

Quality Report



Generated with Pix4Denterprise version 4.5.2
Preview



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	Project-2020-05-21
Processed	2020-05-21 19:16:21
Camera Model Name(s)	FC2204_4.4_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	3.19 cm / 1.26 in
Area Covered	0.042 km ² / 4.2085 ha / 0.02 sq. mi. / 10.4048 acres
Time for Initial Processing (without report)	07m:21s

Quality Check



Images	median of 34323 keypoints per image	
Dataset	103 out of 103 images calibrated (100%), all images enabled	
Camera Optimization	8.25% relative difference between initial and optimized internal camera parameters	
Matching	median of 19541.5 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

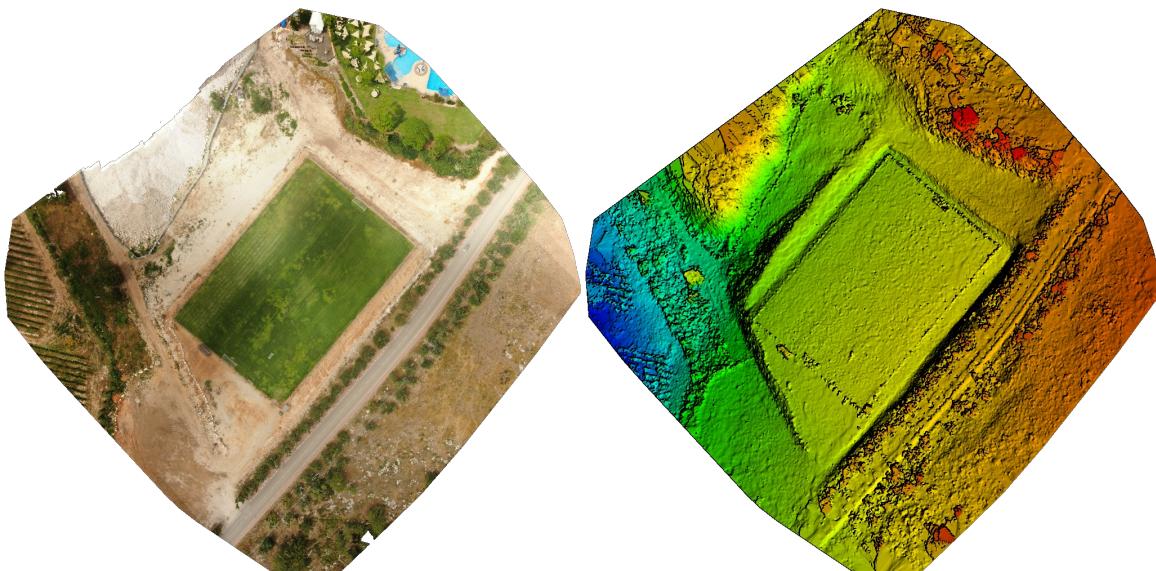


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	103 out of 103
Number of Geolocated Images	103 out of 103

