

Quality Report



Generated with Pix4Denterprise version 4.3.31



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_sanyi_cultural-industry-park_20190110
Processed	2019-01-10 11:54:33
Camera Model Name(s)	FC330_3.6_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	5.27 cm / 2.08 in
Area Covered	0.960 km ² / 96.0273 ha / 0.37 sq. mi. / 237.4114 acres
Time for Initial Processing (without report)	22m:57s

Quality Check



Images	median of 57578 keypoints per image	
Dataset	493 out of 493 images calibrated (100%), all images enabled	
Camera Optimization	15.38% relative difference between initial and optimized internal camera parameters	
Matching	median of 6414.72 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

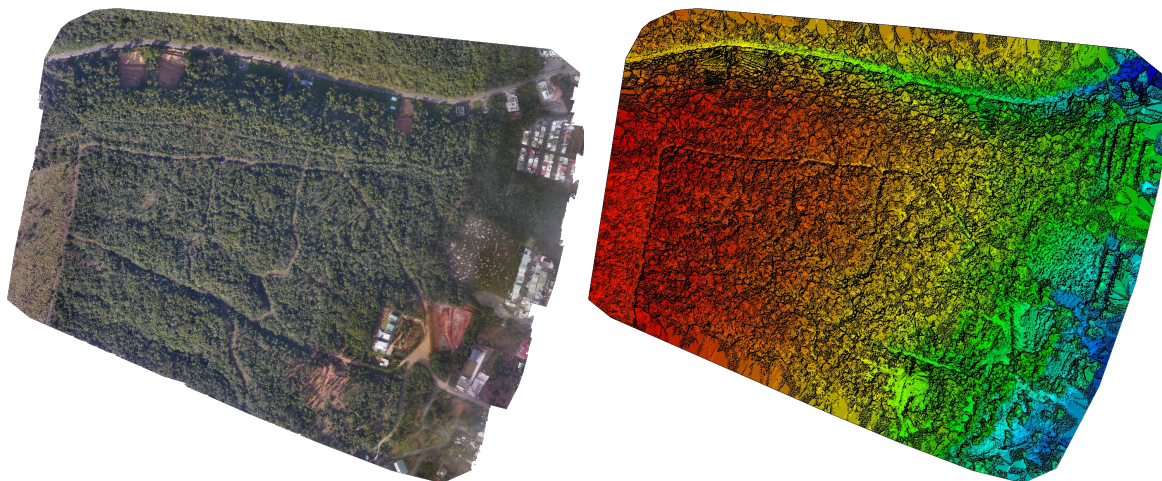


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	493 out of 493
Number of Geolocated Images	493 out of 493

