Quality Report



Generated with Pix4Dmapper version 4.6.4





Summary

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Project	LAGO_POMACOCHAS
Processed	2021-04-27 00:27:25
Camera Model Name(s)	FC6310R_8.8_5472x3648 (2f739a8caeeff2558d853a45e32be1bd) (RGB)
Average Ground Sampling Distance (GSD)	4.57 cm / 1.80 in
Area Covered	3.963 km ² /396.3332 ha / 1.53 sq. mi. / 979.8676 acres

Quality Check

? Images	median of 53924 keypoints per image	②
? Dataset	2065 out of 2065 images calibrated (100%), all images enabled	O
? Camera Optimization	1.37% relative difference between initial and optimized internal camera parameters	②
Matching	median of 6734.09 matches per calibrated image	②
? Georeferencing	yes, 9 GCPs (9 3D), mean RMS error = 0.043 m	②

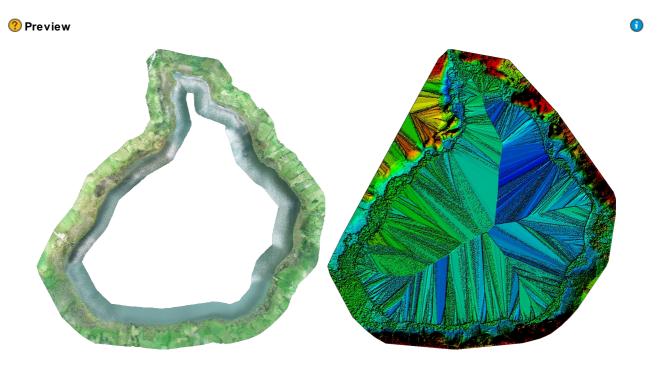


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Number of Calibrated Images	2065 out of 2065
Number of Geolocated Images	2065 out of 2065

Initial Image Positions

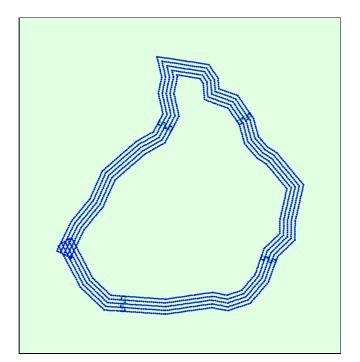
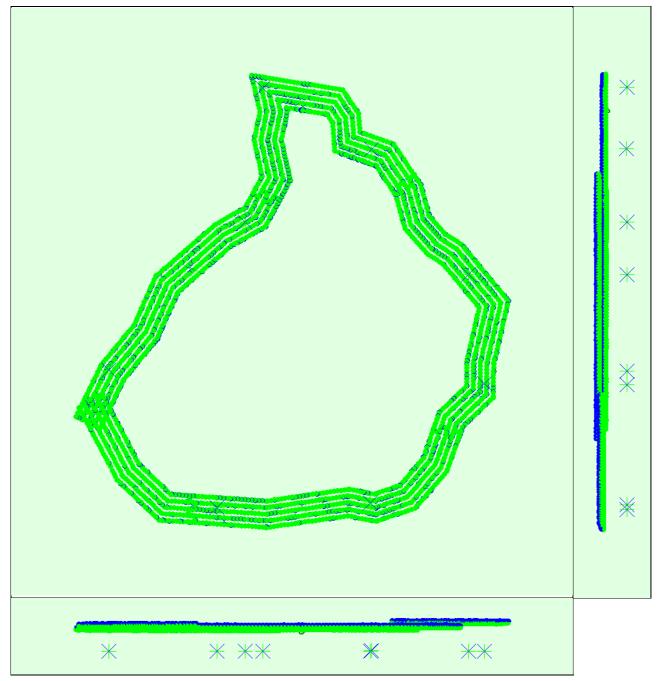


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

? Computed Image/GCPs/Manual Tie Points Positions





Uncertainty ellipses 100x 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

ee]		

	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.039	0.040	0.132	0.013	0.013	0.005
Sigma	0.013	0.013	0.013	0.005	0.004	0.002

Overlap

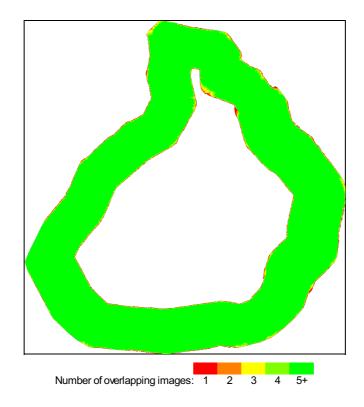


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.

