

# Quality Report



Generated with Pix4Ddiscovery version 4.7.5



**Important:** Click on the different icons for:



Help to analyze the results in the Quality Report



Additional information about the sections



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## Summary



Project	parslybay_brooklyn
Processed	2023-10-25 13:31:40
Camera Model Name(s)	FC3411_8.4_5472x3078 (RGB)
Average Ground Sampling Distance (GSD)	1.41 cm / 0.56 in
Area Covered	0.038 km <sup>2</sup> / 3.7546 ha / 0.01 sq. mi. / 9.2826 acres
Time for Initial Processing (without report)	04m:53s

## Quality Check



Images	median of 38077 keypoints per image	
Dataset	127 out of 149 images calibrated (85%), all images enabled, 2 blocks	
Camera Optimization	66.14% relative difference between initial and optimized internal camera parameters	
Matching	median of 4204.56 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

## Preview

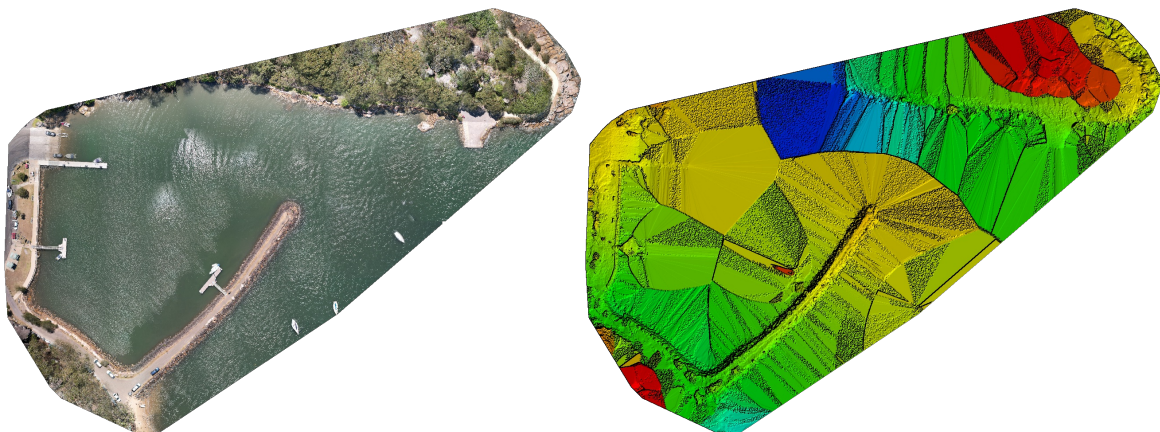


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

## Calibration Details



Number of Calibrated Images	127 out of 149
Number of Geolocated Images	149 out of 149

