

Quality Report



Generated with Pix4Dmapper 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_houlong_nanshi-river_20200116
Processed	2020-01-24 13:47:19
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	2.97 cm / 1.17 in
Area Covered	0.400 km ² / 39.9656 ha / 0.15 sq. mi. / 98.8083 acres
Time for Initial Processing (without report)	01h:53m:37s

Quality Check



Images	median of 66779 keypoints per image	
Dataset	334 out of 334 images calibrated (100%), all images enabled	
Camera Optimization	0.62% relative difference between initial and optimized internal camera parameters	
Matching	median of 21959.1 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

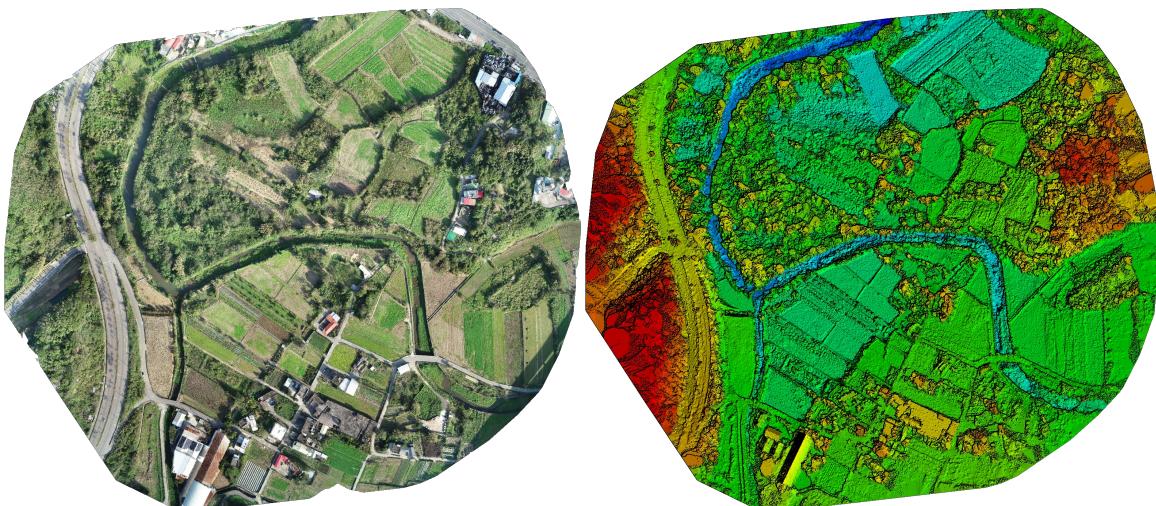


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	334 out of 334
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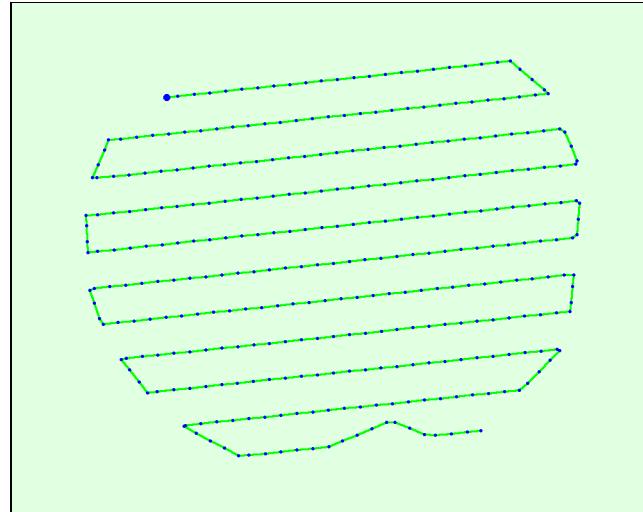
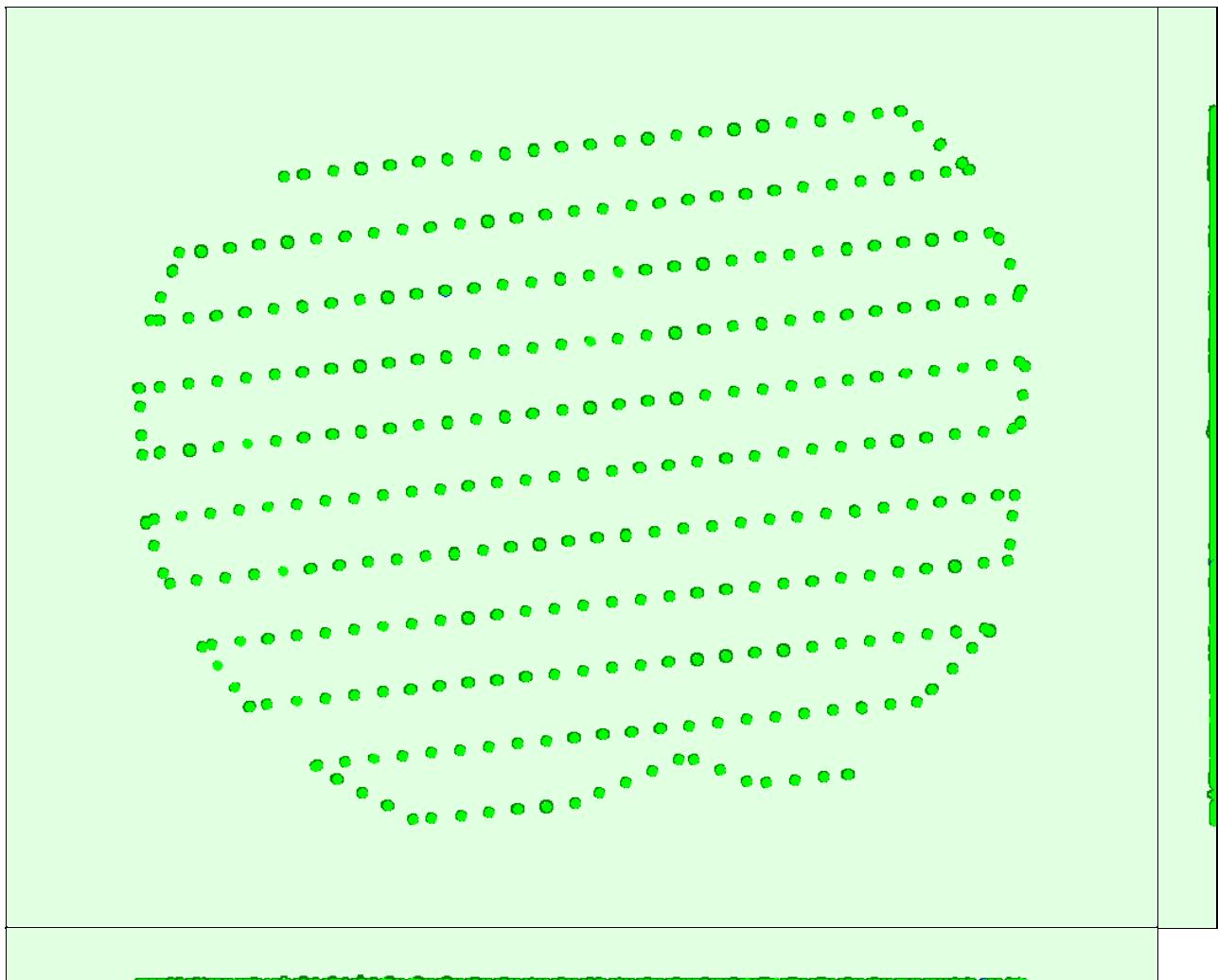
Initial Image Positions

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

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	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.003	0.003	0.003	0.002	0.002	0.002
Sigma	0.000	0.000	0.000	0.000	0.000	0.000

