

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	Multitex
Processed	2024-06-27 11:20:13
Camera Model Name(s)	M3E_12.3_5280x3956 (RGB)
Average Ground Sampling Distance (GSD)	1.81 cm / 0.71 in
Area Covered	0.057 km ² / 5.7071 ha / 0.02 sq. mi. / 14.1098 acres
Time for Initial Processing (without report)	06m:10s

Quality Check



Images	median of 54402 keypoints per image	
Dataset	77 out of 77 images calibrated (100%), all images enabled	
Camera Optimization	2.6% relative difference between initial and optimized internal camera parameters	
Matching	median of 20131.1 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

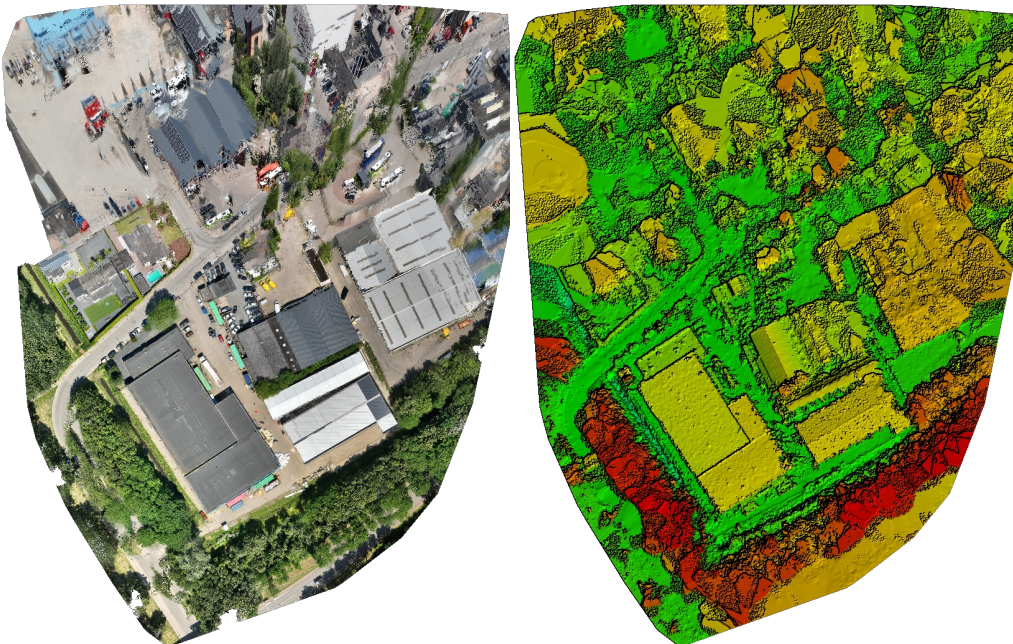


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	77 out of 77
Number of Geolocated Images	77 out of 77

