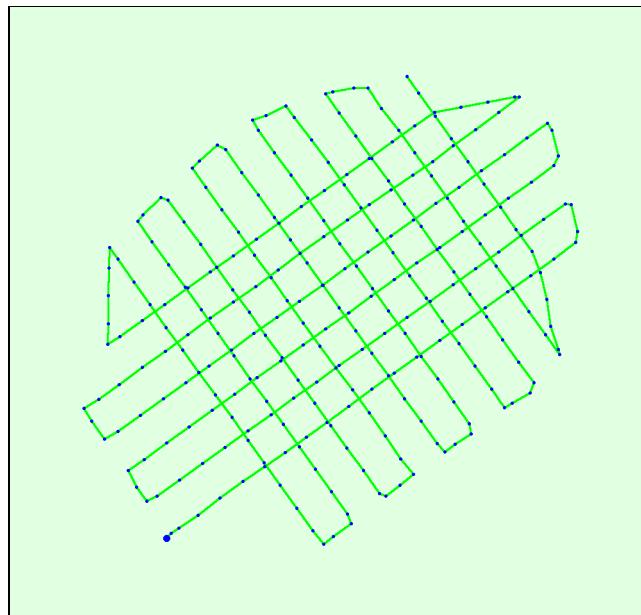
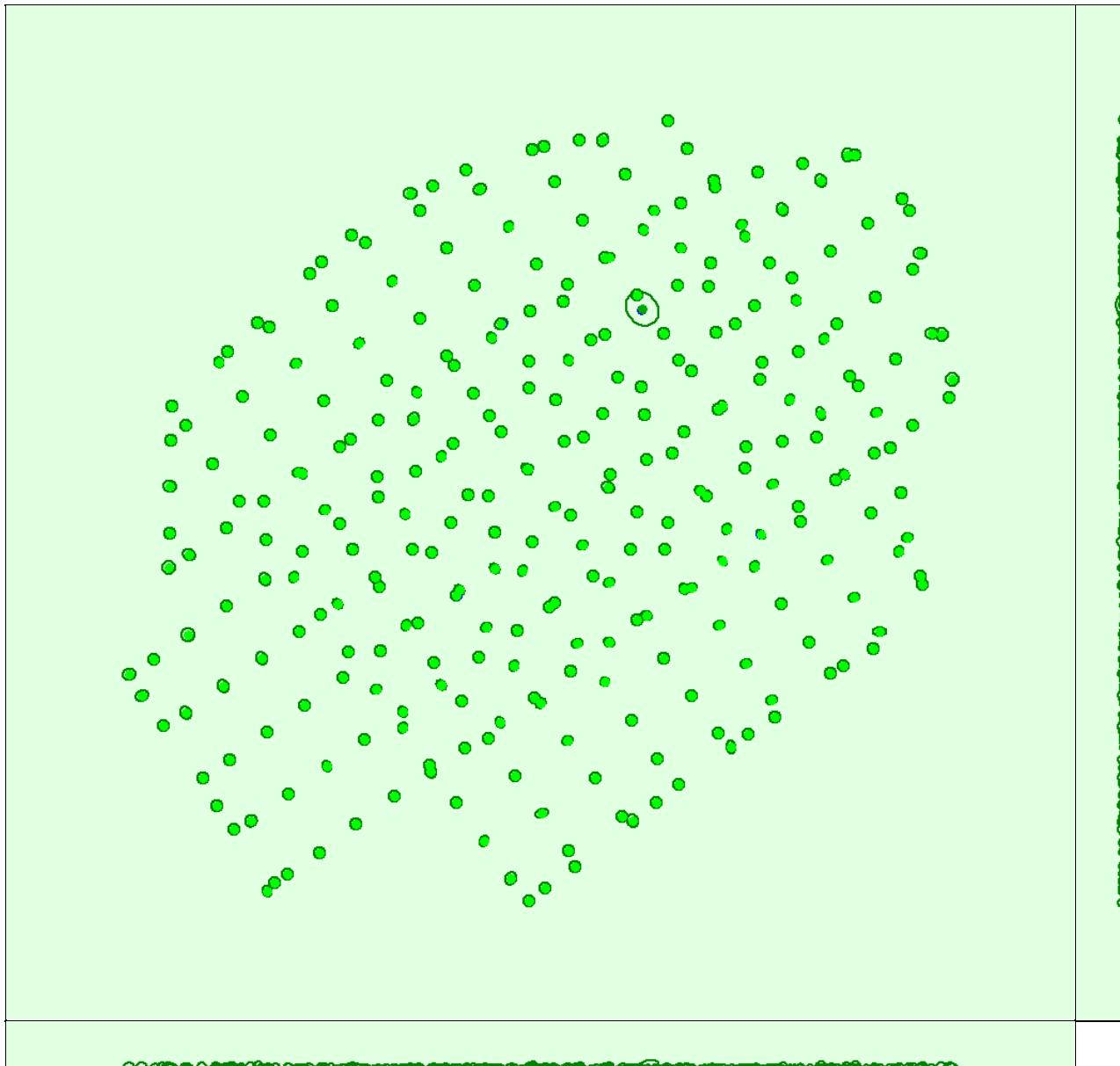


