

# Quality Report



Generated with Pix4Denterprise 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	tw_taichung_salu_nsr_20180602
Processed	2018-06-02 08:00:42
Camera Model Name(s)	FC330_3.6_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	5.10 cm / 2.01 in
Area Covered	0.698 km <sup>2</sup> / 69.7792 ha / 0.27 sq. mi. / 172.5175 acres
Time for Initial Processing (without report)	01h:00m:45s

## Quality Check



<b>Images</b>	median of 38615 keypoints per image	
<b>Dataset</b>	1134 out of 1134 images calibrated (100%), all images enabled	
<b>Camera Optimization</b>	2.25% relative difference between initial and optimized internal camera parameters	
<b>Matching</b>	median of 7622.84 matches per calibrated image	
<b>Georeferencing</b>	yes, no 3D GCP	

## Preview

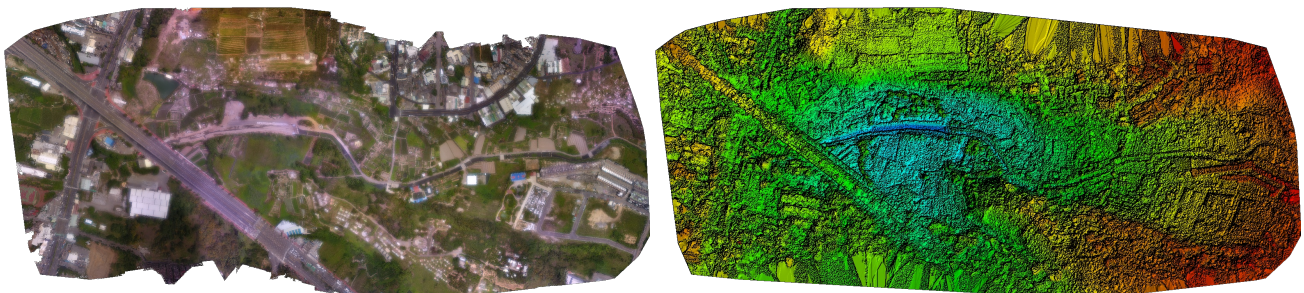


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

## Calibration Details



Number of Calibrated Images	1134 out of 1134
Number of Geolocated Images	1134 out of 1134

? Initial Image Positions

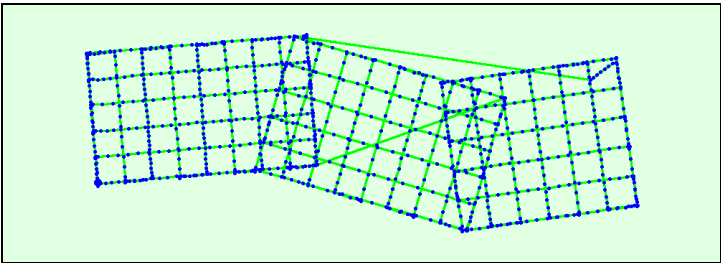


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

? Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 10x magnified

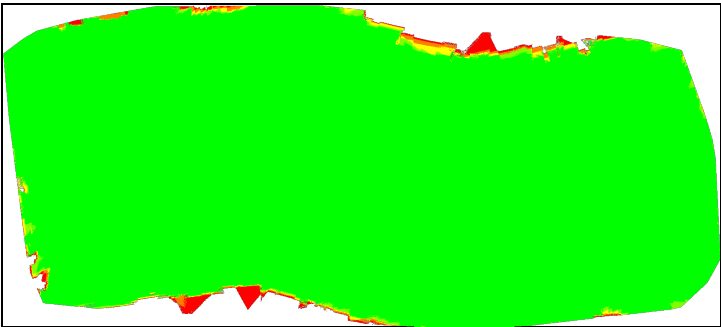
Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Dark green ellipses indicate the absolute position uncertainty of the bundle block adjustment result.

