

Quality Report



Generated with PIX4Dmapper version 4.8.0 Preview

- !** **Important:** Click on the different icons for:
 - ?** Help to analyze the results in the Quality Report
 - i** Additional information about the sections

💡 Click [here](#) for additional tips to analyze the Quality Report

Summary



Project	CL_5_maio_2023_RGB
Processed	2023-06-05 16:42:46
Camera Model Name(s)	FC6360_5.7_1600x1300 (RGB)
Average Ground Sampling Distance (GSD)	8.12 cm / 3.20 in
Area Covered	0.323 km ² / 32.2526 ha / 0.12 sq. mi. / 79.7391 acres
Time for Initial Processing (without report)	04m:38s

Quality Check



? Images	median of 10320 keypoints per image	✓
? Dataset	308 out of 308 images calibrated (100%), 1 images disabled	✓
? Camera Optimization	0.12% relative difference between initial and optimized internal camera parameters	✓
? Matching	median of 4844.69 matches per calibrated image	✓
? Georeferencing	yes, no 3D GCP	⚠

? Preview

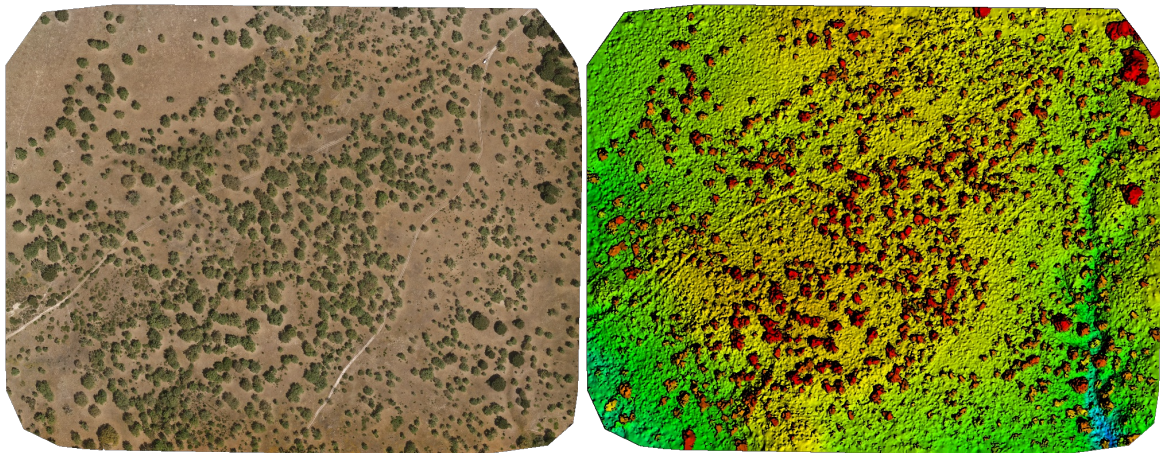


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	308 out of 309
Number of Geolocated Images	309 out of 309

