

# Quality Report



Generated with Pix4Ddiscovery version 4.7.5



**Important:** Click on the different icons for:



Help to analyze the results in the Quality Report



Additional information about the sections



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## Summary



Project	trans_3_5
Processed	2023-02-26 14:59:42
Camera Model Name(s)	CanonIXUS127HS_4.3_4608x3456 (RGB)
Average Ground Sampling Distance (GSD)	4.17 cm / 1.64 in
Area Covered	0.090 km <sup>2</sup> / 8.9705 ha / 0.03 sq. mi. / 22.1781 acres
Time for Initial Processing (without report)	52s

## Quality Check



Images	median of 38458 keypoints per image	
Dataset	17 out of 18 images calibrated (94%), all images enabled	
Camera Optimization	0.38% relative difference between initial and optimized internal camera parameters	
Matching	median of 7242.55 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

## Preview

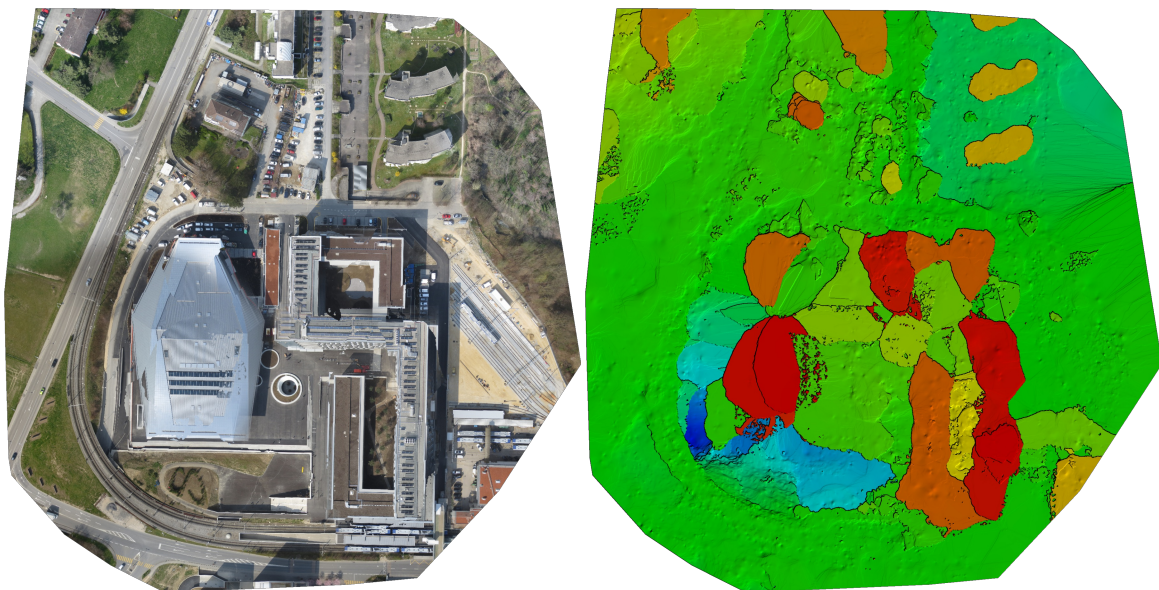


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

# Calibration Details



Number of Calibrated Images	17 out of 18
Number of Geolocated Images	18 out of 18

