

Quality Report



Generated with PIX4Dmapper version 4.8.4



Important: Click on the different icons for:



Help to analyze the results in the Quality Report



Additional information about the sections



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Summary



Project	Halling Marshes 2 (RP)
Processed	2023-05-02 16:05:57
Camera Model Name(s)	FC3582_6.7_4032x2268 (RGB)
Average Ground Sampling Distance (GSD)	1.08 cm / 0.43 in
Area Covered	0.043 km ² / 4.3494 ha / 0.02 sq. mi. / 10.7532 acres
Time for Initial Processing (without report)	10m:08s

Quality Check



Images	median of 36270 keypoints per image	
Dataset	364 out of 368 images calibrated (98%), all images enabled	
Camera Optimization	94.49% relative difference between initial and optimized internal camera parameters	
Matching	median of 6434.11 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

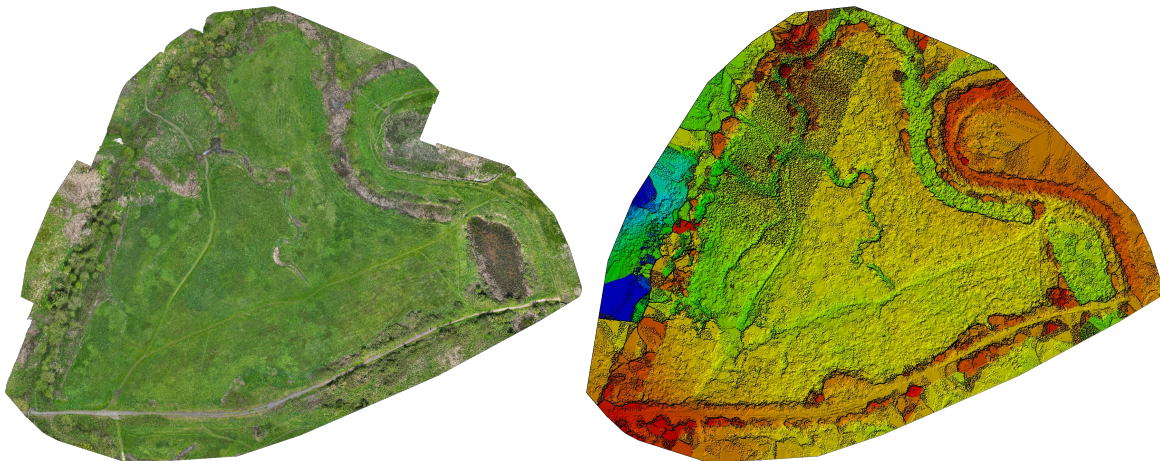


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	364 out of 368
Number of Geolocated Images	368 out of 368

