

Quality Report



Generated with Pix4Dmapper version 4.6.1 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	Punta Lara prueba GCP
Processed	2020-09-13 14:01:38
Camera Model Name(s)	FC1102_4.5_3968x2976 (RGB)
Average Ground Sampling Distance (GSD)	1.41 cm / 0.55 in
Area Covered	0.029 km ² / 2.9484 ha / 0.01 sq. mi. / 7.2895 acres

Quality Check



Images	median of 28210 keypoints per image	
Dataset	410 out of 410 images calibrated (100%), all images enabled	
Camera Optimization	1.16% relative difference between initial and optimized internal camera parameters	
Matching	median of 12852.2 matches per calibrated image	
Georeferencing	yes, 8 GCPs (8 3D), mean RMS error = 1.409 m	

Preview

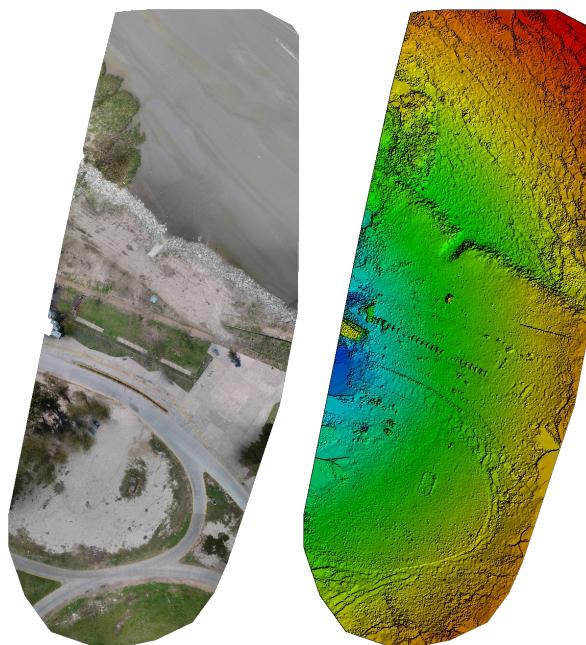


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	410 out of 410
Number of Geolocated Images	410 out of 410