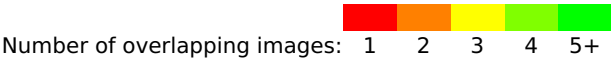
? Absolute camera position and orientation uncertainties



	X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.106	0.106	0.254	0.079	0.044	0.021
Sigma	0.020	0.021	0.054	0.005	0.007	0.003

? 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

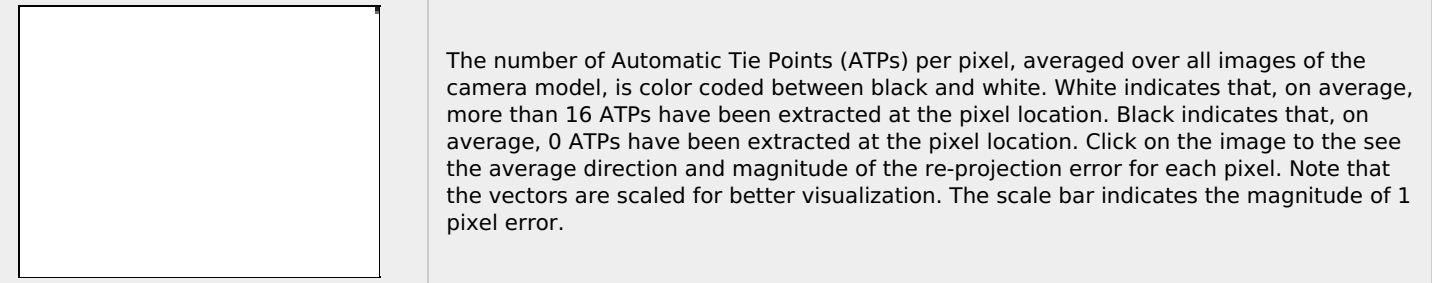
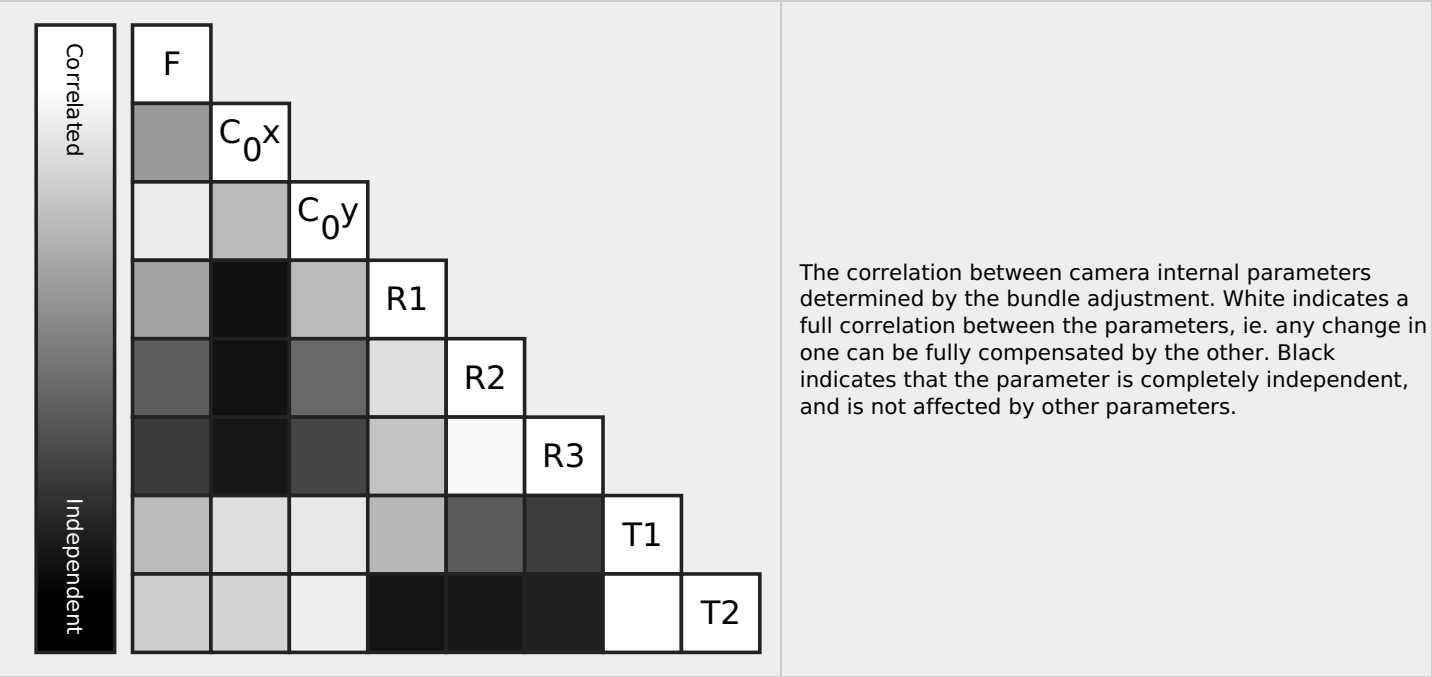
Number of 2D Keypoint Observations for Bundle Block Adjustment	9081061
Number of 3D Points for Bundle Block Adjustment	2729622
Mean Reprojection Error [pixels]	0.241