## ? Initial Image Positions

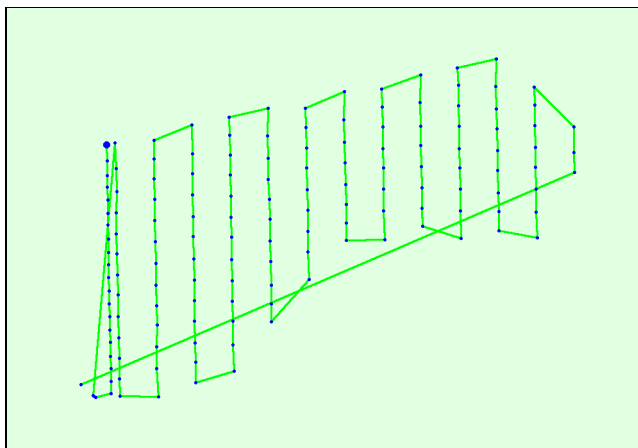
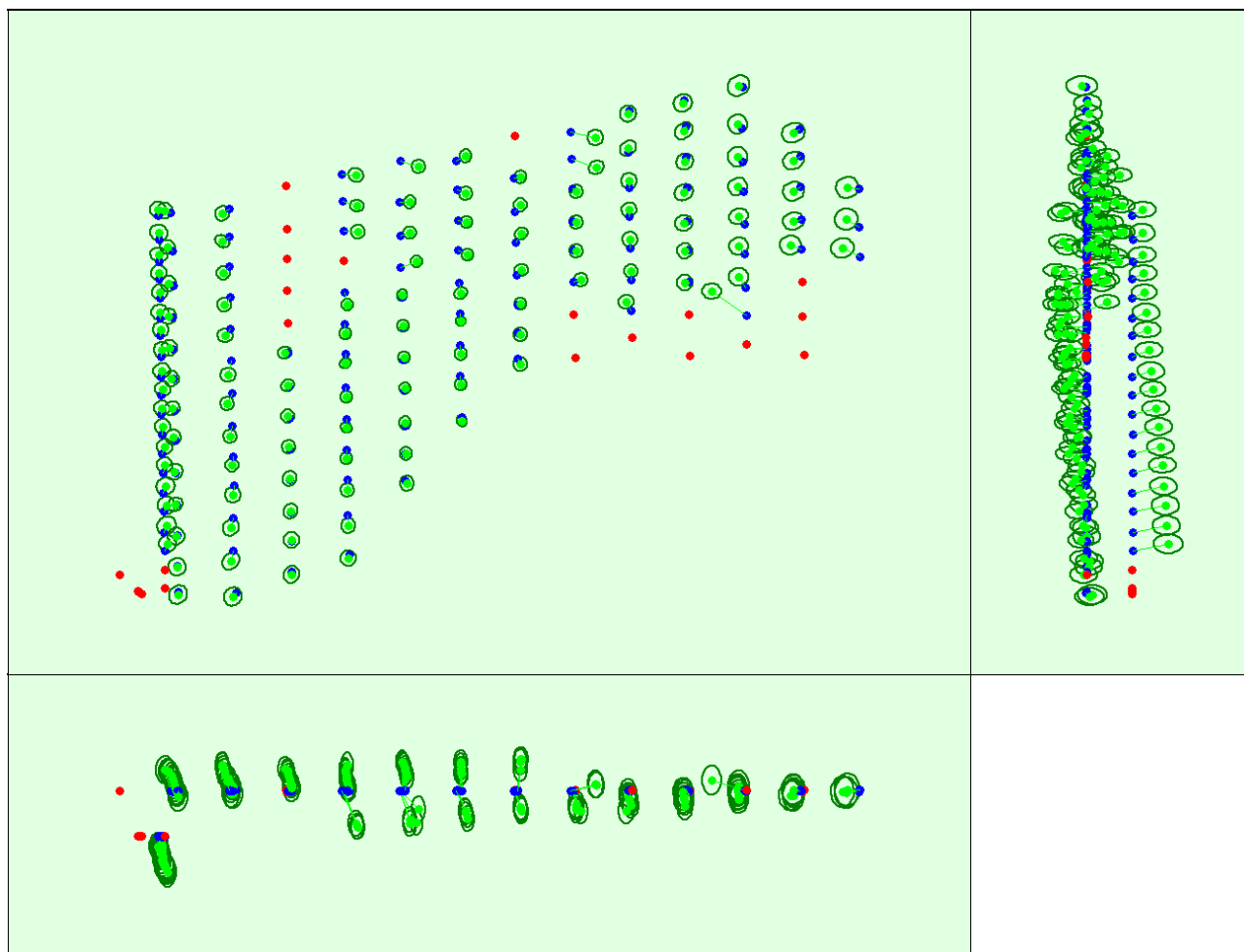


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

## ? Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 5x 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). Red dots indicate disabled or uncalibrated images. 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	0.645	0.625	1.063	0.288	0.269	0.232
Sigma	0.117	0.101	0.075	0.003	0.003	0.004

