Quality Report

Generated with Pix4Dmapper Pro version 3.1.22

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	diu1
Processed	2017-04-17 20:13:36
Camera Model Name(s)	FC300X_3.6_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	1.65 cm / 0.65 in
Area Covered	0.035 km^2 / 3.4978 ha / 0.0135 sq. mi. / 8.6478 acres
Time for Initial Processing (without report)	45m:03s

Quality Check

Images	median of 34382 keypoints per image	✓
Dataset	150 out of 151 images calibrated (99%), all images enabled	✓
Camera Optimization	6.35% relative difference between initial and optimized internal camera parameters	⚠
Matching	median of 11010.5 matches per calibrated image	✓
Georeferencing	yes, no 3D GCP	⚠

Preview

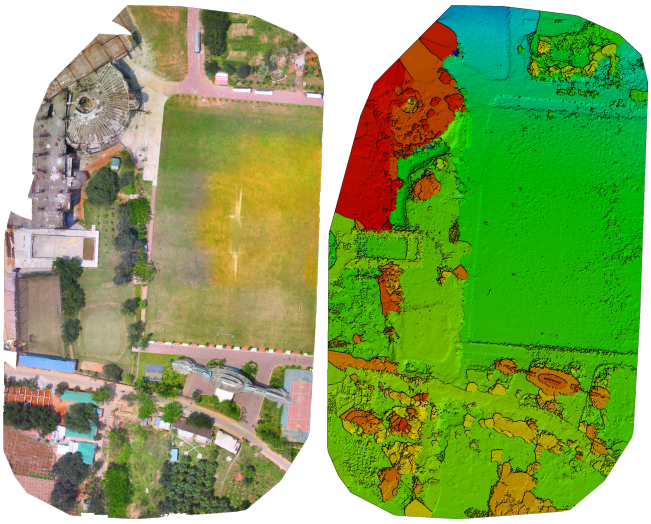


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	150 out of 151
Number of Geolocated Images	151 out of 151

Initial Image Positions

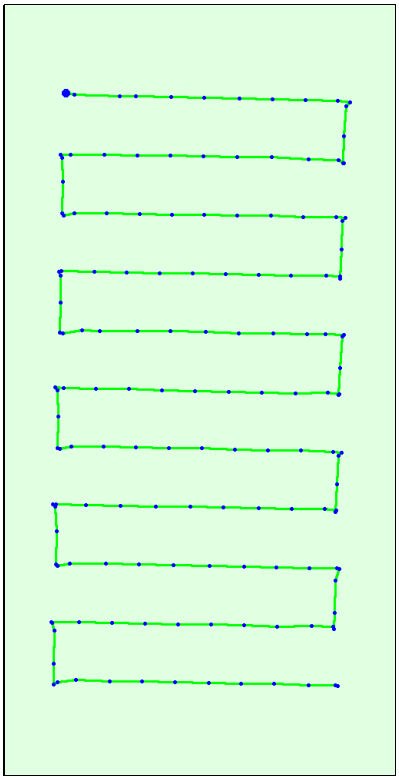


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions

Uncertainty ellipses 5x 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	0.535	0.535	1.314	0.781	1.253	0.332
Sigma	0.090	0.090	0.253	0.071	0.060	0.005

