Quality Report

() Important: Click on the different icons for:					
	Peip to analyze the results in the Quality Report				
	Additional information about the sections				

Click here for additional tips to analyze the Quality Report

Summary

 \bigcirc

Project	tw_miaoli_zhunan_hsinggang-river_20190916
Processed	2019-12-15 02:35:34
Camera Model Name(s)	FC6310R_8.8_4864x3648 (RGB)
Average Ground Sampling Distance (GSD)	3.71 cm / 1.46 in
Area Covered	0.283 km ² / 28.2890 ha / 0.11 sq. mi. / 69.9399 acres
Time for Initial Processing (without report)	24m:41s

Quality Check

Images	median of 41214 keypoints per image	\bigcirc
⑦ Dataset	289 out of 289 images calibrated (100%), all images enabled	0
? Camera Optimization	0.5% relative difference between initial and optimized internal camera parameters	0
? Matching	median of 13394.9 matches per calibrated image	0
③ Georeferencing	yes, no 3D GCP	Δ

Preview

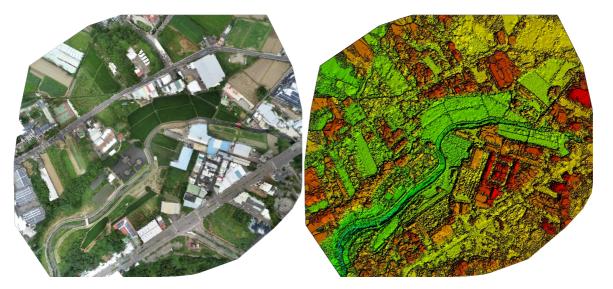


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

6



6

Generated with Pix4Denterprise version 4.4.12

6

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

Initial Image Positions

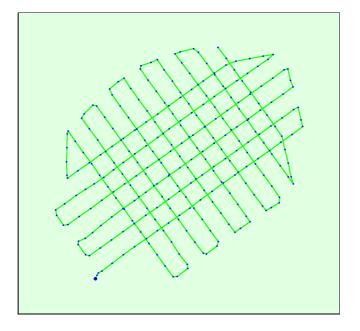
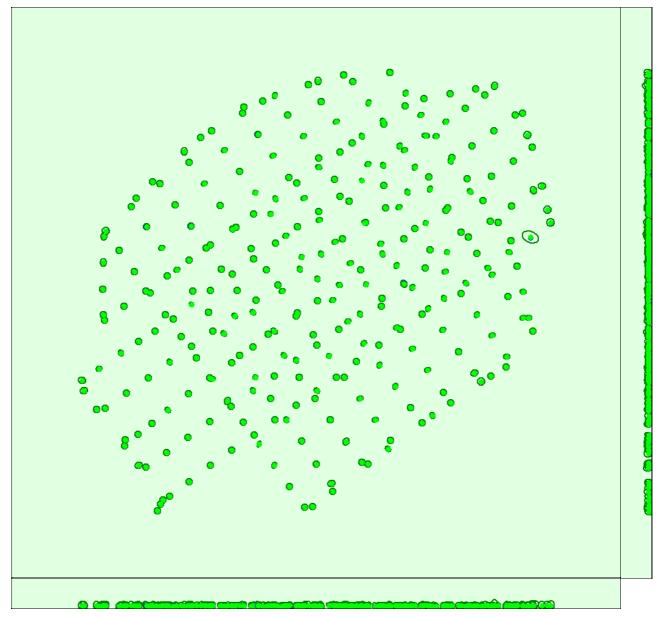


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

⑦ Computed Image/GCPs/Manual Tie Points Positions

0



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.

Obsolute 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	0.001	0.001
Sigma	0.000	0.000	0.000	0.000	0.000	0.000



0

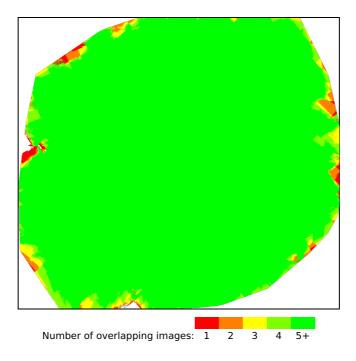


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint 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	3941081
Number of 3D Points for Bundle Block Adjustment	1443611
Mean Reprojection Error [pixels]	0.178

0

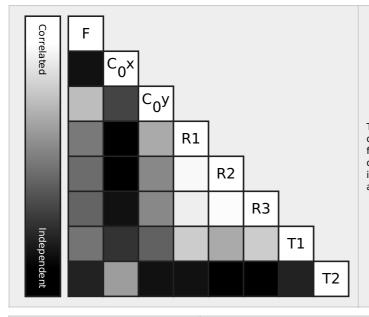
0

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	3648.323 [pixel] 8.556 [mm]	2421.984 [pixel] 5.680 [mm]	1846.748 [pixel] 4.331 [mm]	-0.269	0.115	-0.036	0.001	0.000
Uncertainties (Sigma)	0.051 [pixel] 0.000 [mm]	0.051 [pixel] 0.000 [mm]	0.064 [pixel] 0.000 [mm]	0.000	0.000	0.000	0.000	0.000



The correlation between camera internal parameters determined by the bundle adjustment. White indicates a full correlation between the parameters, ie. any change in one can be fully compensated by the other. Black indicates that the parameter is completely independent, and is not affected by other parameters.