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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

?

Overlap



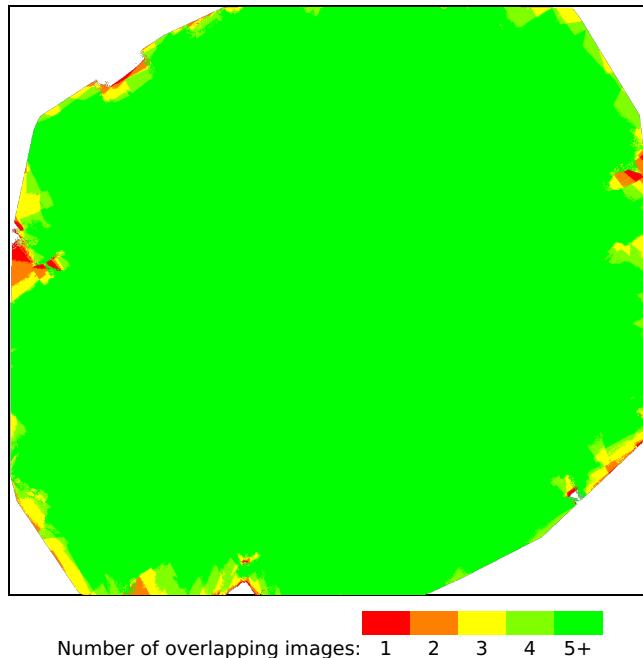


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.

