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Help to analyze the results in the Quality Report



Additional information about the sections



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## Summary



Project	R030823_目川_MavicAir
Processed	2021-08-23 15:12:58
Camera Model Name(s)	FC2103_4.5_4056x3040 (RGB)
Average Ground Sampling Distance (GSD)	1.82 cm / 0.72 in
Area Covered	0.047 km <sup>2</sup> / 4.7226 ha / 0.02 sq. mi. / 11.6758 acres
Time for Initial Processing (without report)	06m:08s

## Quality Check



<b>Images</b>	median of 65489 keypoints per image	
<b>Dataset</b>	133 out of 133 images calibrated (100%), all images enabled	
<b>Camera Optimization</b>	2% relative difference between initial and optimized internal camera parameters	
<b>Matching</b>	median of 9262.92 matches per calibrated image	
<b>Georeferencing</b>	yes, no 3D GCP	

## Preview

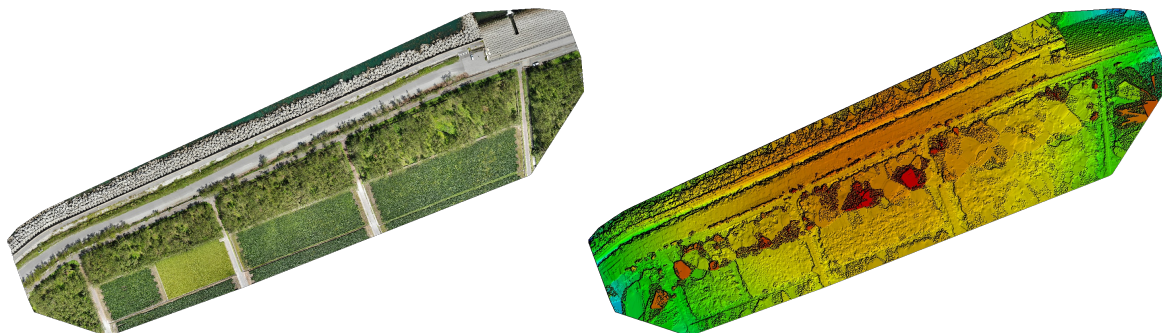


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

## Calibration Details



Number of Calibrated Images	133 out of 133
Number of Geolocated Images	133 out of 133

## Initial Image Positions



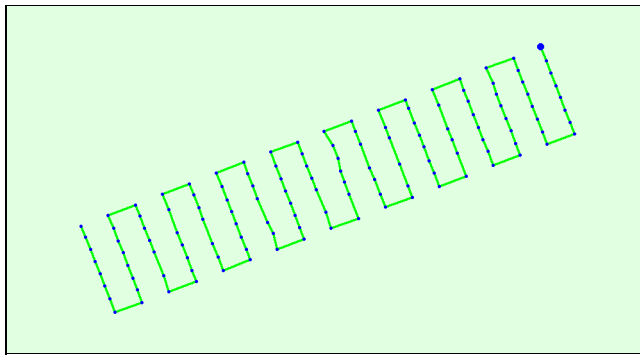
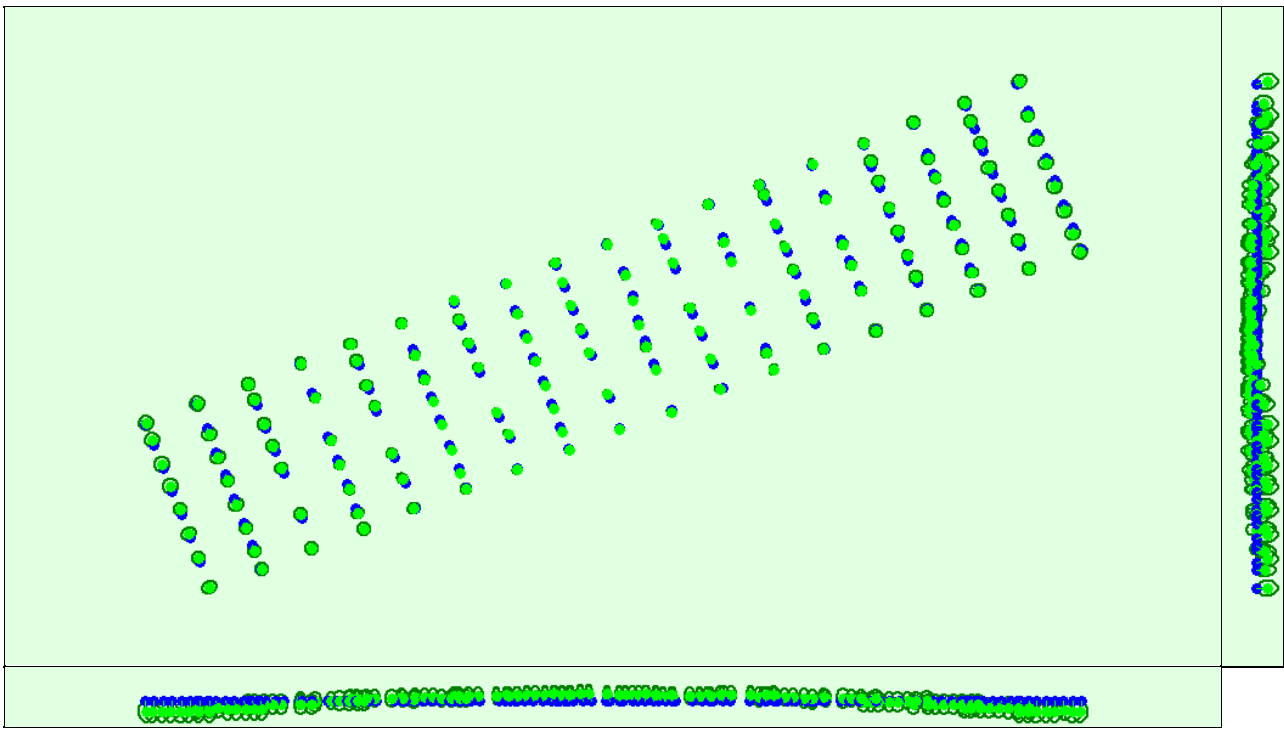


