Quality Report

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	diu 2nd map
Processed	2017-04-17 22:42:00
Camera Model Name(s)	FC300X_3.6_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	1.29 cm / 0.51 in
Area Covered	0.0149 km^2 / 1.4884 ha / 0.0057 sq. mi. / 3.6799 acres
Time for Initial Processing (without report)	37m:27s

Quality Check

Images	median of 30819 keypoints per image	✓
Dataset	113 out of 113 images calibrated (100%), all images enabled	✓
Camera Optimization	28.93% relative difference between initial and optimized internal camera parameters	⚠
Matching	median of 12920.2 matches per calibrated image	✓
Georeferencing	yes, no 3D GCP	⚠

Preview
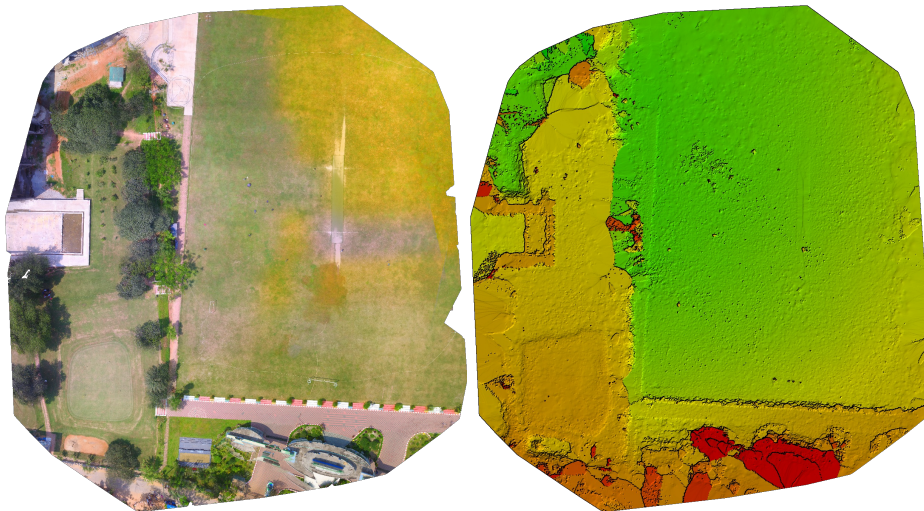

Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

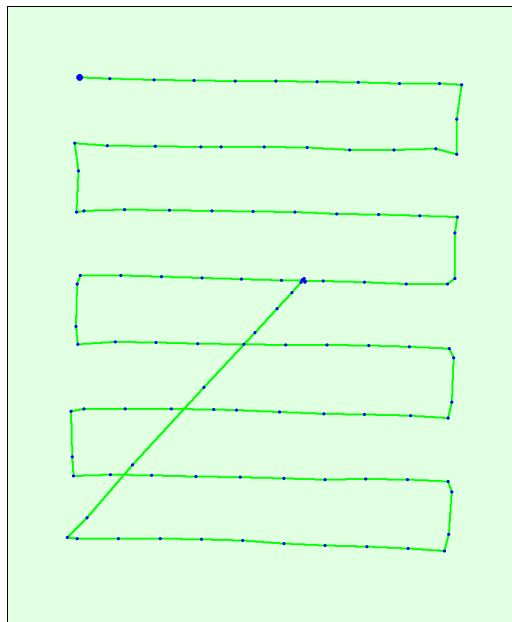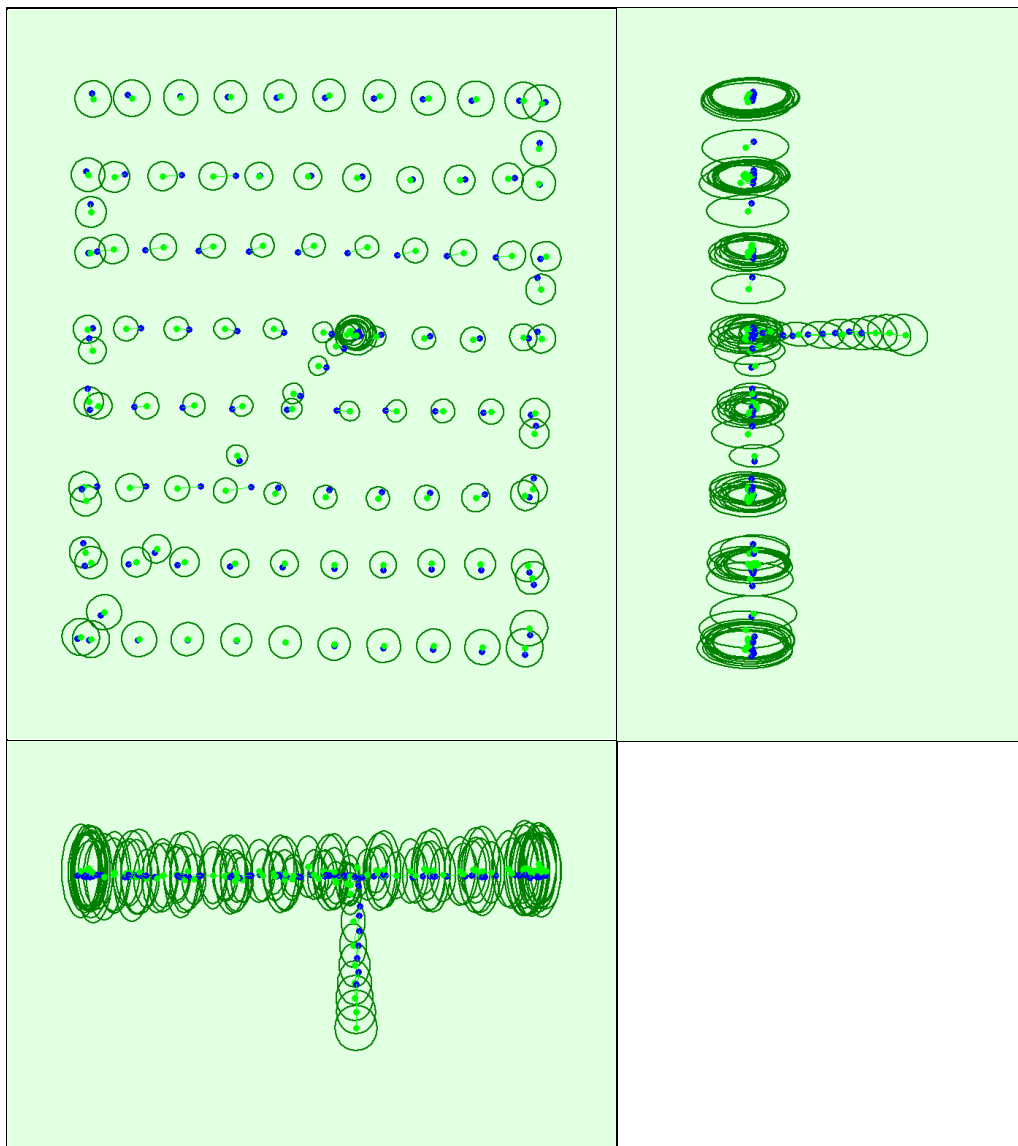|	
Number of Calibrated Images	113 out of 113
Number of Geolocated Images	113 out of 113

