Quality Report

Generated with Pix4Denterprise version 4.3.27

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	stan_4k_3_x3
Processed	2018-10-03 01:00:38
Camera Model Name(s)	FC350_3.6_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	5.42 cm / 2.13 in
Area Covered	0.702 km^2 / 70.1819 ha / 0.27 sq. mi. / 173.5129 acres
Time for Initial Processing (without report)	52m:22s

Quality Check

Images	median of 12101 keypoints per image	✓
Dataset	2070 out of 2076 images calibrated (99%), all images enabled	✓
Camera Optimization	0.65% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 1135.93 matches per calibrated image	✓
Georeferencing	yes, no 3D GCP	⚠

Preview

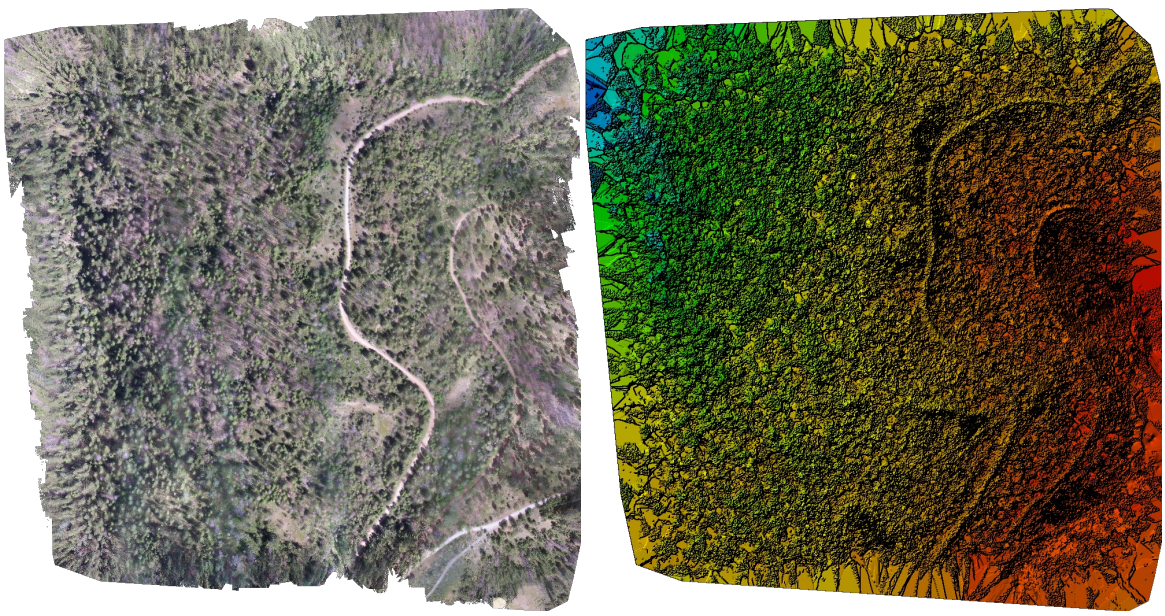


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	2070 out of 2076
Number of Geolocated Images	2076 out of 2076