? Initial Image Positions

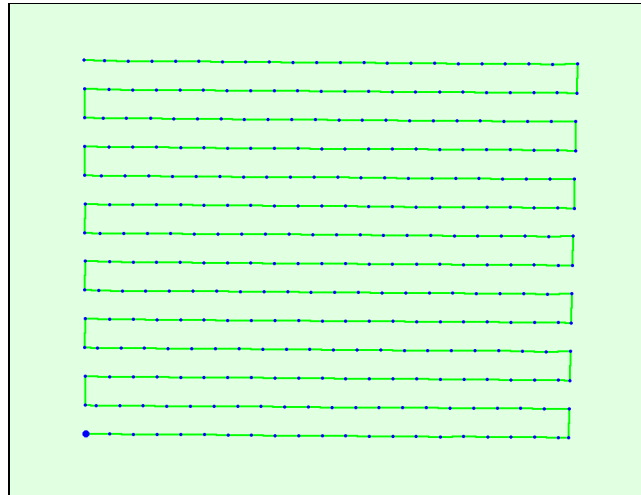
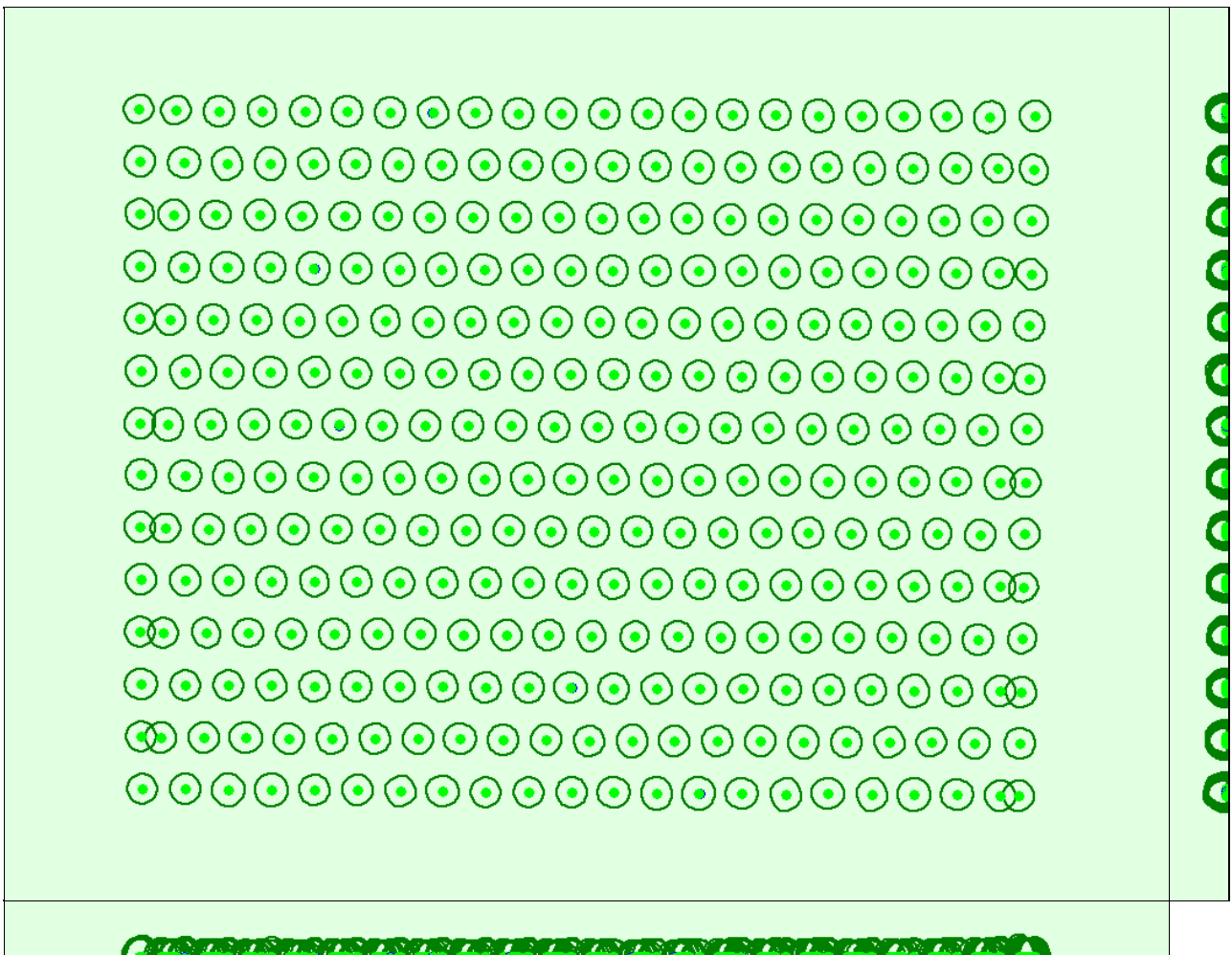


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

? Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 1000x 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	0.009	0.009	0.010	0.005	0.006	0.005
Sigma	0.000	0.000	0.001	0.001	0.001	0.001