Overlap

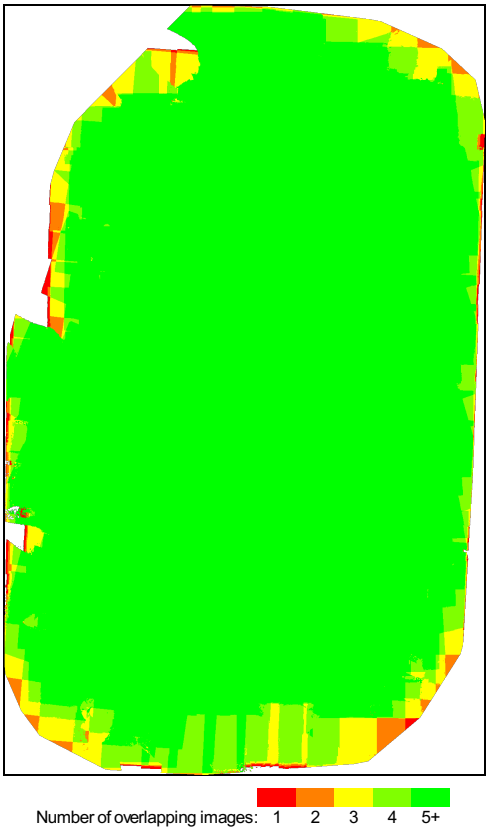


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.
Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

Bundle Block Adjustment Details

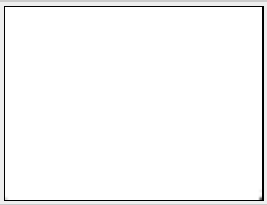
Number of 2D Keypoint Observations for Bundle Block Adjustment	1688812
Number of 3D Points for Bundle Block Adjustment	566831
Mean Reprojection Error [pixels]	0.326

Internal Camera Parameters

FC300X_3.6_4000x3000 (RGB). Sensor Dimensions: 6.317 [mm] x 4.738 [mm]

EXIF ID: FC300X_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]	-0.014	0.013	-0.000	0.001	0.000
Optimized Values	2431.036 [pixel] 3.840 [mm]	2002.876 [pixel] 3.163 [mm]	1535.578 [pixel] 2.425 [mm]	-0.009	0.009	0.007	0.001	-0.000
Uncertainties (Sigma)	3.631 [pixel] 0.006 [mm]	0.233 [pixel] 0.000 [mm]	0.377 [pixel] 0.001 [mm]	0.000	0.001	0.001	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 the 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

	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	34382	11010
Min	20083	2922
Max	69532	18005
Mean	35227	11259

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	373432
In 3 Images	88216
In 4 Images	36442
In 5 Images	20020
In 6 Images	12772
In 7 Images	8978
In 8 Images	6682
In 9 Images	5113
In 10 Images	3803
In 11 Images	2901
In 12 Images	2187
In 13 Images	1715
In 14 Images	1236
In 15 Images	952
In 16 Images	775
In 17 Images	544
In 18 Images	398
In 19 Images	250
In 20 Images	165
In 21 Images	92
In 22 Images	76
In 23 Images	43
In 24 Images	23
In 25 Images	10
In 26 Images	2
In 27 Images	4

