Quality Report

Generated with Pix4Dmapper version 4.3.33

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	Flatstolvar
Processed	2019-05-07 13:02:44
Camera Model Name(s)	FC330_3.6_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	2.15 cm / 0.85 in

Quality Check

Images	median of 23277 keypoints per image	✓
Dataset	226 out of 226 images calibrated (100%), all images enabled	✓
Camera Optimization	3.52% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 10468.6 matches per calibrated image	✓
Georeferencing	yes, no 3D GCP	⚠

Calibration Details

Number of Calibrated Images	226 out of 226
Number of Geolocated Images	226 out of 226

Initial Image Positions

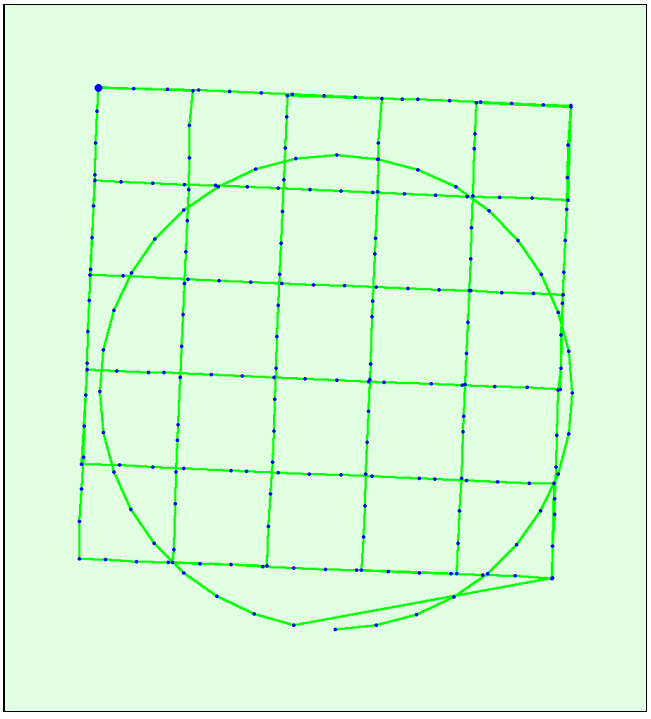
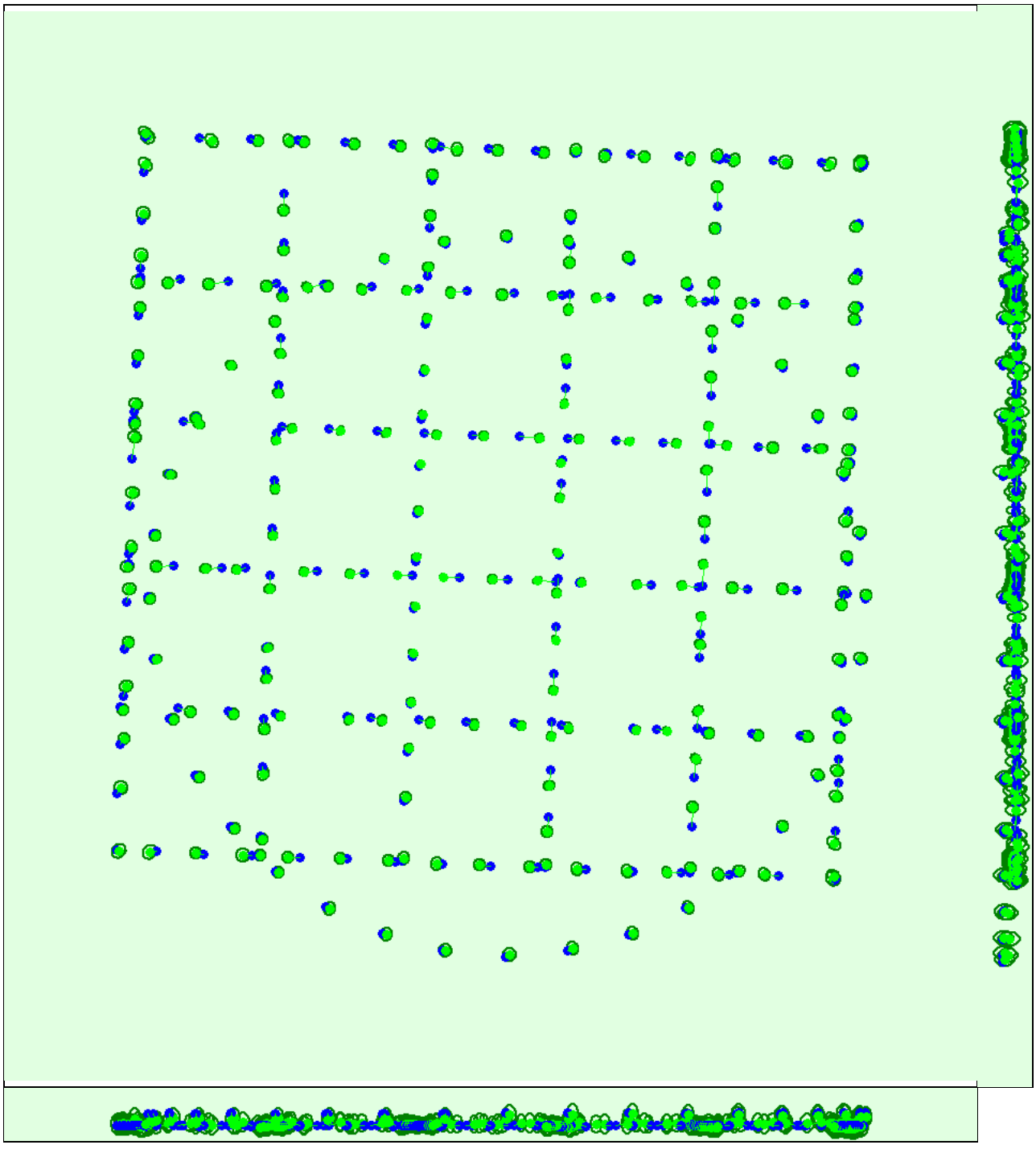


