Quality Report

Generated with Pix4Dmapper Pro version 4.2.26

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	sequoia_4000_1_rgb
Processed	2018-04-19 09:47:09
Camera Model Name(s)	FC350_3.6_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	5.17 cm / 2.04 in
Area Covered	0.644 km^2 / 64.4245 ha / 0.25 sq. mi. / 159.2788 acres
Time for Initial Processing (without report)	01h:47m:24s

Quality Check

Images	median of 11485 keypoints per image	✓
Dataset	1292 out of 1300 images calibrated (99%), all images enabled	✓
Camera Optimization	2.32% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 1933.28 matches per calibrated image	✓
Georeferencing	yes, no 3D GCP	⚠

Preview

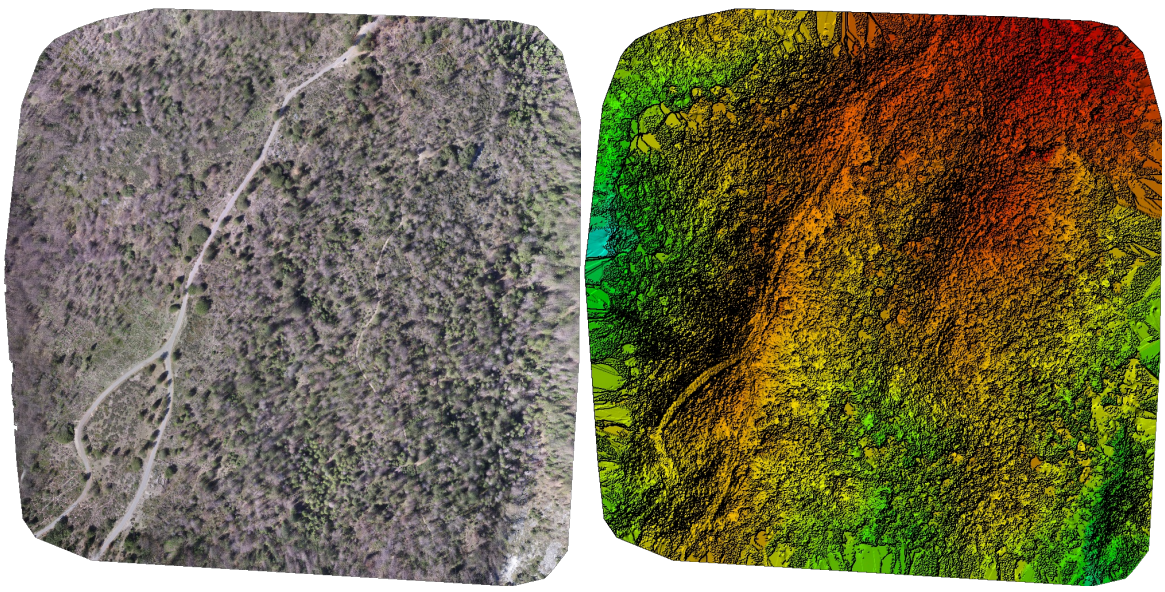


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	1292 out of 1300
Number of Geolocated Images	1300 out of 1300