## Initial Image Positions

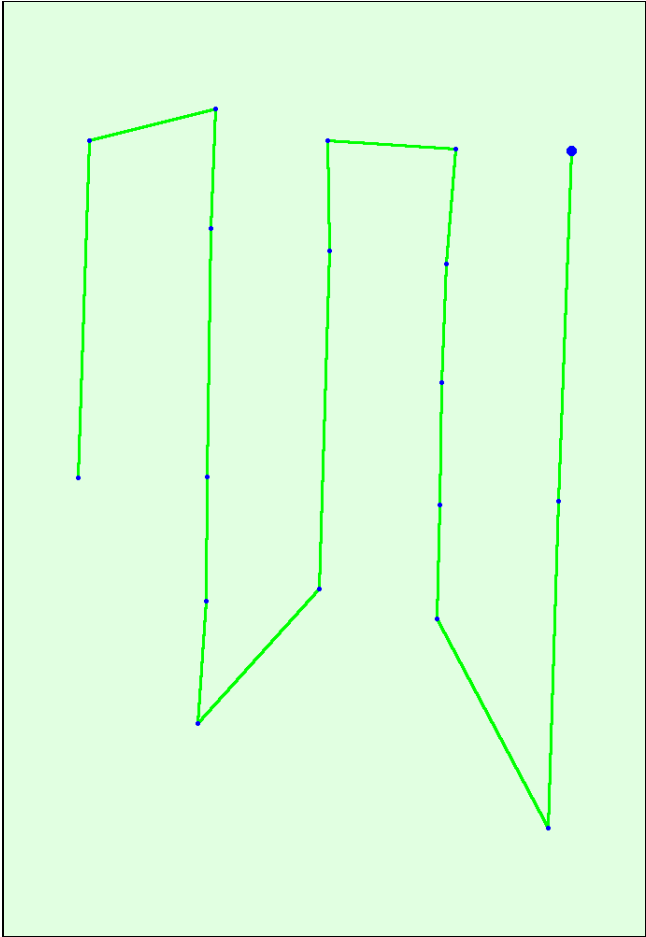
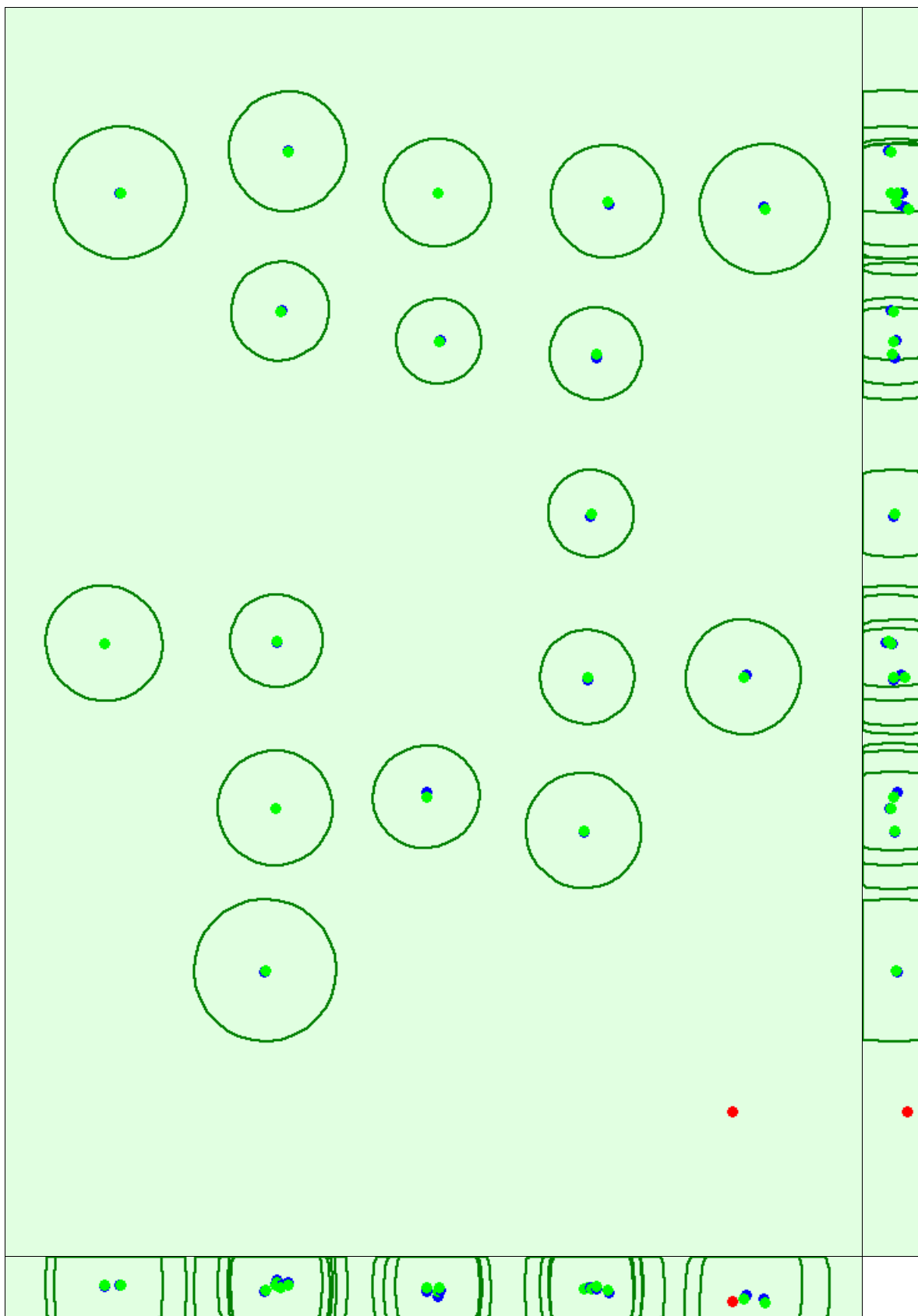