2D Keypoint Matches

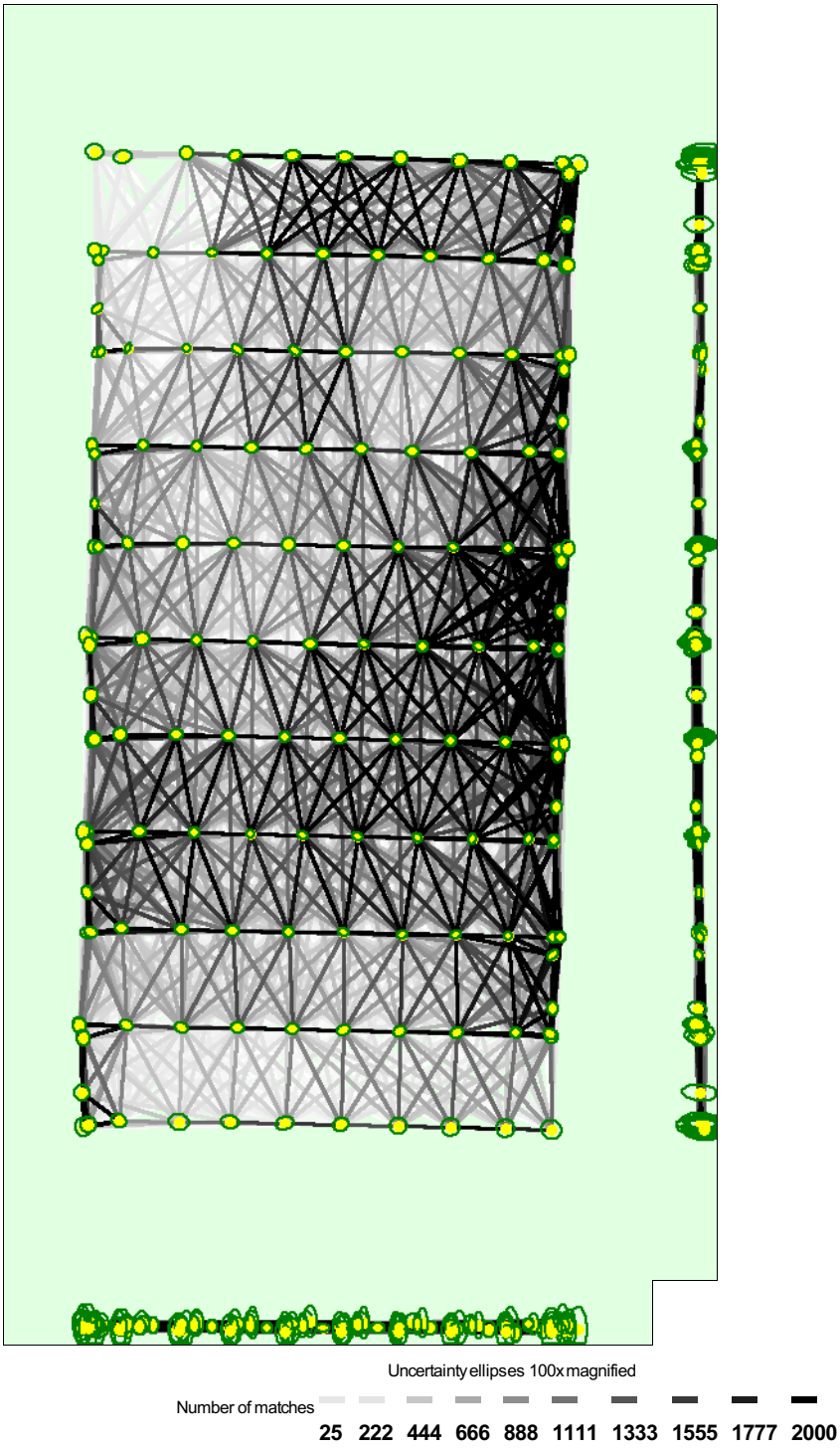


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.012	0.012	0.019	0.041	0.029	0.008
Sigma	0.002	0.002	0.010	0.021	0.010	0.003

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	1.33	0.00	0.00
-3.00	0.00	46.00	84.67	51.33
0.00	3.00	51.33	14.67	48.67
3.00	6.00	1.33	0.67	0.00
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]		0.000000	-0.000000	-0.000002
Sigma [m]		1.444940	0.575019	0.518641
RMS Error [m]		1.444940	0.575019	0.518641

Min Error and Max Error represent geolocation error intervalsbetween -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 intial 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]	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	1.993
Phi	2.901
Kappa	2.049

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) i7-3720QM CPU @ 2.60GHz RAM: 8GB GPU: NVIDIA GeForce GT 650M (Driver: 21.21.13.7654)
Operating System	Windows 10 Pro, 64-bit

Coordinate Systems

Image Coordinate System	WGS84 (egm96)
Output Coordinate System	WGS84 / UTM zone 46N (egm96)

Processing Options

Detected Template	3D Maps
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	22m:02s
Time for 3D Textured Mesh Generation	07m:55s

Results

Number of Generated Tiles	1
Number of 3D Densified Points	10573413
Average Density (per m^3)	729.71

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (1.66 [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
Time for DSM Generation	14m:22s
Time for Orthomosaic Generation	24m:18s