

# Quality Report



Generated with PIX4Dmapper version 4.8.3 Preview



**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



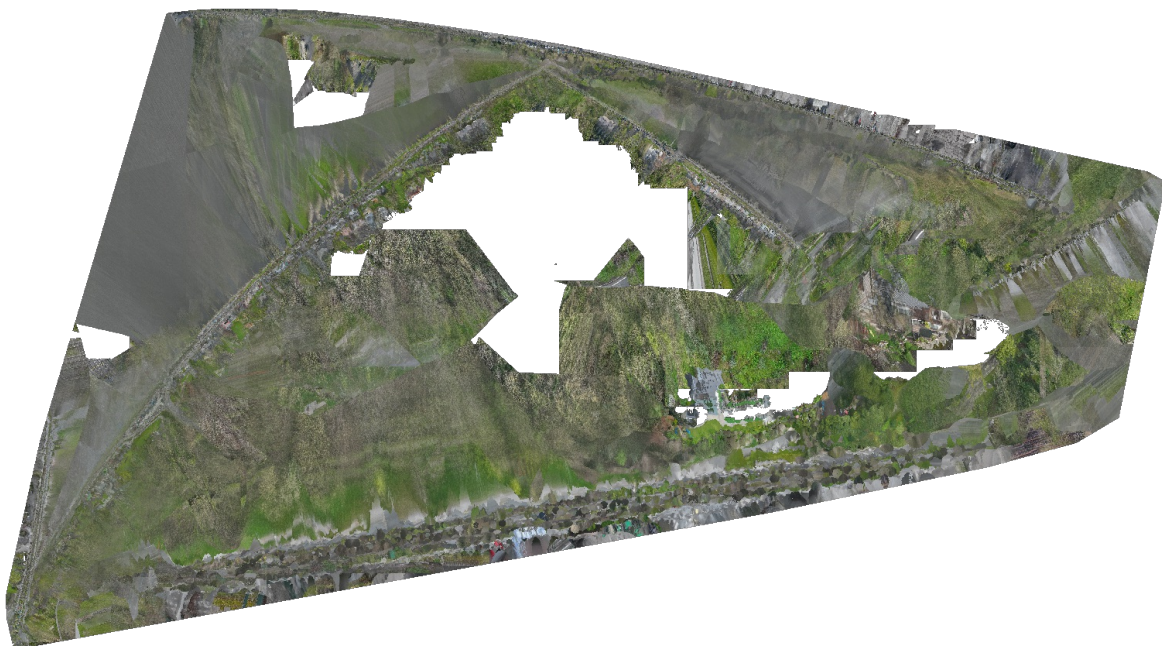
Project	Area Apt2
Processed	2023-04-05 13:41:09
Camera Model Name(s)	M3E_12.3_5280x3956 (RGB)
Average Ground Sampling Distance (GSD)	0.31 cm / 0.12 in
Area Covered	0.030 km <sup>2</sup> / 2.9850 ha / 0.01 sq. mi. / 7.3800 acres
Time for Initial Processing (without report)	02h:38m:40s

## Quality Check



<b>Images</b>	median of 5643 keypoints per image	
<b>Dataset</b>	2783 out of 2794 images calibrated (99%), all images enabled, 6 blocks	
<b>Camera Optimization</b>	23.54% relative difference between initial and optimized internal camera parameters	
<b>Matching</b>	median of 1008.49 matches per calibrated image	
<b>Georeferencing</b>	yes, no 3D GCP	