Initial Image Positions

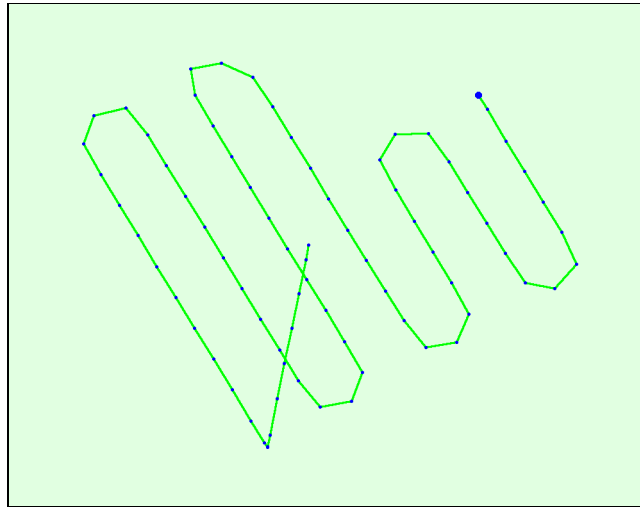
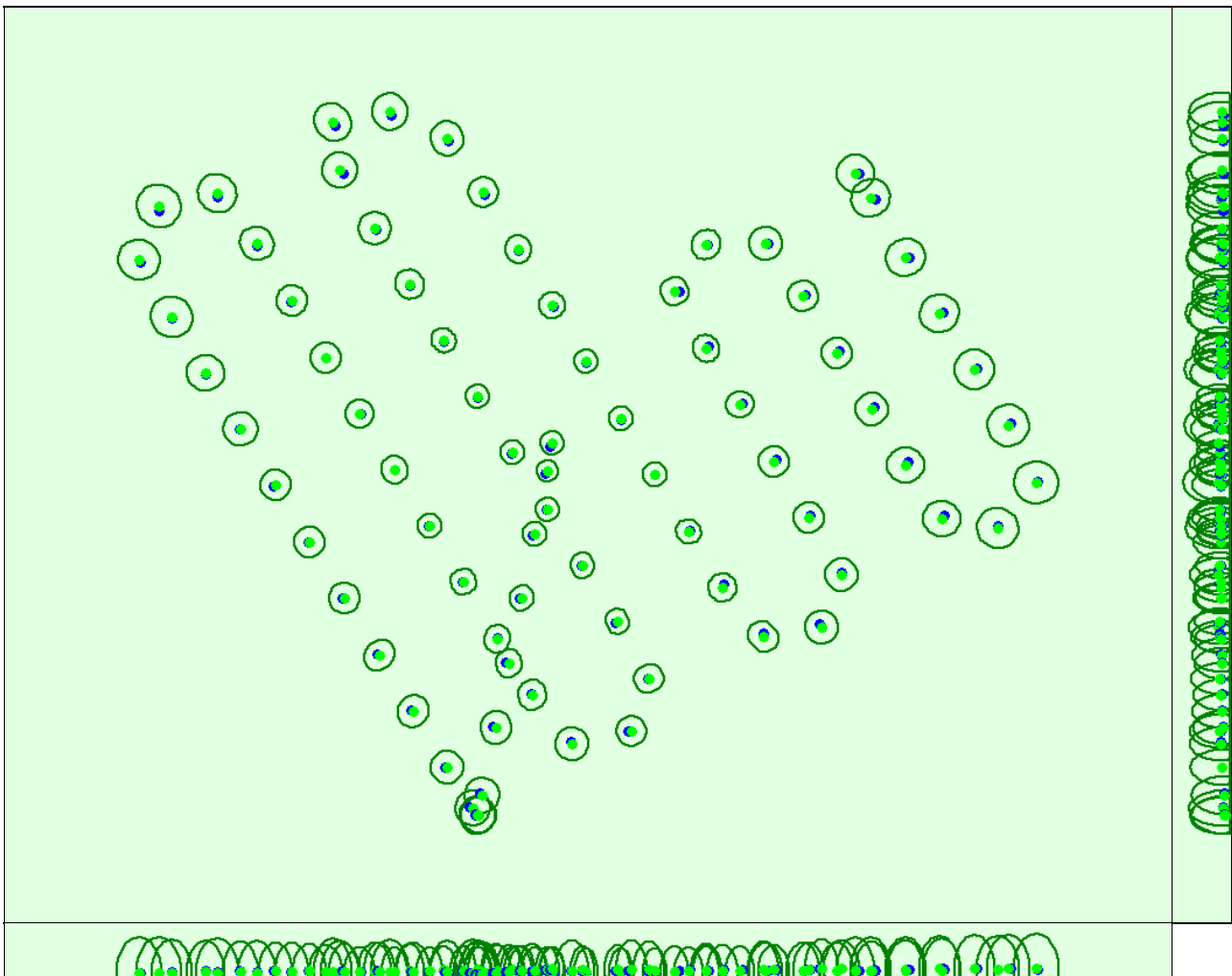


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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	0.052	0.052	0.092	0.072	0.075	0.044
Sigma	0.009	0.009	0.013	0.003	0.006	0.005