Overlap

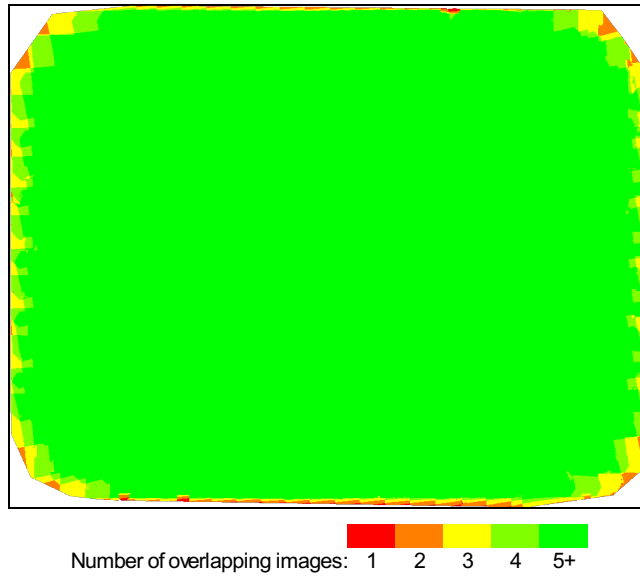


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint 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	1518545
Number of 3D Points for Bundle Block Adjustment	406568
Mean Reprojection Error [pixels]	0.236

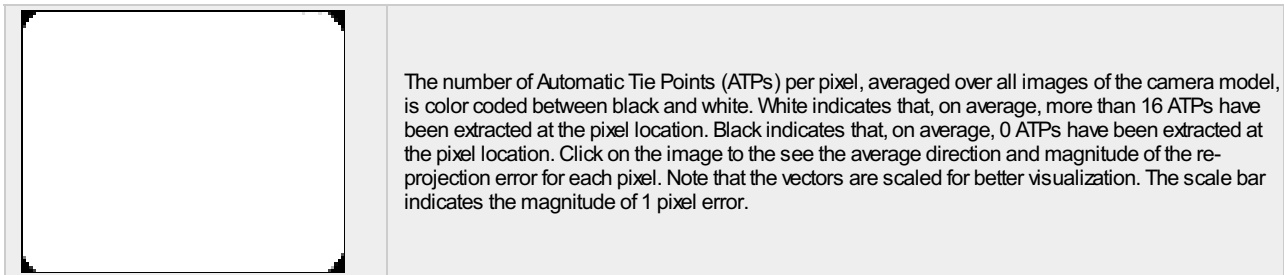
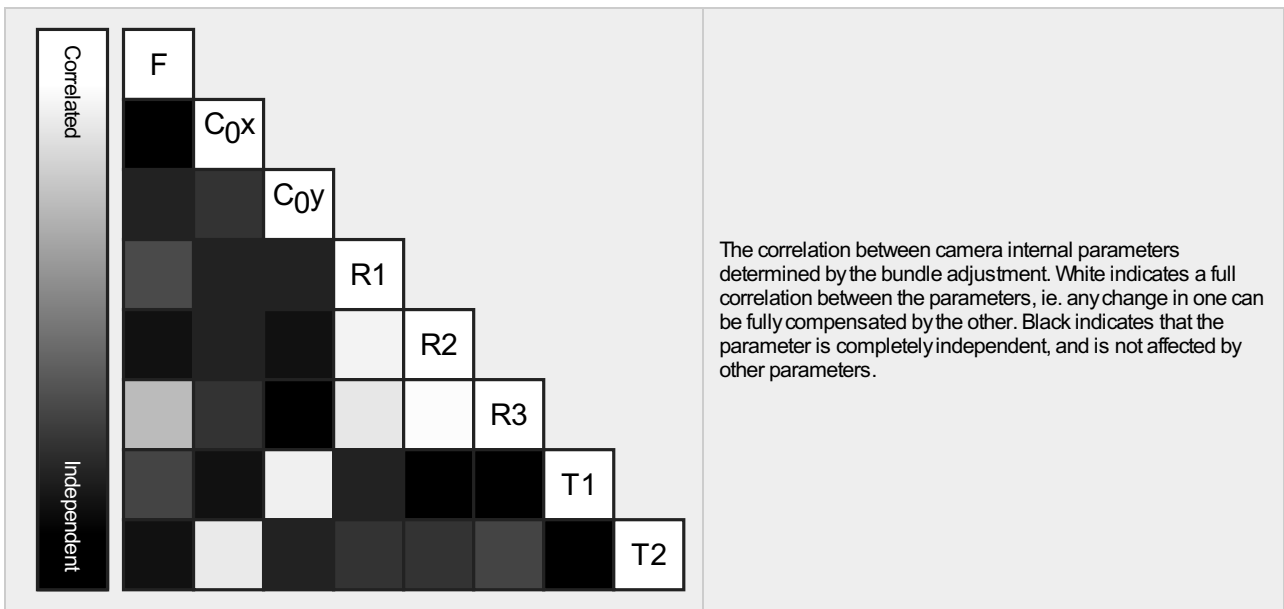
Internal Camera Parameters