Initial Image Positions

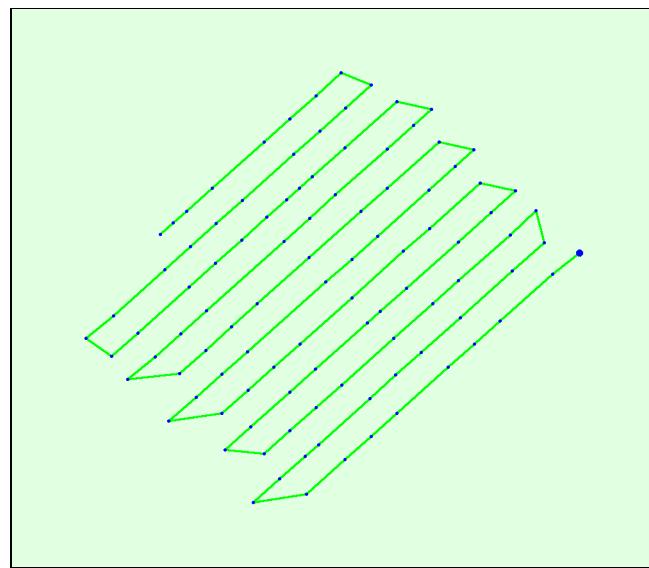
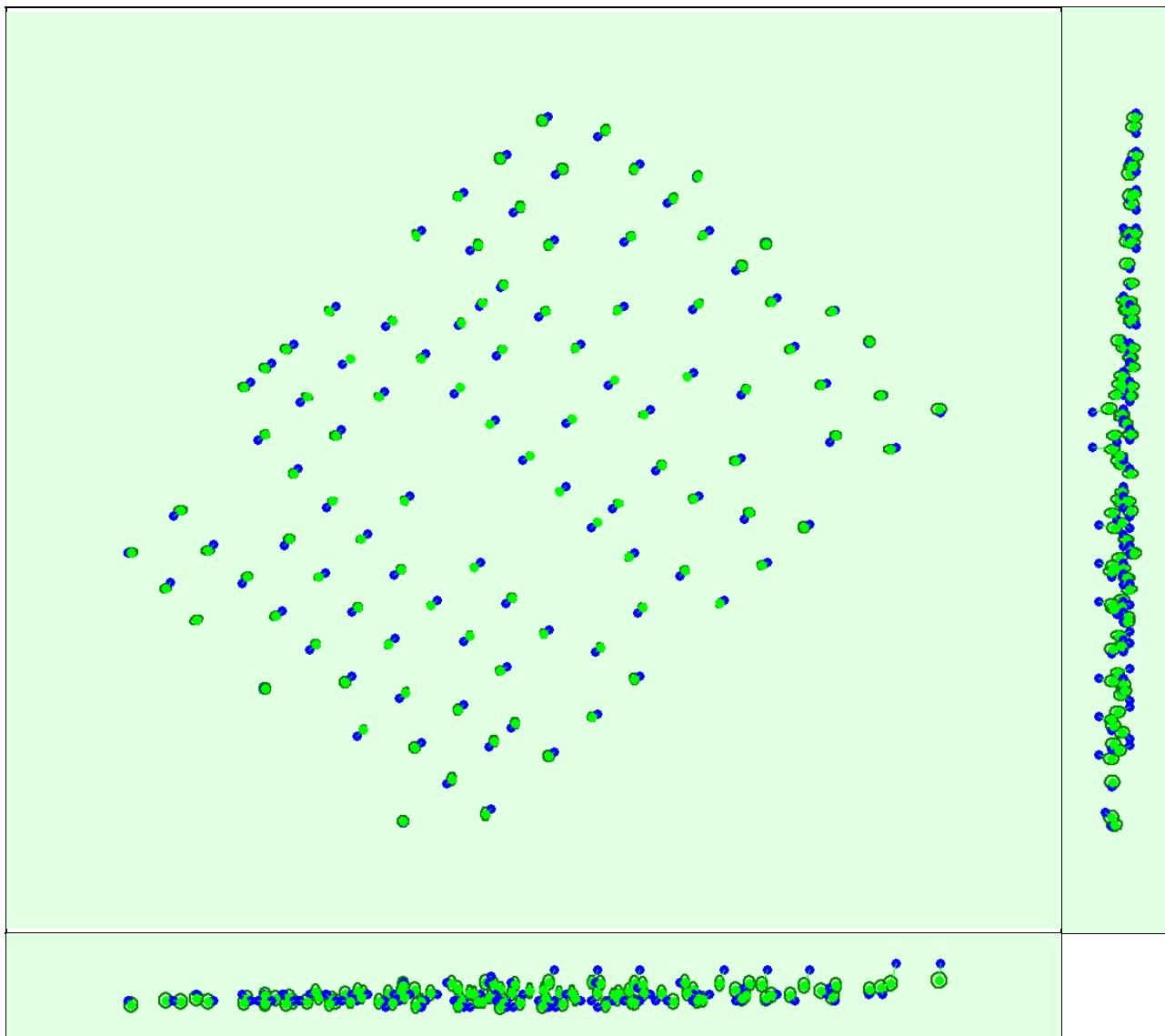


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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	0.076	0.076	0.119	0.037	0.037	0.055
Sigma	0.012	0.010	0.002	0.000	0.000	0.000

