

Quality Report



Generated with Pix4Denterprise version 4.5.6



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	Sena_Tuquerres
Processed	2024-10-03 13:24:28
Camera Model Name(s)	M3E_12.3_5280x3956 (RGB)
Average Ground Sampling Distance (GSD)	2.36 cm / 0.93 in
Area Covered	0.109 km ² / 10.9388 ha / 0.04 sq. mi. / 27.0444 acres
Time for Initial Processing (without report)	43m:21s

Quality Check



Images	median of 5413 keypoints per image	
Dataset	417 out of 417 images calibrated (100%), all images enabled	
Camera Optimization	2.69% relative difference between initial and optimized internal camera parameters	
Matching	median of 2926.89 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

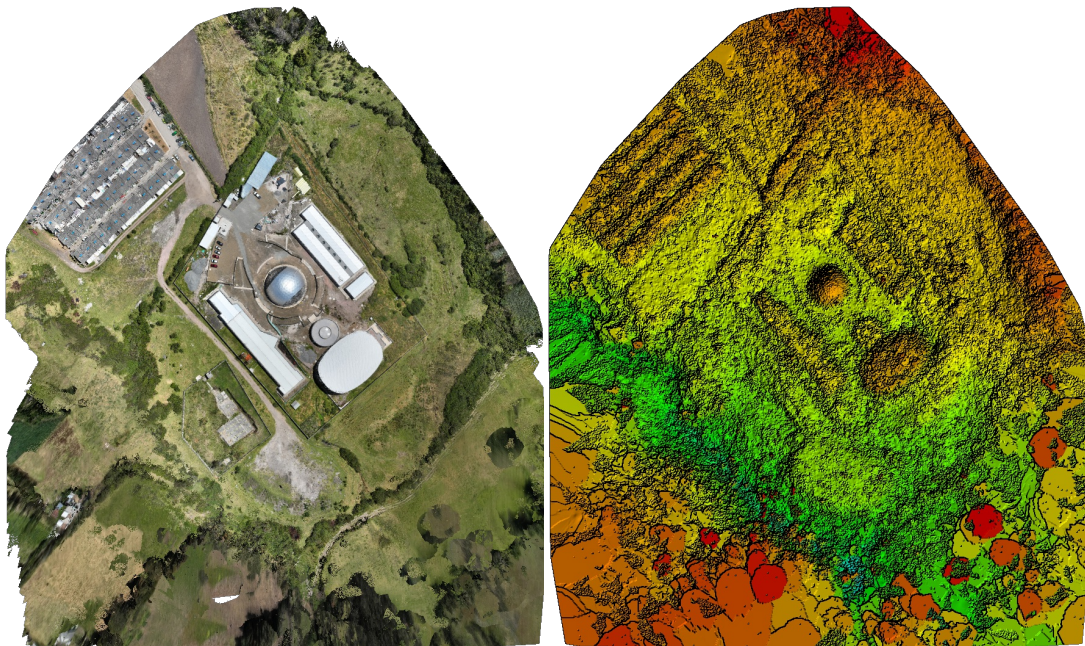


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	417 out of 417
Number of Geolocated Images	417 out of 417