Initial Image Positions

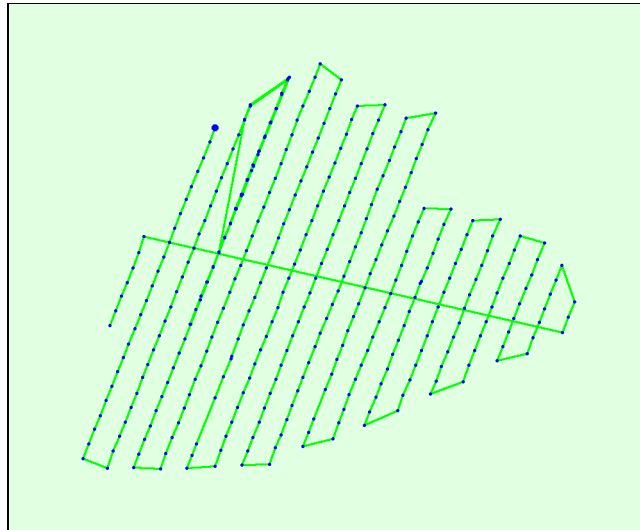
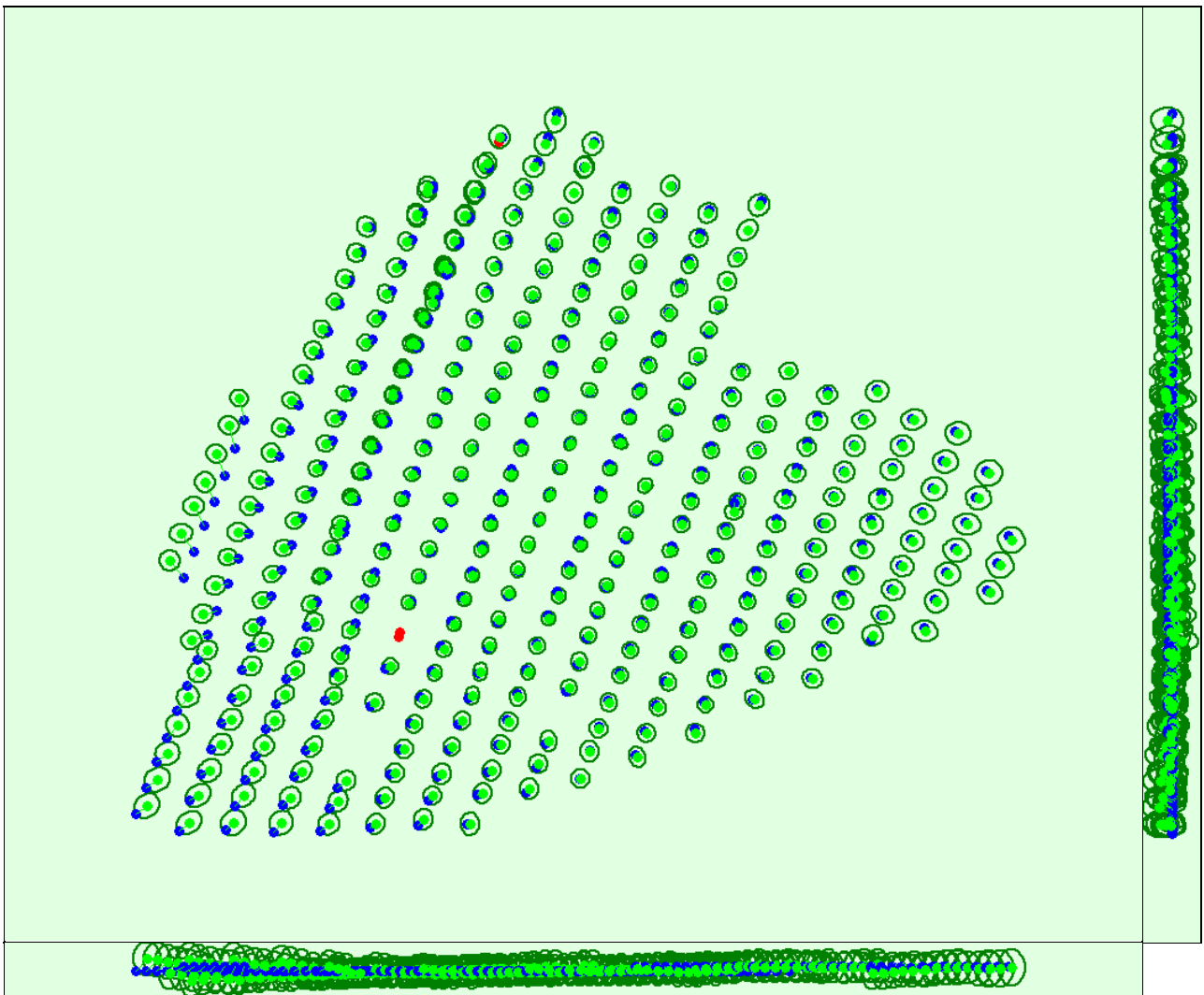