Initial Image Positions

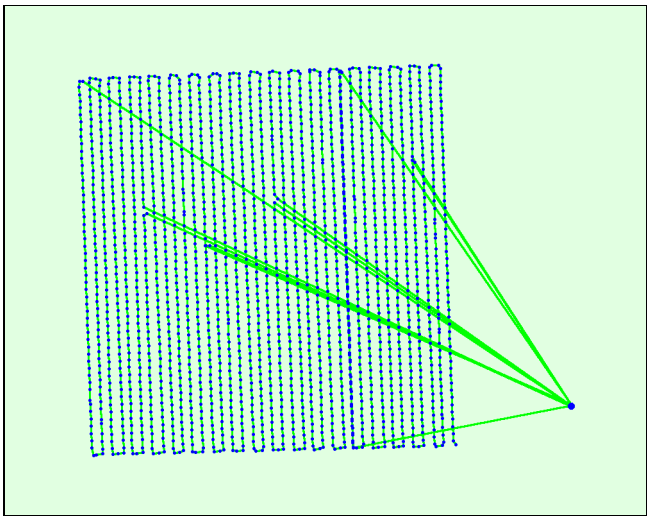
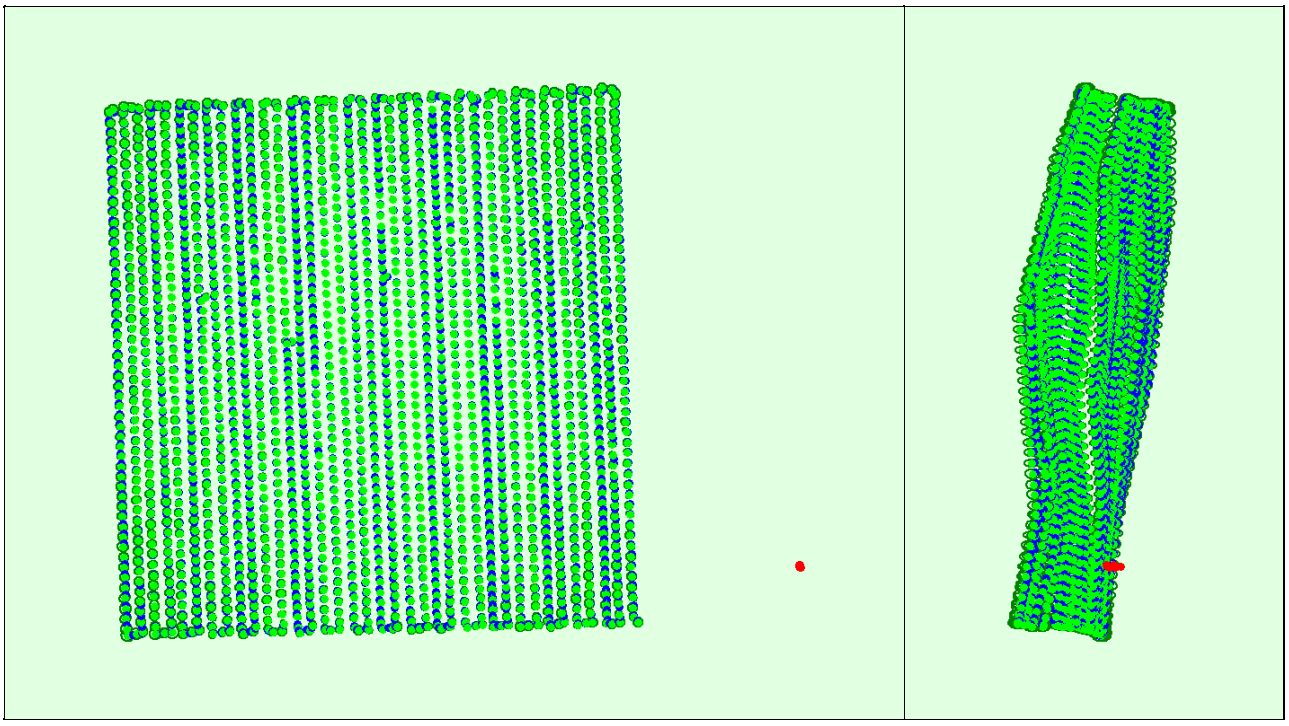
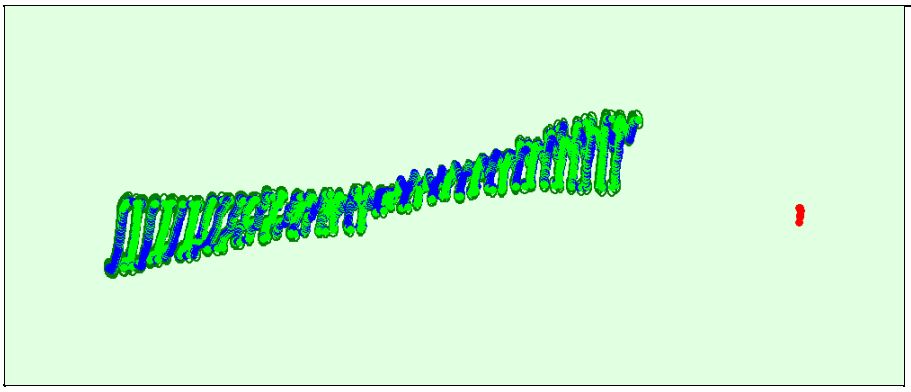