Initial Image Positions

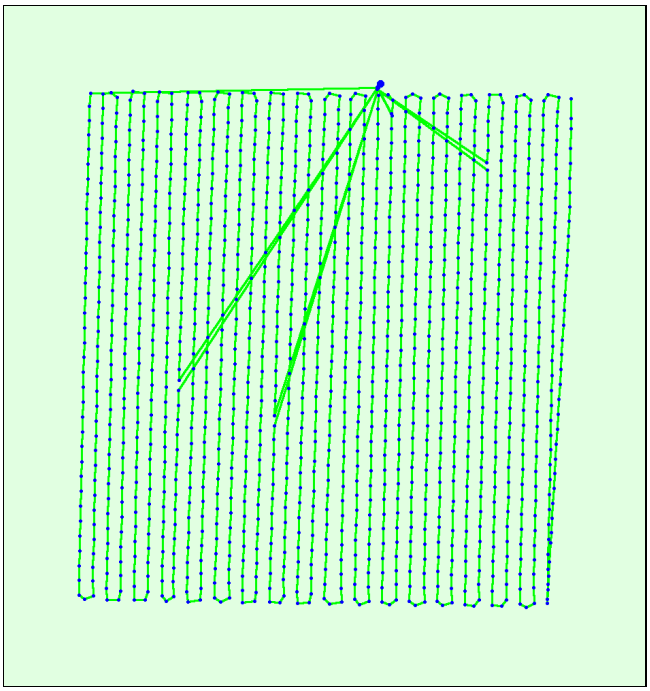
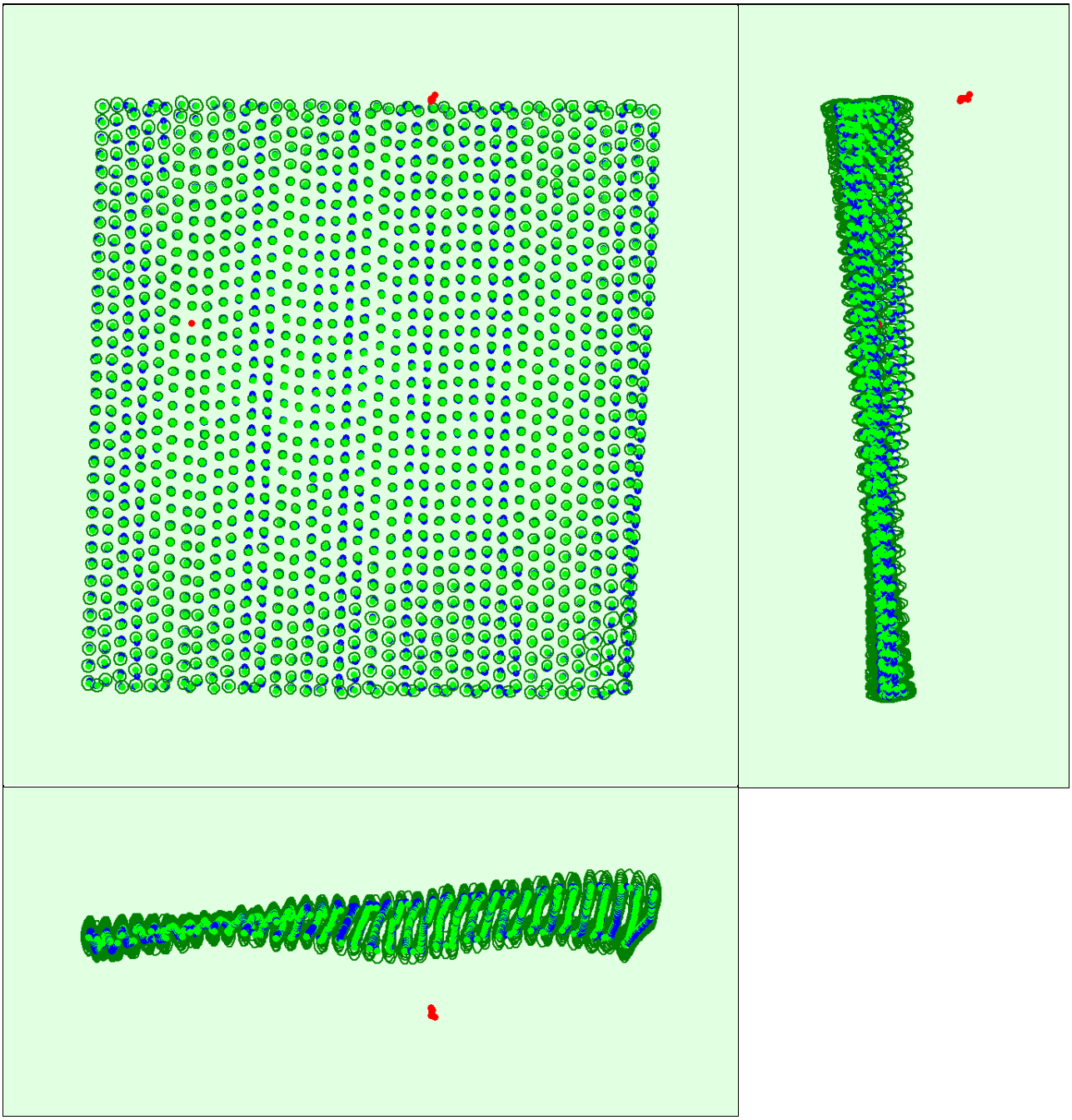