### 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	2337.207 [pixel] 3.691 [mm]	2057.519 [pixel] 3.250 [mm]	1471.424 [pixel] 2.324 [mm]	0.112	-0.128	0.035	0.002	-0.001
Uncertainties (Sigma)	0.303 [pixel] 0.000 [mm]	0.048 [pixel] 0.000 [mm]	0.180 [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	38615	7623
Min	19413	637
Max	58149	24160
Mean	38565	8008

## 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	1432807
In 3 Images	552847
In 4 Images	283027
In 5 Images	158700
In 6 Images	95390
In 7 Images	61569
In 8 Images	40345
In 9 Images	27121
In 10 Images	18848
In 11 Images	13883
In 12 Images	10208
In 13 Images	7624
In 14 Images	5672
In 15 Images	4432
In 16 Images	3282
In 17 Images	2692
In 18 Images	2071
In 19 Images	1631
In 20 Images	1334
In 21 Images	1005
In 22 Images	878
In 23 Images	728
In 24 Images	598
In 25 Images	512
In 26 Images	418
In 27 Images	351
In 28 Images	279
In 29 Images	230
In 30 Images	198
In 31 Images	154
In 32 Images	126
In 33 Images	108
In 34 Images	92
In 35 Images	86
In 36 Images	56
In 37 Images	51
In 38 Images	38
In 39 Images	48
In 40 Images	28

In 41 Images	21
In 42 Images	26
In 43 Images	15
In 44 Images	17
In 45 Images	9
In 46 Images	12
In 47 Images	4
In 48 Images	6
In 49 Images	6
In 50 Images	2
In 51 Images	5
In 52 Images	4
In 53 Images	6
In 54 Images	1
In 55 Images	3
In 56 Images	3
In 57 Images	2
In 58 Images	2
In 59 Images	1
In 60 Images	1
In 62 Images	4
In 65 Images	1
In 67 Images	1
In 68 Images	1
In 69 Images	1
In 76 Images	1

