

Quality Report



Generated with Pix4Denterprise version
4.5.6



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_zhoulan_laozhuang-river_20200325
Processed	2020-07-03 16:01:15
Camera Model Name(s)	FC6310R_8.8_4864x3648 (RGB)
Average Ground Sampling Distance (GSD)	3.62 cm / 1.43 in
Area Covered	0.300 km ² / 29.9748 ha / 0.12 sq. mi. / 74.1077 acres
Time for Initial Processing (without report)	59m:30s

Quality Check



Images	median of 55516 keypoints per image	
Dataset	396 out of 396 images calibrated (100%), all images enabled	
Camera Optimization	0.42% relative difference between initial and optimized internal camera parameters	
Matching	median of 14407.5 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

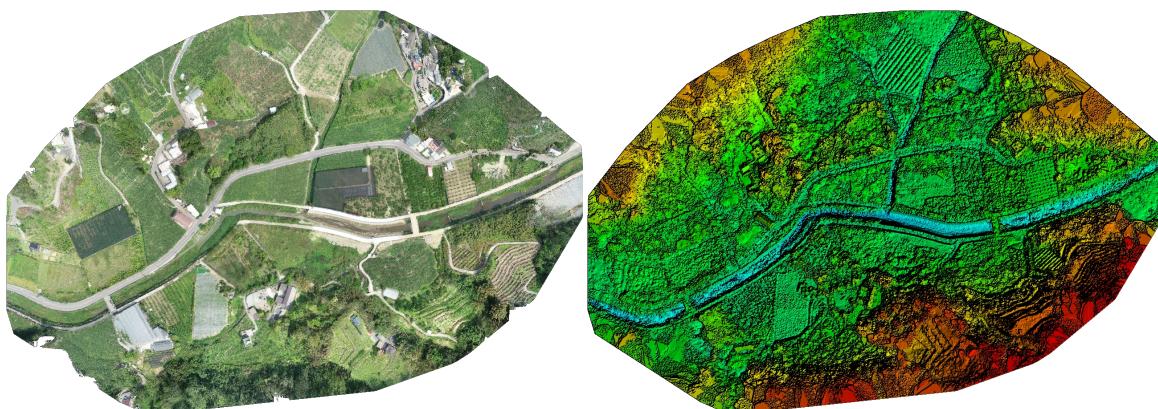


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	396 out of 396
Number of Geolocated Images	396 out of 396

Initial Image Positions

i

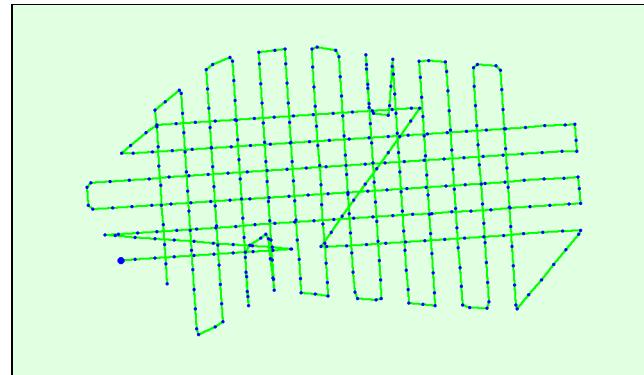
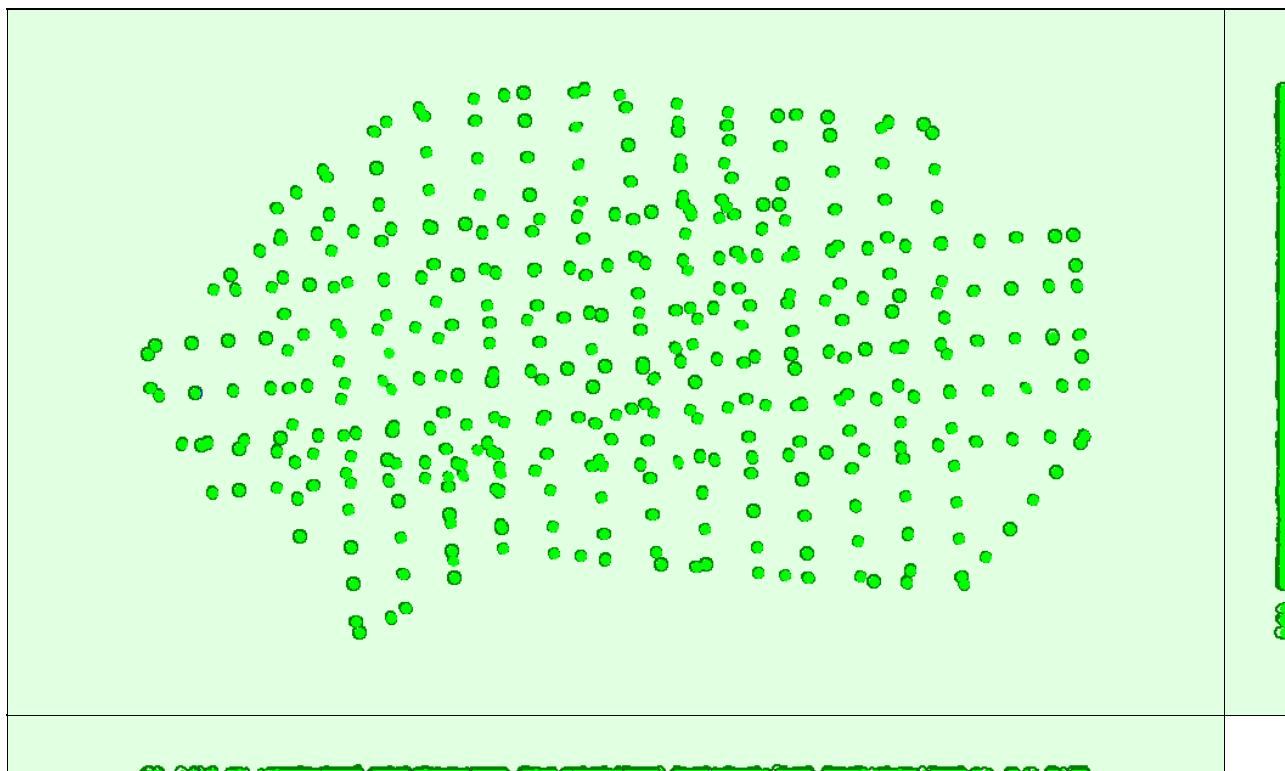