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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	0.107	0.109	0.244	0.056	0.057	0.018
Sigma	0.017	0.018	0.050	0.009	0.007	0.002

Overlap

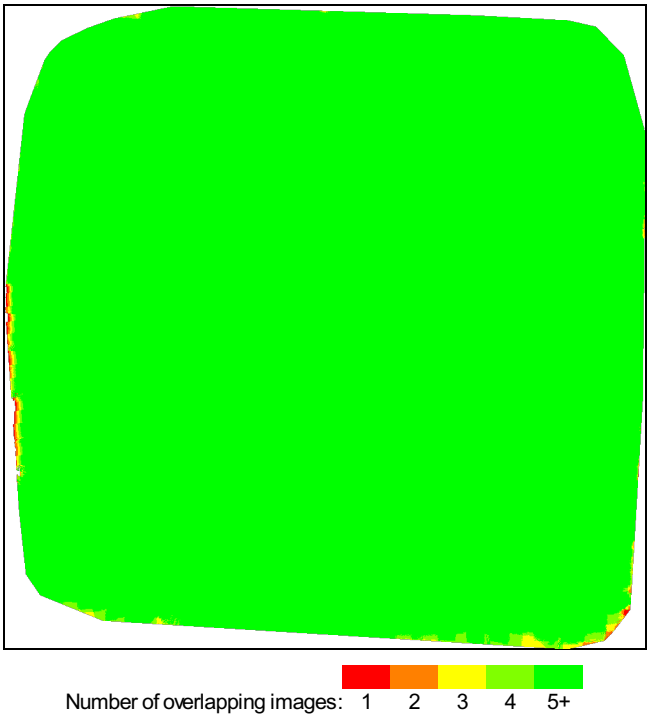


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.
Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint matches is also sufficient for these areas (see Figure 5 for keypoint matches).

Bundle Block Adjustment Details

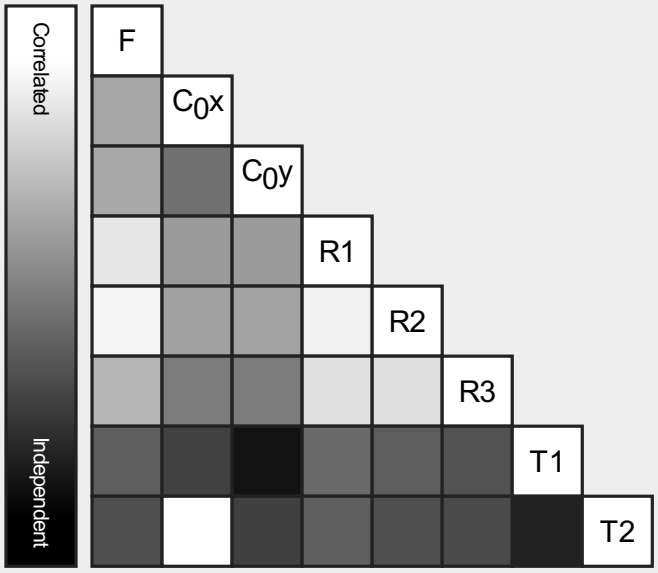
Number of 2D Keypoint Observations for Bundle Block Adjustment	2553635
Number of 3D Points for Bundle Block Adjustment	770296
Mean Reprojection Error [pixels]	0.177

Internal Camera Parameters

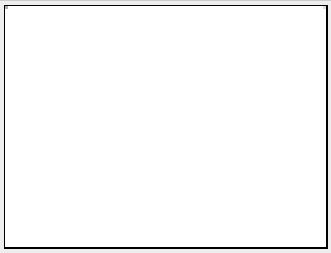
FC350_3.6_4000x3000 (RGB). Sensor Dimensions: 6.317 [mm] x 4.738 [mm]