Initial Image Positions

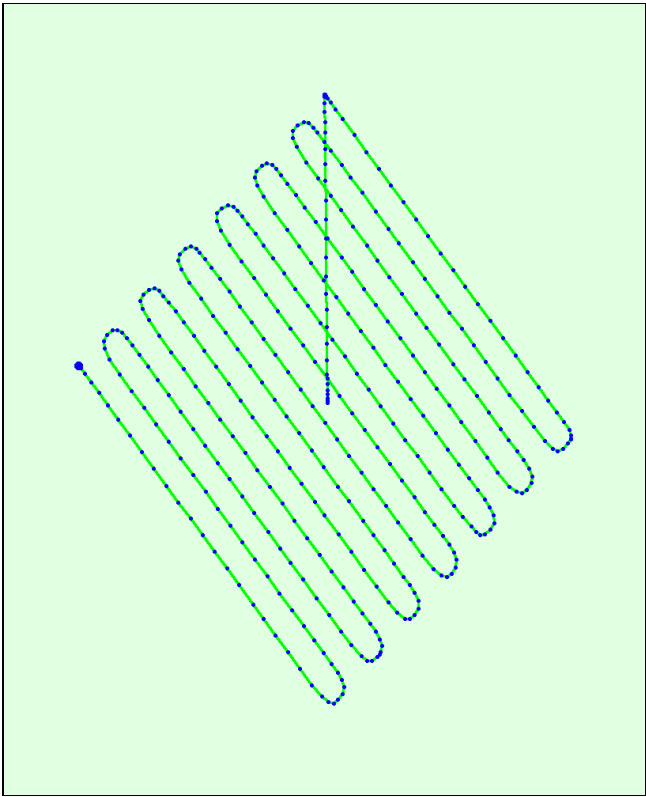


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions



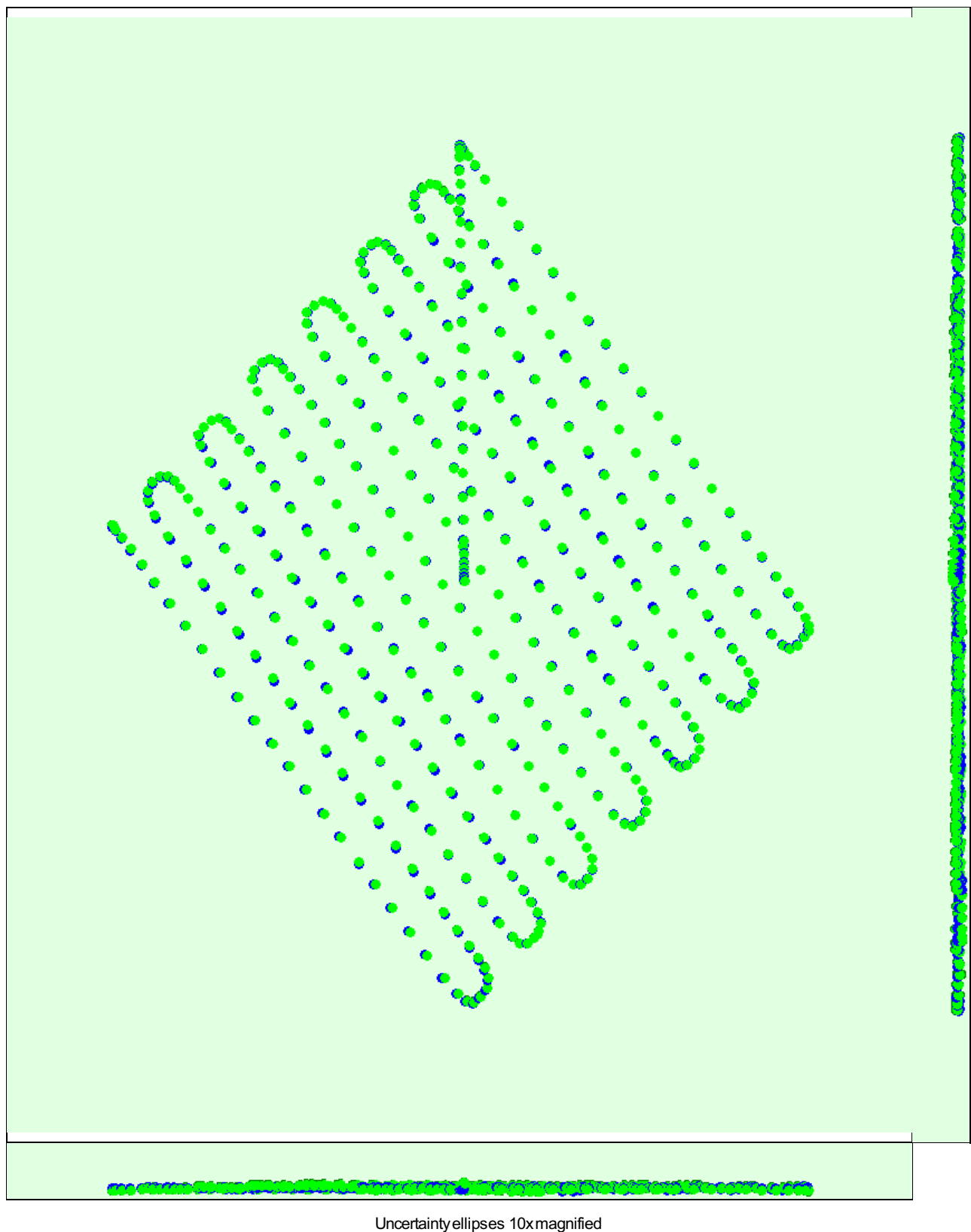


Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Dark green ellipses 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	0.077	0.079	0.125	0.037	0.037	0.034