? Overlap

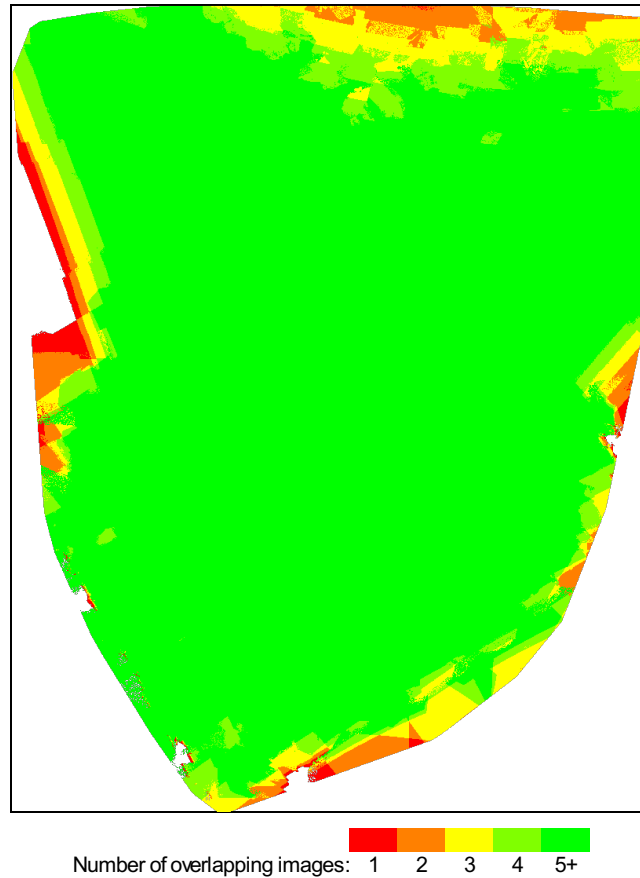


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint 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	1508804
Number of 3D Points for Bundle Block Adjustment	483993
Mean Reprojection Error [pixels]	0.212

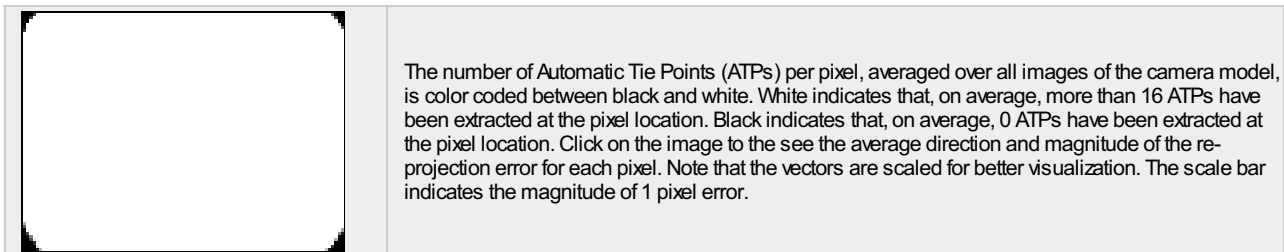
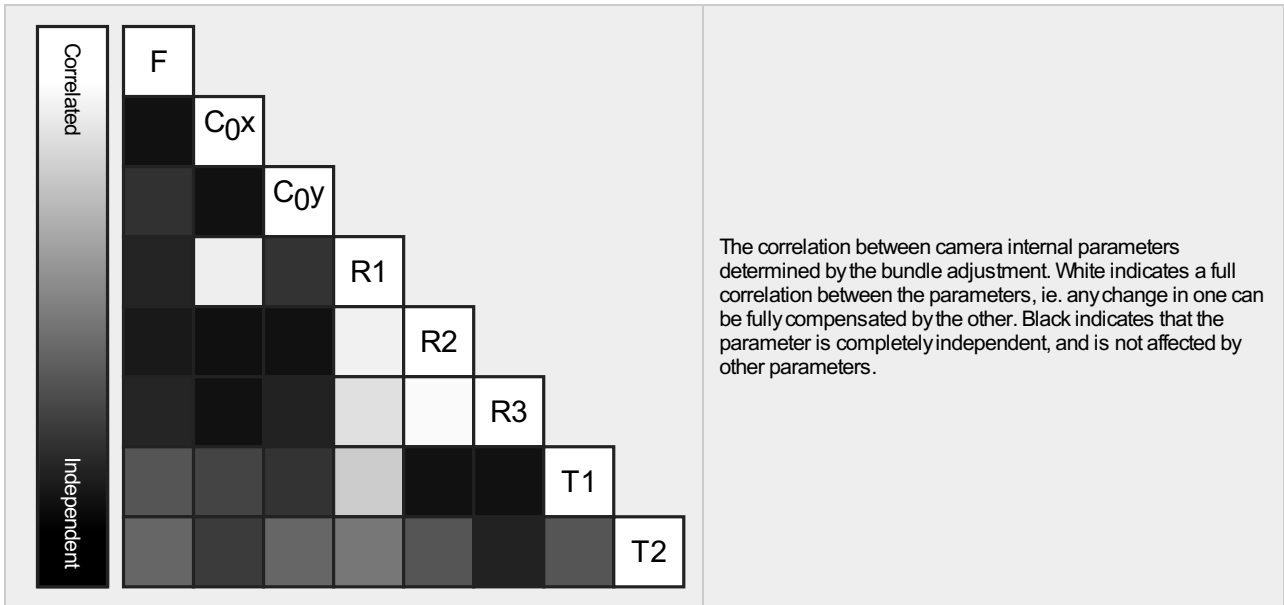
? Internal Camera Parameters