? Initial Image Positions

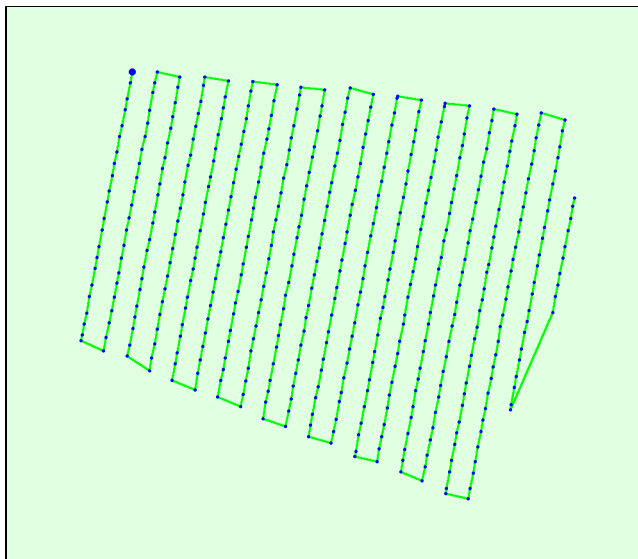
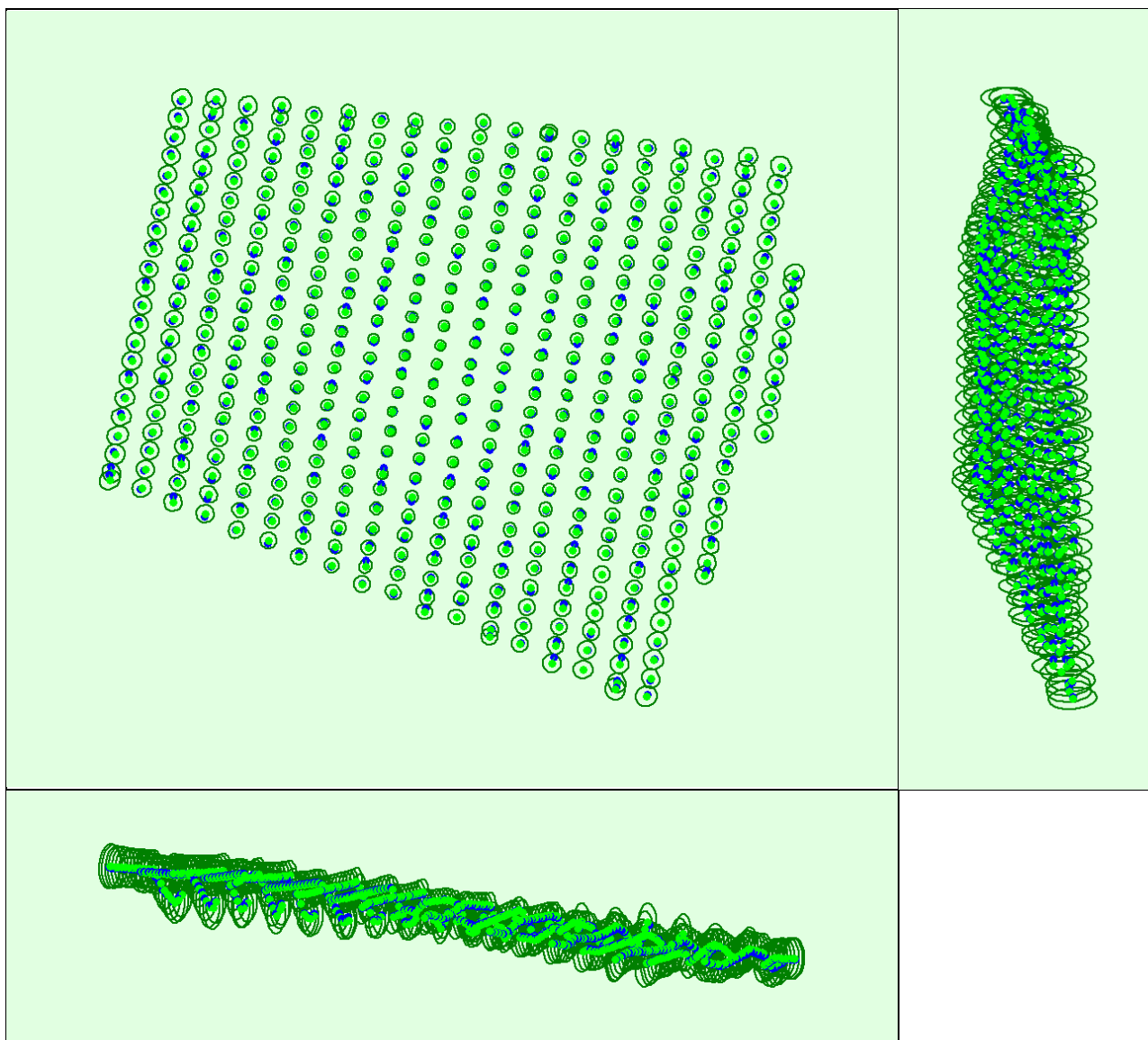


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

? 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). 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	0.232	0.231	0.488	0.069	0.063	0.027
Sigma	0.038	0.038	0.085	0.004	0.006	0.001