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

## 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	0.386	0.386	0.935	0.350	0.453	0.150
Sigma	0.055	0.055	0.181	0.011	0.008	0.009

## Overlap

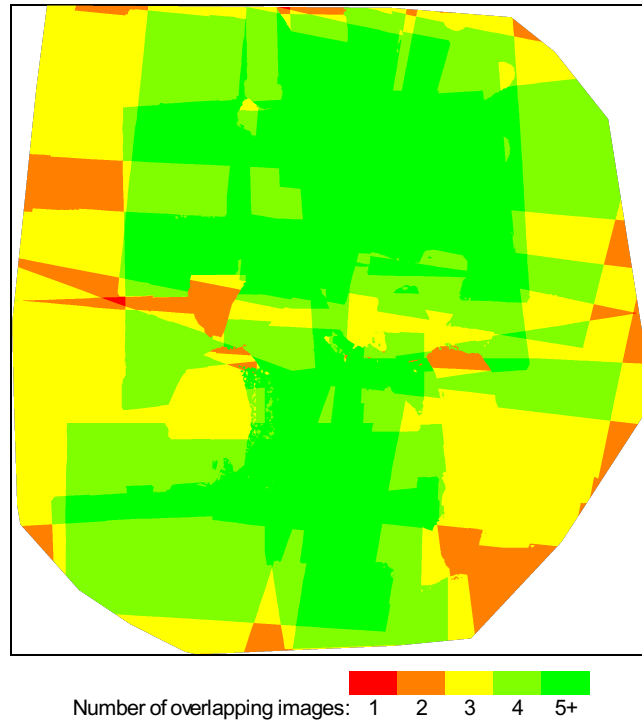


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint 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	127638
Number of 3D Points for Bundle Block Adjustment	55903
Mean Reprojection Error [pixels]	0.177

