Quality Report

Generated with Pix4Dmapper Pro version 4.0.25

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	Jose Salinas Prueba_v2
Processed	2017-12-13 15:21:01
Camera Model Name(s)	FC6310_8.8_3283x2189 (RGB)
Average Ground Sampling Distance (GSD)	4.51 cm / 1.77 in
Area Covered	3.2136 km^2 / 321.361 ha / 1.2414 sq. mi. / 794.513 acres

Quality Check

Images	median of 31175 keypoints per image	✓
Dataset	4710 out of 4710 images calibrated (100%), all images enabled	✓
Camera Optimization	4.23% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 16700.7 matches per calibrated image	✓
Georeferencing	yes, 26 GCPs (26 3D), mean RMS error = 0.054 m	✓

Preview

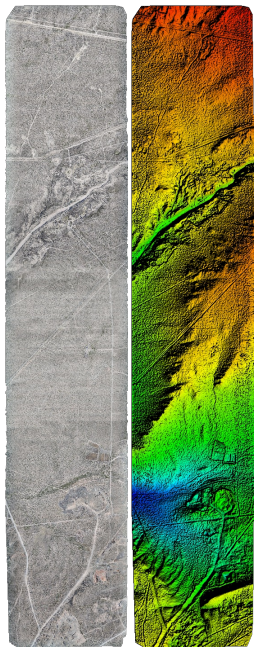


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	4710 out of 4710
Number of Geolocated Images	4710 out of 4710

Initial Image Positions

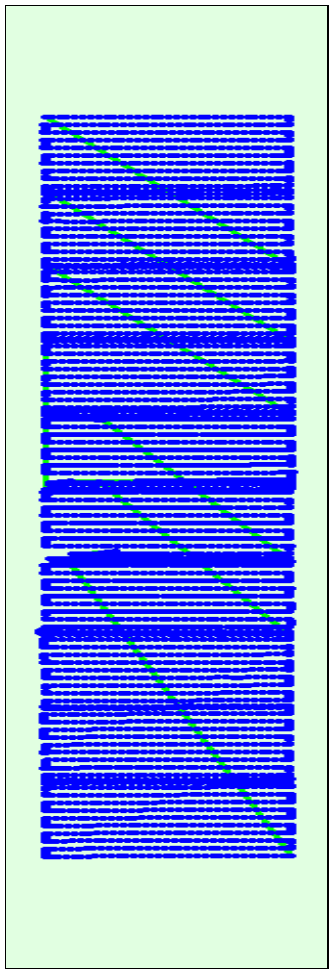
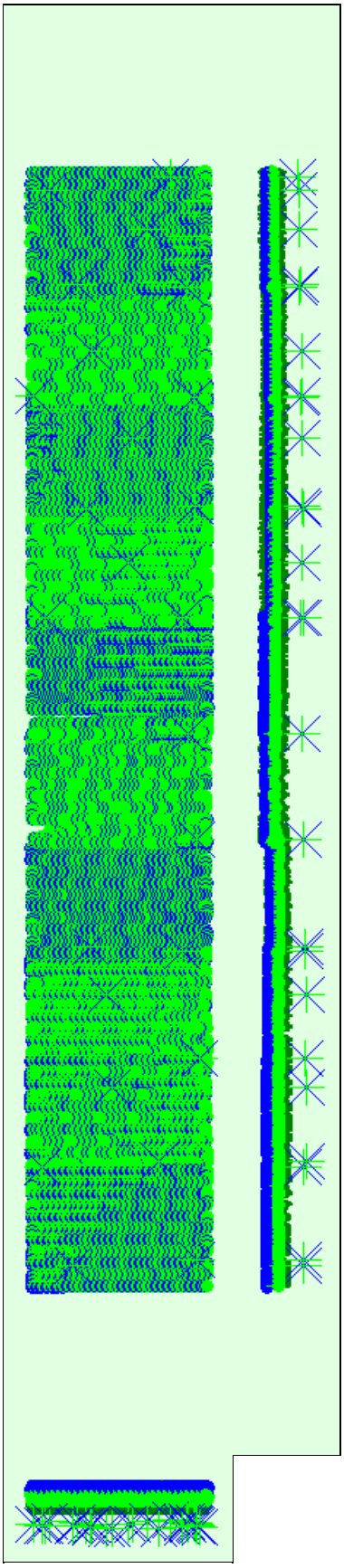