? Overlap

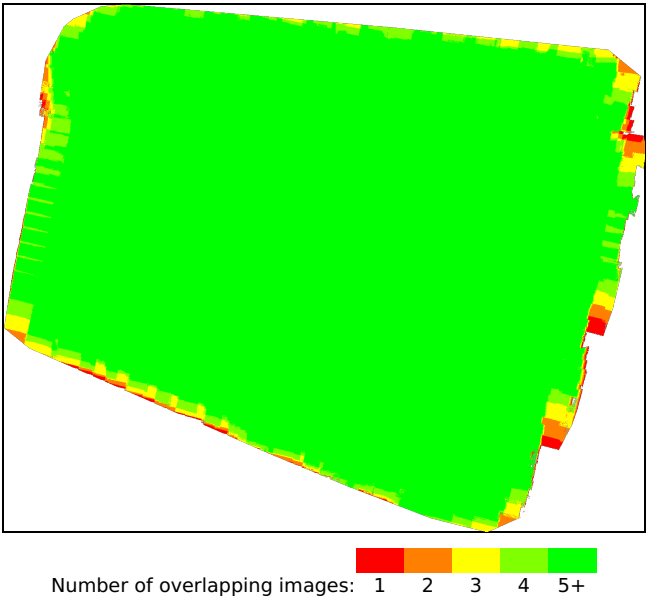


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

Bundle Block Adjustment Details

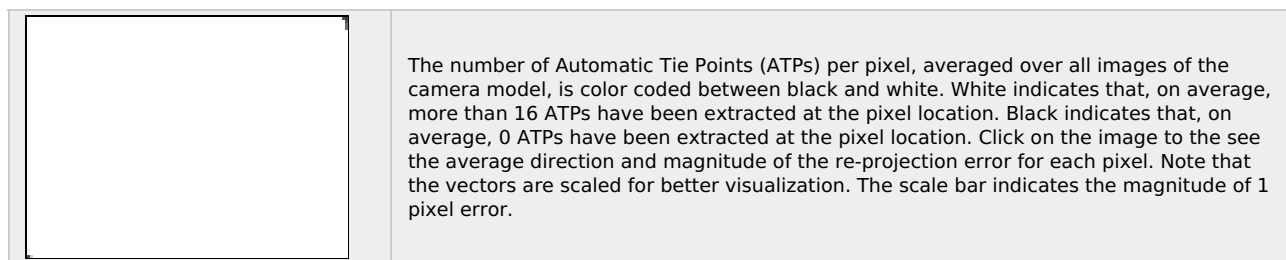
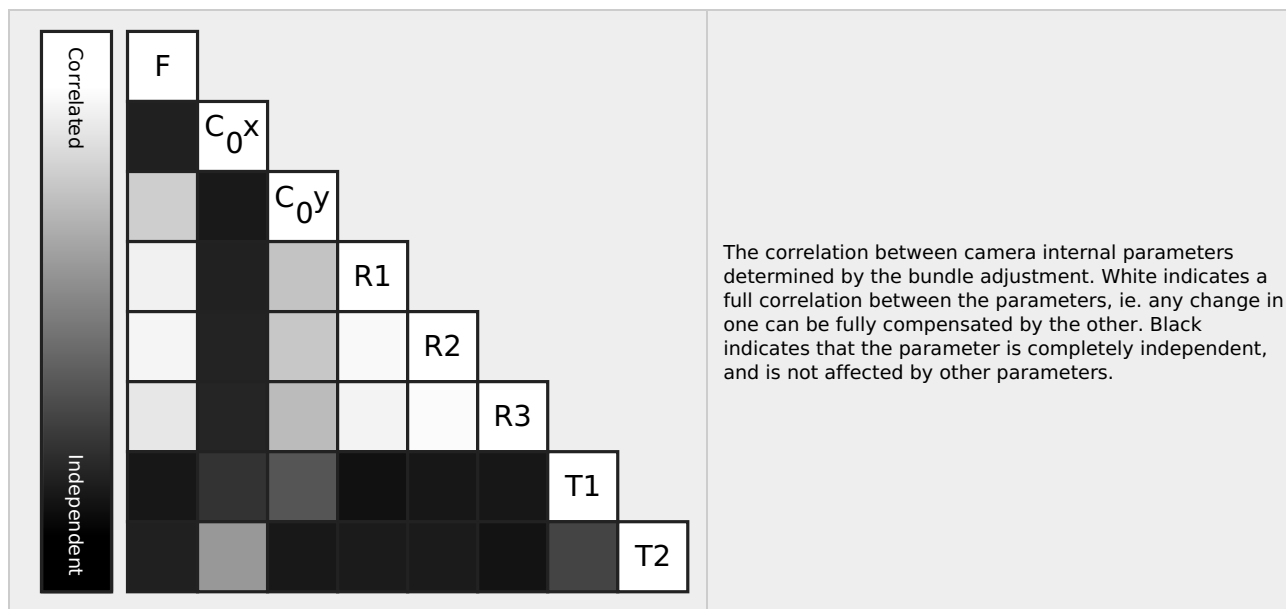
Number of 2D Keypoint Observations for Bundle Block Adjustment	3248203
Number of 3D Points for Bundle Block Adjustment	1388005
Mean Reprojection Error [pixels]	0.225

