

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	2018_11_29_merzuga
Processed	2018-11-29 17:52:57
Camera Model Name(s)	CanonPowerShotELPH110HS_4.3_4608x3456 (RGB)
Average Ground Sampling Distance (GSD)	4.13 cm / 1.62 in
Area Covered	0.3505 km ² / 35.0455 ha / 0.1354 sq. mi. / 86.6441 acres
Time for Initial Processing (without report)	11m:26s

Quality Check

Images	median of 17650 keypoints per image	✓
Dataset	84 out of 84 images calibrated (100%), all images enabled	✓
Camera Optimization	0.09% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 2761.92 matches per calibrated image	✓
Georeferencing	yes, no 3D GCP	⚠

Preview

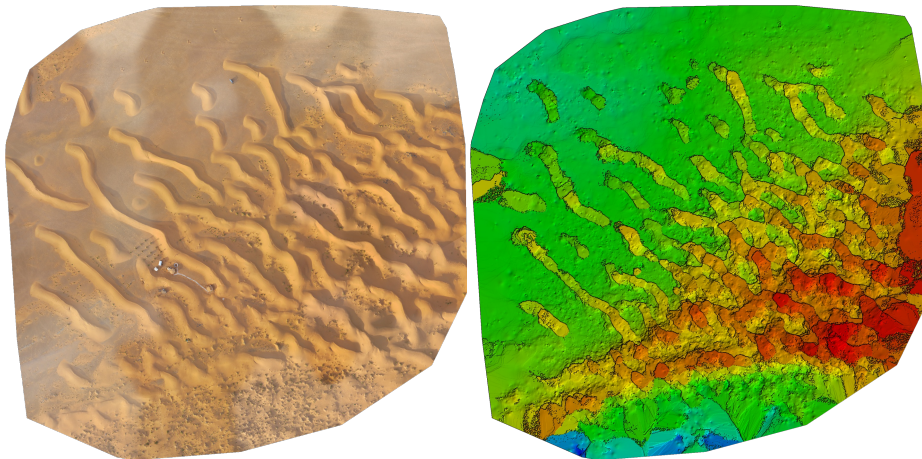


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	84 out of 84
Number of Geolocated Images	84 out of 84