The number of Automatic Tie Points (ATPs) per pixel, averaged over all images of the camera model, is color coded between black and white. White indicates that, on average, more than 16 ATPs have been extracted at the pixel location. Black indicates that, on average, 0 ATPs have been extracted at the pixel location. Click on the image to the see the average direction and magnitude of the re-projection error for each pixel. Note that the vectors are scaled for better visualization. The scale bar indicates the magnitude of 1 pixel error.

? 2D Keypoints Table

	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	41214	13395
Min	21576	2271
Max	58383	23524
Mean	40490	13637

? 3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	1003219
In 3 Images	230450
In 4 Images	90882
In 5 Images	43874
In 6 Images	24628
In 7 Images	14725
In 8 Images	9668
In 9 Images	6640
In 10 Images	4597
In 11 Images	3321
In 12 Images	2452
In 13 Images	1875
In 14 Images	1464
In 15 Images	1151
In 16 Images	809
In 17 Images	693
In 18 Images	535
In 19 Images	447
In 20 Images	344
In 21 Images	285
In 22 Images	261

6

In 23 Images	188	
In 24 Images	197	
In 25 Images	131	
In 26 Images	97	
In 27 Images	85	
In 28 Images	86	
In 29 Images	77	
In 30 Images	68	
In 31 Images	63	
In 32 Images	45	
In 33 Images	42	
In 34 Images	35	
In 35 Images	25	
In 36 Images	29	
In 37 Images	19	
In 38 Images	17	
In 39 Images	12	
In 40 Images	7	
In 41 Images	10	
In 42 Images	9	
In 43 Images	7	
In 44 Images	7	
In 45 Images	6	
In 46 Images	4	
In 47 Images	3	
In 48 Images	3	
In 49 Images	6	
In 50 Images	3	
In 51 Images	2	
In 52 Images	3	
In 54 Images	1	
In 55 Images	2	
In 58 Images	1	
In 62 Images	1	

② 2D Keypoint Matches

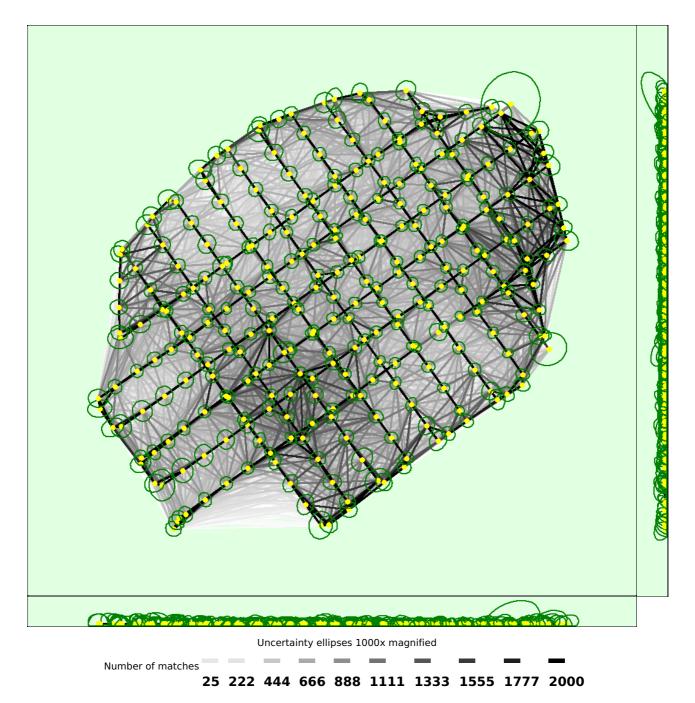


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.005	0.005	0.005	0.004	0.003	0.002
Sigma	0.002	0.002	0.001	0.001	0.001	0.001

Geolocation Details

Output in the second second

Min Error [m] Max Error [m]		Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-10.23	0.00	0.00	0.00

6

6

-10.23	-8.18	0.00	0.00	0.00
-8.18	-6.14	0.00	0.00	0.00
-6.14	-4.09	0.00	0.00	0.00
-4.09	-2.05	0.00	0.00	0.00
-2.05	0.00	49.13	49.13	54.67
0.00	2.05	50.87	50.87	45.33
2.05	4.09	0.00	0.00	0.00
4.09	6.14	0.00	0.00	0.00
6.14	8.18	0.00	0.00	0.00
8.18	10.23	0.00	0.00	0.00
10.23	-	0.00	0.00	0.00
Mean [m]		0.000177	-0.000425	-0.002390
Sigma [m]		0.004250	0.007270	0.044844
RMS Error [m]		0.004253	0.007283	0.044908

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]	99.65	100.00	96.54
[-2.00, 2.00]	100.00	100.00	99.65
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	0.018706	0.018706	0.041489
Sigma of Geolocation Accuracy [m]	0.147511	0.147511	0.399333

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

Geolocation Orientational Variance	RMS [degree]
Omega	0.813
Phi	0.941
Карра	2.140

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 4.15.0-1054-aws x86_64

Coordinate Systems

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

Processing Options

Detected Template	No Template Available
Keypoints Image Scale	Full, Image Scale: 1

6

6

0

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	groupl
Advanced: Use Processing Area	yes
Advanced: Use Annotations	yes
Time for Point Cloud Densification	24m:49s
Time for Point Cloud Classification	01m:45s
Time for 3D Textured Mesh Generation	16m:41s

Results

Number of Generated Tiles	1
Number of 3D Densified Points	26956291
Average Density (per m ³)	76.64

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (3.71 [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 (3.71 [cm/pixel])
Time for DSM Generation	07m:24s
Time for Orthomosaic Generation	14m:12s
Time for DTM Generation	33s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s

6

0

<u></u>

6