📷 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	3620.571 [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	3715.056 [pixel] 12.611 [mm]	2634.530 [pixel] 8.943 [mm]	1935.163 [pixel] 6.569 [mm]	-0.103	-0.007	-0.013	0.000	0.000
Uncertainties (Sigma)	0.225 [pixel] 0.001 [mm]	0.079 [pixel] 0.000 [mm]	0.070 [pixel] 0.000 [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	54402	20131
Min	35514	11422
Max	73865	28341
Mean	53170	19595

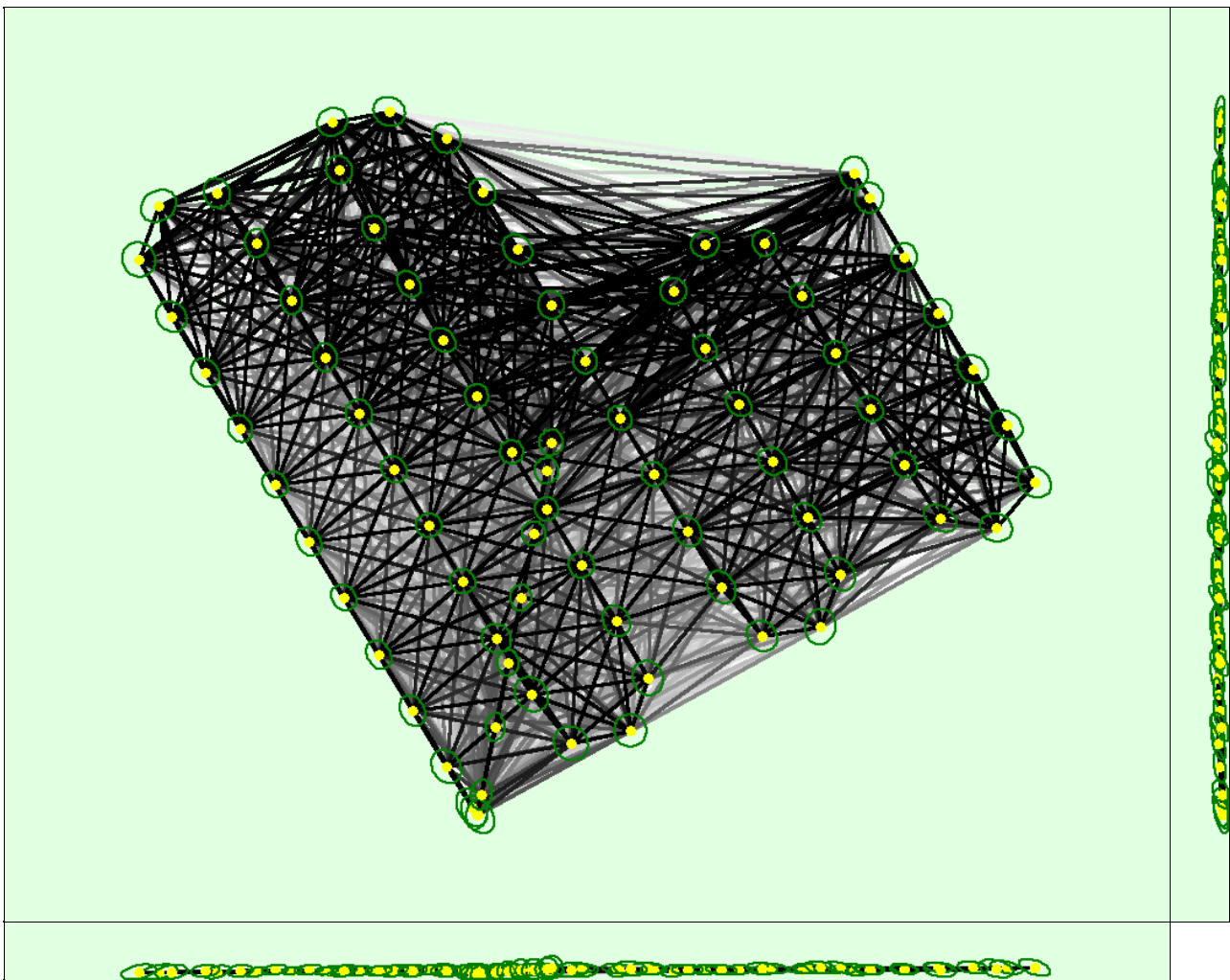
? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	312797
In 3 Images	75136
In 4 Images	32697
In 5 Images	18310
In 6 Images	11427
In 7 Images	7484
In 8 Images	5717
In 9 Images	4035
In 10 Images	3117
In 11 Images	2480
In 12 Images	2041
In 13 Images	1674
In 14 Images	1351
In 15 Images	1041
In 16 Images	876
In 17 Images	730
In 18 Images	588