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

### 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	0.222	0.217	0.367	0.101	0.091	0.073
Sigma	0.046	0.042	0.035	0.001	0.002	0.001

### Overlap

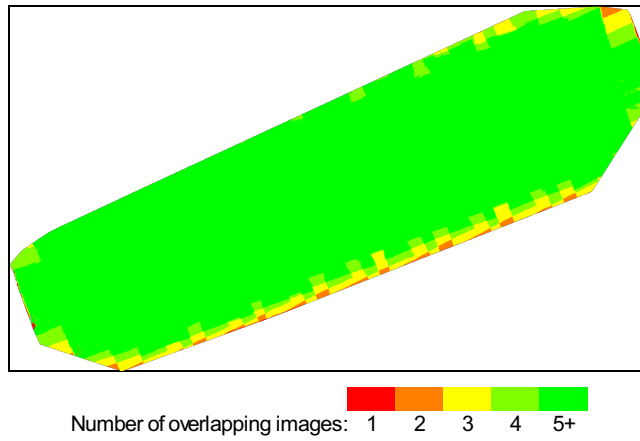


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

## Bundle Block Adjustment Details

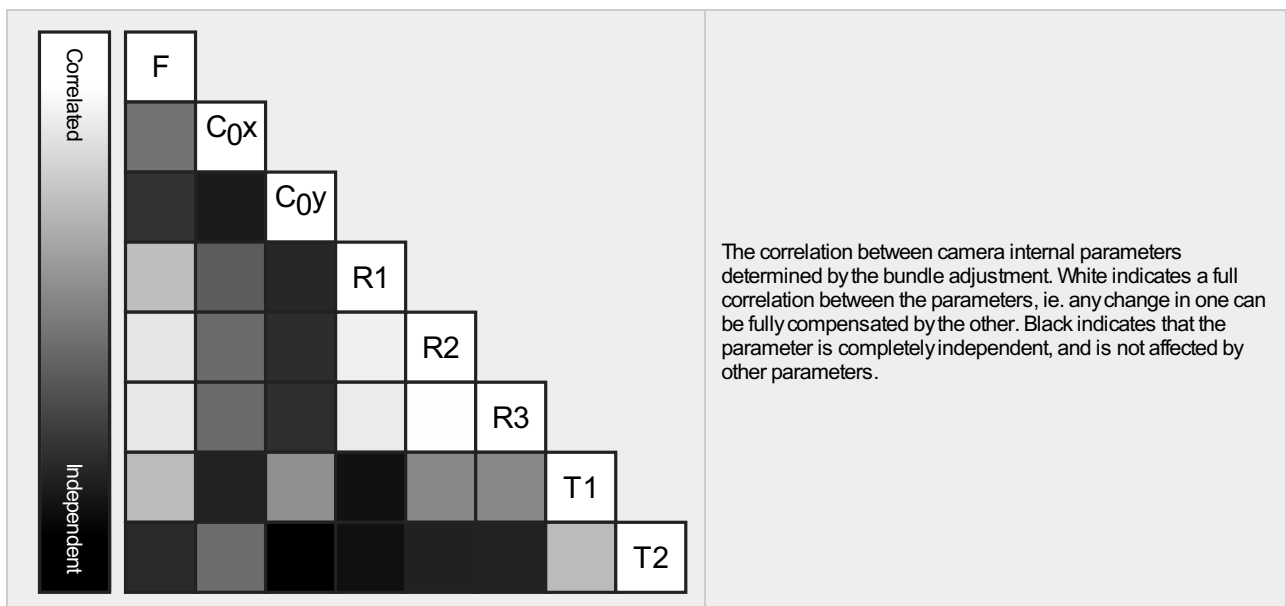
Number of 2D Keypoint Observations for Bundle Block Adjustment	1283333
Number of 3D Points for Bundle Block Adjustment	473172
Mean Reprojection Error [pixels]	0.259