Initial Image Positions

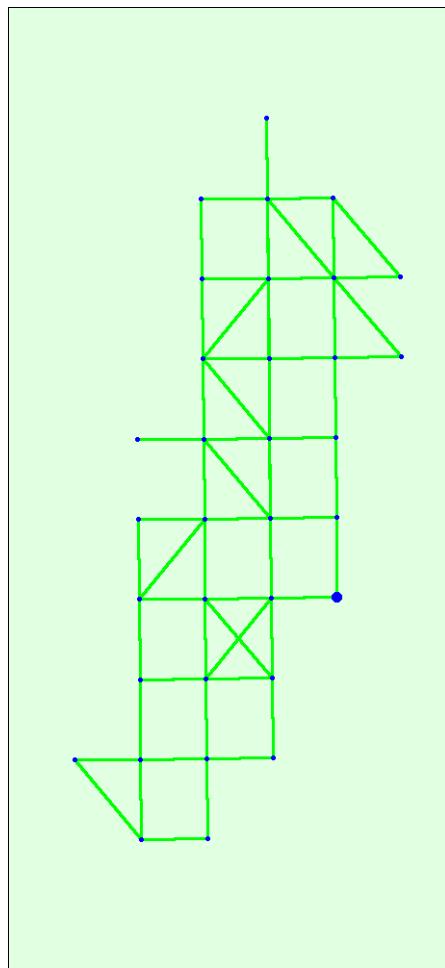
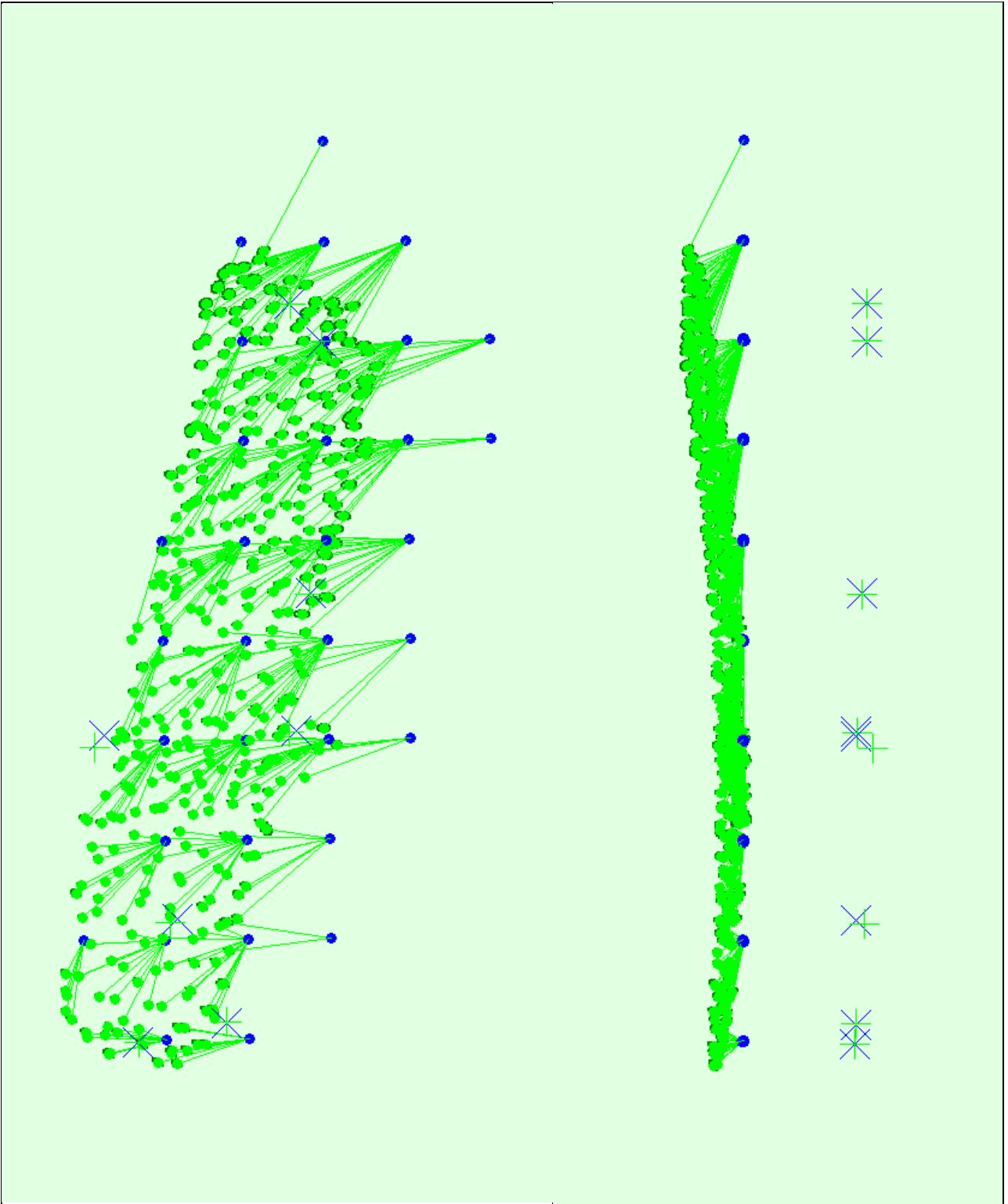
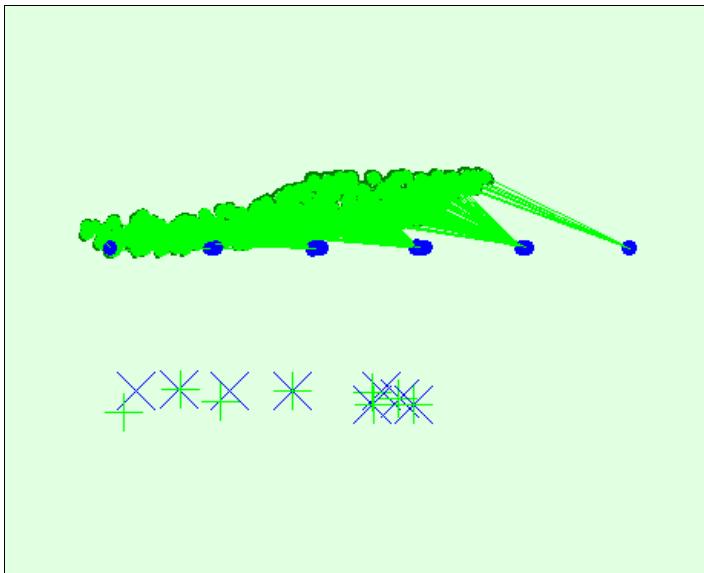