Initial Image Positions

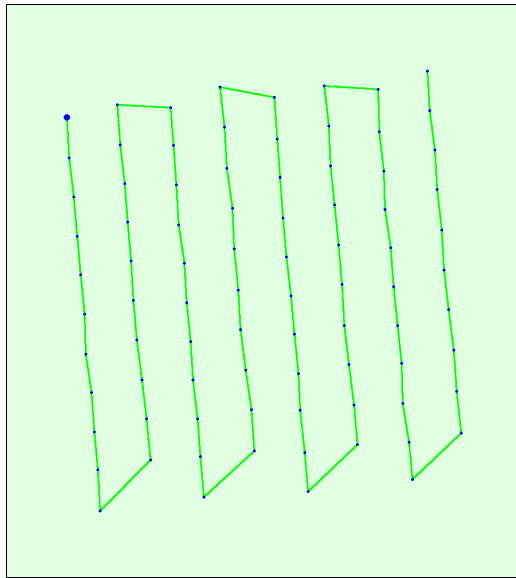
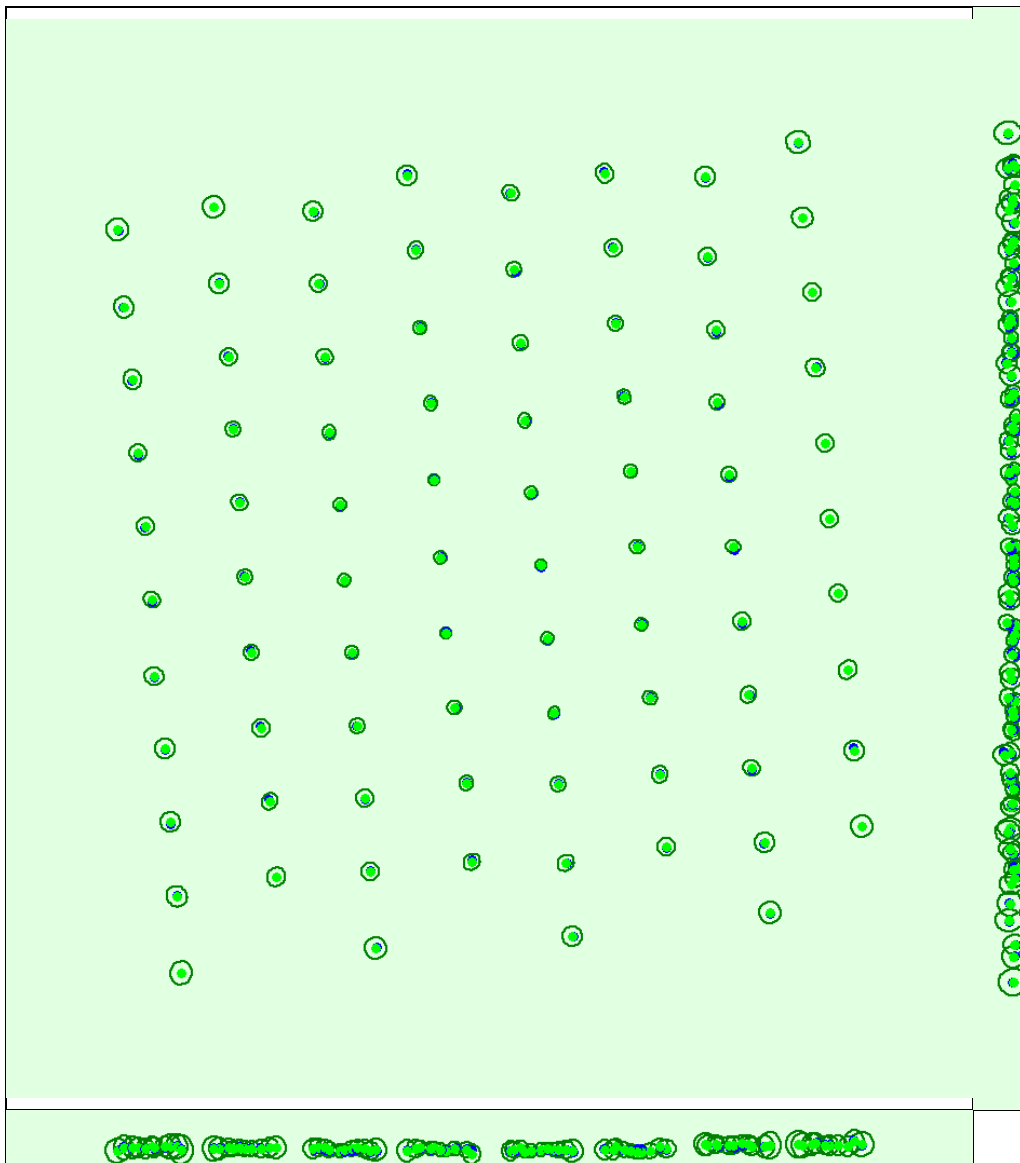


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 10xmagnified

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 i

	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.569	0.571	0.581	0.147	0.147	0.113
Sigma	0.090	0.091	0.125	0.011	0.013	0.002

? Overlap i

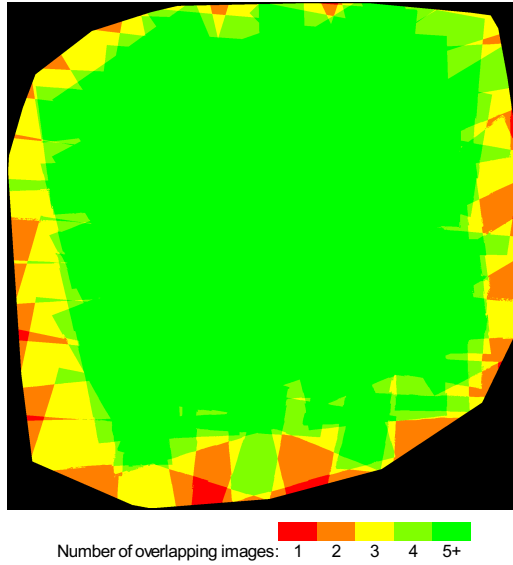


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

Bundle Block Adjustment Details i

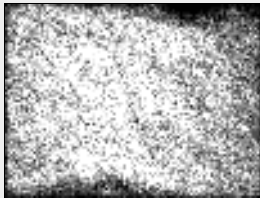
Number of 2D Keypoint Observations for Bundle Block Adjustment	235344
Number of 3D Points for Bundle Block Adjustment	96060
Mean Reprojection Error [pixels]	0.184