⚠ Overlap

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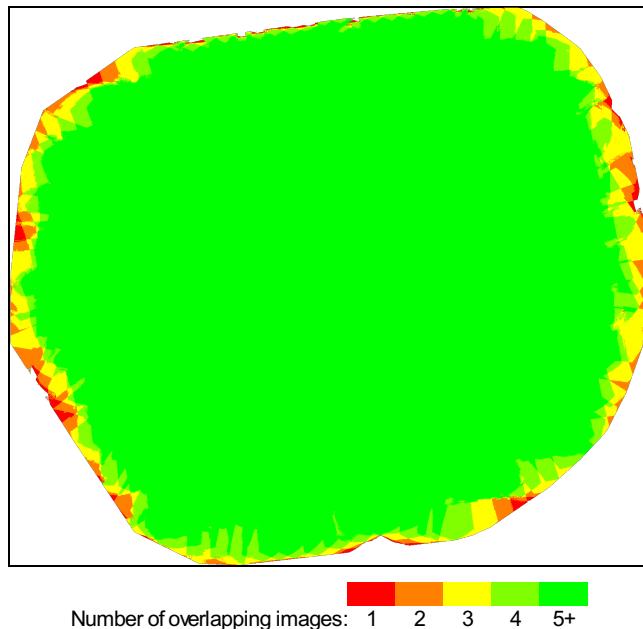


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

Bundle Block Adjustment Details

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Number of 2D Keypoint Observations for Bundle Block Adjustment	7047673
Number of 3D Points for Bundle Block Adjustment	2497674
Mean Reprojection Error [pixels]	0.148

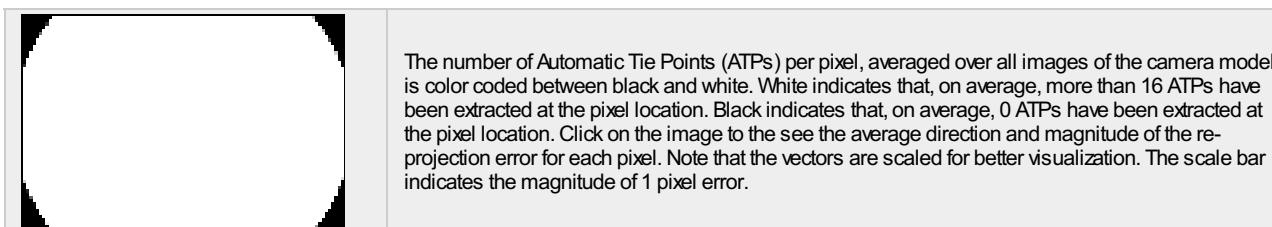
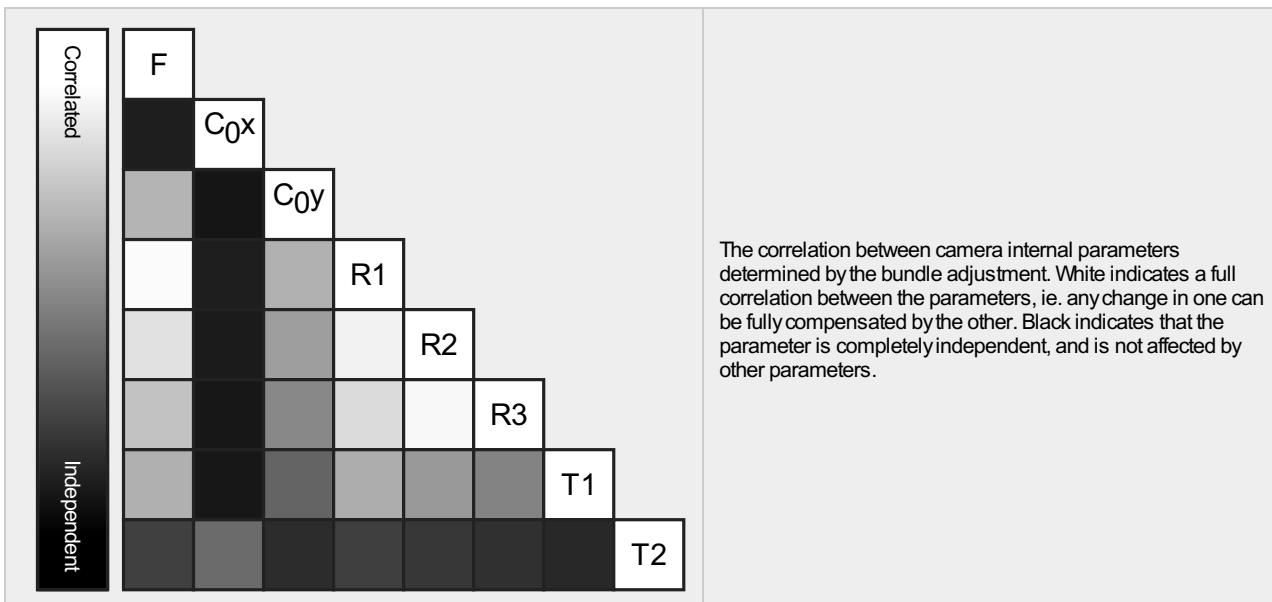
⚠ Internal Camera Parameters