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	14712184
Number of 3D Points for Bundle Block Adjustment	5213245
Mean Reprojection Error [pixels]	0.106

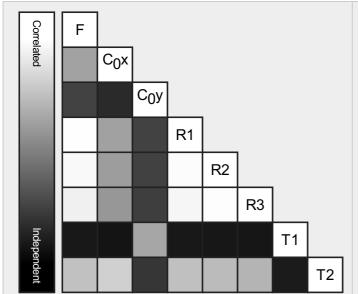
Internal Camera Parameters

FC6310R_8.8_5472x3648 (2f739a8caeeff2558d853a45e32be1bd) (RGB). Sensor Dimensions: 13.200 [mm] x 8.800 [mm]



EXIF ID: FC6310R_8.8_5472x3648

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3719.810 [pixel] 8.973 [mm]	2694.220 [pixel] 6.499 [mm]	1817.210 [pixel] 4.384 [mm]	-0.285	0.129	-0.041	0.001	-0.000
Optimized Values	3770.936 [pixel] 9.097 [mm]	2698.837 [pixel] 6.510 [mm]	1819.477 [pixel] 4.389 [mm]	-0.300	0.143	-0.045	0.001	-0.000
Uncertainties (Sigma)	2.972 [pixel] 0.007 [mm]	0.078 [pixel] 0.000 [mm]	0.053 [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 reprojection error for each pixel. Note that the vectors are scaled for better visualization. The scale bar indicates the magnitude of 1 pixel error.

② 2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	53924	6734
Min	21058	181
Max	79798	25436
Mean	52956	7125

3D Points from 2D Keypoint Matches

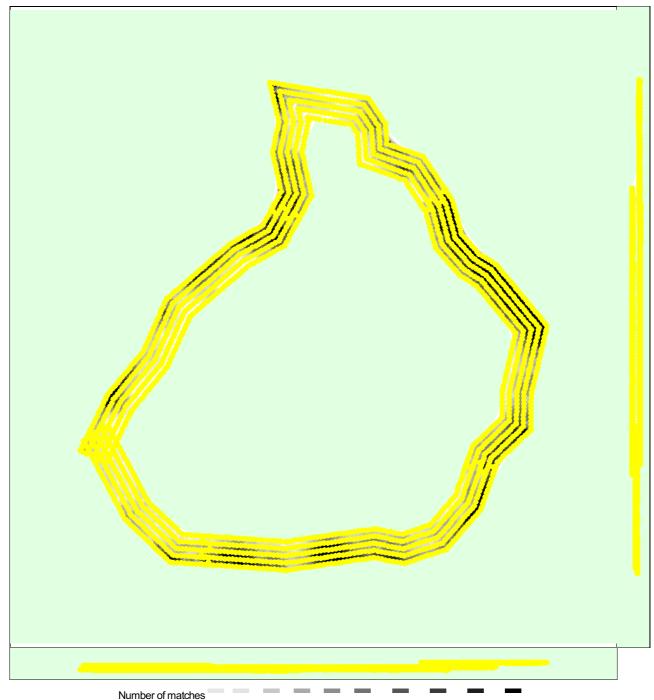


	Number of 3D Points Observed
In 2 Images	3467716
In 3 Images	892629
In 4 Images	361035
In 5 Images	180652
In 6 Images	101703
In 7 Images	61371
In 8 Images	38901
In 9 Images	26369
In 10 Images	18914
In 11 Images	14134
In 12 Images	10515
In 13 Images	7837
In 14 Images	5900
In 15 Images	4549
In 16 Images	3714
In 17 Images	2982
In 18 Images	2406
In 19 Images	1975
In 20 Images	1649
In 21 Images	1304
In 22 Images	1112
In 23 Images	926

In 24 Images	842
In 25 Images	680
In 26 Images	558
In 27 Images	458
In 28 Images	429
In 29 Images	324
In 30 Images	284
In 31 Images	228
In 32 Images	206
In 33 Images	161
In 34 Images	142
In 35 Images	117
In 36 Images	114
In 37 Images	75
In 38 Images	65
In 39 Images	61
In 40 Images	46
In 41 Images	35
In 42 Images	34
In 43 Images	33
In 44 Images	22
In 45 Images	13
In 46 Images	8
In 47 Images	5
In 48 Images	1
In 49 Images	3
In 51 Images	3
In 52 Images	1
In 54 Images	1
In 55 Images	1
In 56 Images	1
In 57 Images	1
III or IIIIages	1

2D Keypoint Matches

1



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.