Sigma	0.010	0.013	0.006	0.000	0.001	0.000



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

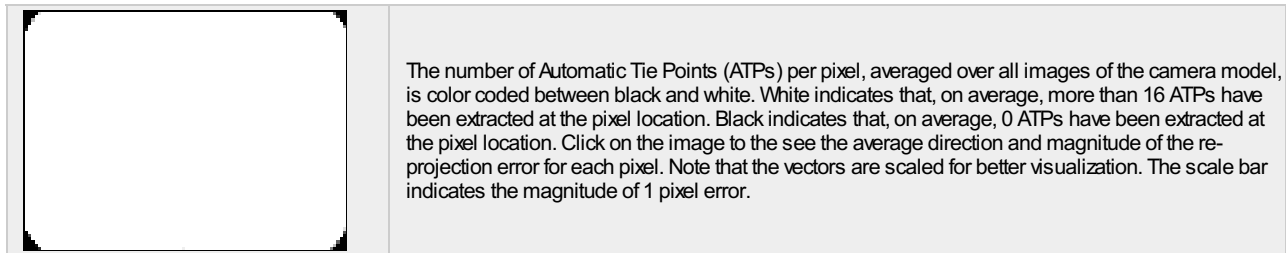
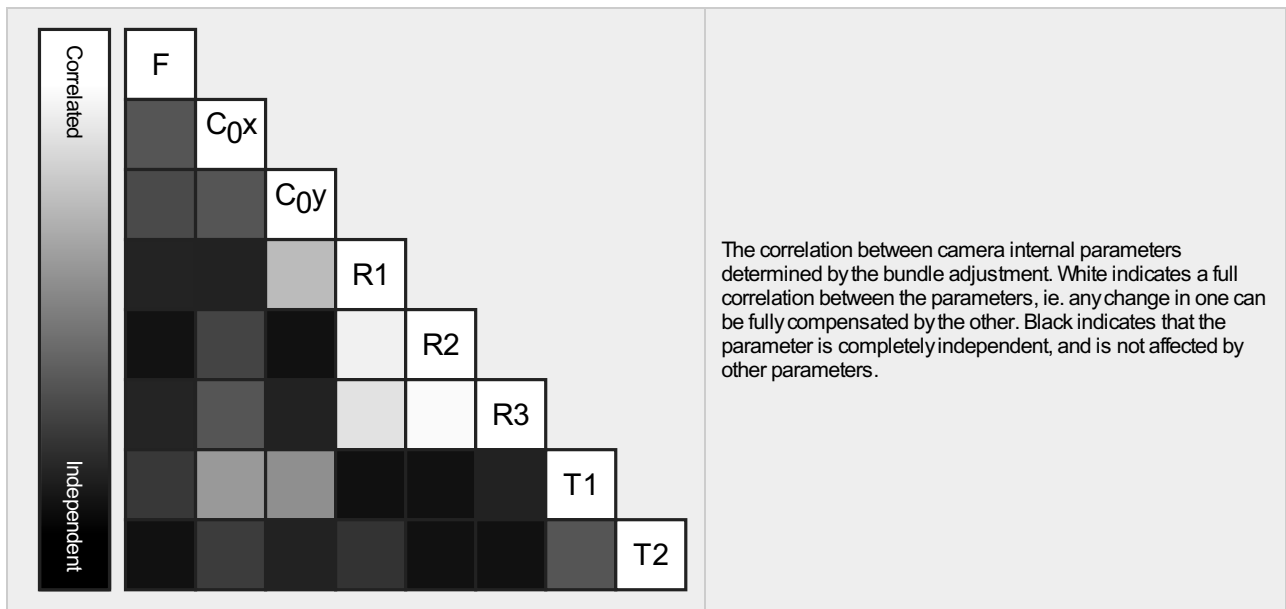
Number of 2D Keypoint Observations for Bundle Block Adjustment	1236857
Number of 3D Points for Bundle Block Adjustment	252689
Mean Reprojection Error [pixels]	0.129