FC6360_5.7_1600x1300 (RGB). Sensor Dimensions: 5.022 [mm] x 4.081 [mm]



EXIF ID: FC6360_5.7_1600x1300

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	2173.920 [pixel] 6.824 [mm]	780.964 [pixel] 2.451 [mm]	639.519 [pixel] 2.007 [mm]	-0.511	0.507	-0.546	0.000	0.000
Optimized Values	2171.207 [pixel] 6.816 [mm]	790.978 [pixel] 2.483 [mm]	645.777 [pixel] 2.027 [mm]	-0.513	0.510	-0.560	0.004	0.002
Uncertainties (Sigma)	0.414 [pixel] 0.001 [mm]	0.311 [pixel] 0.001 [mm]	0.318 [pixel] 0.001 [mm]	0.001	0.006	0.015	0.000	0.000



? 2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	10320	4845
Min	9266	3638
Max	11573	6480
Mean	10359	4930

? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	217966
In 3 Images	64895
In 4 Images	34007
In 5 Images	21601
In 6 Images	14839
In 7 Images	10980
In 8 Images	8570
In 9 Images	6888
In 10 Images	5744
In 11 Images	4592
In 12 Images	3631
In 13 Images	3109
In 14 Images	2620
In 15 Images	2216
In 16 Images	1783
In 17 Images	1236
In 18 Images	773
In 19 Images	540
In 20 Images	312
In 21 Images	222

