

# Quality Report



Generated with Pix4Dmapper version 4.6.4



**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	25%_mgeom_mgcp_8
Processed	2021-05-12 13:47:06
Camera Model Name(s)	Insta360Pro_1.9_7680x3840 (RGB)
Average Ground Sampling Distance (GSD)	0.89 cm / 0.35 in
Time for Initial Processing (without report)	22m:53s

## Quality Check



Images	median of 24957 keypoints per image	
Dataset	268 out of 268 images calibrated (100%), all images enabled	
Camera Optimization	0% relative difference between initial and optimized internal camera parameters	
Matching	median of 193.856 matches per calibrated image	
Georeferencing	yes, 30 GCPs (30 3D), mean RMS error = 0.082 m	

## Calibration Details



Number of Calibrated Images	268 out of 268
Number of Geolocated Images	0 out of 268



### Initial Image Positions

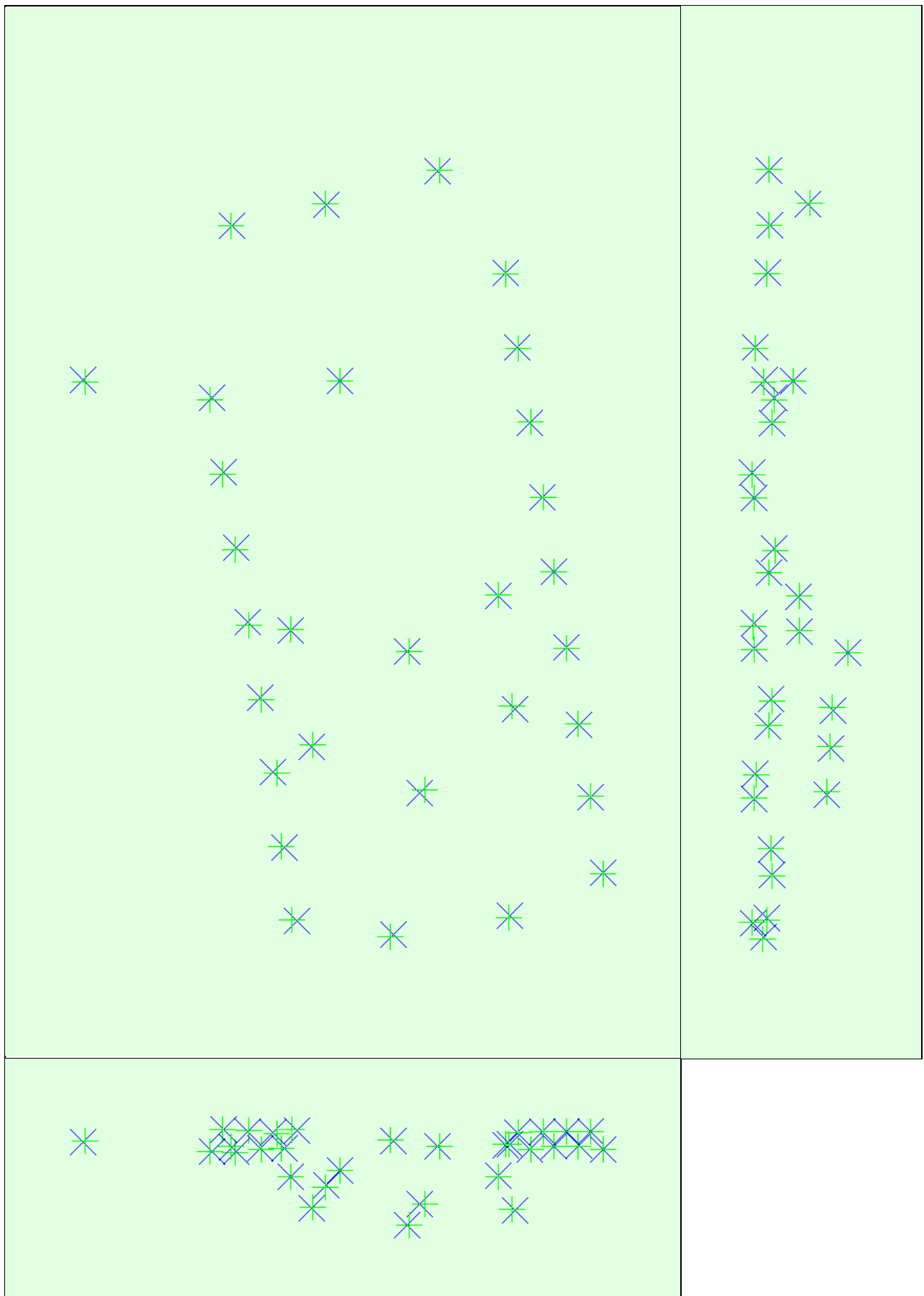


The preview is not generated for images without geolocation.