 **Overlap**

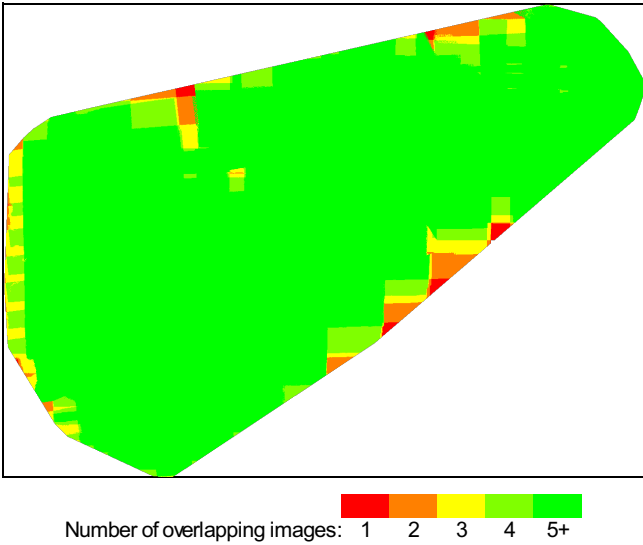


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint 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	538577
Number of 3D Points for Bundle Block Adjustment	210749
Mean Reprojection Error [pixels]	0.229