## Preview



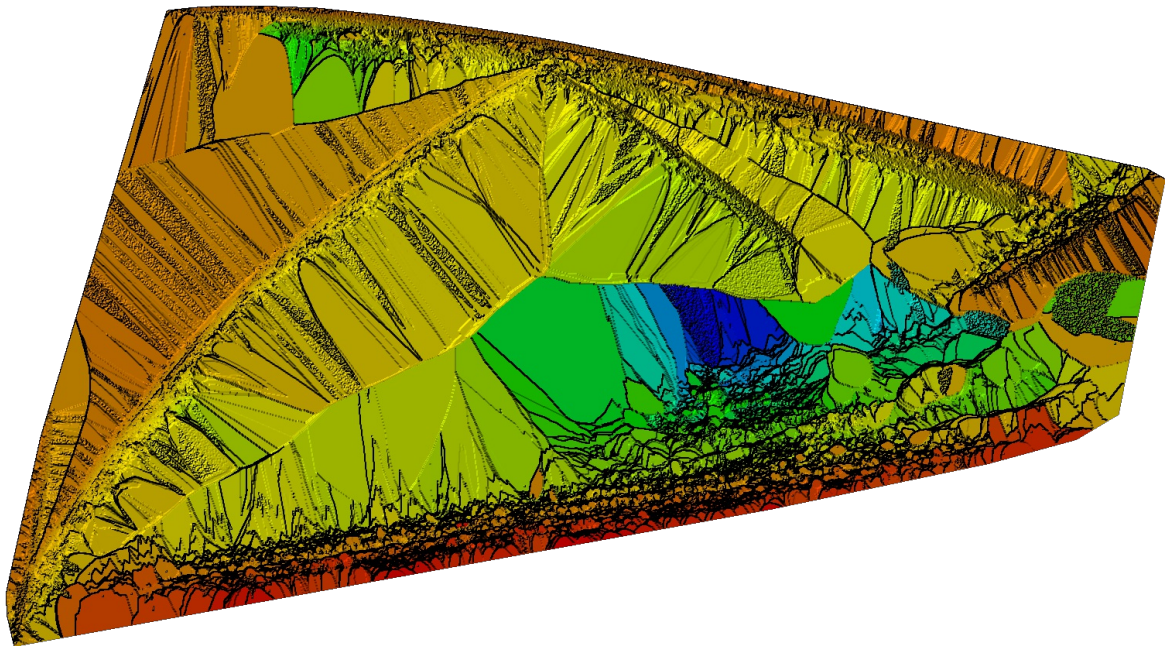


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

## Calibration Details

Number of Calibrated Images	2783 out of 2794
Number of Geolocated Images	2794 out of 2794

### Initial Image Positions

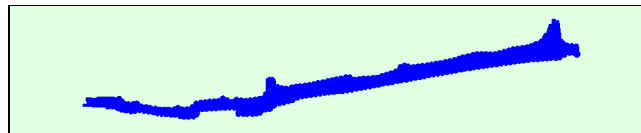


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

### Computed Image/GCPs/Manual Tie Points Positions

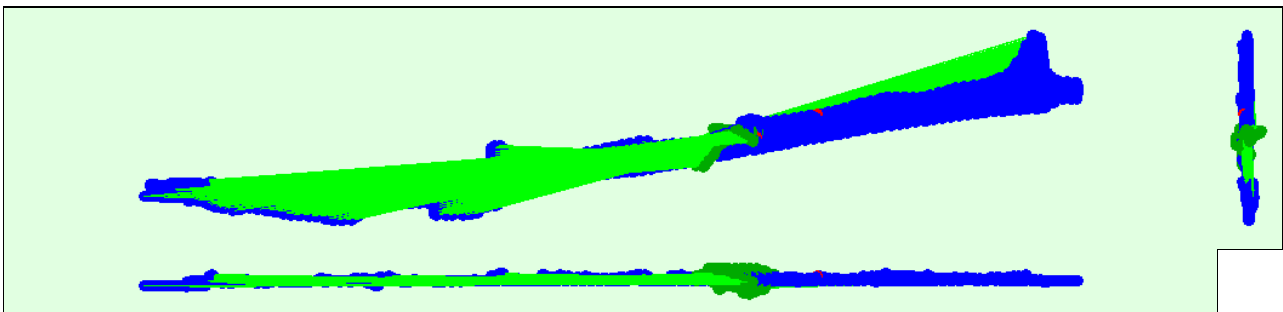


Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Red dots indicate disabled or uncalibrated images.

### Absolute camera position and orientation uncertainties

Uncertainty computation failed.