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions

i



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

i

	X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.003	0.003	0.004	0.002	0.002	0.002
Sigma	0.000	0.000	0.000	0.000	0.000	0.001

Overlap

i

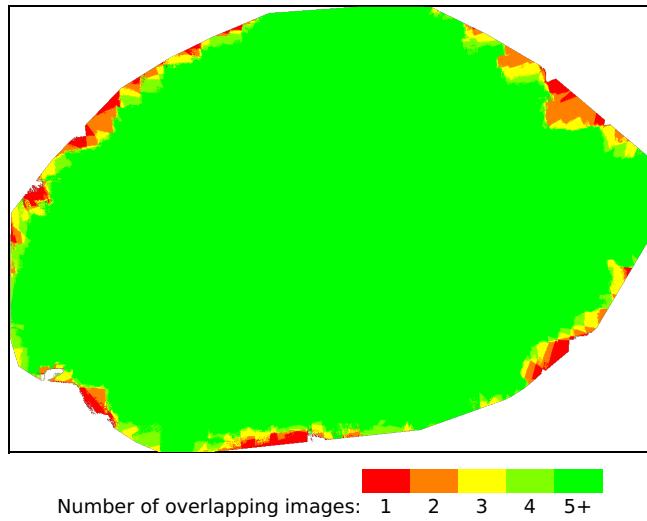


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.