⚠ Overlap

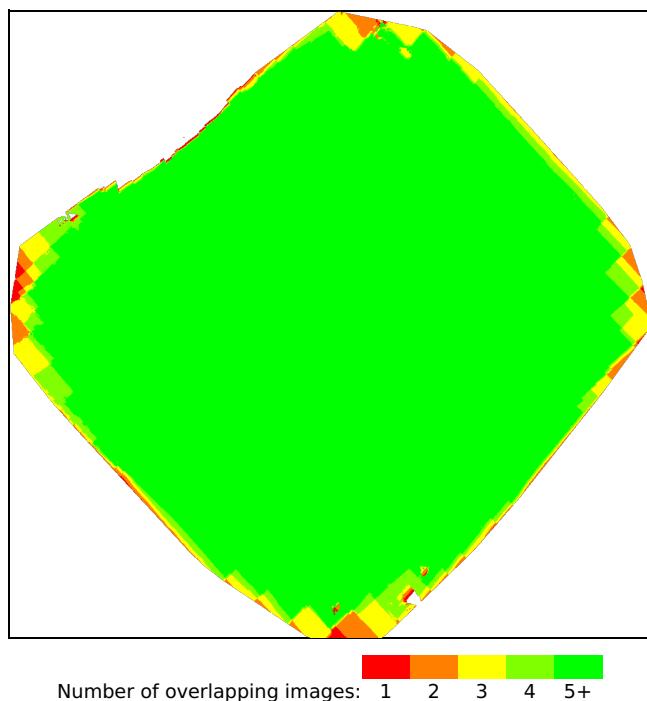


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.

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	2023742
Number of 3D Points for Bundle Block Adjustment	338374
Mean Reprojection Error [pixels]	0.217

⚠ Internal Camera Parameters



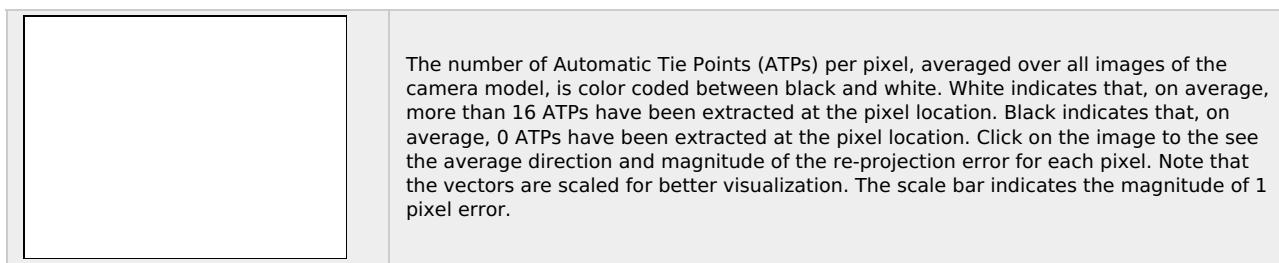
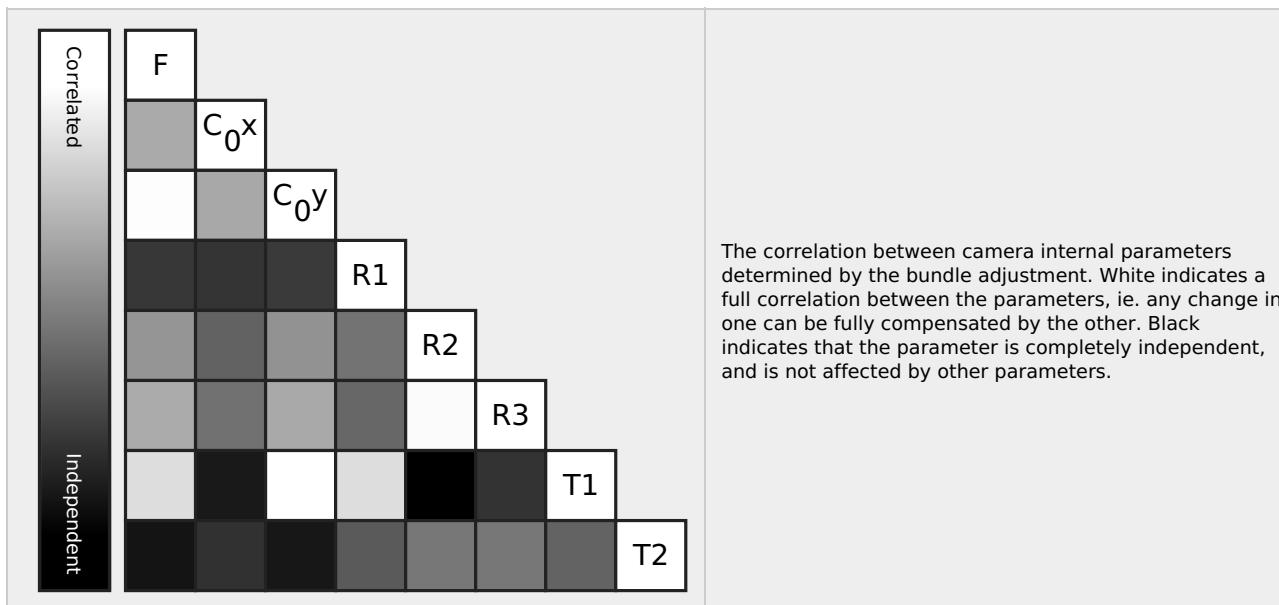
📄 **FC2204_4.4_4000x3000 (RGB). Sensor Dimensions: 6.396 [mm] x 4.797 [mm]**