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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). 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	0.147	0.147	0.247	0.078	0.077	0.074
Sigma	0.020	0.020	0.017	0.013	0.007	0.025

Bundle Block Adjustment Details

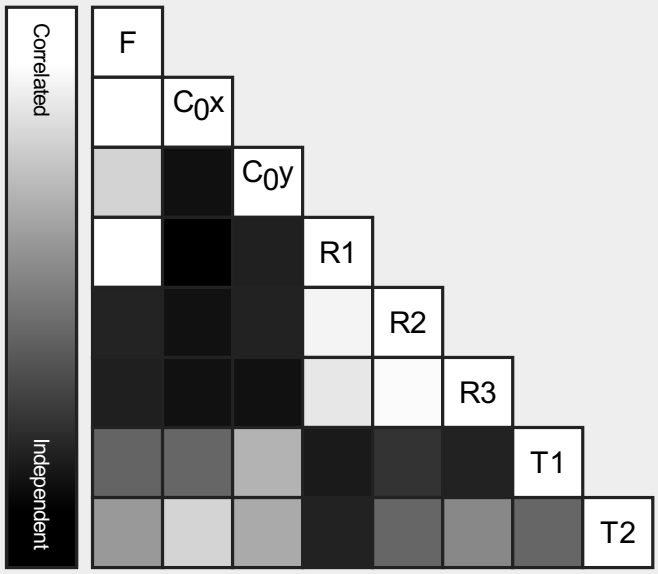
Number of 2D Keypoint Observations for Bundle Block Adjustment	2622678
Number of 3D Points for Bundle Block Adjustment	858499
Mean Reprojection Error [pixels]	0.226

Internal Camera Parameters

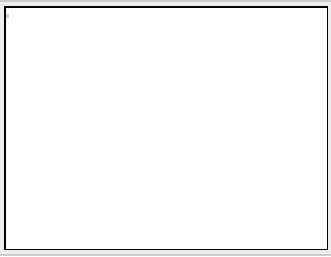
FC330_3.6_4000x3000 (RGB). Sensor Dimensions: 6.317 [mm] x 4.738 [mm]

EXIF ID: FC330_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]	-0.001	-0.002	0.000	-0.001	-0.001
Optimized Values	2366.381 [pixel] 3.737 [mm]	2069.173 [pixel] 3.268 [mm]	1515.435 [pixel] 2.393 [mm]	-0.003	-0.003	0.002	0.000	0.001
Uncertainties (Sigma)	0.146 [pixel] 0.000 [mm]	0.048 [pixel] 0.000 [mm]	0.094 [pixel] 0.000 [mm]	0.000	0.000	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	23277	10469
Min	20007	5984
Max	42619	23857
Mean	24887	11605

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed

In 2 Images	513109
In 3 Images	156260
In 4 Images	71905
In 5 Images	40306
In 6 Images	24306
In 7 Images	16204
In 8 Images	10804
In 9 Images	7540
In 10 Images	5318
In 11 Images	3539
In 12 Images	2563
In 13 Images	1940
In 14 Images	1354
In 15 Images	983
In 16 Images	734
In 17 Images	482
In 18 Images	376
In 19 Images	252
In 20 Images	152
In 21 Images	104
In 22 Images	94
In 23 Images	46
In 24 Images	41
In 25 Images	30
In 26 Images	16
In 27 Images	18
In 28 Images	2
In 29 Images	5
In 30 Images	8
In 31 Images	1
In 32 Images	3
In 33 Images	3
In 41 Images	1