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). 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	0.474	0.472	1.078	1.419	1.376	0.536
Sigma	0.085	0.082	0.255	0.055	0.055	0.008

Overlap
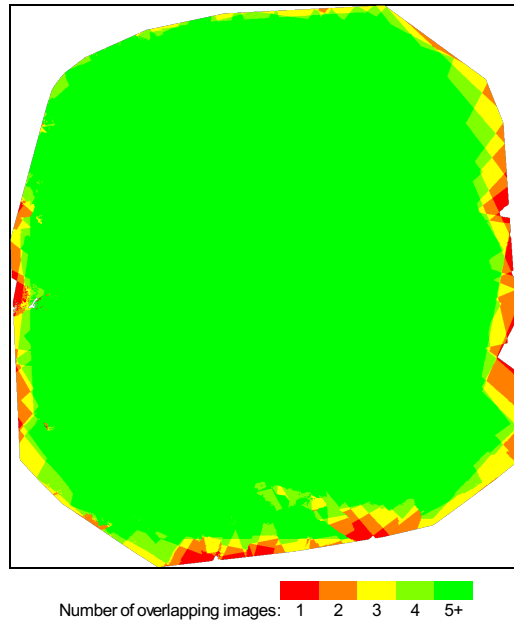

Number of overlapping images: 1 2 3 4 5+

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	1402391
Number of 3D Points for Bundle Block Adjustment	409402
Mean Reprojection Error [pixels]	0.334