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

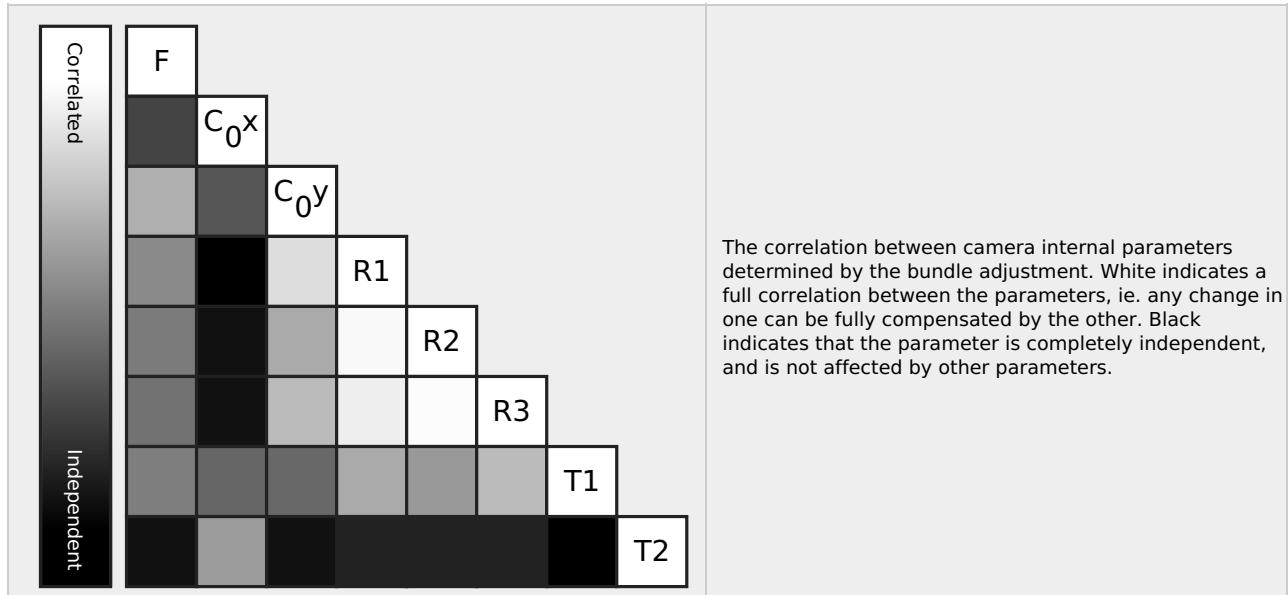
Number of 2D Keypoint Observations for Bundle Block Adjustment	5769770
Number of 3D Points for Bundle Block Adjustment	2150547
Mean Reprojection Error [pixels]	0.161

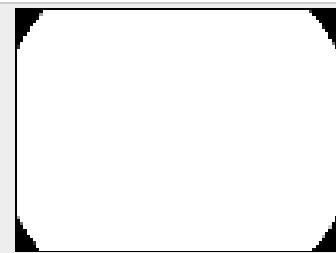
Internal Camera Parameters

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	3651.339 [pixel] 8.563 [mm]	2422.516 [pixel] 5.681 [mm]	1846.889 [pixel] 4.331 [mm]	-0.269	0.115	-0.036	0.001	0.000
Uncertainties (Sigma)	0.051 [pixel] 0.000 [mm]	0.056 [pixel] 0.000 [mm]	0.064 [pixel] 0.000 [mm]	0.000	0.000	0.000	0.000	0.000





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 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	55516	14408
Min	45063	4709
Max	66595	26973
Mean	55431	14570

3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	1554869
In 3 Images	316465
In 4 Images	117965
In 5 Images	57147
In 6 Images	32174
In 7 Images	20014
In 8 Images	12994
In 9 Images	9047
In 10 Images	6427
In 11 Images	4762
In 12 Images	3633
In 13 Images	2818
In 14 Images	2155
In 15 Images	1697
In 16 Images	1349
In 17 Images	1099
In 18 Images	894
In 19 Images	773
In 20 Images	660
In 21 Images	536
In 22 Images	459
In 23 Images	361
In 24 Images	295
In 25 Images	264
In 26 Images	247
In 27 Images	192
In 28 Images	179
In 29 Images	142
In 30 Images	117
In 31 Images	103
In 32 Images	92
In 33 Images	85
In 34 Images	84
In 35 Images	54
In 36 Images	69
In 37 Images	38
In 38 Images	50
In 39 Images	28
In 40 Images	32

In 41 Images	23
In 42 Images	21
In 43 Images	18
In 44 Images	16
In 45 Images	19
In 46 Images	16
In 47 Images	6
In 48 Images	4
In 49 Images	8
In 50 Images	3
In 51 Images	8
In 52 Images	4
In 53 Images	9
In 54 Images	3
In 55 Images	3
In 56 Images	3
In 57 Images	3
In 58 Images	2
In 59 Images	2
In 60 Images	4
In 62 Images	1
In 67 Images	2