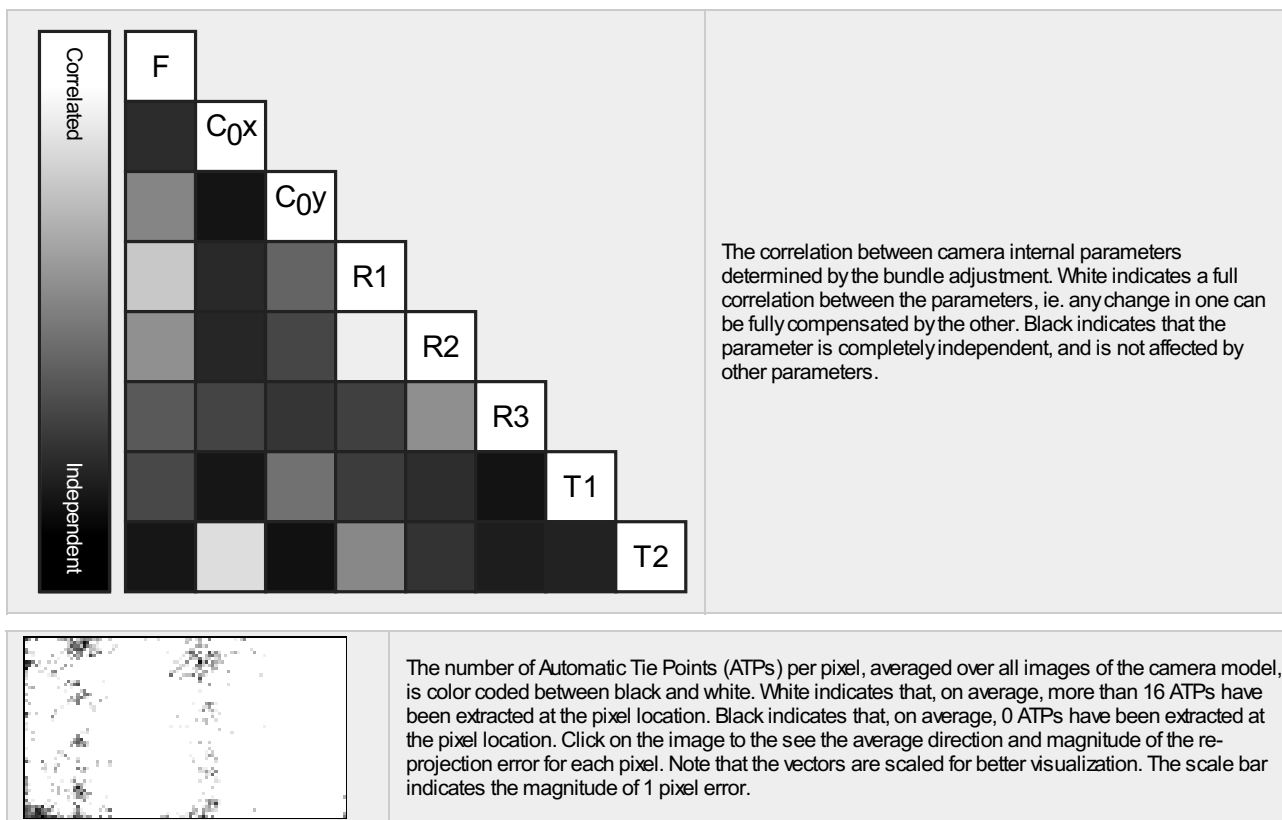
 **Internal Camera Parameters**

 **FC3411\_8.4\_5472x3078 (RGB). Sensor Dimensions: 13.332 [mm] x 7.499 [mm]**



EXIF ID: FC3411\_8.4\_5472x3078

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3439.543 [pixel] 8.380 [mm]	2736.000 [pixel] 6.666 [mm]	1539.000 [pixel] 3.750 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	5714.769 [pixel] 13.923 [mm]	2736.892 [pixel] 6.668 [mm]	1517.045 [pixel] 3.696 [mm]	-0.175	0.372	0.306	0.000	0.001
Uncertainties (Sigma)	25.408 [pixel] 0.062 [mm]	1.062 [pixel] 0.003 [mm]	0.897 [pixel] 0.002 [mm]	0.002	0.012	0.024	0.000	0.000