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 10x 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	0.268	0.268	0.430	0.155	0.147	0.115
Sigma	0.044	0.036	0.024	0.022	0.017	0.001

🔍 Overlap

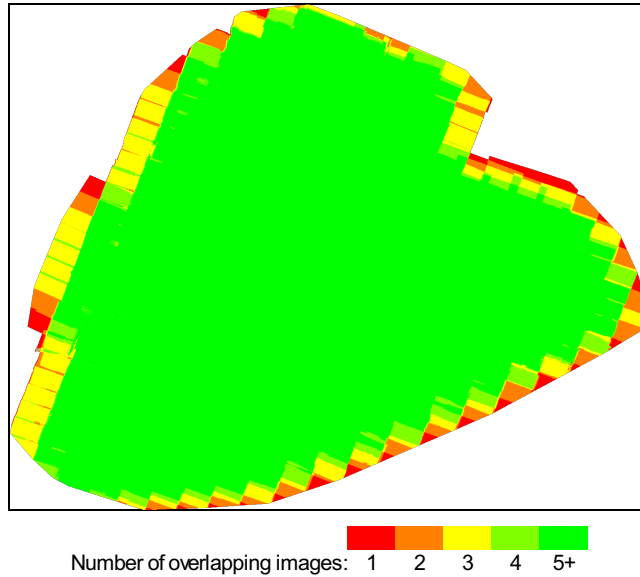


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint 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	3024077
Number of 3D Points for Bundle Block Adjustment	1280915
Mean Reprojection Error [pixels]	0.171

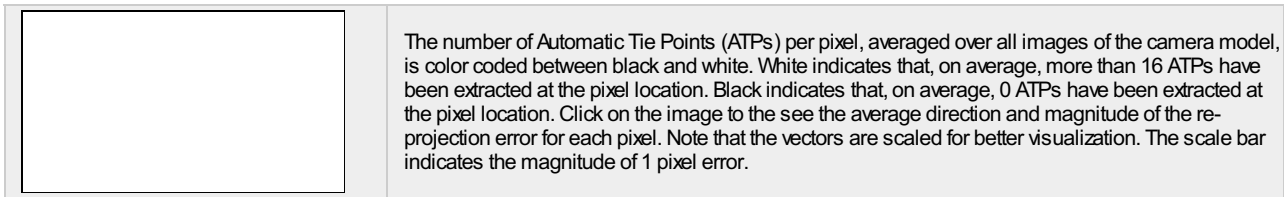
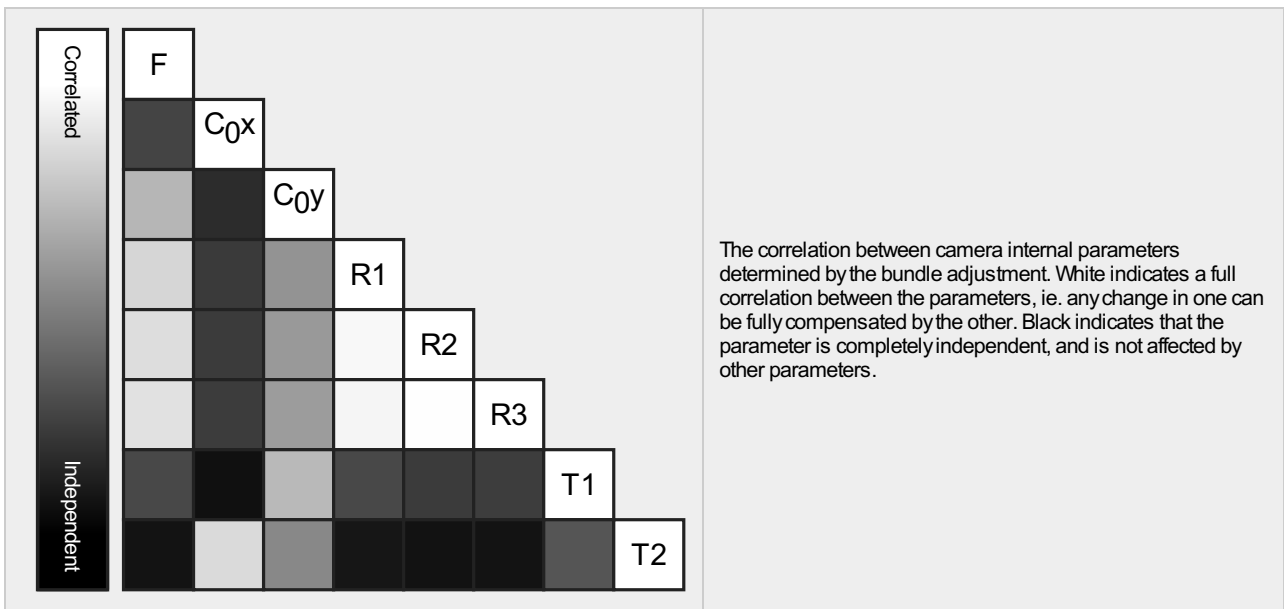
🔍 Internal Camera Parameters