? Internal Camera Parameters

📷 M3E_12.3_5280x3956 (RGB). Sensor Dimensions: 17.923 [mm] x 13.429 [mm]

EXIF ID: M3E_12.3_5280x3956

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3620.570 [pixel] 12.290 [mm]	2640.000 [pixel] 8.961 [mm]	1978.000 [pixel] 6.714 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	3718.250 [pixel] 12.622 [mm]	2652.986 [pixel] 9.006 [mm]	1958.680 [pixel] 6.649 [mm]	-0.112	0.010	-0.024	-0.000	-0.000
Uncertainties (Sigma)	0.451 [pixel] 0.002 [mm]	0.141 [pixel] 0.000 [mm]	0.164 [pixel] 0.001 [mm]	0.000	0.000	0.000	0.000	0.000



? 2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	5413	2927
Mn	4866	2378
Max	7022	3901
Mean	5498	2966

? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	138154
In 3 Images	39795
In 4 Images	19708
In 5 Images	11666
In 6 Images	7648
In 7 Images	5623
In 8 Images	4325
In 9 Images	3320
In 10 Images	2656
In 11 Images	2093
In 12 Images	1683
In 13 Images	1496
In 14 Images	1185
In 15 Images	1047
In 16 Images	904
In 17 Images	785
In 18 Images	675
In 19 Images	624
In 20 Images	553
In 21 Images	484
In 22 Images	485

In 23 Images	450
In 24 Images	419
In 25 Images	359
In 26 Images	320
In 27 Images	335
In 28 Images	290
In 29 Images	272
In 30 Images	253
In 31 Images	228
In 32 Images	241
In 33 Images	208
In 34 Images	198
In 35 Images	200
In 36 Images	183
In 37 Images	180
In 38 Images	155
In 39 Images	149
In 40 Images	144
In 41 Images	137
In 42 Images	153
In 43 Images	117
In 44 Images	94
In 45 Images	103
In 46 Images	97
In 47 Images	92
In 48 Images	89
In 49 Images	82
In 50 Images	87
In 51 Images	70
In 52 Images	66
In 53 Images	67
In 54 Images	70
In 55 Images	58
In 56 Images	77
In 57 Images	67
In 58 Images	64
In 59 Images	64
In 60 Images	63
In 61 Images	51
In 62 Images	36
In 63 Images	48
In 64 Images	35
In 65 Images	41
In 66 Images	56
In 67 Images	39
In 68 Images	39
In 69 Images	44
In 70 Images	48
In 71 Images	37
In 72 Images	39
In 73 Images	34
In 74 Images	32
In 75 Images	32
In 76 Images	31
In 77 Images	26
In 78 Images	34
In 79 Images	32
In 80 Images	17
In 81 Images	36