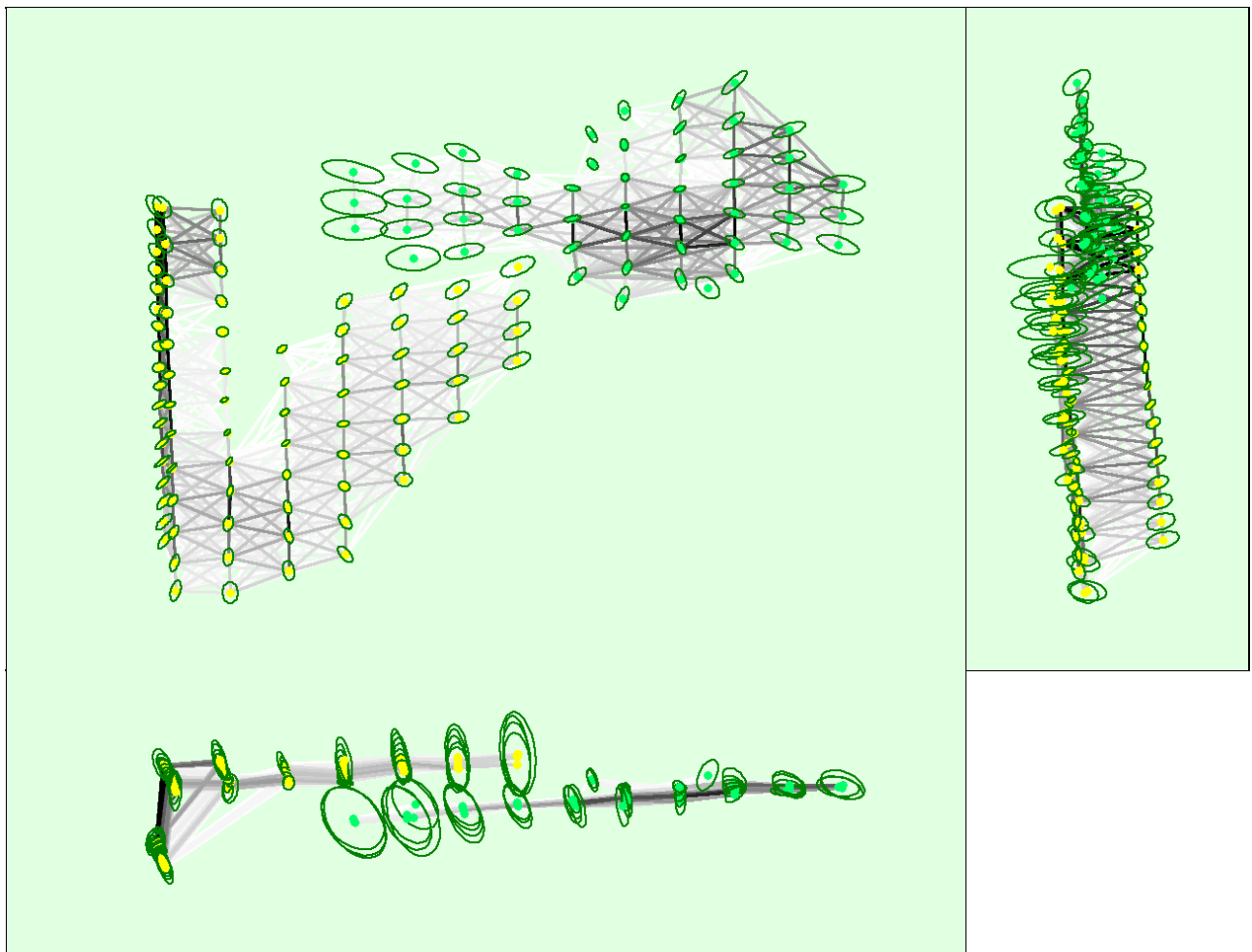
## 2D Keypoints Table

	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	38077	4205
Mn	24481	129
Max	77325	15205
Mean	43919	4241

## 3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	150103
In 3 Images	34743
In 4 Images	12456
In 5 Images	5715
In 6 Images	3408
In 7 Images	2072
In 8 Images	965
In 9 Images	553
In 10 Images	347
In 11 Images	188
In 12 Images	101
In 13 Images	47
In 14 Images	33
In 15 Images	17
In 16 Images	1

## 2D Keypoint Matches



Uncertainty ellipses 100x magnified

Number of matches

25 222 444 666 888 1111 1333 1555 1777 2000

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	0.039	0.029	0.056	0.054	0.057	0.018
Sigma	0.025	0.010	0.038	0.009	0.005	0.004

## Geolocation Details

### Absolute Geolocation Variance

Mn 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	1.57
-12.00	-9.00	1.57	0.79	8.66
-9.00	-6.00	2.36	0.00	15.75
-6.00	-3.00	7.09	7.87	9.45
-3.00	0.00	39.37	44.88	14.96
0.00	3.00	44.88	29.13	14.96
3.00	6.00	3.15	16.54	9.45

6.00	9.00	0.79	0.79	12.60
9.00	12.00	0.00	0.00	4.72
12.00	15.00	0.79	0.00	7.09
15.00	-	0.00	0.00	0.79
Mean [m]		-0.030808	0.049516	0.187159
Sigma [m]		2.797033	2.540838	7.320099
RMS Error [m]		2.797203	2.541320	7.322491

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]	92.13	98.43	81.10
[-2.00, 2.00]	98.43	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	5.148
Phi	3.559
Kappa	78.263

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) Core(TM) i7-8700 CPU @ 3.20GHz RAM: 64GB GPU: NVIDIA GeForce RTX 2060 (Driver: 31.0.15.3623), NVIDIA GeForce RTX 2060 (Driver: 31.0.15.3623)
Operating System	Windows 10 Home, 64-bit


### Coordinate Systems



Image Coordinate System	WGS 84 (EGM96 Geoid)
Output Coordinate System	WGS 84 / UTM zone 56S (EGM96 Geoid)

### Processing Options



Detected Template	 3D Maps
Keypoints Image Scale	Full, Image Scale: 1
Advanced: Matching Image Pairs	Aerial Grid or Corridor
Advanced: Matching Strategy	Use Geometrically Verified Matching: no
Advanced: Keypoint Extraction	Targeted Number of Keypoints: Automatic
Advanced: Calibration	Calibration Method: Standard 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: no
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	02m:42s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	01m:56s

## Results



Number of Generated Tiles	1
Number of 3D Densified Points	3751135
Average Density (per m <sup>3</sup> )	852.04