📷 **FC3582_6.7_4032x2268 (RGB). Sensor Dimensions: 9.800 [mm] x 5.513 [mm]**



EXIF ID: FC3582_6.7_4032x2268

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	2764.799 [pixel] 6.720 [mm]	2016.000 [pixel] 4.900 [mm]	1134.000 [pixel] 2.756 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	5377.313 [pixel] 13.070 [mm]	1988.582 [pixel] 4.833 [mm]	1052.280 [pixel] 2.558 [mm]	0.453	-3.165	8.532	-0.001	-0.000
Uncertainties (Sigma)	17.321 [pixel] 0.042 [mm]	0.929 [pixel] 0.002 [mm]	0.941 [pixel] 0.002 [mm]	0.004	0.046	0.185	0.000	0.000



2D Keypoints Table

	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	36270	6434
Mn	26060	824
Max	47393	29983
Mean	35848	8308

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	993241
In 3 Images	199549
In 4 Images	53144
In 5 Images	14397
In 6 Images	8352
In 7 Images	4884
In 8 Images	3015
In 9 Images	1686
In 10 Images	926
In 11 Images	760
In 12 Images	355
In 13 Images	187
In 14 Images	151
In 15 Images	94
In 16 Images	75
In 17 Images	59
In 18 Images	22
In 19 Images	7
In 20 Images	5
In 21 Images	6