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



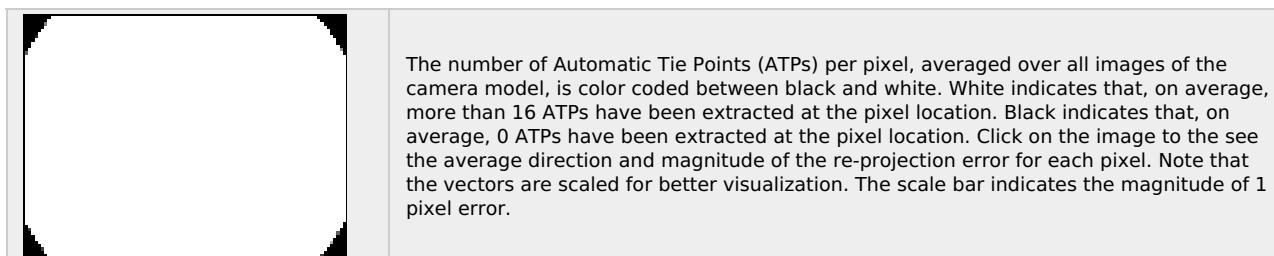
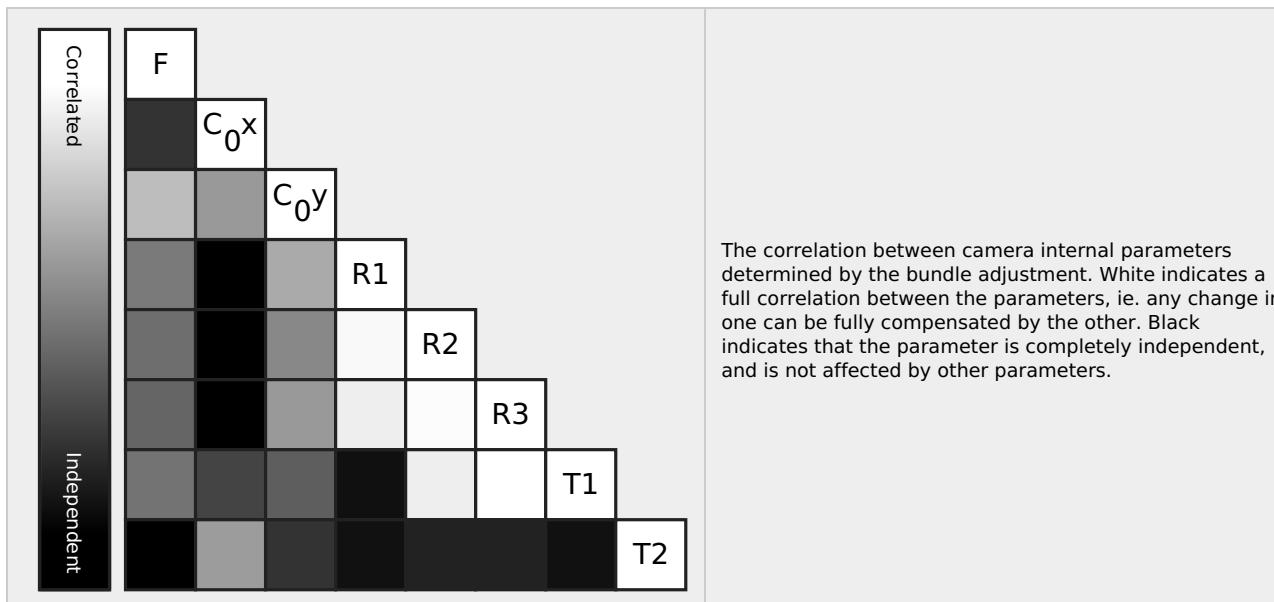
Number of 2D Keypoint Observations for Bundle Block Adjustment	5129764
Number of 3D Points for Bundle Block Adjustment	1753921
Mean Reprojection Error [pixels]	0.175

Internal Camera Parameters

FC6310R_8.8_4864x3648 (RGB). Sensor Dimensions: 11.407 [mm] x 8.556 [mm]

EXIF ID: **FC6310R_8.8_4864x3648**

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3666.840 [pixel] 8.600 [mm]	2420.300 [pixel] 5.676 [mm]	1835.990 [pixel] 4.306 [mm]	-0.270	0.112	-0.032	0.000	-0.001
Optimized Values	3649.559 [pixel] 8.559 [mm]	2422.089 [pixel] 5.680 [mm]	1847.252 [pixel] 4.332 [mm]	-0.269	0.115	-0.035	0.001	0.000
Uncertainties (Sigma)	0.056 [pixel] 0.000 [mm]	0.054 [pixel] 0.000 [mm]	0.070 [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	45728	17751
Min	31762	6609
Max	59777	27100
Mean	45051	17750

💡 3D Points from 2D Keypoint Matches

ⓘ

	Number of 3D Points Observed
In 2 Images	1120327
In 3 Images	305393
In 4 Images	132116
In 5 Images	69353
In 6 Images	40534
In 7 Images	25564
In 8 Images	16847
In 9 Images	11408
In 10 Images	8079
In 11 Images	5778
In 12 Images	4216
In 13 Images	3114
In 14 Images	2385
In 15 Images	1835
In 16 Images	1424
In 17 Images	1109
In 18 Images	820
In 19 Images	698
In 20 Images	516
In 21 Images	459
In 22 Images	345