EXIF ID: FC2204_4.4_4000x3000

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	2742.856 [pixel] 4.386 [mm]	1999.999 [pixel] 3.198 [mm]	1500.000 [pixel] 2.399 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	2969.237 [pixel] 4.748 [mm]	2012.638 [pixel] 3.218 [mm]	1492.993 [pixel] 2.387 [mm]	-0.021	0.042	-0.035	0.000	0.000

Uncertainties (Sigma)	2.798 [pixel] 0.004 [mm]	0.104 [pixel] 0.000 [mm]	0.596 [pixel] 0.001 [mm]	0.000	0.000	0.000	0.000	0.000
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2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	34323	19541
Min	23894	12818
Max	39849	26680
Mean	33610	19648

3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	161309
In 3 Images	49673
In 4 Images	26079
In 5 Images	16590
In 6 Images	11801
In 7 Images	8908
In 8 Images	7007
In 9 Images	5804
In 10 Images	5001
In 11 Images	4297
In 12 Images	3586
In 13 Images	3148
In 14 Images	2759
In 15 Images	2683
In 16 Images	2302
In 17 Images	2139
In 18 Images	1952
In 19 Images	1748
In 20 Images	1585

In 21 Images	1436
In 22 Images	1326
In 23 Images	1173
In 24 Images	1075
In 25 Images	1056
In 26 Images	917
In 27 Images	849
In 28 Images	810
In 29 Images	783
In 30 Images	702
In 31 Images	661
In 32 Images	560
In 33 Images	599
In 34 Images	524
In 35 Images	513
In 36 Images	494
In 37 Images	418
In 38 Images	419
In 39 Images	375
In 40 Images	337
In 41 Images	310
In 42 Images	306
In 43 Images	254
In 44 Images	281
In 45 Images	252
In 46 Images	215
In 47 Images	208
In 48 Images	206
In 49 Images	168
In 50 Images	155
In 51 Images	182
In 52 Images	167
In 53 Images	146
In 54 Images	140
In 55 Images	131
In 56 Images	129
In 57 Images	133
In 58 Images	118
In 59 Images	127
In 60 Images	98
In 61 Images	114
In 62 Images	107
In 63 Images	94
In 64 Images	86
In 65 Images	75
In 66 Images	93
In 67 Images	76
In 68 Images	72
In 69 Images	51
In 70 Images	60
In 71 Images	50
In 72 Images	47
In 73 Images	38
In 74 Images	33
In 75 Images	38
In 76 Images	41
In 77 Images	39
In 78 Images	21
In 79 Images	20

In 80 Images	26
In 81 Images	11
In 82 Images	16
In 83 Images	18
In 84 Images	12
In 85 Images	10
In 86 Images	2