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 500x 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	0.011	0.009	0.086	0.004	0.006	0.001

Sigma	0.001	0.001	0.004	0.001	0.001	0.000

Overlap

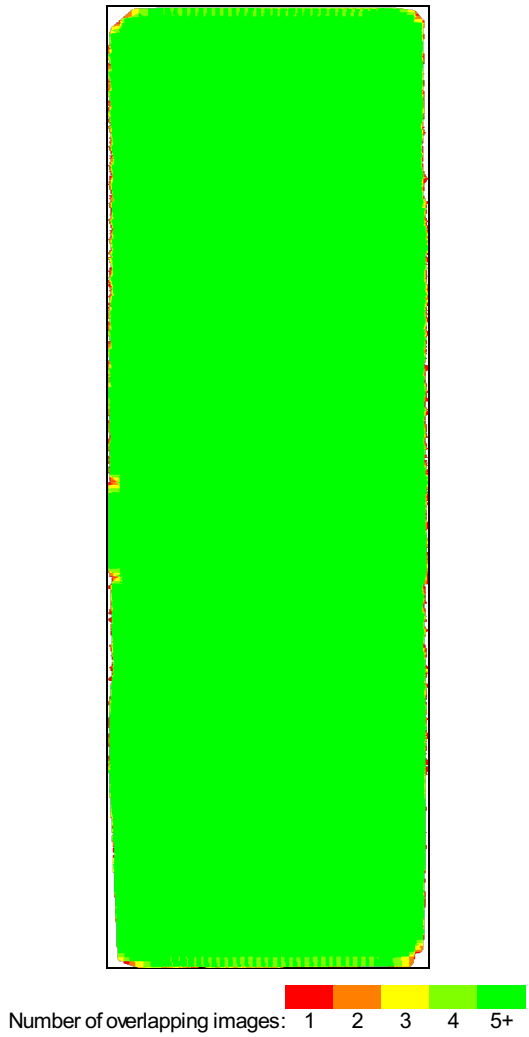


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.
Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint 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	80410092
Number of 3D Points for Bundle Block Adjustment	17463421
Mean Reprojection Error [pixels]	0.098

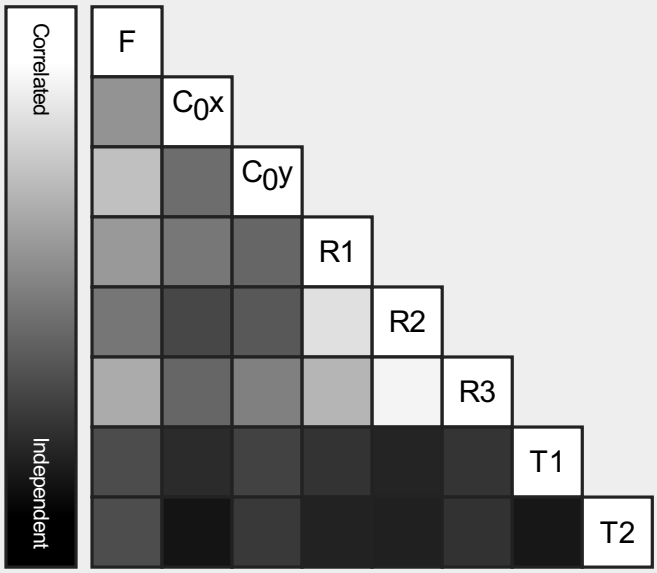
Internal Camera Parameters

FC6310_8.8_3283x2189 (RGB). Sensor Dimensions: 12.833 [mm] x 8.557 [mm]