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions







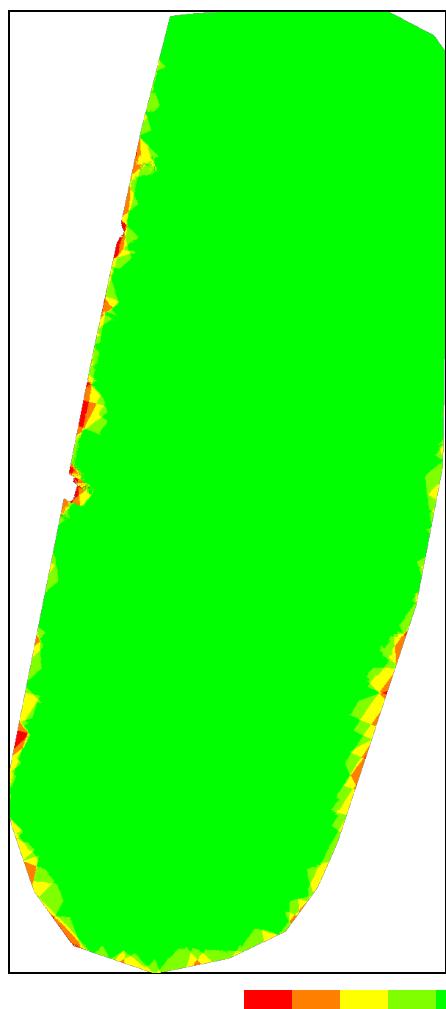
Uncertainty ellipses 50x magnified

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	0.030	0.018	0.032	0.031	0.029	0.008
Sigma	0.006	0.006	0.004	0.009	0.009	0.004

Overlap



Number of overlapping images: 1 2 3 4 5+

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	5245129
Number of 3D Points for Bundle Block Adjustment	1079340
Mean Reprojection Error [pixels]	0.449