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	2338.863 [pixel] 3.694 [mm]	1985.488 [pixel] 3.136 [mm]	1501.704 [pixel] 2.372 [mm]	-0.130	0.117	-0.016	0.001	0.000
Uncertainties (Sigma)	3.891 [pixel] 0.006 [mm]	0.093 [pixel] 0.000 [mm]	0.090 [pixel] 0.000 [mm]	0.000	0.001	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	11485	1933
Min	10304	368
Max	12647	4526
Mean	11465	1976

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	475108
In 3 Images	129266
In 4 Images	57620
In 5 Images	31483
In 6 Images	19468
In 7 Images	12849
In 8 Images	9036
In 9 Images	6520
In 10 Images	4993
In 11 Images	3841
In 12 Images	2999
In 13 Images	2458
In 14 Images	1868
In 15 Images	1590
In 16 Images	1327
In 17 Images	1129
In 18 Images	987
In 19 Images	872
In 20 Images	737
In 21 Images	627
In 22 Images	572

In 23 Images	473
In 24 Images	421
In 25 Images	378
In 26 Images	316
In 27 Images	309
In 28 Images	285
In 29 Images	259
In 30 Images	226
In 31 Images	188
In 32 Images	171
In 33 Images	164
In 34 Images	161
In 35 Images	133
In 36 Images	104
In 37 Images	114
In 38 Images	97
In 39 Images	85
In 40 Images	89
In 41 Images	84
In 42 Images	77
In 43 Images	62
In 44 Images	59
In 45 Images	61
In 46 Images	55
In 47 Images	40
In 48 Images	48
In 49 Images	38
In 50 Images	33
In 51 Images	36
In 52 Images	38
In 53 Images	24
In 54 Images	33
In 55 Images	22
In 56 Images	24
In 57 Images	13
In 58 Images	19
In 59 Images	15
In 60 Images	22
In 61 Images	14
In 62 Images	16
In 63 Images	13
In 64 Images	10
In 65 Images	16
In 66 Images	14
In 67 Images	7
In 68 Images	11
In 69 Images	11
In 70 Images	9
In 71 Images	4
In 72 Images	3
In 73 Images	10
In 74 Images	1
In 75 Images	3
In 76 Images	7
In 77 Images	6
In 78 Images	3
In 79 Images	2
In 80 Images	4
In 81 Images	1