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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). Red dots indicate disabled or uncalibrated images. 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	0.083	0.083	0.148	0.029	0.029	0.014
Sigma	0.014	0.013	0.024	0.003	0.004	0.001

Overlap

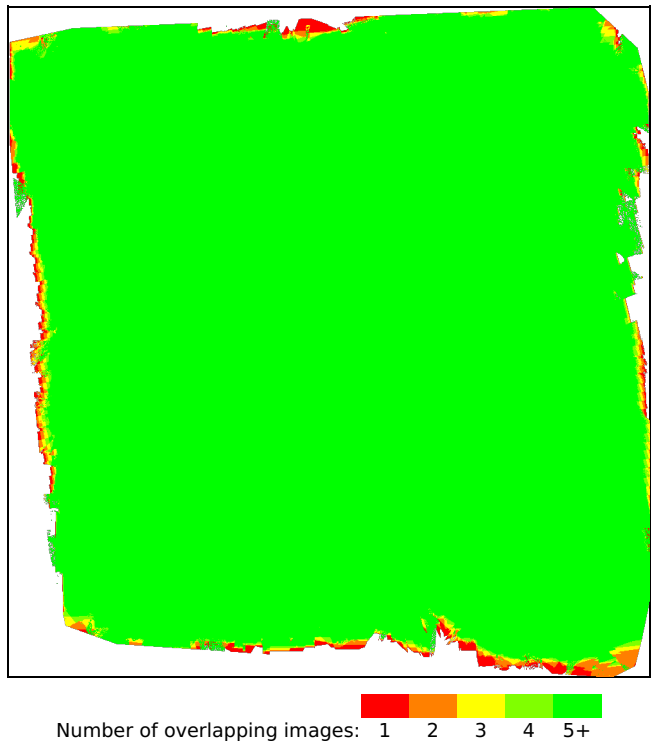


**Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.
Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint 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	2319256
Number of 3D Points for Bundle Block Adjustment	852851

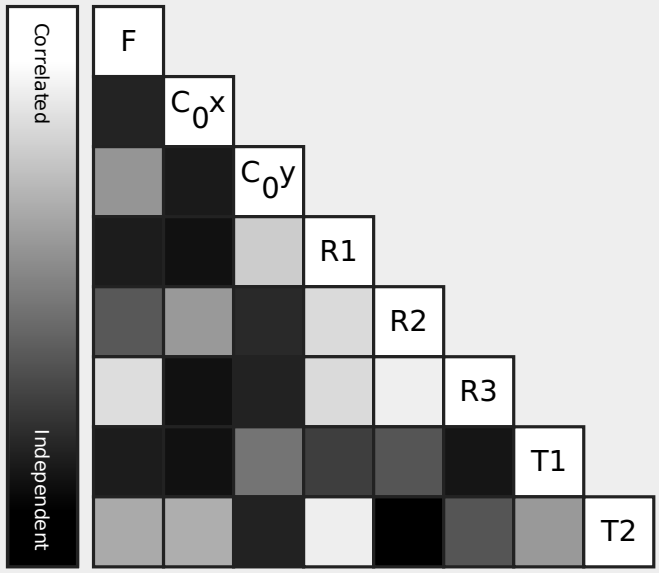
Mean Reprojection Error [pixels]	0.123

Internal Camera Parameters

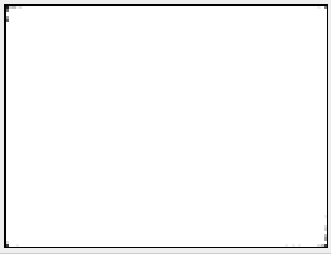
FC350_3.6_4000x3000 (RGB). Sensor Dimensions: 6.317 [mm] x 4.738 [mm]