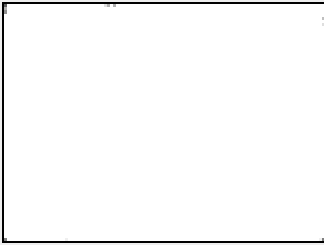
### Internal Camera Parameters

FC2103\_4.5\_4056x3040 (RGB). Sensor Dimensions: 6.071 [mm] x 4.550 [mm]

EXIF ID: FC2103\_4.5\_4056x3040

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	2972.320 [pixel] 4.449 [mm]	2036.890 [pixel] 3.049 [mm]	1449.140 [pixel] 2.169 [mm]	0.182	-0.593	0.418	0.001	-0.000
Optimized Values	3031.900 [pixel] 4.538 [mm]	2050.359 [pixel] 3.069 [mm]	1503.829 [pixel] 2.251 [mm]	0.211	-0.624	0.426	-0.000	-0.000
Uncertainties (Sigma)	1.951 [pixel] 0.003 [mm]	0.144 [pixel] 0.000 [mm]	0.093 [pixel] 0.000 [mm]	0.000	0.002	0.002	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	65489	9263
Min	29908	1971
Max	79371	18318
Mean	60938	9649

## ? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	347025
In 3 Images	63027
In 4 Images	22439
In 5 Images	11848
In 6 Images	7406
In 7 Images	5127
In 8 Images	3950
In 9 Images	3200
In 10 Images	2537
In 11 Images	2090
In 12 Images	1323
In 13 Images	1086
In 14 Images	874
In 15 Images	548
In 16 Images	335
In 17 Images	186
In 18 Images	113
In 19 Images	45
In 20 Images	13