2D Keypoint Matches

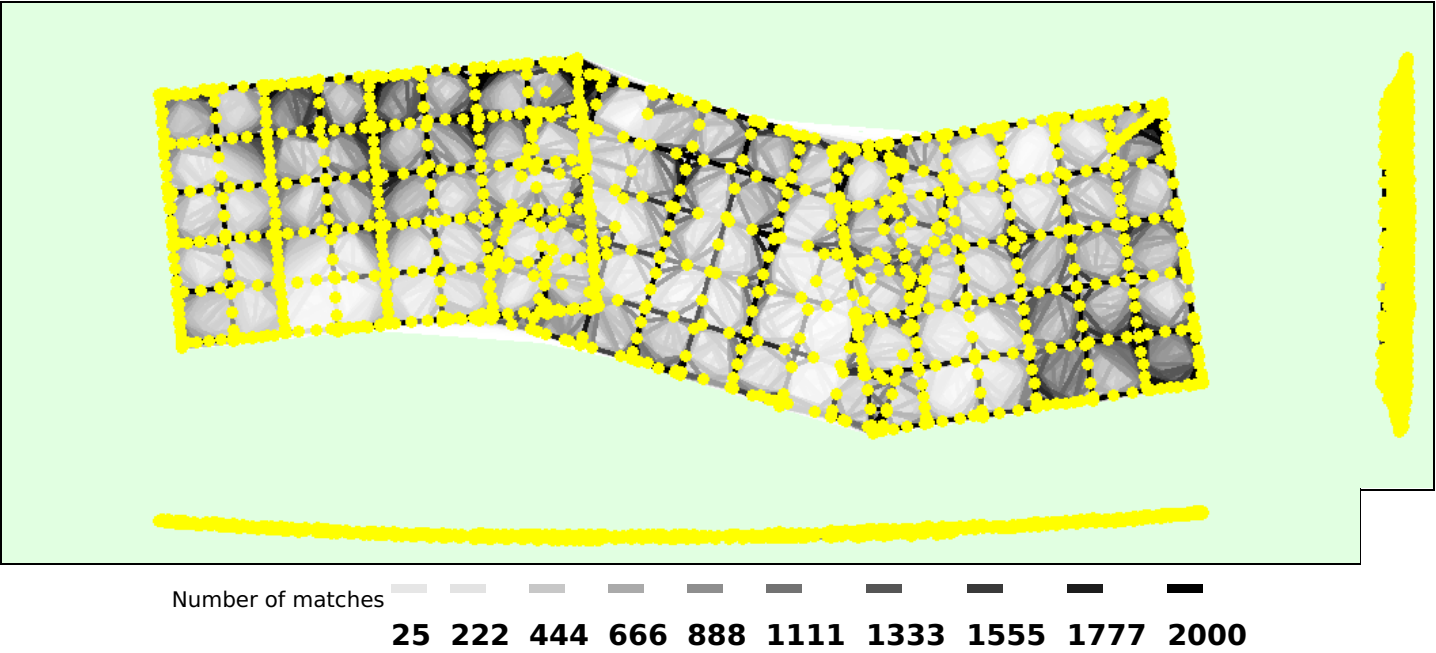


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

# Geolocation Details



## 🔍 Absolute Geolocation Variance



Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-15.00	0.00	0.00	0.71
-15.00	-12.00	0.00	0.00	5.82
-12.00	-9.00	0.00	0.00	9.08
-9.00	-6.00	0.00	0.00	7.32
-6.00	-3.00	6.35	2.29	9.35
-3.00	0.00	48.32	50.71	7.85
0.00	3.00	40.92	39.86	14.81
3.00	6.00	4.32	7.14	24.87
6.00	9.00	0.09	0.00	16.67
9.00	12.00	0.00	0.00	3.53
12.00	15.00	0.00	0.00	0.00
15.00	-	0.00	0.00	0.00
Mean [m]		-0.000009	-0.000003	0.000109
Sigma [m]		1.607863	1.661106	6.819651
RMS Error [m]		1.607863	1.661106	6.819651

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]	99.74	99.65	86.07
[-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	1.240
Phi	2.715
Kappa	3.660

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 3.13.0-149-generic x86_64

Coordinate Systems



Image Coordinate System	WGS84 (egm96)
Output Coordinate System	TWD97 / TM2 zone 121 (egm96)

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, 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: 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	01h:24m:43s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	31m:06s

Results



Number of Generated Tiles	3
Number of 3D Densified Points	58431502
Average Density (per m <sup>3</sup> )	30.48

DSM, Orthomosaic and Index Details



## Processing Options



DSM and Orthomosaic Resolution	1 x GSD (5.1 [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 (5.1 [cm/pixel])
Time for DSM Generation	15m:48s
Time for Orthomosaic Generation	32m:28s
Time for DTM Generation	01m:01s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s