? Internal Camera Parameters

FC330_3.6_4000x3000 (RGB). Sensor Dimensions: 6.317 [mm] x 4.738 [mm]

EXIF ID: FC330_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]	-0.001	-0.002	0.000	-0.001	-0.001
Optimized Values	2637.355 [pixel] 4.165 [mm]	2060.806 [pixel] 3.255 [mm]	1473.464 [pixel] 2.327 [mm]	0.154	-0.213	0.070	-0.001	-0.000
Uncertainties (Sigma)	5.545 [pixel] 0.009 [mm]	0.096 [pixel] 0.000 [mm]	0.146 [pixel] 0.000 [mm]	0.001	0.002	0.001	0.000	0.000



? 2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	57578	6415
Min	20223	815
Max	69125	26142
Mean	53689	6589

? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	1152645
In 3 Images	146732
In 4 Images	41320
In 5 Images	18150
In 6 Images	9590
In 7 Images	5585
In 8 Images	3803
In 9 Images	2805
In 10 Images	2093
In 11 Images	1363
In 12 Images	1003
In 13 Images	690
In 14 Images	545
In 15 Images	439
In 16 Images	315
In 17 Images	246
In 18 Images	182
In 19 Images	140
In 20 Images	110
In 21 Images	77
In 22 Images	40

In 23 Images	34
In 24 Images	17
In 25 Images	22
In 26 Images	12
In 27 Images	16
In 28 Images	14
In 29 Images	11
In 30 Images	2
In 32 Images	3
In 33 Images	1