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

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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	3681.191 [pixel] 8.633 [mm]	2725.661 [pixel] 6.392 [mm]	1850.447 [pixel] 4.340 [mm]	-0.272	0.114	-0.034	0.001	0.000
Uncertainties (Sigma)	2.395 [pixel] 0.006 [mm]	0.058 [pixel] 0.000 [mm]	0.058 [pixel] 0.000 [mm]	0.000	0.000	0.000	0.000	0.000



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 2D Keypoints Table


	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	66779	21959
Min	50072	2900
Max	80000	33086
Mean	65632	21101

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 3D Points from 2D Keypoint Matches


	Number of 3D Points Observed
In 2 Images	1692960
In 3 Images	399017
In 4 Images	159561
In 5 Images	82334
In 6 Images	48702
In 7 Images	31157
In 8 Images	21781
In 9 Images	16043
In 10 Images	11965
In 11 Images	8945
In 12 Images	6513
In 13 Images	4744
In 14 Images	3691
In 15 Images	2881
In 16 Images	2188
In 17 Images	1622
In 18 Images	1138
In 19 Images	821
In 20 Images	593
In 21 Images	398
In 22 Images	327
In 23 Images	149

In 24 Images	69
In 25 Images	42
In 26 Images	22
In 27 Images	10
In 28 Images	1

2D Keypoint Matches

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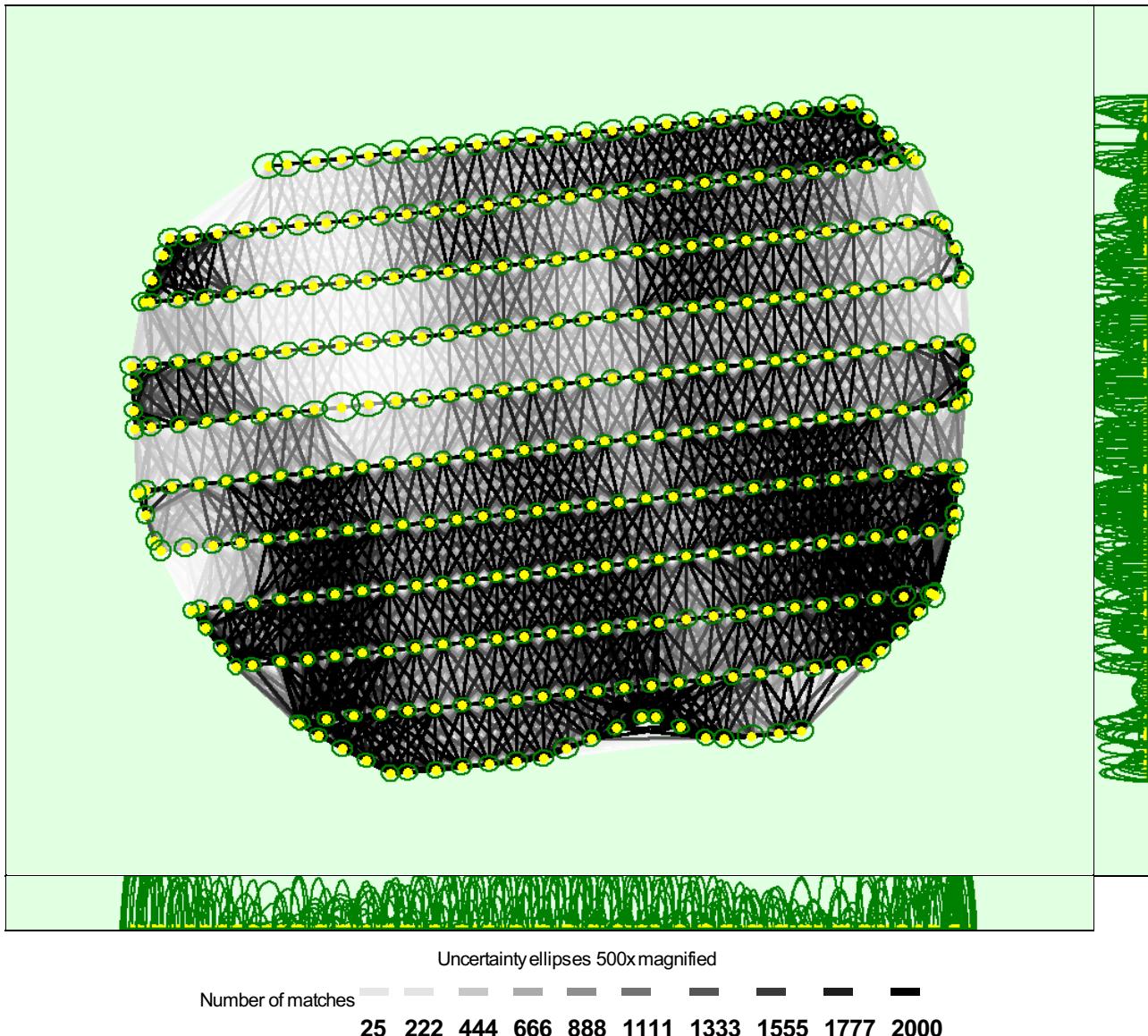