In 22 Images	40
In 23 Images	4

2D Keypoint Matches

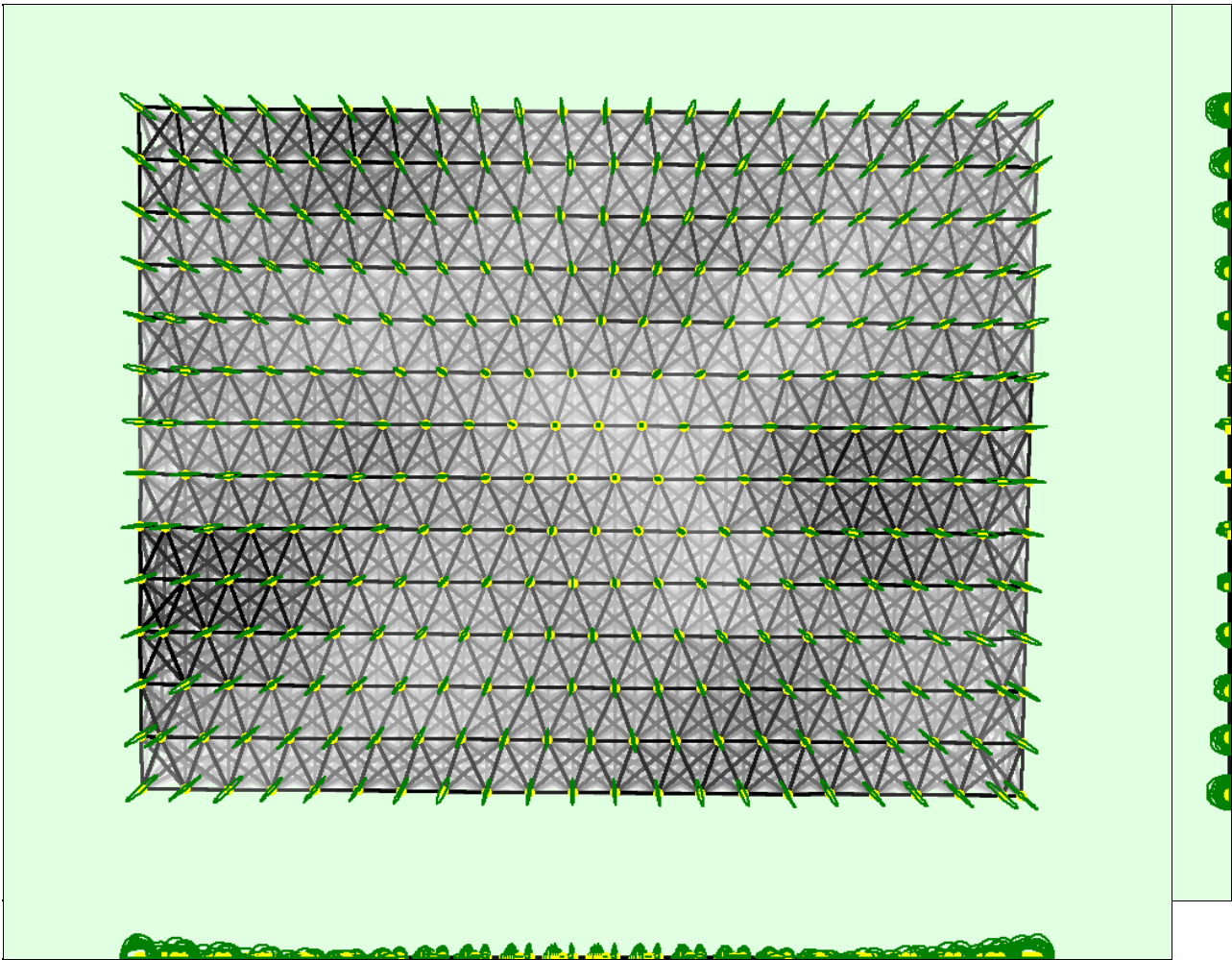


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.525	0.416	0.416	0.240	0.298	0.016
Sigma	0.288	0.220	0.274	0.143	0.171	0.006

Geolocation Details

Absolute Geolocation Variance

Mn Error [m]	Max Error [m]	Geolocation Error X[%]	Geolocation Error Y[%]	Geolocation Error Z[%]
-	-0.09	0.00	0.00	0.00
-0.09	-0.07	0.00	0.00	0.00

-0.07	-0.06	0.00	0.00	0.32
-0.06	-0.04	0.00	0.00	6.17
-0.04	-0.02	0.00	0.00	16.56
-0.02	0.00	53.90	48.38	27.60
0.00	0.02	46.10	51.62	29.55
0.02	0.04	0.00	0.00	12.34
0.04	0.06	0.00	0.00	4.55
0.06	0.07	0.00	0.00	1.30
0.07	0.09	0.00	0.00	1.62
0.09	-	0.00	0.00	0.00
Mean [m]		0.000067	0.000016	0.000279
Sigma [m]		0.005589	0.002831	0.025420
RMS Error [m]		0.005589	0.002831	0.025422

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	97.08
[-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]	0.027893	0.027893	0.055118
Sigma of Geolocation Accuracy [m]	0.000274	0.000274	0.001681

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

Geolocation Orientational Variance	RMS [degree]
Omega	1.177
Phi	0.318
Kappa	6.074

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) Core(TM) i7-9700 CPU @ 3.00GHz RAM: 32GB GPU: Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown), Microsoft Remote Display Adapter (Driver: unknown)
Operating System	Windows 10 Education N, 64-bit

Coordinate Systems

Image Coordinate System	WGS 84
Output Coordinate System	ETRS89 / Portugal TM06

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: yes
Advanced: Keypoint Extraction	Targeted Number of Keypoints: Automatic
Advanced: Calibration	Calibration Method: Standard Internal Parameters Optimization: All prior External Parameters Optimization: All Rematch: Auto, yes

Point Cloud Densification details



Processing Options



Image Scale	multiscale, 1/2 (Half image size, Default)
Point Density	High (Slow)
Minimum Number of Matches	3
3D Textured Mesh Generation	no
LOD	Generated: no
Advanced: Image Groups	group1
Advanced: Use Processing Area	yes
Advanced: Use Annotations	yes
Time for Point Cloud Densification	13m:38s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	NA

Results



Number of Generated Tiles	1
Number of 3D Densified Points	15637209
Average Density (per m ³)	18.36

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (8.12 [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: no
Contour Lines Generation	Generated: yes Contour Base [m]: 0 Elevation Interval [m]: 1 Resolution [cm]: 100 Minimum Line Size [vertices]: 20
Time for DSM Generation	09m:49s
Time for Orthomosaic Generation	04m:49s
Time for DTM Generation	00s
Time for Contour Lines Generation	14s
Time for Reflectance Map Generation	00s

Time for Index Map Generation

00s