2D Keypoint Matches

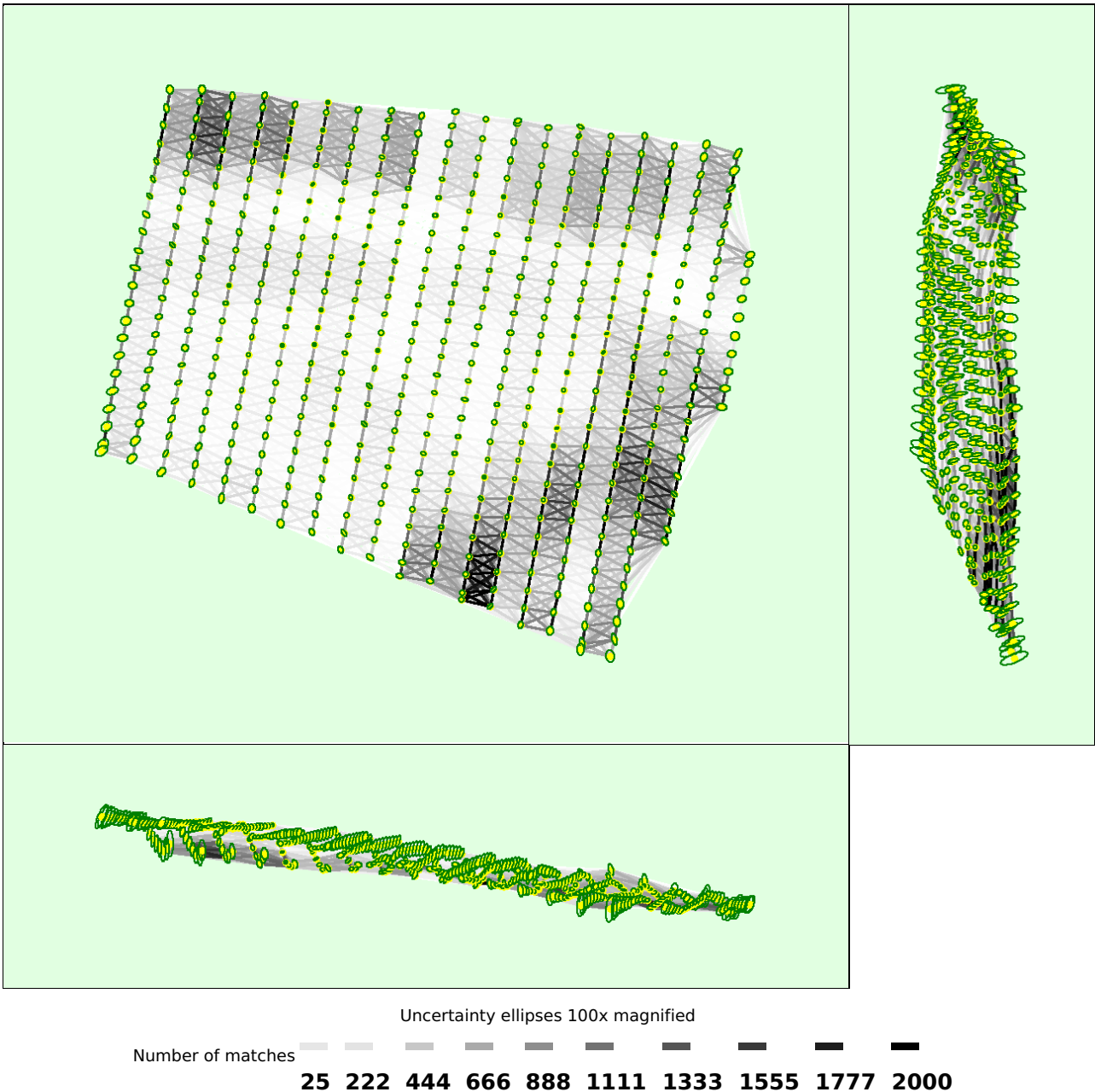


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty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

Relative camera position and orientation uncertainties

	X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.045	0.046	0.073	0.029	0.032	0.007
Sigma	0.012	0.012	0.038	0.011	0.014	0.002

Geolocation Details



🔍 Absolute Geolocation Variance



Min 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	8.92	0.20
-6.00	-3.00	0.20	16.84	3.85
-3.00	0.00	46.25	26.98	45.44
0.00	3.00	52.94	22.92	45.23
3.00	6.00	0.61	12.78	5.27
6.00	9.00	0.00	8.92	0.00
9.00	12.00	0.00	2.64	0.00
12.00	15.00	0.00	0.00	0.00
15.00	-	0.00	0.00	0.00
Mean [m]		-0.000144	-0.005040	0.021357
Sigma [m]		1.318335	4.396114	1.917979
RMS Error [m]		1.318335	4.396117	1.918098

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	71.60	100.00
[-2.00, 2.00]	100.00	99.39	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	0.728
Phi	1.167
Kappa	1.575

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) Platinum 8124M CPU @ 3.00GHz RAM: 69GB GPU: no info (Driver: unknown)
Operating System	Linux 4.15.0-1029-aws x86_64

Coordinate Systems



Image Coordinate System	WGS 84 (EGM 96 Geoid)
Output Coordinate System	TWD97 / TM2 zone 121 (EGM 96 Geoid)

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: 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	19m:40s
Time for Point Cloud Classification	04m:20s
Time for 3D Textured Mesh Generation	24m:50s

Results



Number of Generated Tiles	4
Number of 3D Densified Points	37361350
Average Density (per m ³)	17.78

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (5.27 [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 (5.27 [cm/pixel])
Time for DSM Generation	06m:12s
Time for Orthomosaic Generation	15m:59s
Time for DTM Generation	01m:06s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s