Geolocation Details © Ground Control Points

GCP Name	Accuracy XY/Z [m]	Error X[m]	Error Y[m]	Error Z [m]	Projection Error [pixel]	Verified/Marked
P1 (3D)	0.020/ 0.020	0.000	0.005	-0.048	0.310	3/3
P2 (3D)	0.020/ 0.020	0.003	0.009	-0.105	0.200	3/3
P3 (3D)	0.020/ 0.020	0.010	0.014	-0.046	0.424	4/4
P4 (3D)	0.020/ 0.020	-0.001	-0.010	0.064	0.551	4/4
P5 (3D)	0.020/ 0.020	0.014	-0.018	0.280	0.001	2/2
P6 (3D)	0.020/ 0.020	0.008	0.003	0.030	0.464	6/6

P7 (3D)	0.020/ 0.020	0.005	-0.000	0.153	0.084	2/2
P8 (3D)	0.020/ 0.020	-0.010	-0.008	0.060	0.710	3/3
P8_1 (3D)	0.020/ 0.020	-0.006	-0.006	-0.063	0.468	4/4
Mean [m]		0.002571	-0.001300	0.036061		
Sigma [m]		0.007359	0.009496	0.114446		
RMS Error [m]		0.007795	0.009585	0.119993		

Localisation accuracy per GCP and mean errors in the three coordinate directions. The last column counts the number of calibrated images where the GCP has been automatically verified vs. manually marked.

Absolute Geolocation Variance



Min Error [m]	Max Error [m]	Geolocation Error X[%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-4.62	0.05	0.00	0.68
-4.62	-3.69	0.15	0.10	1.69
-3.69	-2.77	0.34	1.11	4.50
-2.77	-1.85	2.03	4.16	13.27
-1.85	-0.92	13.61	12.69	16.90
-0.92	0.00	31.19	25.42	18.26
0.00	0.92	36.37	36.90	14.77
0.92	1.85	13.90	17.29	12.11
1.85	2.77	1.60	2.18	7.75
2.77	3.69	0.63	0.05	4.89
3.69	4.62	0.10	0.10	3.20
4.62	-	0.05	0.00	1.99
Mean [m]		0.640063	-0.387534	15.393559
Sigma [m]		1.030660	1.062240	2.055743
RMS Error [m]		1.213236	1.130724	15.530220

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.

Geolocation Bias	X	Υ	Z
Translation [m]	0.620815	-0.415785	15.457039

Bias between image initial and computed geolocation given in output coordinate system.

Relative Geolocation Variance



Relative Geolocation Error	Images X[%]	Images Y[%]	Images Z [%]
[-1.00, 1.00]	77.43	72.40	79.23
[-2.00, 2.00]	97.38	95.30	98.35
[-3.00, 3.00]	99.47	99.32	99.95
Mean of Geolocation Accuracy [m]	1.127188	1.127188	2.525568
Sigma of Geolocation Accuracy [m]	0.087538	0.087538	0.123923

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

Geolocation Orientational Variance	RMS [degree]
Omega	0.532
Phi	0.562
Карра	5.844

Initial Processing Details System Information CPU: Intel(R) Xeon(R) W-2133 CPU @ 3.60GHz Hardware RAM 64GB GPU: NMDIA Quadro P4000 (Driver: 27.21.14.6172) Operating System Windows 10 Enterprise LTSC 2019, 64-bit Coordinate Systems Image Coordinate System WGS 84 Ground Control Point (GCP) Coordinate System WGS 84 / UTM zone 18S Output Coordinate System WGS 84 / UTM zone 18S **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: no Advanced: Keypoint Extraction Targeted Number of Keypoints: Automatic Calibration Method: Standard Internal Parameters Optimization: All Advanced: Calibration 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 Resolution: Medium Resolution (default) 3D Textured Mesh Settings: Color Balancing: no Generated: no Advanced: 3D Textured Mesh Settings Sample Density Divider: 1 Advanced: Image Groups group1 Advanced: Use Processing Area ves Advanced: Use Annotations Time for Point Cloud Densification 07h:26m:51s Time for Point Cloud Classification Time for 3D Textured Mesh Generation 30m:42s Results **Number of Processed Clusters** 2 Number of Generated Tiles 8 Number of 3D Densified Points 183833248 47.03 Average Density (per m³)

DSM, Orthomosaic and Index Details

DSM and Orthomosaic Resolution	50 [cm/pixel]	
DSMFilters	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	
Raster DTM	Generated: yes Merge Tiles: yes	
DTMResolution	50 [cm/pixel]	
Time for DSM Generation	02m:18s	
Time for Orthomosaic Generation	38m:34s	
Time for DTM Generation	17m:47s	
Time for Contour Lines Generation	00s	
Time for Reflectance Map Generation	00s	
Time for Index Map Generation	00s	