In 19 Images	520
In 20 Images	430
In 21 Images	328
In 22 Images	223
In 23 Images	222
In 24 Images	167
In 25 Images	150
In 26 Images	103
In 27 Images	71
In 28 Images	54
In 29 Images	62
In 30 Images	50
In 31 Images	38
In 32 Images	19
In 33 Images	23
In 34 Images	13
In 35 Images	8
In 36 Images	5
In 37 Images	3
In 38 Images	1
In 39 Images	1
In 42 Images	1

2D Keypoint Matches



Uncertainty ellipses 1000x magnified



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

Relative camera position and orientation uncertainties



	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.002	0.002	0.001	0.002	0.002	0.001
Sigma	0.000	0.000	0.000	0.001	0.001	0.000

Geolocation Details



Absolute Geolocation Variance



Mn Error [m]	Max Error [m]	Geolocation Error X[%]	Geolocation Error Y[%]	Geolocation Error Z[%]
-	-4.81	0.00	0.00	0.00
-4.81	-3.84	0.00	0.00	0.00
-3.84	-2.88	0.00	0.00	0.00
-2.88	-1.92	0.00	0.00	0.00
-1.92	-0.96	0.00	0.00	0.00
-0.96	0.00	50.65	51.95	48.05
0.00	0.96	49.35	48.05	51.95
0.96	1.92	0.00	0.00	0.00
1.92	2.88	0.00	0.00	0.00
2.88	3.84	0.00	0.00	0.00
3.84	4.81	0.00	0.00	0.00
4.81	-	0.00	0.00	0.00
Mean [m]		0.006700	0.003909	0.000677
Sigma [m]		0.305966	0.290434	0.103204
RMS Error [m]		0.306039	0.290460	0.103206

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]	1.657981	1.657981	3.129232
Sigma of Geolocation Accuracy [m]	0.030775	0.030775	0.039585

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

Geolocation Orientational Variance	RMS [degree]
Omega	115.823
Phi	0.504
Kappa	49.434

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 7 5800H with Radeon Graphics RAM: 32GB GPU: NVIDIA GeForce RTX3070 Laptop GPU (Driver: 32.0.15.5599)
Operating System	Windows 10 Home, 64-bit

Coordinate Systems



Image Coordinate System	WGS 84
Output Coordinate System	WGS 84 / UTMzone 31N

Processing Options



Detected Template	3D Maps
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

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	08m:31s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	04m:07s

Results



Number of Generated Tiles	1
Number of 3D Densified Points	9484824
Average Density (per m ³)	381.14

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (1.81 [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	07m:50s
Time for Orthomosaic Generation	09m:53s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s