In 23 Images	244
In 24 Images	222
In 25 Images	205
In 26 Images	155
In 27 Images	141
In 28 Images	105
In 29 Images	101
In 30 Images	96
In 31 Images	59
In 32 Images	49
In 33 Images	33
In 34 Images	31
In 35 Images	20
In 36 Images	18
In 37 Images	20
In 38 Images	20
In 39 Images	14
In 40 Images	14
In 41 Images	8
In 42 Images	14
In 43 Images	4
In 44 Images	6
In 45 Images	4
In 46 Images	4
In 47 Images	4
In 48 Images	3
In 49 Images	1
In 50 Images	4
In 53 Images	1
In 62 Images	1

?

2D Keypoint Matches



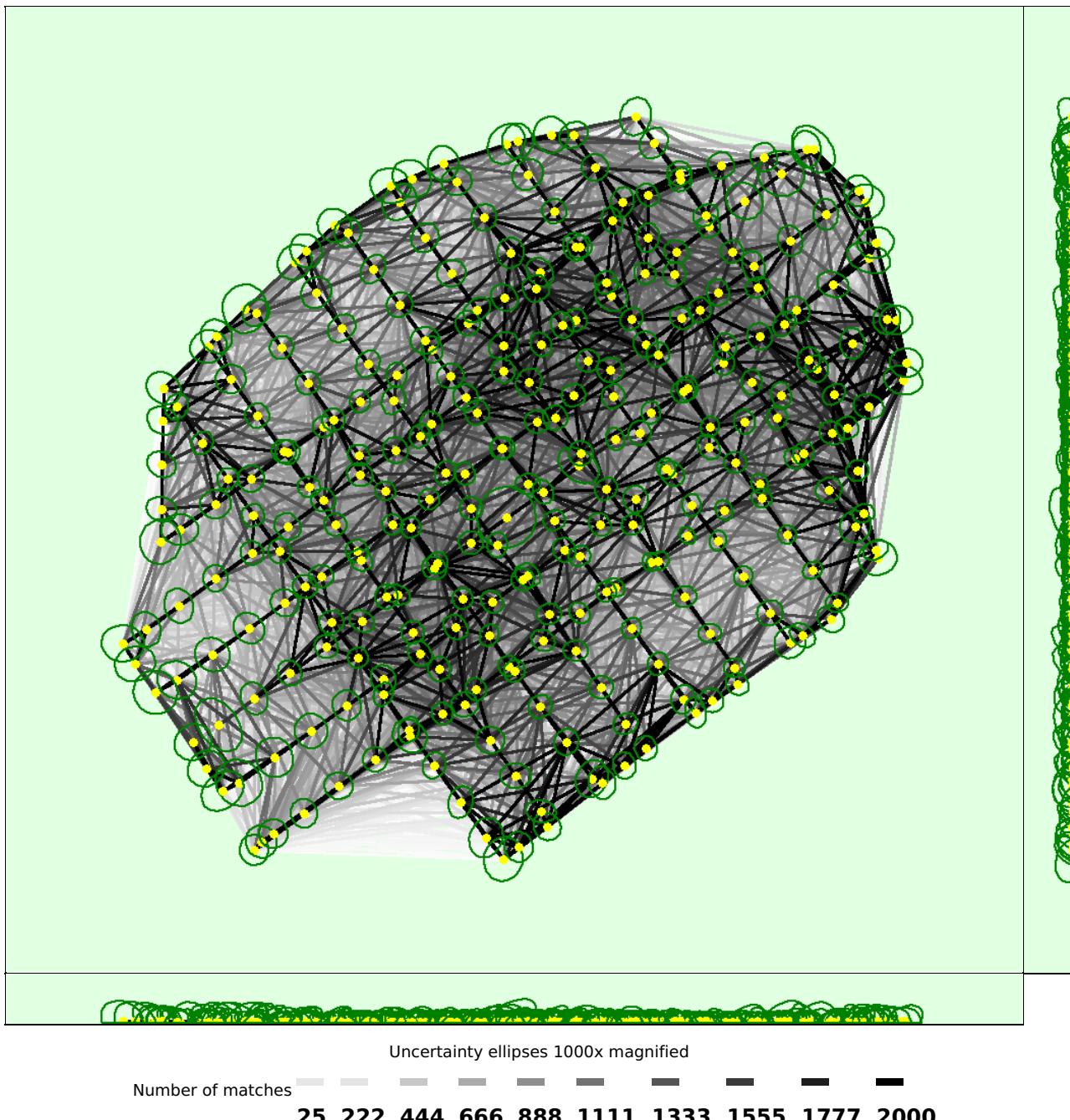


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty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

ⓘ Relative camera position and orientation uncertainties

i

	X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.006	0.006	0.005	0.004	0.004	0.003
Sigma	0.001	0.001	0.001	0.001	0.001	0.001

Geolocation Details

i

ⓘ Absolute Geolocation Variance

i

Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-0.03	0.00	0.00	0.35

-0.03	-0.03	0.00	0.00	0.69
-0.03	-0.02	0.35	0.00	2.08
-0.02	-0.01	0.00	0.00	4.17
-0.01	-0.01	1.39	0.35	14.93
-0.01	0.00	48.61	50.00	28.82
0.00	0.01	48.61	48.61	25.35
0.01	0.01	0.69	0.69	16.32
0.01	0.02	0.35	0.35	4.86
0.02	0.03	0.00	0.00	1.04
0.03	0.03	0.00	0.00	0.35
0.03	-	0.00	0.00	1.04
Mean [m]		-0.000021	0.000008	0.000080
Sigma [m]		0.002817	0.002365	0.011739
RMS Error [m]		0.002817	0.002365	0.011739

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 i

Relative Geolocation Error	Images X [%]	Images Y [%]	Images Z [%]
[-1.00, 1.00]	98.61	99.65	94.44
[-2.00, 2.00]	99.65	100.00	98.61
[-3.00, 3.00]	100.00	100.00	99.31
Mean of Geolocation Accuracy [m]	0.009748	0.009748	0.019096
Sigma of Geolocation Accuracy [m]	0.000361	0.000361	0.000529