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	2947.042 [pixel] 4.654 [mm]	1949.649 [pixel] 3.079 [mm]	1663.698 [pixel] 2.628 [mm]	-0.029	0.033	0.002	0.001	-0.001
Uncertainties (Sigma)	4.976 [pixel] 0.008 [mm]	0.488 [pixel] 0.001 [mm]	0.905 [pixel] 0.001 [mm]	0.001	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.
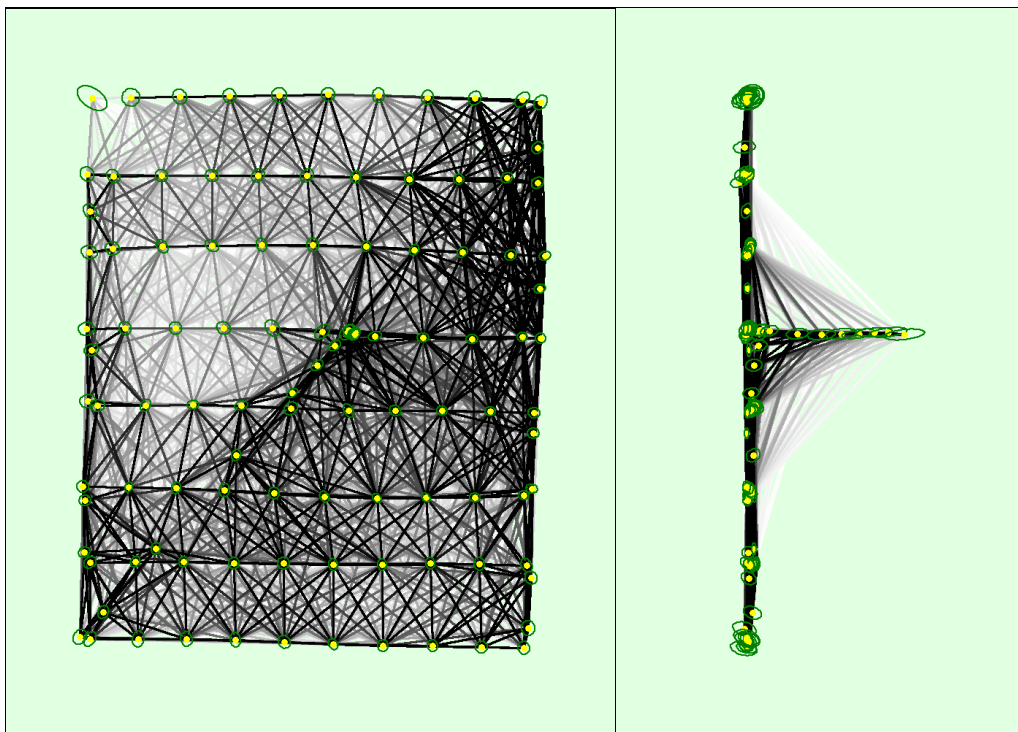
2D Keypoints Table

	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	30819	12920
Min	20630	2529
Max	46574	18438
Mean	31118	12411

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	235035
In 3 Images	69224
In 4 Images	33271
In 5 Images	19275
In 6 Images	12910
In 7 Images	9071
In 8 Images	6630
In 9 Images	5125
In 10 Images	4011
In 11 Images	3035
In 12 Images	2584
In 13 Images	1955
In 14 Images	1490
In 15 Images	1368
In 16 Images	1041
In 17 Images	816
In 18 Images	653
In 19 Images	490
In 20 Images	336
In 21 Images	283
In 22 Images	167
In 23 Images	171
In 24 Images	129
In 25 Images	109
In 26 Images	80
In 27 Images	71
In 28 Images	30
In 29 Images	19
In 30 Images	15
In 31 Images	7
In 32 Images	1

2D Keypoint Matches

Uncertainty ellipses 100x magnified

Number of matches

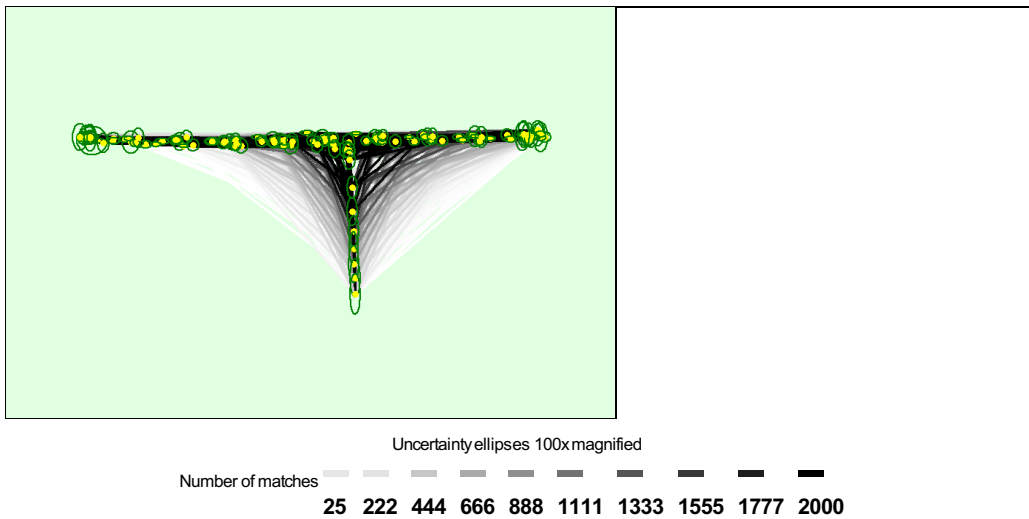25 222 444 666 888 1111 1333 1555 1777 2000

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	0.010	0.010	0.010	0.032	0.030	0.009
Sigma	0.002	0.002	0.007	0.016	0.014	0.001

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	2.65	0.00	0.00
-3.00	0.00	47.79	60.18	72.57
0.00	3.00	46.02	39.82	22.12
3.00	6.00	3.54	0.00	1.77
6.00	9.00	0.00	0.00	3.54
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	0.000000
Sigma [m]		1.401137	0.687249	1.609482
RMS Error [m]		1.401137	0.687249	1.609482

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 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	3.822
Phi	3.118

Kappa	1.926

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	18m:44s
Time for 3D Textured Mesh Generation	08m:44s

Results

Number of Generated Tiles	1
Number of 3D Densified Points	7838549
Average Density (per m^3)	1846.16

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (1.3 [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	19m:06s

Time for Orthomosaic Generation	20m:39s