2D Keypoint Matches

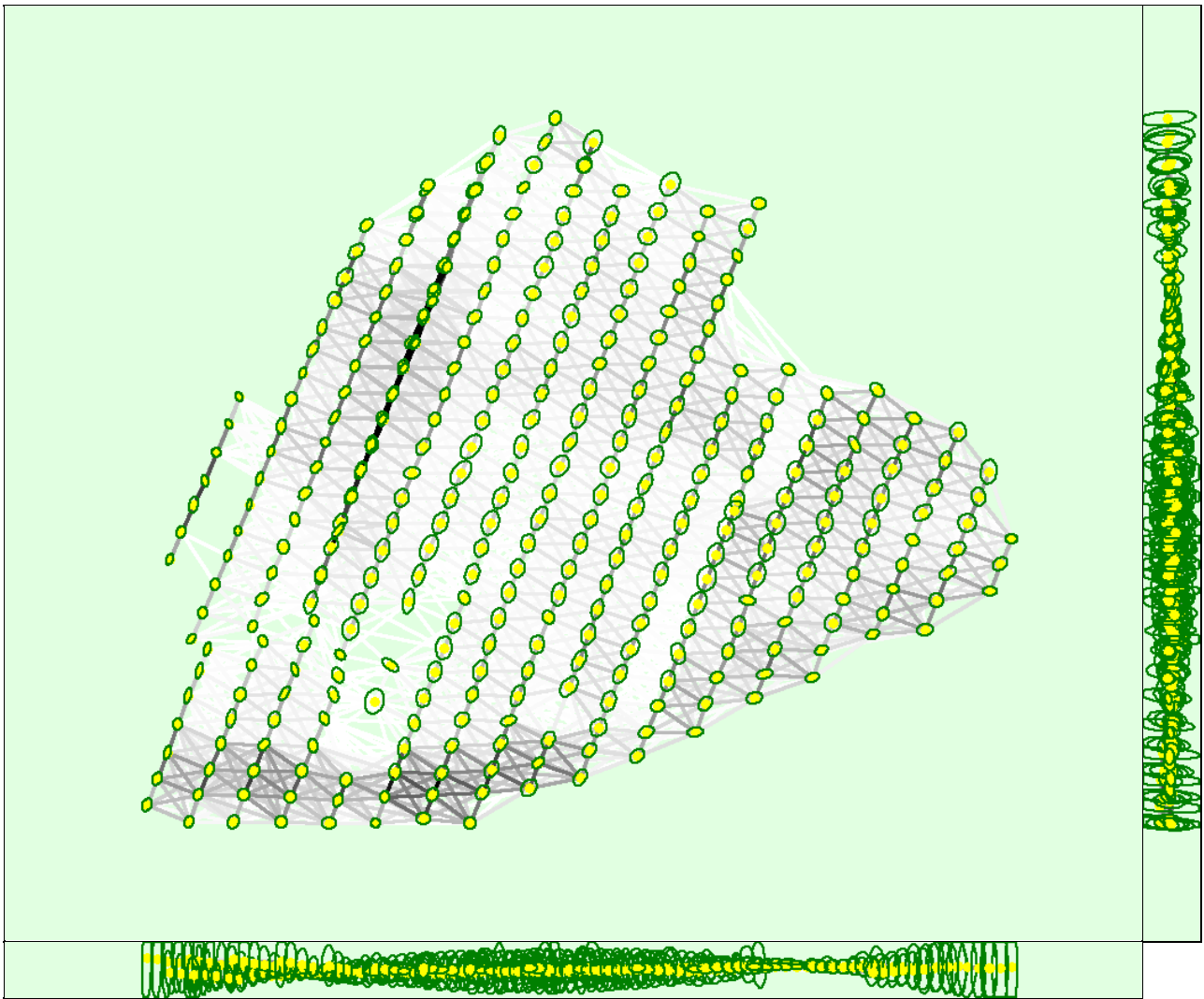


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.040	0.048	0.075	0.133	0.120	0.012
Sigma	0.008	0.012	0.049	0.067	0.057	0.005

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	0.82	0.00
-6.00	-3.00	2.20	1.92	1.10
-3.00	0.00	55.22	42.31	46.70
0.00	3.00	40.66	54.95	51.37
3.00	6.00	1.92	0.00	0.82
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]		-0.000010	0.000027	-0.000010
Sigma [m]		1.360476	1.337246	0.990847
RMS Error [m]		1.360476	1.337246	0.990847

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	98.08	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	1.940
Phi	1.234
Kappa	25.449

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: 11th Gen Intel(R) Core(TM) i5-11400F @ 2.60GHz RAM: 32GB GPU: NVIDIA GeForce RTX 3060 Ti (Driver: 31.0.15.2824)
Operating System	Windows 11, 64-bit

Coordinate Systems

Image Coordinate System	WGS 84 (EGM96 Geoid)
Output Coordinate System	WGS 84 / UTMzone 31N (EGM96 Geoid)

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, 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	14m:26s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	10m:00s

Results



Number of Generated Tiles	1
Number of 3D Densified Points	27706462
Average Density (per m ³)	1830.23

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (1.08 [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
Time for DSM Generation	10m:13s
Time for Orthomosaic Generation	11m:37s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s