💡 2D Keypoint Matches

ⓘ

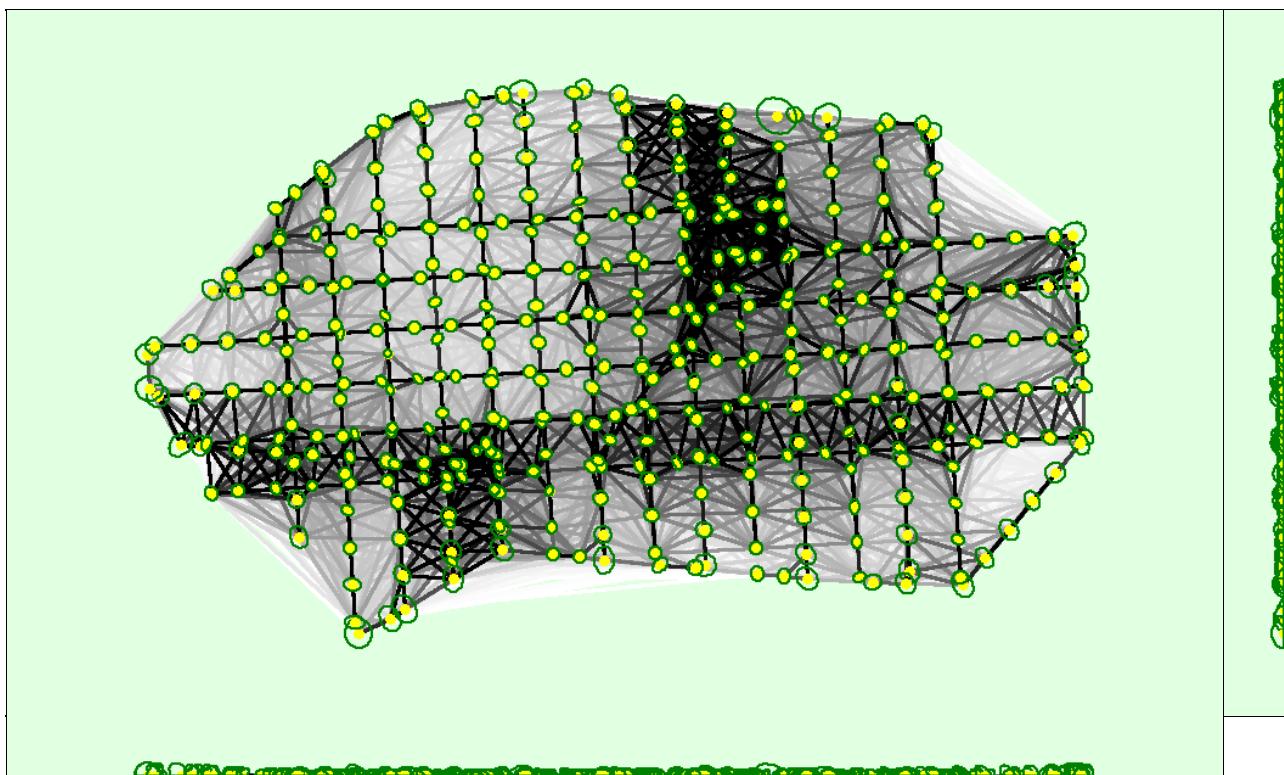


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.007	0.007	0.007	0.005	0.005	0.003

Sigma	0.002	0.002	0.002	0.002	0.002	0.001
-------	-------	-------	-------	-------	-------	-------

Geolocation Details



Absolute Geolocation Variance



Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-0.03	0.00	0.00	0.51
-0.03	-0.02	0.00	0.00	1.77
-0.02	-0.02	0.00	0.00	6.31
-0.02	-0.01	0.25	0.76	9.60
-0.01	-0.01	7.58	7.58	10.61
-0.01	0.00	44.70	42.17	13.89
0.00	0.01	41.16	41.92	27.78
0.01	0.01	4.55	6.82	15.91
0.01	0.02	1.52	0.76	8.59
0.02	0.02	0.25	0.00	3.54
0.02	0.03	0.00	0.00	1.01
0.03	-	0.00	0.00	0.51
Mean [m]		-0.000004	-0.000012	-0.000183
Sigma [m]		0.004004	0.004097	0.010987
RMS Error [m]		0.004004	0.004097	0.010989

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]	97.22	96.21	87.63
[-2.00, 2.00]	99.75	100.00	99.75
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	0.009901	0.009901	0.017214
Sigma of Geolocation Accuracy [m]	0.000377	0.000377	0.000491

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

Geolocation Orientational Variance	RMS [degree]
Omega	1.324
Phi	1.084
Kappa	3.135

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 5.3.0-1023-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
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	58m:49s
Time for Point Cloud Classification	03m:19s
Time for 3D Textured Mesh Generation	22m:52s

Results



Number of Generated Tiles	4
Number of 3D Densified Points	36514294
Average Density (per m ³)	62.69

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (3.62 [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 (3.62 [cm/pixel])
Time for DSM Generation	11m:26s
Time for Orthomosaic Generation	16m:39s
Time for DTM Generation	40s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s