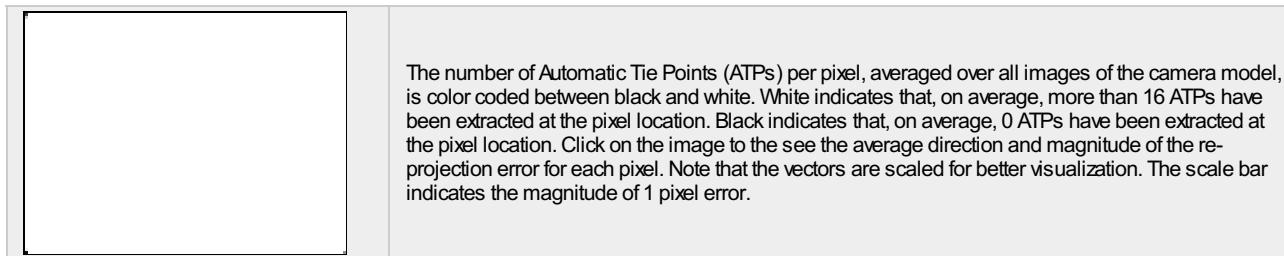
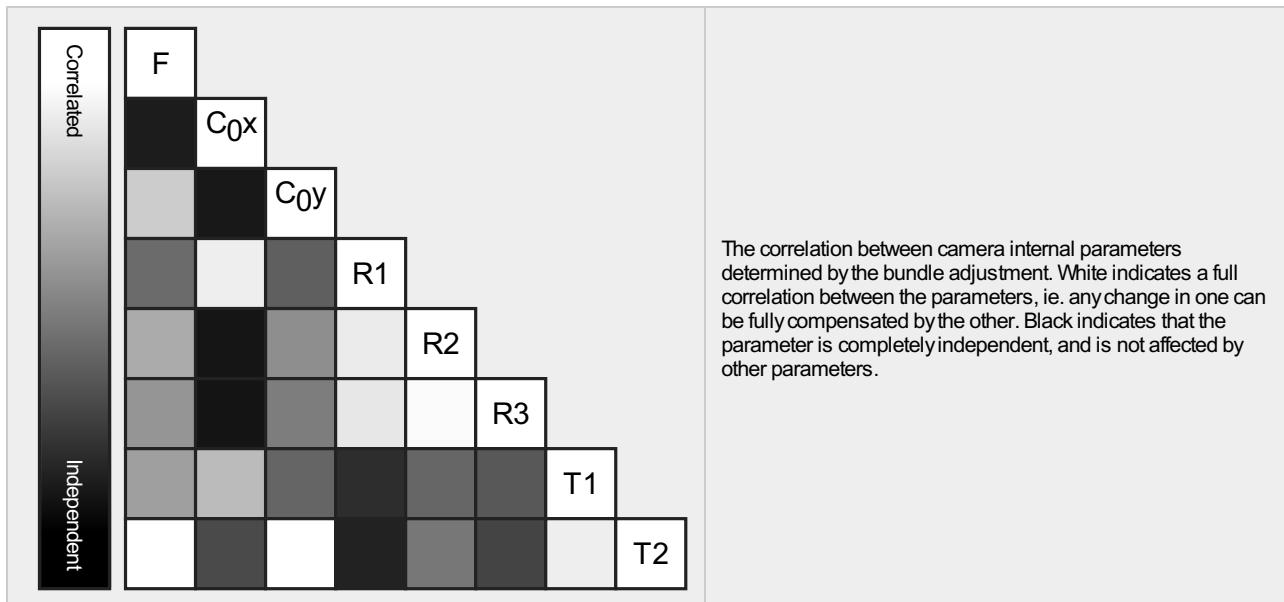
Internal Camera Parameters



FC1102_4.5_3968x2976 (RGB). Sensor Dimensions: 6.286 [mm] x 4.714 [mm]

EXIF ID: FC1102_4.5_3968x2976

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	2951.270 [pixel] 4.675 [mm]	1976.090 [pixel] 3.130 [mm]	1474.000 [pixel] 2.335 [mm]	0.117	-0.298	0.142	0.001	-0.000
Optimized Values	2985.601 [pixel] 4.730 [mm]	2010.550 [pixel] 3.185 [mm]	1393.345 [pixel] 2.207 [mm]	0.093	-0.298	0.153	0.004	0.000
Uncertainties (Sigma)	1.863 [pixel] 0.003 [mm]	0.154 [pixel] 0.000 [mm]	0.260 [pixel] 0.000 [mm]	0.000	0.001	0.001	0.000	0.000