In 83 Images	1
In 87 Images	1
In 88 Images	2
In 89 Images	1

2D Keypoint Matches

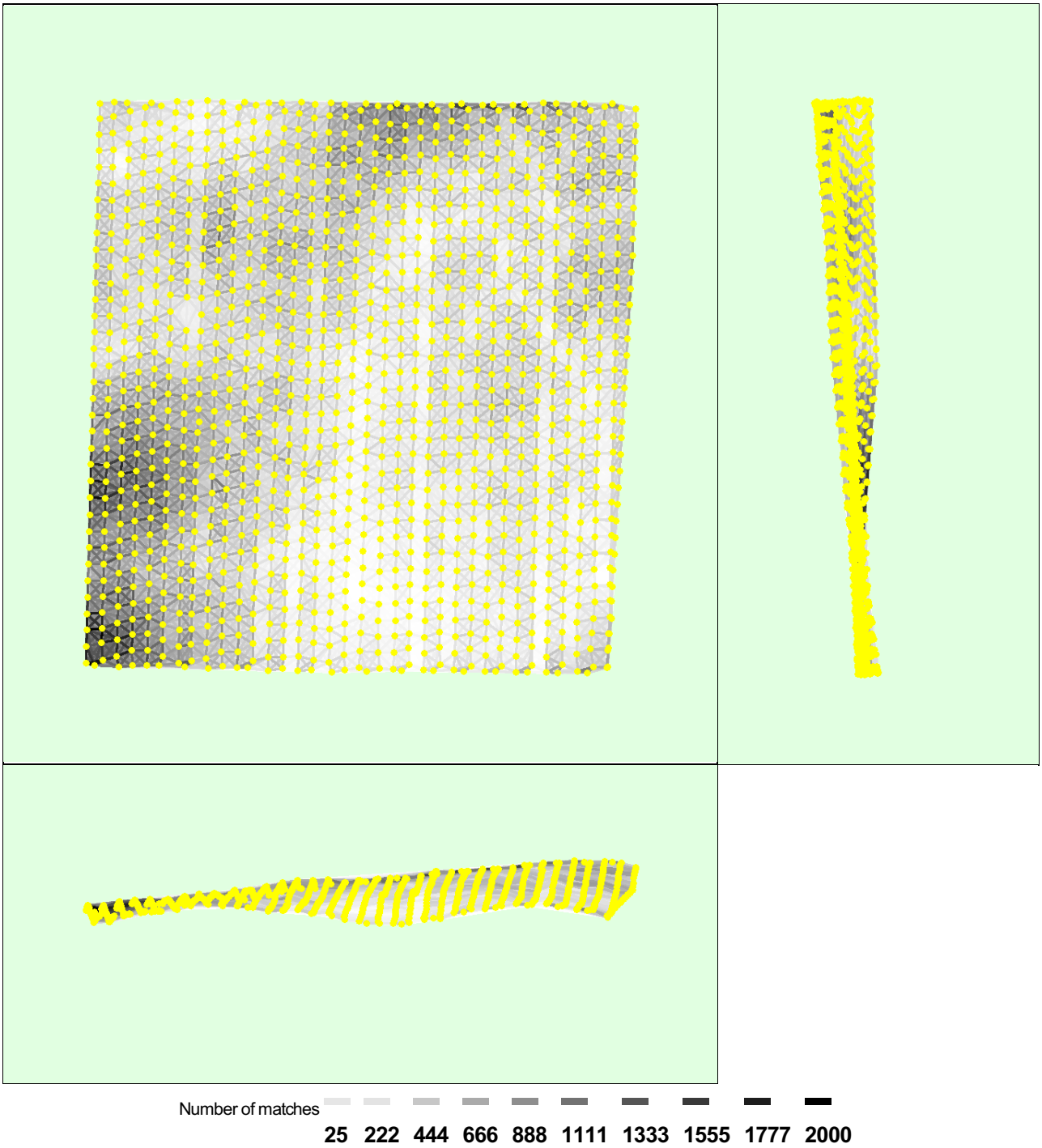


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

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	1.08	0.00
-6.00	-3.00	0.62	14.09	0.00
-3.00	0.00	47.06	31.81	50.00
0.00	3.00	52.32	37.85	49.61
3.00	6.00	0.00	15.09	0.39
6.00	9.00	0.00	0.08	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]		0.003665	0.001995	0.005857
Sigma [m]		0.686256	2.607235	1.077516
RMS Error [m]		0.686266	2.607235	1.077532

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]	99.85	96.28	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	0.566
Phi	1.499
Kappa	4.605

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) i7-4770 CPU @ 3.40GHz RAM: 32GB GPU: RDPDD Chained DD (Driver: unknown), RDPDD Chained DD (Driver: unknown), RDP Encoder Mirror Driver (Driver: unknown), RDP Reflector Display Driver (Driver: unknown)
Operating System	Windows 7 Enterprise, 64-bit

Coordinate Systems

Image Coordinate System	WGS84 (egm96)
Output Coordinate System	WGS 84 / UTM zone 11N (egm96)

Processing Options

Detected Template	Local structure outbreak intensity RGB*
Keypoints Image Scale	Custom, Image Scale: 0.5
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: Alternative Internal Parameters Optimization: All External Parameters Optimization: All Rematch: Auto, no

Point Cloud Densification details

Processing Options

Image Scale	multiscale, 1/4 (Quarter image size, Fast)
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	01h:39m:46s
Time for Point Cloud Classification	04m:34s
Time for 3D Textured Mesh Generation	17m:12s

Results

Number of Generated Tiles	1
Number of 3D Densified Points	14487405
Average Density (per m^3)	8.03

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (5.17 [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
Raster DTM	Generated: yes Merge Tiles: yes
DTM Resolution	5 x GSD (5.17 [cm/pixel])
Time for DSM Generation	03m:25s
Time for Orthomosaic Generation	05h:22m:37s
Time for DTM Generation	07m:20s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s