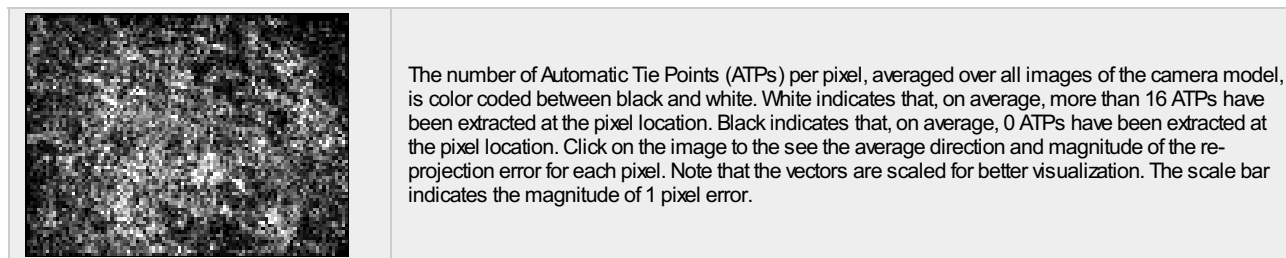
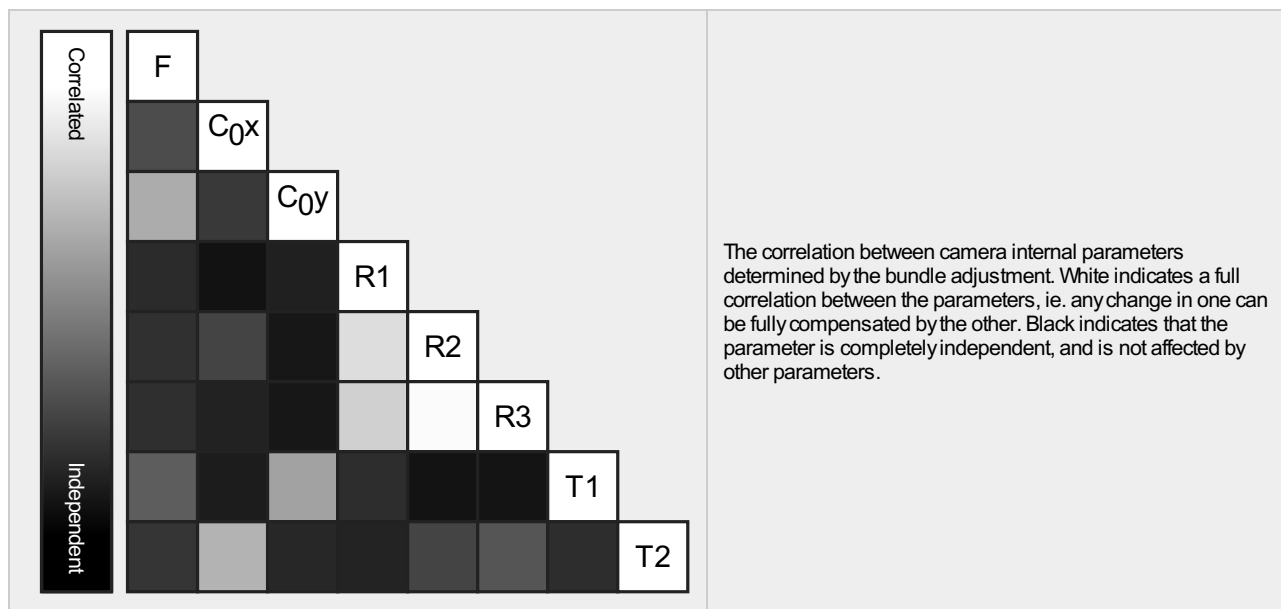
## Internal Camera Parameters

CanonIXUS127HS\_4.3\_4608x3456 (RGB). Sensor Dimensions: 6.170 [mm] x 4.628 [mm]



EXIF ID: CanonIXUS127HS\_4.3\_4608x3456

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3270.924 [pixel] 4.380 [mm]	2303.999 [pixel] 3.085 [mm]	1728.000 [pixel] 2.314 [mm]	-0.049	0.059	-0.036	0.000	-0.003
Optimized Values	3283.467 [pixel] 4.396 [mm]	2312.417 [pixel] 3.096 [mm]	1846.635 [pixel] 2.473 [mm]	-0.048	0.052	-0.027	0.008	0.000
Uncertainties (Sigma)	1.233 [pixel] 0.002 [mm]	0.302 [pixel] 0.000 [mm]	0.313 [pixel] 0.000 [mm]	0.000	0.001	0.001	0.000	0.000



## ? 2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	38458	7243
Mn	27797	3672
Max	46012	10543
Mean	38088	7508

## ? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	44156
In 3 Images	8534
In 4 Images	2518
In 5 Images	540
In 6 Images	133
In 7 Images	22