2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	28210	12852
Mn	17845	578

Max	54220	34314
Mean	29070	12793

② 3D Points from 2D Keypoint Matches

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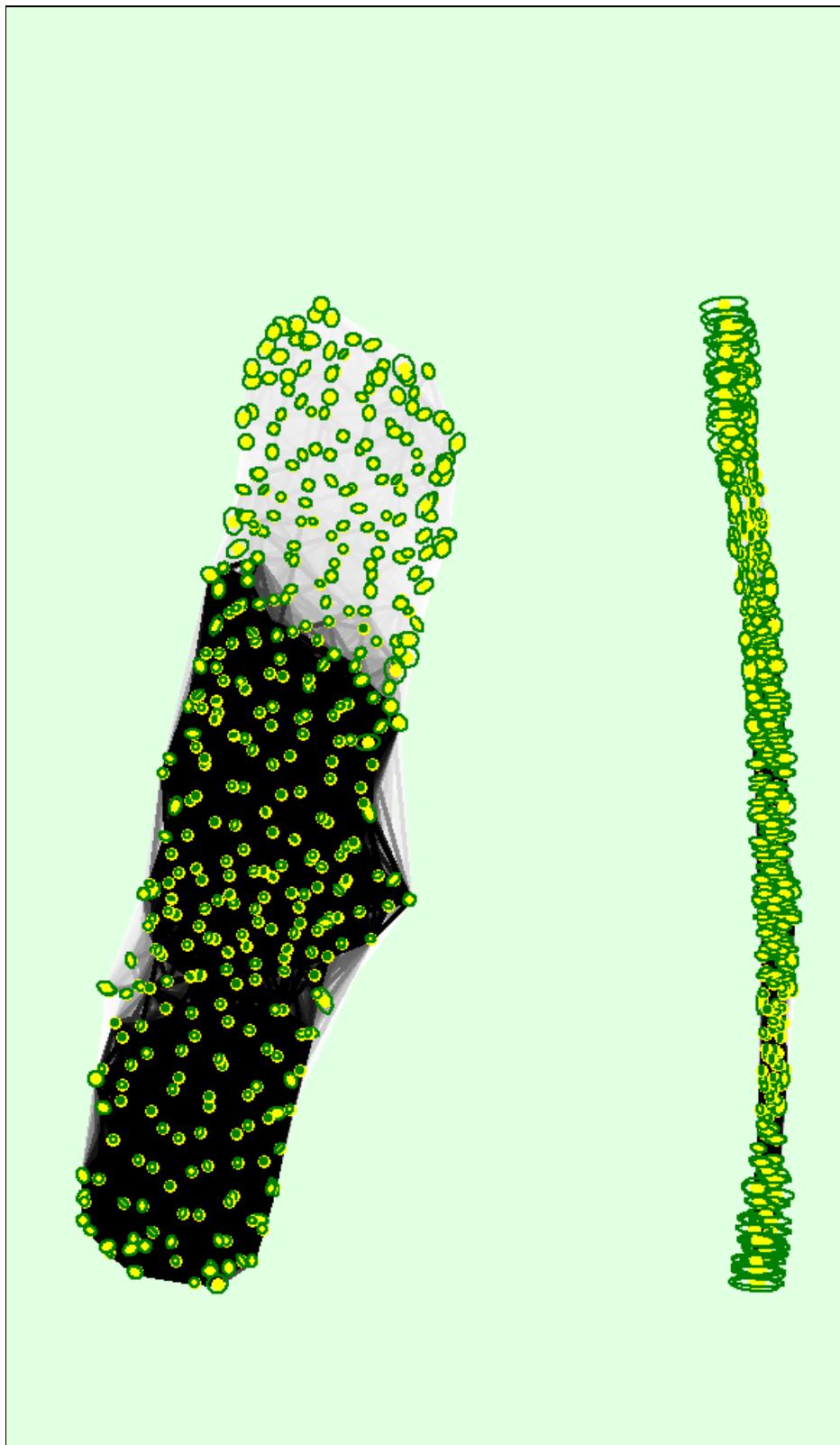
	Number of 3D Points Observed
In 2 Images	551517
In 3 Images	168666
In 4 Images	85250
In 5 Images	52268
In 6 Images	35563
In 7 Images	26162
In 8 Images	20496
In 9 Images	16369
In 10 Images	13780
In 11 Images	11499
In 12 Images	9863
In 13 Images	8689
In 14 Images	7597
In 15 Images	6595
In 16 Images	5847
In 17 Images	5376
In 18 Images	4852
In 19 Images	4471
In 20 Images	4040
In 21 Images	3643
In 22 Images	3204
In 23 Images	3058
In 24 Images	2747
In 25 Images	2610
In 26 Images	2435
In 27 Images	2242
In 28 Images	2074
In 29 Images	1868
In 30 Images	1852
In 31 Images	1708
In 32 Images	1545
In 33 Images	1414
In 34 Images	1232
In 35 Images	1204
In 36 Images	1073
In 37 Images	897
In 38 Images	794
In 39 Images	713
In 40 Images	604
In 41 Images	544
In 42 Images	467
In 43 Images	417
In 44 Images	396
In 45 Images	318
In 46 Images	263
In 47 Images	236
In 48 Images	182
In 49 Images	154
In 50 Images	116
In 51 Images	99
In 52 Images	83
In 53 Images	66