### Overlap

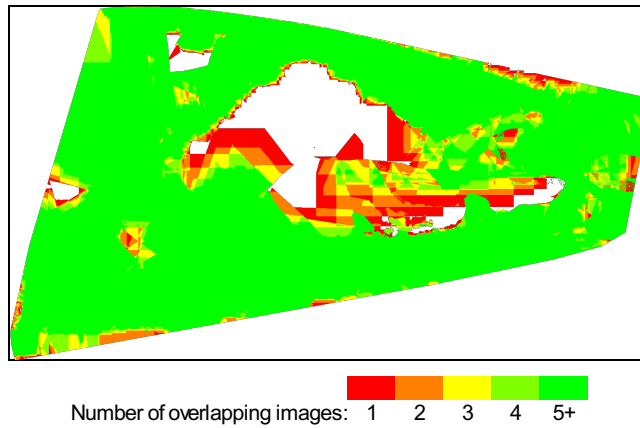


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

## Bundle Block Adjustment Details

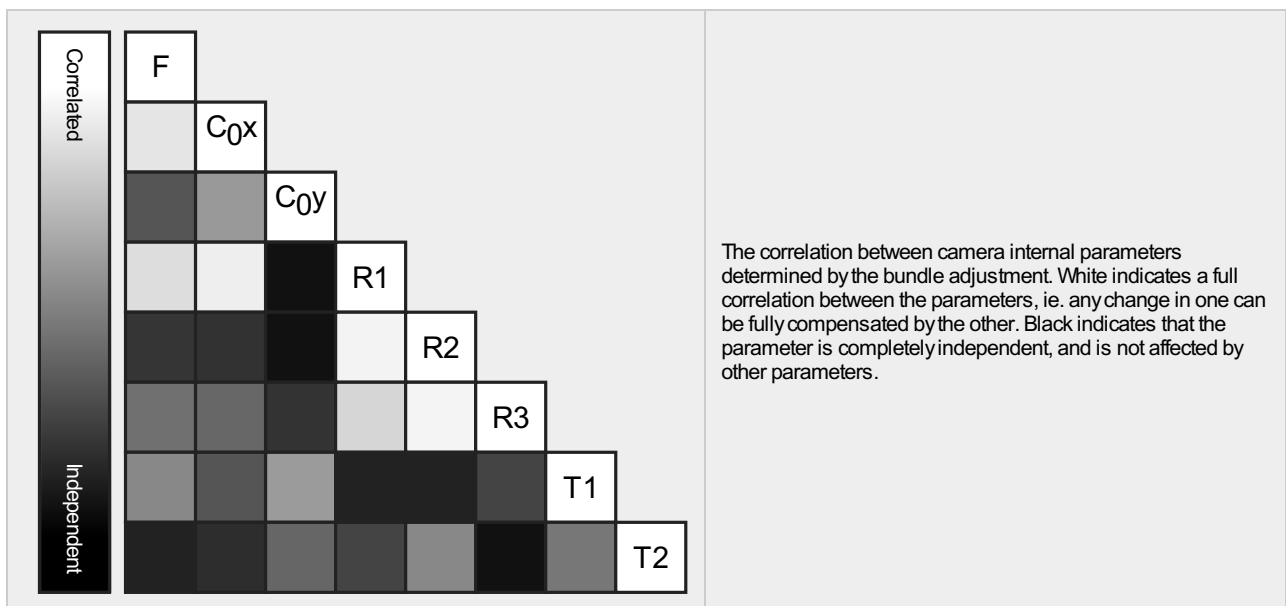
Number of 2D Keypoint Observations for Bundle Block Adjustment	2729358
Number of 3D Points for Bundle Block Adjustment	789876
Mean Reprojection Error [pixels]	0.106

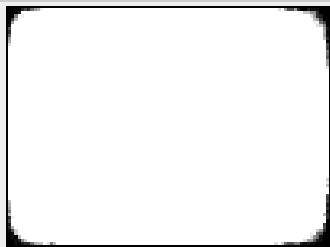
### Internal Camera Parameters

M3E\_12.3\_5280x3956 (RGB). Sensor Dimensions: 17.424 [mm] x 13.055 [mm]

EXIF ID: M3E\_0.2mmf/2.8\_12.3\_5280x3956

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3720.980 [pixel] 12.279 [mm]	2644.890 [pixel] 8.728 [mm]	1967.940 [pixel] 6.494 [mm]	-0.111	0.012	-0.027	-0.000	-0.000
Optimized Values	4597.214 [pixel] 15.171 [mm]	2581.571 [pixel] 8.519 [mm]	1972.468 [pixel] 6.509 [mm]	-0.001	-0.081	0.199	-0.000	0.002
Uncertainties (Sigma)	59.057 [pixel] 0.195 [mm]	6.142 [pixel] 0.020 [mm]	2.114 [pixel] 0.007 [mm]	0.004	0.020	0.035	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. 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	5643	1008
Min	2856	19
Max	7220	2255
Mean	5569	981

## ? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	507382
In 3 Images	127448
In 4 Images	52113
In 5 Images	26941
In 6 Images	15963
In 7 Images	10773
In 8 Images	7499
In 9 Images	5531
In 10 Images	4303
In 11 Images	3550
In 12 Images	2852
In 13 Images	2417
In 14 Images	2096
In 15 Images	1735
In 16 Images	1590
In 17 Images	1368
In 18 Images	1215
In 19 Images	1101
In 20 Images	1009
In 21 Images	931
In 22 Images	882
In 23 Images	843
In 24 Images	792
In 25 Images	732
In 26 Images	687
In 27 Images	703
In 28 Images	650
In 29 Images	622
In 30 Images	578
In 31 Images	546
In 32 Images	540
In 33 Images	476
In 34 Images	469
In 35 Images	450
In 36 Images	465
In 37 Images	403
In 38 Images	348
In 39 Images	294
In 40 Images	283