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

Geolocation Orientational Variance	RMS [degree]
Omega	1.016
Phi	1.082
Kappa	2.583

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

Initial Processing Details i

System Information i

Hardware	CPU: Intel(R) Xeon(R) Platinum 8124M CPU @ 3.00GHz RAM: 69GB GPU: no info (Driver: unknown)
Operating System	Linux 4.15.0-1054-aws x86_64

Coordinate Systems i

Image Coordinate System	WGS 84
Output Coordinate System	TWD97 / TM2 zone 121

Processing Options i

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: yes
Advanced: Keypoint Extraction	Targeted Number of Keypoints: Automatic
Advanced: Calibration	Calibration Method: Geolocation Based Internal Parameters Optimization: All External Parameters Optimization: All Rematch: Auto, yes

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: yes
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	24m:34s
Time for Point Cloud Classification	01m:51s
Time for 3D Textured Mesh Generation	16m:33s

Results



Number of Generated Tiles	1
Number of 3D Densified Points	25518014
Average Density (per m ³)	74.79

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (3.63 [cm/pixel])
DSM Filters	Noise Filtering: yes Surface Smoothing: yes, Type: Sharp
Raster DSM	Generated: yes Method: Inverse Distance Weighting Merge Tiles: yes
Orthomosaic	Generated: yes Merge Tiles: yes GeoTIFF Without Transparency: no Google Maps Tiles and KML: yes
Raster DTM	Generated: yes Merge Tiles: yes
DTM Resolution	10 x GSD (3.63 [cm/pixel])
Time for DSM Generation	06m:09s
Time for Orthomosaic Generation	14m:32s
Time for DTM Generation	32s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s