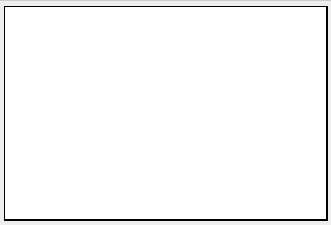
EXIF ID: FC6310_8.8_3283x2189

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	2251.200 [pixel] 8.800 [mm]	1641.500 [pixel] 6.417 [mm]	1094.500 [pixel] 4.278 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	2155.881 [pixel] 8.427 [mm]	1627.311 [pixel] 6.361 [mm]	1110.956 [pixel] 4.343 [mm]	-0.000	-0.008	0.008	0.000	-0.000

Uncertainties (Sigma)	1.887 [pixel] 0.007 [mm]	0.054 [pixel] 0.000 [mm]	0.064 [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 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	31175	16701
Min	15303	4669
Max	42049	28070
Mean	30730	17072

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	7399830
In 3 Images	3244688
In 4 Images	1843224
In 5 Images	1215342
In 6 Images	729970
In 7 Images	503274
In 8 Images	383752
In 9 Images	308082
In 10 Images	258456
In 11 Images	208090
In 12 Images	182832
In 13 Images	163288
In 14 Images	152807
In 15 Images	138297
In 16 Images	106144
In 17 Images	94087
In 18 Images	84848
In 19 Images	78041
In 20 Images	70906
In 21 Images	50048

In 22 Images	43080
In 23 Images	38471
In 24 Images	33691
In 25 Images	28861
In 26 Images	19897
In 27 Images	15163
In 28 Images	12325
In 29 Images	9997
In 30 Images	8434
In 31 Images	6868
In 32 Images	5543
In 33 Images	4646
In 34 Images	3934
In 35 Images	3484
In 36 Images	2871
In 37 Images	2094
In 38 Images	1542
In 39 Images	1248
In 40 Images	981
In 41 Images	844
In 42 Images	603
In 43 Images	493
In 44 Images	393
In 45 Images	323
In 46 Images	271
In 47 Images	200
In 48 Images	179
In 49 Images	154
In 50 Images	103
In 51 Images	118
In 52 Images	97
In 53 Images	87
In 54 Images	70
In 55 Images	68
In 56 Images	44
In 57 Images	46
In 58 Images	32
In 59 Images	31
In 60 Images	28
In 61 Images	24
In 62 Images	19
In 63 Images	11
In 64 Images	7
In 65 Images	9
In 66 Images	18
In 67 Images	7
In 68 Images	6