In 82 Images	31
In 83 Images	23
In 84 Images	23
In 85 Images	16
In 86 Images	22
In 87 Images	23
In 88 Images	22
In 89 Images	17
In 90 Images	16
In 91 Images	19
In 92 Images	19
In 93 Images	16
In 94 Images	13
In 95 Images	15
In 96 Images	14
In 97 Images	15
In 98 Images	21
In 99 Images	12
In 100 Images	14
In 101 Images	16
In 102 Images	15
In 103 Images	10
In 104 Images	12
In 105 Images	12
In 106 Images	12
In 107 Images	7
In 108 Images	8
In 109 Images	10
In 110 Images	8
In 111 Images	9
In 112 Images	16
In 113 Images	7
In 114 Images	9
In 115 Images	9
In 116 Images	7
In 117 Images	1
In 118 Images	8
In 119 Images	3
In 120 Images	5
In 121 Images	8
In 122 Images	8
In 123 Images	5
In 124 Images	10
In 125 Images	4
In 126 Images	3
In 127 Images	11
In 128 Images	5
In 129 Images	6
In 130 Images	6
In 131 Images	1
In 132 Images	4
In 133 Images	4
In 134 Images	2
In 135 Images	6
In 136 Images	7
In 137 Images	4
In 138 Images	1
In 139 Images	1
In 140 Images	4

In 141 Images	2
In 142 Images	1
In 143 Images	4
In 144 Images	1
In 145 Images	2
In 146 Images	1
In 147 Images	1
In 148 Images	4
In 150 Images	5
In 151 Images	4
In 152 Images	1
In 153 Images	2
In 154 Images	3
In 155 Images	1
In 156 Images	1
In 157 Images	2
In 158 Images	2
In 159 Images	4
In 160 Images	1
In 161 Images	2
In 162 Images	2
In 163 Images	1
In 164 Images	2
In 166 Images	1
In 167 Images	2
In 168 Images	1
In 170 Images	1
In 173 Images	1
In 174 Images	1
In 176 Images	1