EXIF ID: FC350_3.6_4000x3000

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	2285.722 [pixel] 3.610 [mm]	2000.006 [pixel] 3.159 [mm]	1500.003 [pixel] 2.369 [mm]	-0.130	0.106	-0.016	-0.000	0.000
Optimized Values	2300.794 [pixel] 3.634 [mm]	1986.345 [pixel] 3.137 [mm]	1503.240 [pixel] 2.374 [mm]	-0.126	0.107	-0.013	0.001	0.000
Uncertainties (Sigma)	0.362 [pixel] 0.001 [mm]	0.047 [pixel] 0.000 [mm]	0.051 [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	12101	1136
Min	10652	438
Max	15311	2609
Mean	12112	1120

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	600156
In 3 Images	135939
In 4 Images	51459
In 5 Images	24181
In 6 Images	13315
In 7 Images	7836

In 8 Images	5119
In 9 Images	3409
In 10 Images	2435
In 11 Images	1709
In 12 Images	1322
In 13 Images	966
In 14 Images	819
In 15 Images	605
In 16 Images	538
In 17 Images	415
In 18 Images	361
In 19 Images	294
In 20 Images	241
In 21 Images	203
In 22 Images	151
In 23 Images	146
In 24 Images	135
In 25 Images	113
In 26 Images	75
In 27 Images	93
In 28 Images	75
In 29 Images	76
In 30 Images	66
In 31 Images	64
In 32 Images	48
In 33 Images	39
In 34 Images	36
In 35 Images	31
In 36 Images	29
In 37 Images	29
In 38 Images	32
In 39 Images	19
In 40 Images	21
In 41 Images	15
In 42 Images	19
In 43 Images	16
In 44 Images	13
In 45 Images	17
In 46 Images	20
In 47 Images	11
In 48 Images	13
In 49 Images	13
In 50 Images	8
In 51 Images	4
In 52 Images	6
In 53 Images	3
In 54 Images	12
In 55 Images	1
In 56 Images	3
In 57 Images	5
In 58 Images	3
In 59 Images	4
In 60 Images	9
In 61 Images	3
In 62 Images	3
In 63 Images	4
In 64 Images	5
In 65 Images	1
In 66 Images	4

In 67 Images	4
In 68 Images	1
In 69 Images	1
In 71 Images	3
In 72 Images	3
In 73 Images	4
In 74 Images	2
In 76 Images	1
In 77 Images	1
In 78 Images	2
In 79 Images	1
In 80 Images	1
In 86 Images	1
In 90 Images	2
In 91 Images	1
In 93 Images	1
In 99 Images	1
In 101 Images	1
In 104 Images	1
In 105 Images	1
In 109 Images	1
In 122 Images	1
In 130 Images	1