2D Keypoint Matches

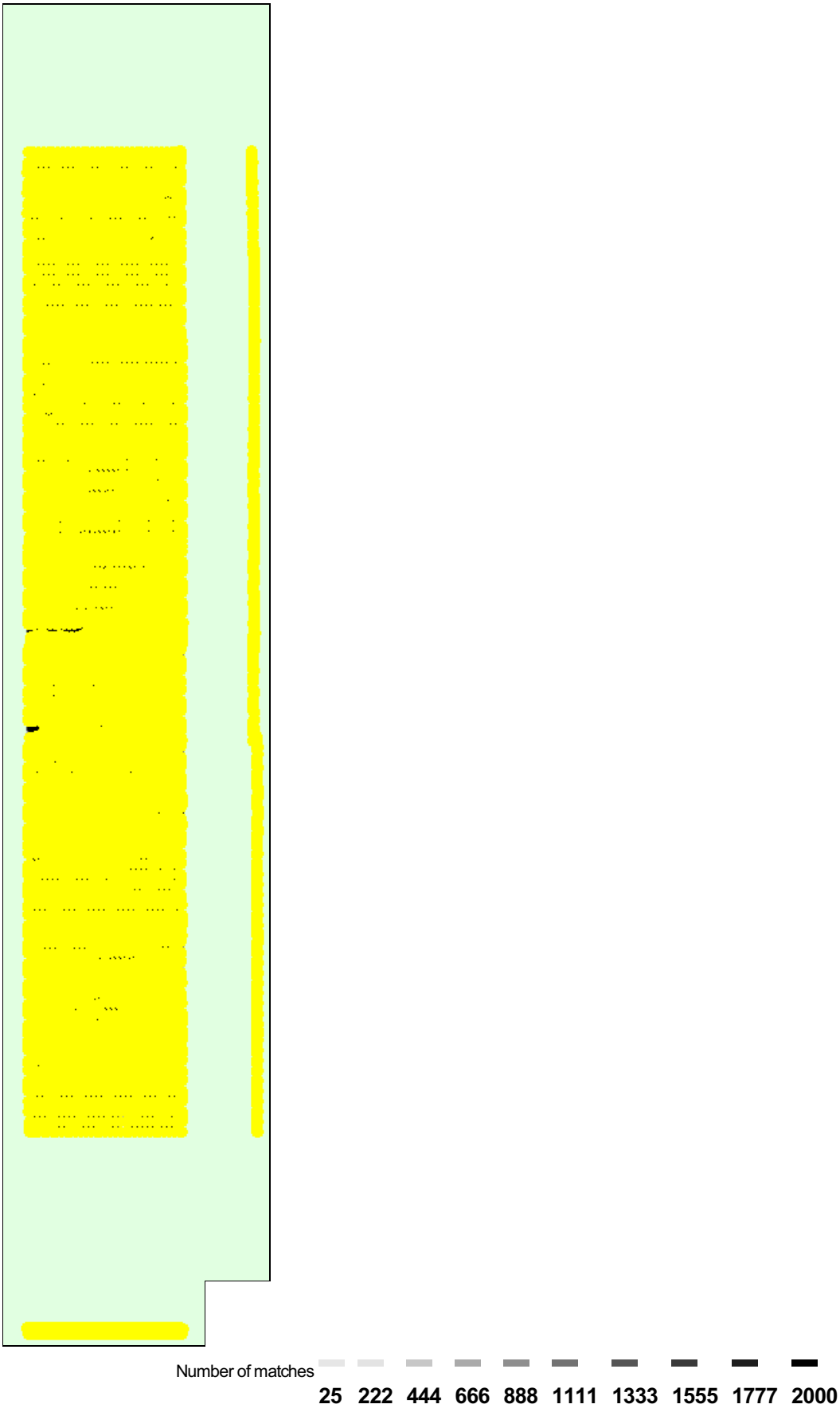


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

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	0.105	0.028	-0.246	0.537	4 / 4
p3 (3D)	0.020/ 0.020	-0.099	0.041	0.086	0.911	3 / 3
p4 (3D)	0.020/ 0.020	0.023	-0.067	0.105	0.195	4 / 4
p5 (3D)	0.020/ 0.020	0.056	0.053	-0.079	0.134	3 / 3
p6 (3D)	0.020/ 0.020	0.019	0.007	-0.065	0.756	6 / 6
p7 (3D)	0.020/ 0.020	0.027	0.004	-0.014	0.561	10 / 10
p8 (3D)	0.020/ 0.020	-0.033	0.019	0.013	0.827	4 / 4
p9 (3D)	0.020/ 0.020	-0.002	0.004	0.001	0.339	5 / 5
p10 (3D)	0.020/ 0.020	-0.025	-0.019	-0.054	0.664	6 / 6
p11 (3D)	0.020/ 0.020	-0.069	0.001	0.108	0.575	5 / 5
p12 (3D)	0.020/ 0.020	0.113	0.003	-0.031	0.892	4 / 4
p13 (3D)	0.020/ 0.020	0.005	0.001	0.117	0.696	3 / 3
p14 (3D)	0.020/ 0.020	0.026	0.058	-0.025	1.016	4 / 4
p15 (3D)	0.020/ 0.020	-0.037	0.008	0.053	0.210	4 / 4
p16 (3D)	0.020/ 0.020	0.039	-0.006	-0.010	0.655	3 / 3
p17 (3D)	0.020/ 0.020	-0.082	-0.046	0.046	0.314	4 / 4
p19 (3D)	0.020/ 0.020	-0.013	0.016	-0.051	0.374	3 / 3
p20 (3D)	0.020/ 0.020	-0.061	0.001	-0.012	0.421	4 / 4
p22 (3D)	0.020/ 0.020	-0.073	0.003	-0.036	0.162	3 / 3
p23 (3D)	0.020/ 0.020	0.025	0.008	0.027	0.775	4 / 4
p24 (3D)	0.020/ 0.020	0.087	0.008	-0.064	0.764	4 / 4
p25 (3D)	0.020/ 0.020	0.023	-0.044	-0.057	0.217	4 / 4
p27 (3D)	0.020/ 0.020	-0.104	-0.034	-0.035	0.472	3 / 3
p28 (3D)	0.020/ 0.020	-0.004	-0.007	-0.094	0.113	3 / 3
p29 (3D)	0.020/ 0.020	0.064	0.049	0.004	0.301	3 / 3
p30 (3D)	0.020/ 0.020	0.045	0.015	0.003	0.878	6 / 6
Mean [m]		0.002226	0.003987	-0.011897		
Sigma [m]		0.058792	0.029031	0.074302		
RMS Error [m]		0.058834	0.029303	0.075248		

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 [%]
-	-15.00	0.00	0.00	10.96
-15.00	-12.00	0.00	0.00	8.11
-12.00	-9.00	0.04	0.00	7.90
-9.00	-6.00	14.99	0.00	8.56