### 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). Dark green ellipses indicate the absolute position uncertainty of the bundle block adjustment result.

	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.005	0.005	0.004	0.120	0.019	0.049
Sigma	0.001	0.002	0.001	0.226	0.005	0.248

# Bundle Block Adjustment Details



Number of 2D Keypoint Observations for Bundle Block Adjustment	52727
Number of 3D Points for Bundle Block Adjustment	12231
Mean Reprojection Error [pixels]	0.529

## ? Internal Camera Parameters



EXIF ID: Insta360Pro\_1.9\_7680x3840

It is a spherical camera and it doesn't have internal 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 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	24957	194
Mn	16023	44
Max	30554	349
Mean	24240	197

## ? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	8139
In 3 Images	1820
In 4 Images	611
In 5 Images	300
In 6 Images	226
In 7 Images	149
In 8 Images	115
In 9 Images	98
In 10 Images	87
In 11 Images	68
In 12 Images	51
In 13 Images	39
In 14 Images	33
In 15 Images	36
In 16 Images	32
In 17 Images	22
In 18 Images	18
In 19 Images	17
In 20 Images	20
In 21 Images	13
In 22 Images	14

In 23 Images	16
In 24 Images	23
In 25 Images	14
In 26 Images	12
In 27 Images	15
In 28 Images	5
In 29 Images	8
In 30 Images	9
In 31 Images	5
In 32 Images	8
In 33 Images	7
In 34 Images	6
In 35 Images	3
In 36 Images	9
In 37 Images	7
In 38 Images	4
In 39 Images	7
In 40 Images	3
In 42 Images	7
In 44 Images	4
In 45 Images	1
In 46 Images	8
In 47 Images	2
In 48 Images	5
In 49 Images	1
In 50 Images	3
In 51 Images	2
In 52 Images	4
In 53 Images	5
In 54 Images	5
In 55 Images	7
In 56 Images	5
In 57 Images	4
In 58 Images	2
In 59 Images	4
In 60 Images	1
In 61 Images	3
In 62 Images	1
In 63 Images	2
In 64 Images	2
In 65 Images	3
In 66 Images	2
In 68 Images	2
In 70 Images	2
In 71 Images	2
In 73 Images	2
In 75 Images	1
In 76 Images	2
In 77 Images	1
In 78 Images	2
In 79 Images	2
In 80 Images	3
In 81 Images	1
In 82 Images	2
In 83 Images	2
In 84 Images	3
In 85 Images	2
In 86 Images	3
In 87 Images	4

In 88 Images	1
In 89 Images	2
In 91 Images	2
In 92 Images	1
In 94 Images	1
In 95 Images	1
In 96 Images	1
In 97 Images	2
In 98 Images	1
In 100 Images	5
In 101 Images	1
In 103 Images	2
In 104 Images	1
In 105 Images	2
In 108 Images	1
In 109 Images	1
In 111 Images	1
In 112 Images	2
In 113 Images	1
In 114 Images	2
In 115 Images	3
In 116 Images	1
In 117 Images	1
In 119 Images	1
In 121 Images	1
In 123 Images	1
In 131 Images	1
In 132 Images	1
In 136 Images	1
In 159 Images	1