In 41 Images	218
In 42 Images	207
In 43 Images	185
In 44 Images	138
In 45 Images	148
In 46 Images	104
In 47 Images	65
In 48 Images	54
In 49 Images	46
In 50 Images	30
In 51 Images	21
In 52 Images	22
In 53 Images	20
In 54 Images	11
In 55 Images	7
In 56 Images	3
In 57 Images	3
In 58 Images	2
In 59 Images	1
In 60 Images	5
In 61 Images	2
In 62 Images	1
In 70 Images	1
In 101 Images	1
In 103 Images	1

## 2D Keypoint Matches

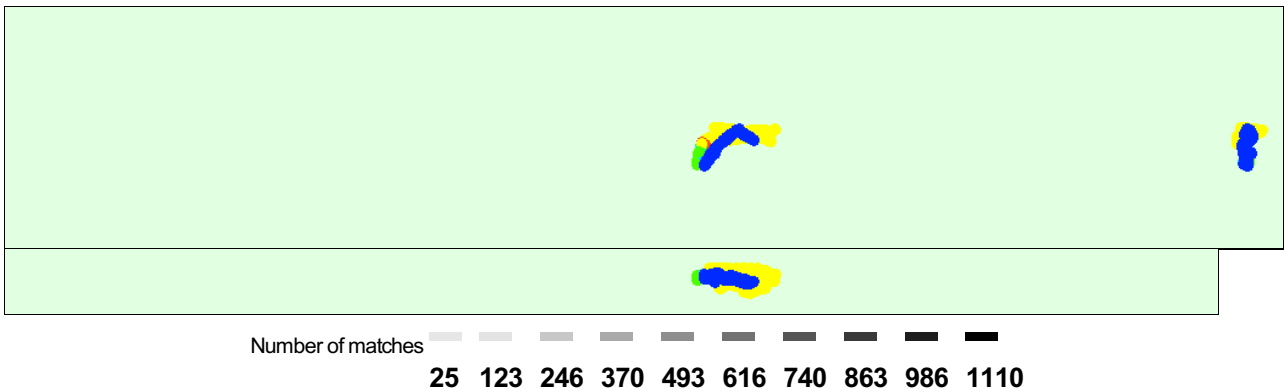


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

## Geolocation Details

### Absolute Geolocation Variance

Mn Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-0.04	0.00	5.26	0.00
-0.04	-0.03	0.00	0.00	0.00
-0.03	-0.02	5.26	0.00	0.00
-0.02	-0.01	0.00	5.26	5.26
-0.01	-0.01	0.00	5.26	0.00
-0.01	0.00	57.89	36.84	31.58
0.00	0.01	26.32	15.79	47.37
0.01	0.01	5.26	15.79	15.79

0.01	0.02	0.00	5.26	0.00
0.02	0.03	5.26	0.00	0.00
0.03	0.04	0.00	5.26	0.00
0.04	-	0.00	5.26	0.00
<b>Mean [m]</b>		-0.000010	0.000084	0.000540
<b>Sigma [m]</b>		0.008493	0.019630	0.005173
<b>RMS Error [m]</b>		0.008493	0.019631	0.005201

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]	89.47	73.68	100.00
[-2.00, 2.00]	100.00	84.21	100.00
[-3.00, 3.00]	100.00	94.74	100.00
<b>Mean of Geolocation Accuracy [m]</b>	0.013323	0.013323	0.020828
<b>Sigma of Geolocation Accuracy [m]</b>	0.000591	0.000591	0.001114

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

Geolocation Orientational Variance	RMS [degree]
Omega	73.617
Phi	17.048
Kappa	7.517

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) i9-10900X CPU @ 3.70GHz RAM: 64GB GPU: NVIDIA Quadro RTX 4000 (Driver: 31.0.15.3141)
Operating System	Windows 11, 64-bit

## Coordinate Systems

Image Coordinate System	IRENET95 / Irish Transverse Mercator
Output Coordinate System	IRENET95 / Irish Transverse Mercator

## Processing Options

Detected Template	No Template Available
Keypoints Image Scale	Rapid, Image Scale: 0.25
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, no