-6.00	-3.00	16.90	2.00	2.21
-3.00	0.00	17.05	43.01	8.83
0.00	3.00	19.47	51.80	5.84
3.00	6.00	15.77	2.29	10.81
6.00	9.00	15.75	0.89	11.36
9.00	12.00	0.02	0.00	8.32
12.00	15.00	0.00	0.00	11.74
15.00	-	0.00	0.00	5.37
Mean [m]		-0.757551	-1.277910	25.486064
Sigma [m]		4.865949	1.632616	10.835926
RMS Error [m]		4.924566	2.073280	27.693984

Min Error and Max Error represent geolocation error intervalsbetween -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 intial 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]	-0.757551	-1.277910	25.486064

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]	59.81	98.64	51.95
[-2.00, 2.00]	99.98	100.00	99.98
[-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.

Initial Processing Details

System Information

Hardware	CPU: Intel(R) Core(TM) i7-4790K CPU @ 4.00GHz RAM: 32GB GPU: NVIDIA GeForce GTX 960 (Driver: 23.21.13.8813), Intel(R) HD Graphics 4600 (Driver: 20.19.15.4835)
Operating System	Windows 10 Pro, 64-bit

Coordinate Systems

Image Coordinate System	WGS84 (egm96)
Ground Control Point (GCP) Coordinate System	POSGAR 2007 / Argentina 2 (egm2008)
Output Coordinate System	WGS84 / UTM zone 19S (egm2008)

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
Advanced: Calibration	Calibration Method: Standard Internal Parameters Optimization: All 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	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	06h:45m:51s
Time for 3D Textured Mesh Generation	28m:23s

Results

Number of Processed Clusters	3
Number of Generated Tiles	3
Number of 3D Densified Points	151891411
Average Density (per m^3)	49.99

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (4.52 [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: yes Google Maps Tiles and KML: yes
Time for DSM Generation	01h:36m:59s
Time for Orthomosaic Generation	03h:47m:44s