## ? 2D Keypoint Matches



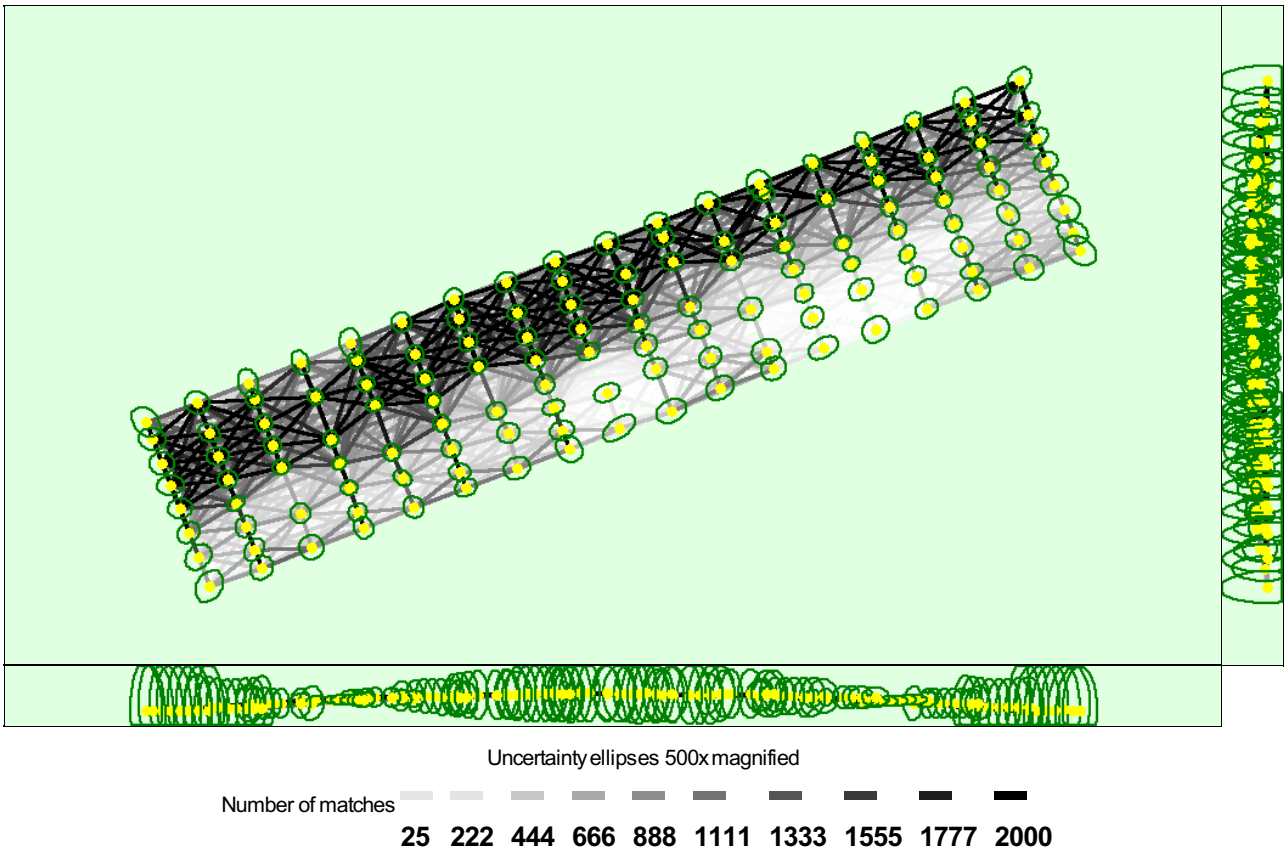


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.009	0.008	0.018	0.011	0.021	0.004
Sigma	0.002	0.002	0.010	0.004	0.009	0.001

## 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	0.00
-12.00	-9.00	0.00	0.00	0.00
-9.00	-6.00	0.00	0.00	0.00
-6.00	-3.00	0.00	0.00	0.75
-3.00	0.00	51.13	50.38	56.39
0.00	3.00	48.87	49.62	24.81
3.00	6.00	0.00	0.00	18.05
6.00	9.00	0.00	0.00	0.00
9.00	12.00	0.00	0.00	0.00
12.00	15.00	0.00	0.00	0.00
15.00	-	0.00	0.00	0.00
<b>Mean [m]</b>		-0.000008	-0.000048	0.000095
<b>Sigma [m]</b>		0.736229	1.729712	2.376949
<b>RMS Error [m]</b>		0.736229	1.729712	2.376949

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	100.00	100.00
[-2.00, 2.00]	100.00	100.00	100.00
[-3.00, 3.00]	100.00	100.00	100.00
<b>Mean of Geolocation Accuracy [m]</b>	5.000000	5.000000	10.000000
<b>Sigma of Geolocation Accuracy [m]</b>	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	1.677
Phi	2.738
Kappa	8.144

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: AMD Ryzen 9 3900X 12-Core Processor RAM: 64GB GPU: NVIDIA GeForce GTX 1060 6GB (Driver: 27.21.14.6647)
Operating System	Windows 10 Pro, 64-bit

### Coordinate Systems

Image Coordinate System	WGS 84 (EGM96 Geoid)
Output Coordinate System	WGS 84 / UTMzone 53N (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:54s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	03m:07s

## Results



Number of Generated Tiles	1
Number of 3D Densified Points	8770459
Average Density (per m <sup>3</sup> )	425.97

## DSM, Orthomosaic and Index Details



### Processing Options



DSM and Orthomosaic Resolution	1 x GSD (1.82 [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: no
Time for DSM Generation	04m:32s
Time for Orthomosaic Generation	04m:48s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s