2D Keypoint Matches

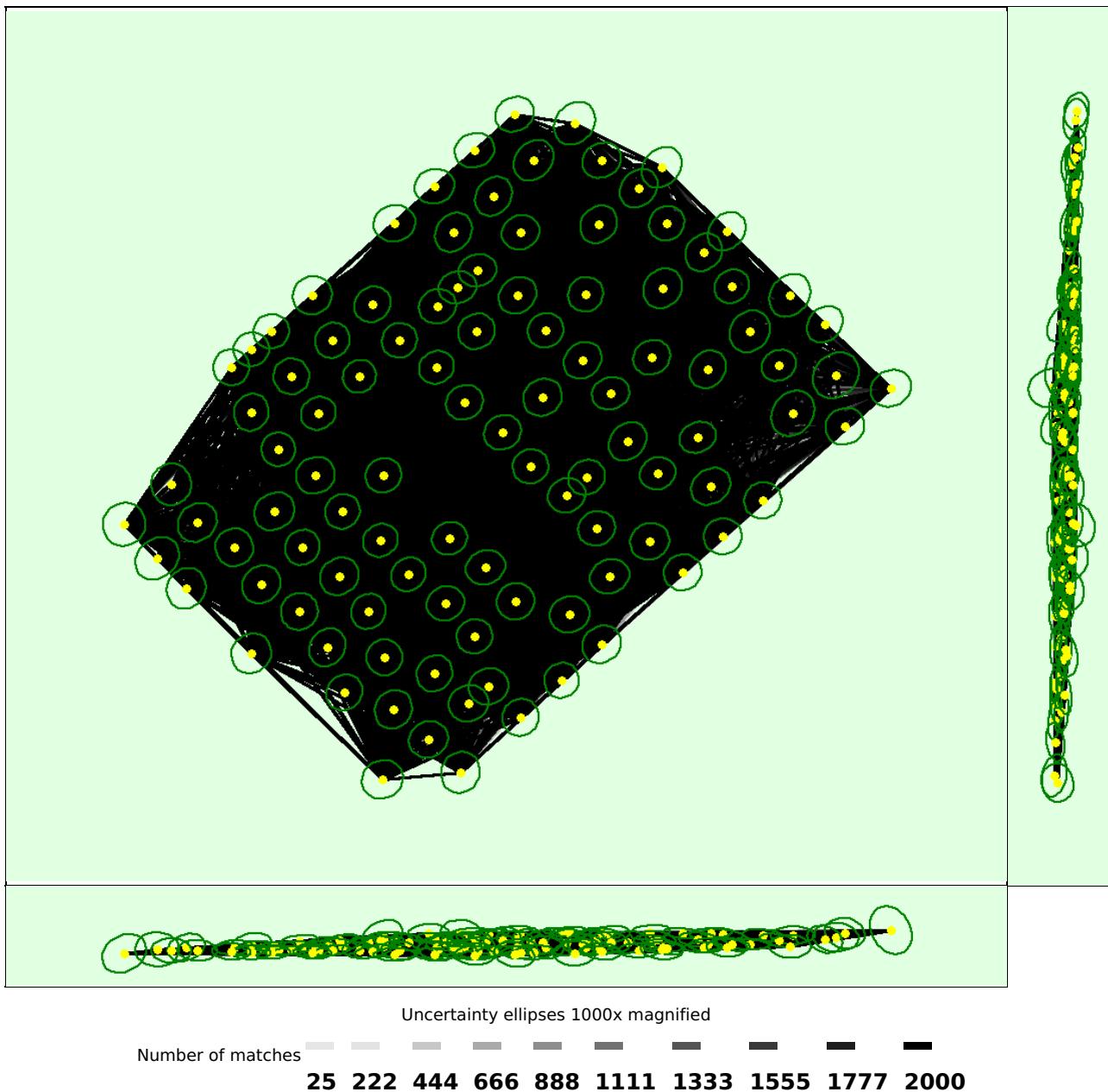


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.003	0.003	0.001	0.004	0.004	0.001
Sigma	0.000	0.000	0.001	0.002	0.002	0.000

Geolocation Details



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 Absolute Geolocation Variance

Min 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	0.00
-3.00	0.00	49.51	46.60	52.43
0.00	3.00	50.49	53.40	46.60
3.00	6.00	0.00	0.00	0.97
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
Mean [m]		-0.000000	-0.000000	-0.000001
Sigma [m]		0.934128	0.762979	0.962479
RMS Error [m]		0.934128	0.762979	0.962479

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.

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 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
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	4.941
Phi	4.317
Kappa	30.664

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 5.3.0-1017-aws x86_64

Coordinate Systems



Image Coordinate System	WGS 84 (EGM 96 Geoid)
Output Coordinate System	WGS 84 / UTM zone 36N (EGM 96 Geoid)

Processing Options

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Detected Template	 ag-rgb-dsm*
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: Alternative Internal Parameters Optimization: All External Parameters Optimization: All Rematch: Auto, yes

Point Cloud Densification details

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Processing Options

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Image Scale	multiscale, 1/4 (Quarter image size, Fast)
Point Density	Low (Fast)
Minimum Number of Matches	3
3D Textured Mesh Generation	no
LOD	Generated: no
Advanced: Image Groups	group1
Advanced: Use Processing Area	yes
Advanced: Use Annotations	yes
Time for Point Cloud Densification	59s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	NA

Results

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Number of Generated Tiles	1
Number of 3D Densified Points	289319
Average Density (per m ³)	13.02

DSM, Orthomosaic and Index Details

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Processing Options

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DSM and Orthomosaic Resolution	1 x GSD (3.19 [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	16s
Time for Orthomosaic Generation	03m:48s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s

Time for Index Map Generation

00s