2D Keypoint Matches

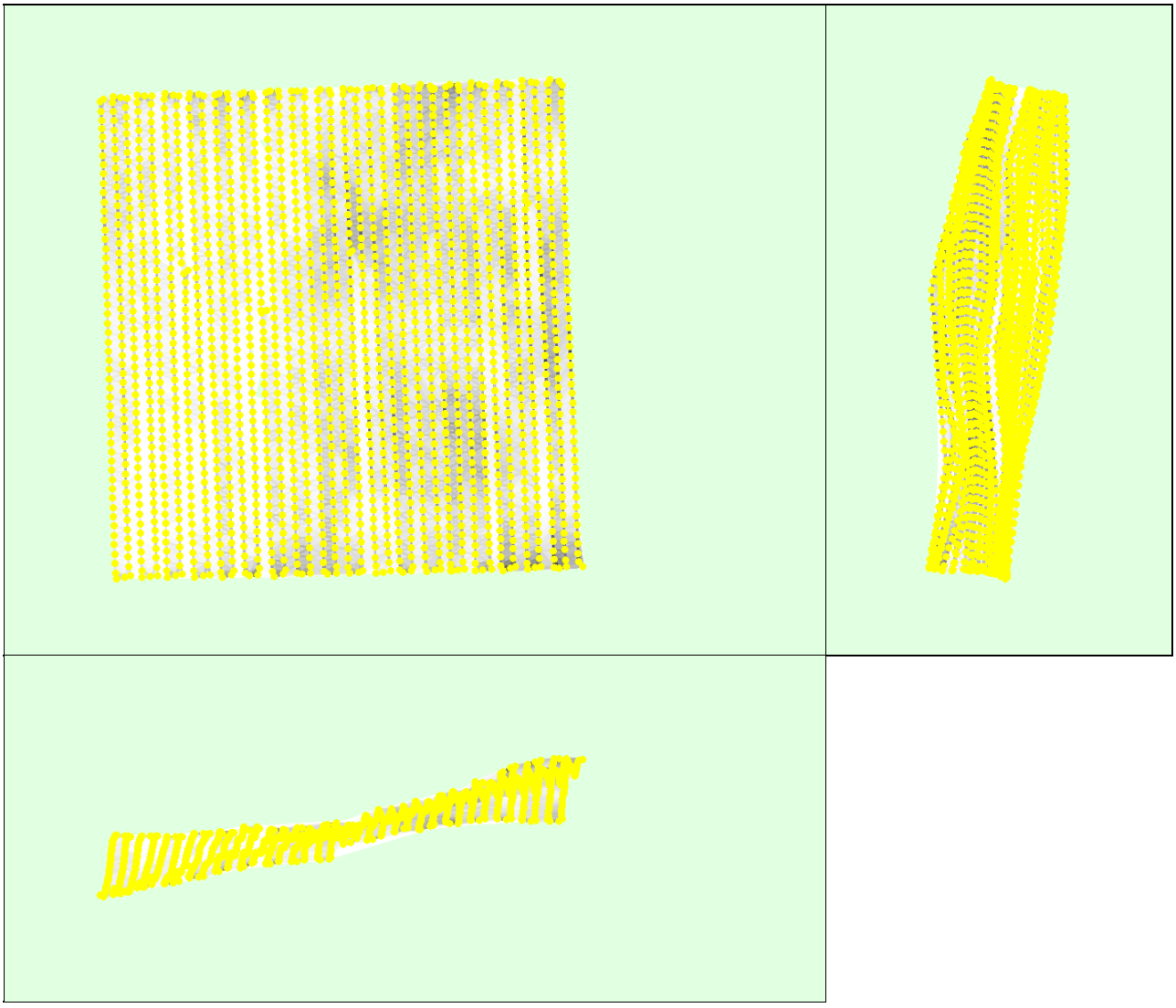


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

Geolocation Details

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	0.77	15.85	0.68
-3.00	0.00	48.79	32.90	51.35
0.00	3.00	50.43	36.76	45.02
3.00	6.00	0.00	14.35	2.95
6.00	9.00	0.00	0.14	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]		0.897558	2.541870	1.464549
RMS Error [m]		0.897558	2.541870	1.464549

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]	99.95	97.44	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	0.630
Phi	2.705
Kappa	5.846

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 4.15.0-1021-aws x86_64

Coordinate Systems

Image Coordinate System	WGS 84 (EGM 96 Geoid)
Output Coordinate System	WGS 84 / UTM zone 10N (EGM 96 Geoid)

Processing Options

Detected Template	No Template Available
Keypoints Image Scale	Custom, Image Scale: 0.5
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	02h:59m:37s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	52m:49s

Results

Number of Generated Tiles	4
Number of 3D Densified Points	80612314
Average Density (per m^3)	21.22

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (5.42 [cm/pixel])
DSM Filters	Noise Filtering: yes Surface Smoothing: yes, Type: Sharp

Raster DSM	Generated: yes Method: Triangulation Merge Tiles: yes
Orthomosaic	Generated: yes Merge Tiles: yes GeoTIFF Without Transparency: no Google Maps Tiles and KML: no
Time for DSM Generation	05m:31s
Time for Orthomosaic Generation	07h:51m:26s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s