? Internal Camera Parameters

CanonPowerShotELPH110HS_4.3_4608x3456 (RGB). Sensor Dimensions: 6.172 [mm] x 4.629 [mm] i

EXIF ID: CanonPowerShotELPH110HS_4.3_4608x3456

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3263.377 [pixel] 4.371 [mm]	2324.394 [pixel] 3.113 [mm]	1793.154 [pixel] 2.402 [mm]	-0.049	0.056	-0.034	0.005	0.002
Optimized Values	3266.606 [pixel] 4.375 [mm]	2237.308 [pixel] 2.997 [mm]	1767.551 [pixel] 2.368 [mm]	-0.049	0.060	-0.036	0.002	-0.004
Uncertainties (Sigma)	3.660 [pixel] 0.005 [mm]	0.879 [pixel] 0.001 [mm]	1.225 [pixel] 0.002 [mm]	0.001	0.003	0.003	0.000	0.000



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 see the average direction and magnitude of the re-projection error for each pixel. Note that the vectors are scaled for better visualization.

? 2D Keypoints Table i

	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	17650	2762
Mn	14755	1242
Max	21093	5533
Mean	17681	2802

? 3D Points from 2D Keypoint Matches i

	Number of 3D Points Observed
In 2 Images	72298
In 3 Images	13669
In 4 Images	5092
In 5 Images	2492
In 6 Images	1326
In 7 Images	699
In 8 Images	333
In 9 Images	114
In 10 Images	33
In 11 Images	4