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty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

Relative camera position and orientation uncertainties

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	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.014	0.011	0.054	0.031	0.037	0.002
Sigma	0.002	0.002	0.031	0.018	0.020	0.001

Geolocation Details

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Absolute Geolocation Variance



Mn Error [m]	Max Error [m]	Geolocation Error X[%]	Geolocation Error Y[%]	Geolocation Error Z[%]
-	-0.03	0.00	0.00	0.30
-0.03	-0.03	0.00	0.00	1.50
-0.03	-0.02	0.00	0.00	2.99
-0.02	-0.01	0.30	0.00	7.78
-0.01	-0.01	0.60	0.90	14.67
-0.01	0.00	53.29	50.30	21.86
0.00	0.01	44.01	46.71	20.96
0.01	0.01	1.80	2.10	17.66
0.01	0.02	0.00	0.00	8.98
0.02	0.03	0.00	0.00	2.10
0.03	0.03	0.00	0.00	0.60
0.03	-	0.00	0.00	0.60
Mean [m]		-0.000000	0.000002	0.000143
Sigma [m]		0.002637	0.002645	0.012276
RMS Error [m]		0.002637	0.002645	0.012277

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]	99.70	99.70	91.32
[-2.00, 2.00]	100.00	100.00	99.70
[-3.00, 3.00]	100.00	100.00	99.70
Mean of Geolocation Accuracy [m]	0.010359	0.010359	0.019482
Sigma of Geolocation Accuracy [m]	0.000287	0.000287	0.000597

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

Geolocation Orientational Variance	RMS [degree]
Omega	0.291
Phi	0.511
Kappa	3.919

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) Xeon(R) CPU E3-1505M v5 @ 2.80GHz RAM: 32GB GPU: Intel(R) HD Graphics P530 (Driver: 23.20.16.4973)
Operating System	Windows 10 Pro, 64-bit

Coordinate Systems



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

Processing Options



Detected Template	DJI P4 RTK*
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
Mnimum 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	04h:06m:44s
Time for Point Cloud Classification	38m:39s
Time for 3D Textured Mesh Generation	01h:07m:24s

Results



Number of Generated Tiles	4
Number of 3D Densified Points	43321599
Average Density (per m ³)	106.73

DSM, Orthomosaic and Index Details



Processing Options



DSMand Orthomosaic Resolution	1 x GSD (2.97 [cm/pixel])
DSMFilters	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: no
Raster DTM	Generated: yes Merge Tiles: yes
DTMResolution	10 x GSD (2.97 [cm/pixel])
Time for DSM Generation	01h:11m:23s
Time for Orthomosaic Generation	01h:40m:07s
Time for DTM Generation	07m:07s

Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s