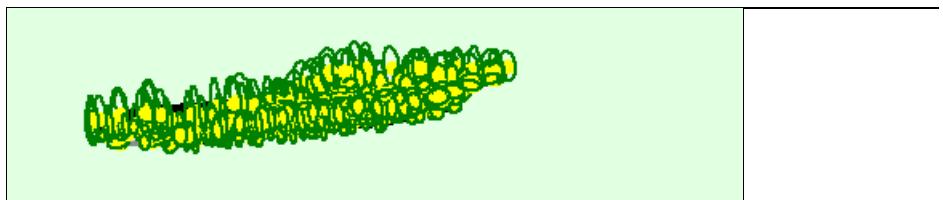
In 54 Images	56
In 55 Images	45
In 56 Images	32
In 57 Images	21
In 58 Images	15
In 59 Images	7
In 60 Images	1
In 61 Images	3
In 62 Images	1
In 63 Images	1

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2D Keypoint Matches

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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

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	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.013	0.013	0.023	0.031	0.034	0.009
Sigma	0.005	0.005	0.013	0.017	0.019	0.006

Geolocation Details

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ⓘ Ground Control Points

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GCP Name	Accuracy XY/Z [m]	Error X [m]	Error Y [m]	Error Z [m]	Projection Error [pixel]	Verified/Marked
Centro del Mjon (3D)	0.020/ 0.020	2.323	1.104	2.631	1.218	19 / 19
Banco plaza (3D)	0.020/ 0.020	2.019	0.511	0.587	1.351	25 / 26
Extremo entrada micros (3D)	0.020/ 0.020	3.071	3.557	5.255	2.553	5 / 5
Bajada Costa (3D)	0.020/ 0.020	0.370	0.326	0.024	2.599	45 / 45
Extremo Rotonda poste de luz(3D)	0.020/ 0.020	-0.178	0.011	-0.040	12.957	37 / 37
Costa (3D)	0.020/ 0.020	-0.047	-0.068	-0.090	1.492	60 / 60
Costa 2 (3D)	0.020/ 0.020	-0.170	-0.175	0.075	1.663	71 / 71
Extremo rotonda 2 (3D)	0.020/ 0.020	-0.080	-0.258	0.078	22.604	26 / 29
Mean [m]		0.913417	0.626040	1.064919		
Sigma [m]		1.246602	1.183667	1.796849		
RMS Error [m]		1.545427	1.339027	2.088712		

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

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Mn Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-15.00	2.93	4.88	0.00
-15.00	-12.00	5.12	6.59	0.00
-12.00	-9.00	6.83	9.51	3.66
-9.00	-6.00	11.22	10.73	10.00
-6.00	-3.00	12.20	8.78	9.76
-3.00	0.00	11.22	9.51	19.27
0.00	3.00	13.17	9.51	29.76
3.00	6.00	12.44	9.51	22.68
6.00	9.00	8.29	9.51	4.88
9.00	12.00	8.29	8.54	0.00

12.00	15.00	4.88	8.29	0.00
15.00	-	3.41	4.63	0.00
Mean [m]		22.054766	14.400968	-7.327307
Sigma [m]		8.277949	9.377828	4.357593
RMS Error [m]		23.557103	17.185213	8.525142

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	Y	Z
Translation [m]	22.054766	14.400968	-7.327307

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

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 Relative Geolocation Variance

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Relative Geolocation Error	Images X[%]	Images Y[%]	Images Z[%]
[-1.00, 1.00]	41.95	31.71	99.76
[-2.00, 2.00]	74.15	63.90	100.00
[-3.00, 3.00]	93.66	90.49	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	4.657
Phi	6.478
Kappa	13.435

Geolocation RMS error of the orientation angles given by the difference between the initial and computed image orientation angles.

Initial Processing Details i

System Information i

Hardware	CPU: Intel(R) Core(TM) i7-6700HQ CPU @ 2.60GHz RAM 8GB GPU: Intel(R) HD Graphics 530 (Driver: 23.20.16.4973)
Operating System	Windows 10 Home, 64-bit

Coordinate Systems i

Image Coordinate System	WGS 84 (EGM96 Geoid)
Ground Control Point (GCP) Coordinate System	WGS 84 / UTMzone 21S (EGM96 Geoid)
Output Coordinate System	WGS 84 / UTMzone 21S (EGM96 Geoid)

Processing Options i

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

Advanced: Calibration

Calibration Method: Standard
Internal Parameters Optimization: All
External Parameters Optimization: All
Rematch: Auto, yes