2D Keypoint Matches



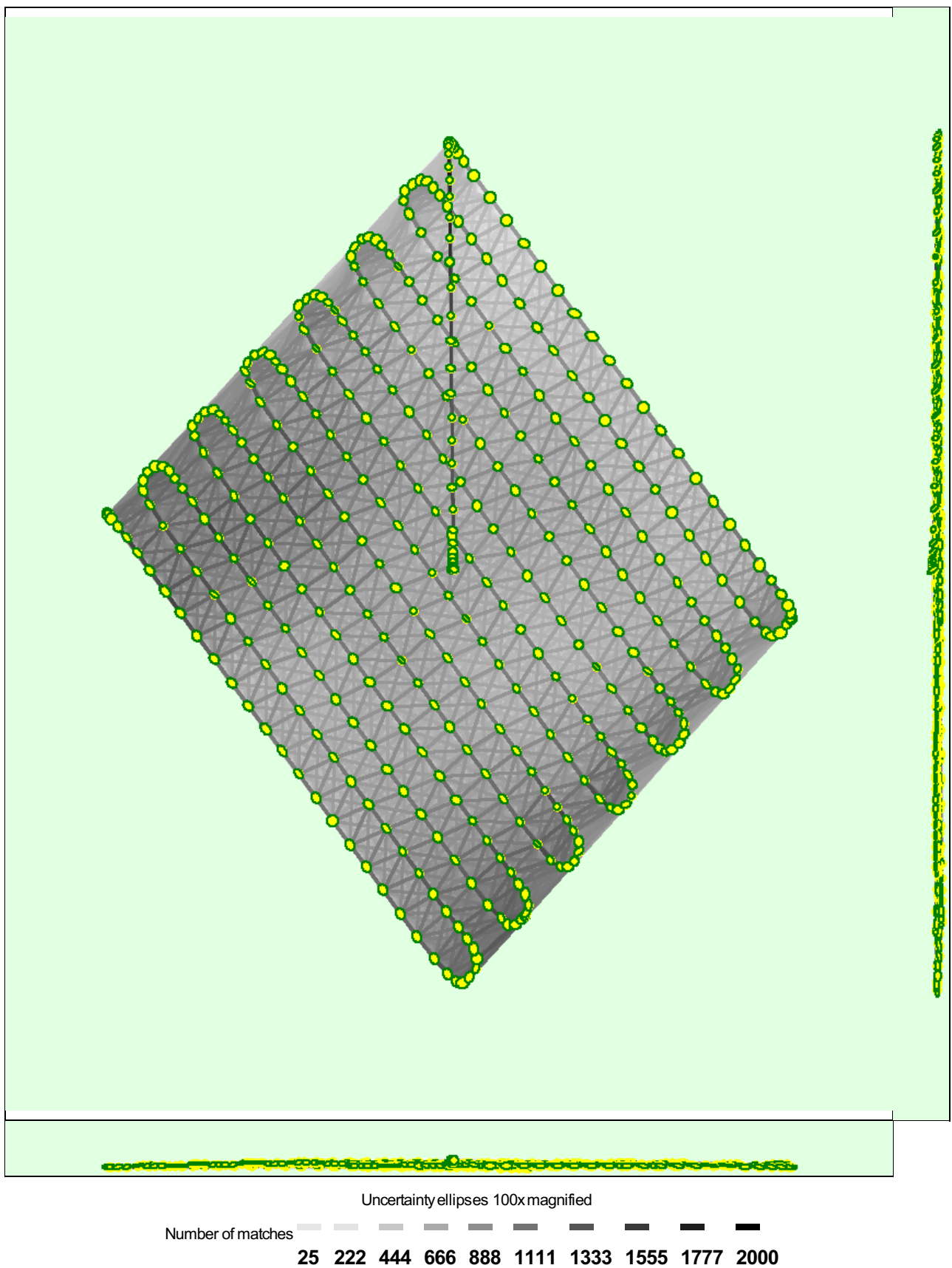


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.014	0.015	0.005	0.009	0.009	0.003
Sigma	0.001	0.002	0.002	0.001	0.002	0.000

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	0.00
-3.00	0.00	50.60	42.93	41.97
0.00	3.00	49.40	57.07	58.03
3.00	6.00	0.00	0.00	0.00
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	-0.000000
Sigma [m]		0.322190	0.422019	0.490811
RMS Error [m]		0.322190	0.422019	0.490811

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
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	0.495
Phi	0.628
Kappa	1.076

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 5 4600H with Radeon Graphics RAM: 7GB GPU: AMD Radeon(TM) Graphics (Driver: 27.20.21030.11000), NVIDIA GeForce GTX 1650 Ti (Driver: 32.0.15.5613)
Operating System	Windows 10 Home Single Language, 64-bit

Coordinate Systems



Image Coordinate System	WGS 84 (EGM96 Geoid)
Output Coordinate System	MAGNA-SIRGAS / Colombia West zone (EGM96 Geoid)

Processing Options



Detected Template	3D Maps - Rapid/Low Res
Keypoints Image Scale	Rapid, Image Scale: 0.25
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, 1/4 (Quarter image size, Fast)
Point Density	Low (Fast)
Minimum Number of Matches	3
3D Textured Mesh Generation	yes
3D Textured Mesh Settings:	Resolution: Medium Resolution (default) Color Balancing: yes
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	19m:26s
Time for Point Cloud Classification	26s
Time for 3D Textured Mesh Generation	26m:11s

Results



Number of Processed Clusters	2
Number of Generated Tiles	1
Number of 3D Densified Points	1839886
Average Density (per m ³)	43.26

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	4 x GSD (2.36 [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: yes
Grid DSM	Generated: yes, Spacing [cm]: 100

Raster DTM	Generated: yes Merge Tiles: yes
DTMResolution	5 x GSD (2.36 [cm/pixel])
Contour Lines Generation	Generated: yes Contour Base [m]: 0 Elevation Interval [m]: 10 Resolution [cm]: 100 Minimum Line Size [vertices]: 20
Time for DSMGeneration	09s
Time for Orthomosaic Generation	26m:38s
Time for DTMGeneration	10m:36s
Time for Contour Lines Generation	02s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s