2D Keypoint Matches

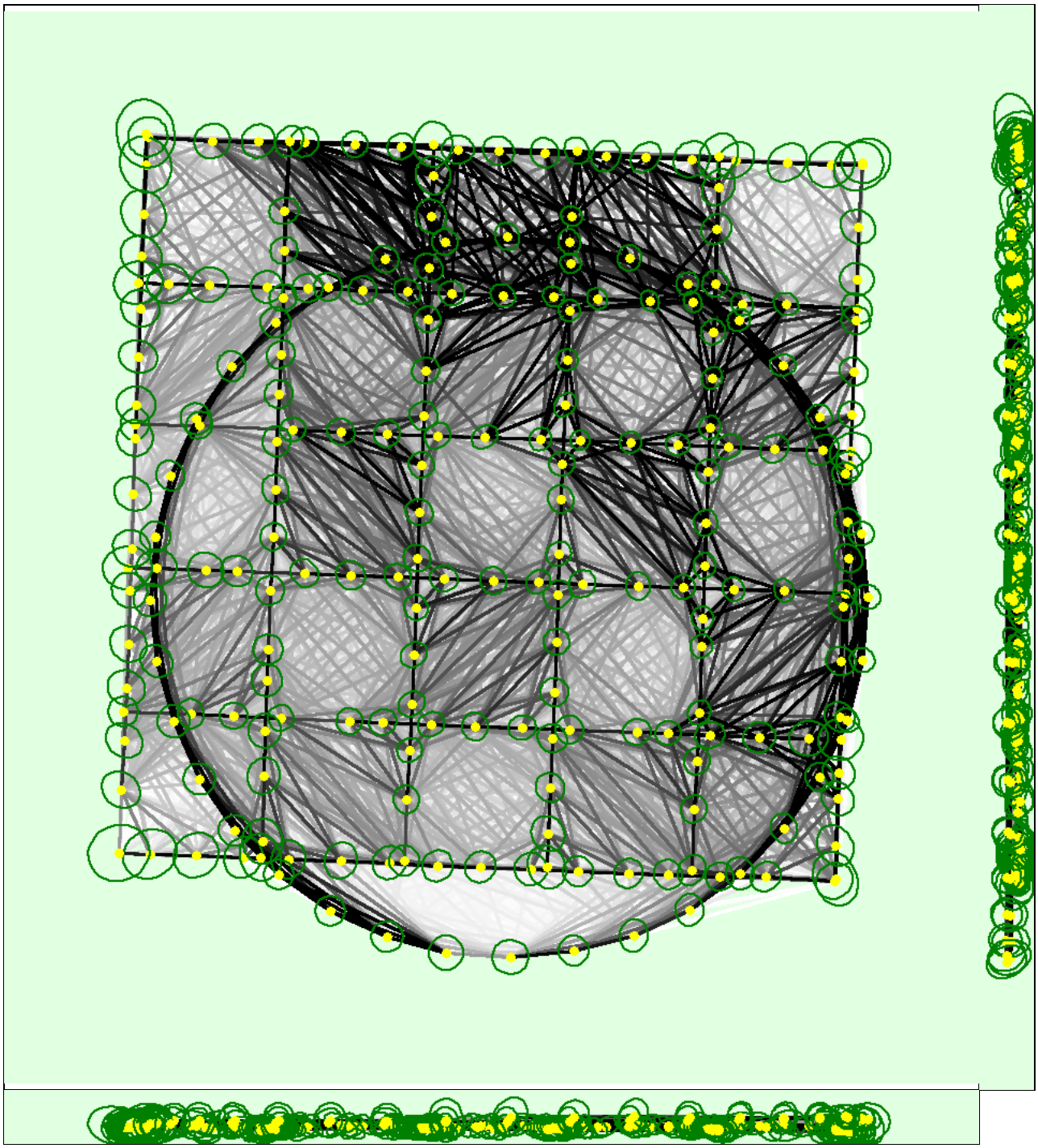


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.004	0.004	0.003	0.005	0.005	0.003
Sigma	0.001	0.001	0.001	0.001	0.002	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	7.96	7.96	0.00
-3.00	0.00	47.79	39.38	53.98
0.00	3.00	33.19	45.58	46.02
3.00	6.00	11.06	7.08	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]		0.000005	-0.000001	-0.000002
Sigma [m]		1.962132	1.880805	0.678387
RMS Error [m]		1.962132	1.880805	0.678387

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]	98.67	97.79	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	3.817
Phi	3.882
Kappa	7.400

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) i7-2600 CPU @ 3.40GHz RAM: 8GB GPU: AMD Radeon HD 5450 (Driver: 15.201.1151.1008)
Operating System	Windows 10 Education, 64-bit

Coordinate Systems

Image Coordinate System	WGS 84 (EGM96 Geoid)
Output Coordinate System	WGS 84 / UTM zone 32N (EGM96 Geoid)

Processing Options

Detected Template	3D Models
Keypoints Image Scale	Full, Image Scale: 1
Advanced: Matching Image Pairs	Free Flight or Terrestrial
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

Results

Number of Generated Tiles	1
Number of 3D Densified Points	14862823
Average Density (per m^3)	388.89

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (2.15 [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