2D Keypoint Matches

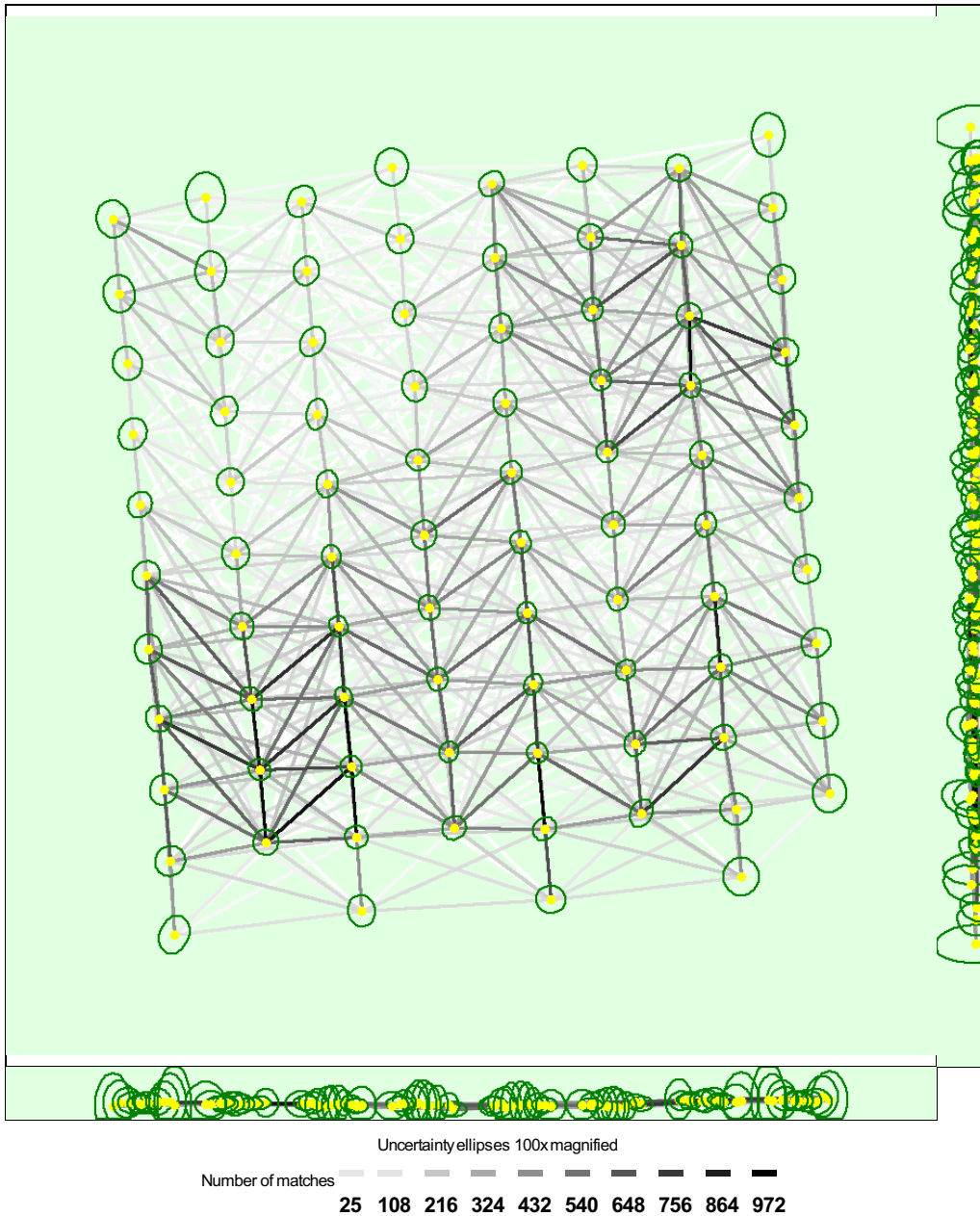


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.089	0.098	0.100	0.067	0.065	0.018
Sigma	0.014	0.018	0.049	0.025	0.028	0.007

Geolocation Details



Absolute Geolocation Variance



Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-6.24	0.00	0.00	0.00
-6.24	-5.00	0.00	0.00	0.00
-5.00	-3.75	0.00	0.00	0.00
-3.75	-2.50	0.00	0.00	0.00
-2.50	-1.25	0.00	5.95	4.76
-1.25	0.00	46.43	45.24	44.05
0.00	1.25	53.57	40.48	47.62
1.25	2.50	0.00	8.33	3.57
2.50	3.75	0.00	0.00	0.00
3.75	5.00	0.00	0.00	0.00
5.00	6.24	0.00	0.00	0.00
6.24	-	0.00	0.00	0.00
Mean [m]		0.001073	-0.015162	-0.027903
Sigma [m]		0.276357	0.814002	0.738478
RMS Error [m]		0.276359	0.814144	0.739005

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]	4.028857	4.028857	3.334214
Sigma of Geolocation Accuracy [m]	0.062757	0.062757	0.115875

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

Geolocation Orientational Variance	RMS [degree]
Omega	1.689
Phi	3.036
Kappa	3.303

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) i7-4600U CPU @ 2.10GHz RAM: 16GB GPU: Intel(R) HD Graphics Family (Driver: 10.18.10.3574), 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
Output Coordinate System	WGS84 / UTM zone 30N

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 Bundle Adjustment: Classic

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
Advanced: 3D Textured Mesh Settings	Sample Density Divider: 1
Advanced: Matching Window Size	7x7 pixels
Advanced: Image Groups	group1
Advanced: Use Processing Area	yes
Advanced: Use Annotations	yes
Advanced: Limit Camera Depth Automatically	no
Time for Point Cloud Densification	31m:55s
Time for 3D Textured Mesh Generation	05m:06s

Results



Number of Generated Tiles	1
Number of 3D Densified Points	8420934
Average Density (per m ³)	38.86

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (4.13 [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
Grid DSM	Generated: yes, Spacing [cm]: 25
Time for DSM Generation	31m:27s
Time for Orthomosaic Generation	24m:07s