## ? 2D Keypoint Matches



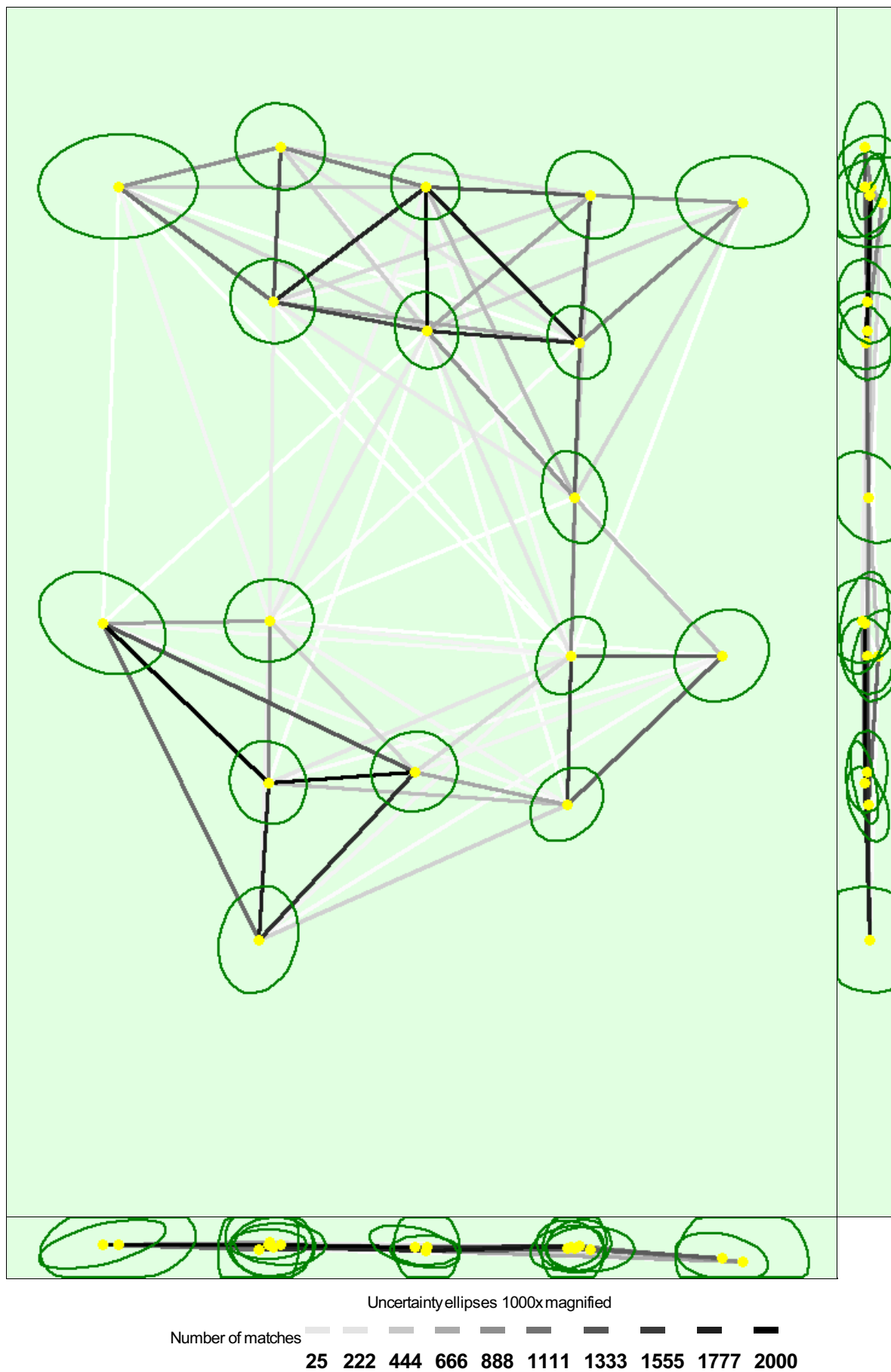


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty of the bundle block adjustment result.

## ? Relative camera position and orientation uncertainties



X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
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Mean	0.016	0.016	0.011	0.017	0.012	0.005
Sigma	0.005	0.002	0.005	0.006	0.005	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	0.00	0.00	0.00
-3.00	0.00	52.94	52.94	47.06
0.00	3.00	47.06	47.06	52.94
3.00	6.00	0.00	0.00	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]		0.000001	-0.000384	-0.001238
Sigma [m]		0.291532	0.728266	0.845155
RMS Error [m]		0.291532	0.728266	0.845156

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]	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.

## Initial Processing Details

### System Information

Hardware	CPU: Intel(R) Core(TM) i7-9750H CPU @ 2.60GHz RAM: 16GB GPU: Intel(R) UHD Graphics 630 (Driver: 27.20.100.9316), NMDIA Quadro T1000 (Driver: 31.0.15.1713)
Operating System	Windows 10 Pro, 64-bit

### Coordinate Systems

Image Coordinate System	WGS 84
Output Coordinate System	WGS 84 / UTMzone 32N

## 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

## 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
Time for Point Cloud Densification	01m:11s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	01m:17s

### Results



Number of Generated Tiles	1
Number of 3D Densified Points	2152239
Average Density (per m <sup>3</sup> )	33.57