## 2D Keypoint Matches



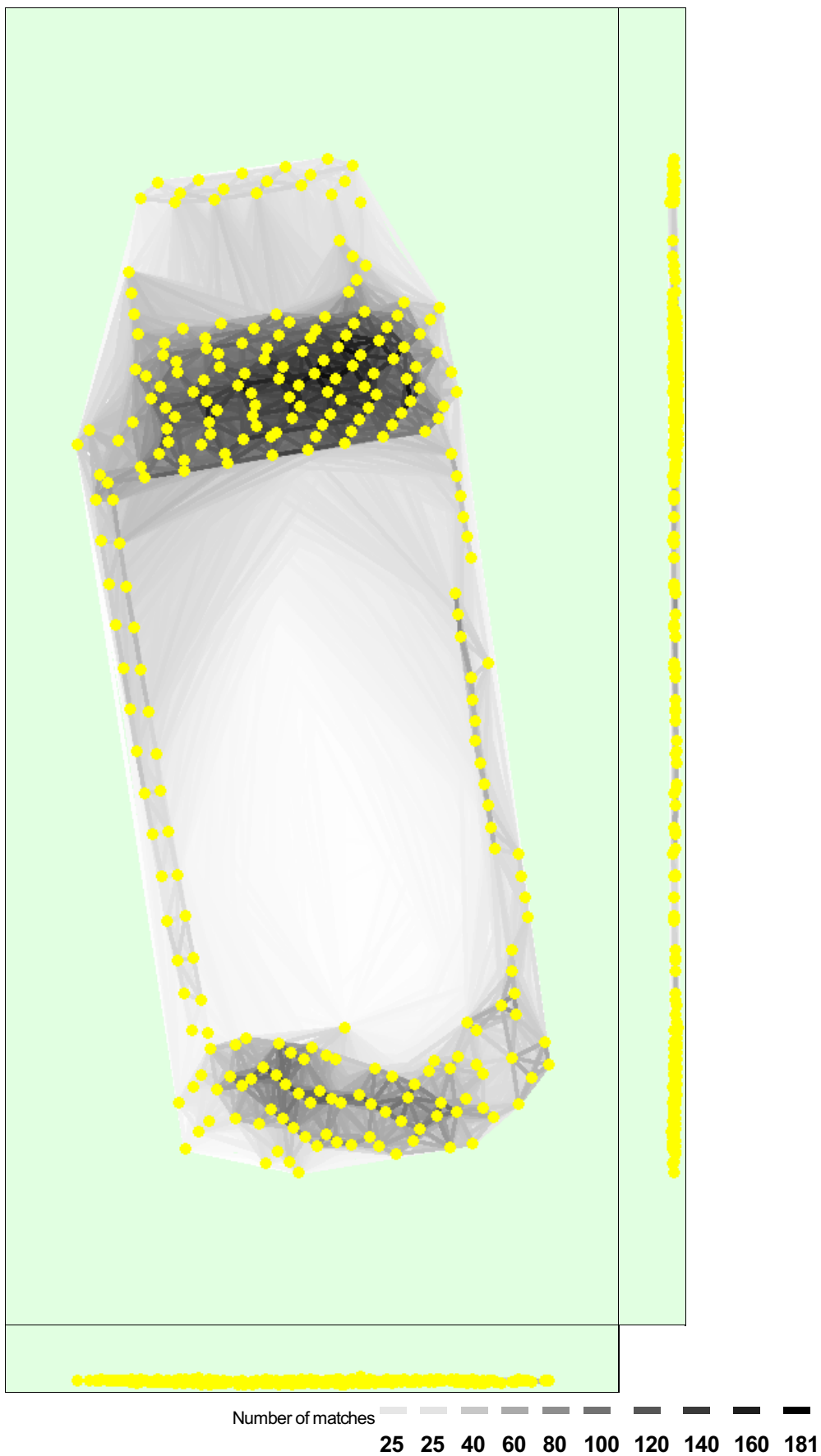


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

## Geolocation Details



GCP Name	Accuracy XY/Z [m]	Error X [m]	Error Y [m]	Error Z [m]	Projection Error [pixel]	Verified/Marked
19 (3D)	0.020/ 0.020	-0.037	0.168	-0.006	3.427	4 / 4
20 (3D)	0.020/ 0.020	0.026	0.107	0.046	8.374	5 / 5
21 (3D)	0.020/ 0.020	0.047	0.094	-0.019	4.870	3 / 3
24 (3D)	0.020/ 0.020	-0.017	0.011	0.008	1.723	8 / 8
6 (3D)	0.020/ 0.020	-0.060	-0.063	0.000	3.354	5 / 5
7 (3D)	0.020/ 0.020	-0.045	-0.047	0.008	1.058	5 / 5
8 (3D)	0.020/ 0.020	-0.009	-0.027	0.042	2.875	5 / 5
9 (3D)	0.020/ 0.020	-0.021	0.040	0.009	2.996	6 / 6
10 (3D)	0.020/ 0.020	0.067	-0.025	0.056	2.427	5 / 5
26 (3D)	0.020/ 0.020	0.129	-0.184	-0.092	1.493	7 / 7
27 (3D)	0.020/ 0.020	-0.302	-0.143	-0.001	2.477	6 / 6
14 (3D)	0.020/ 0.020	0.188	0.134	-0.044	5.663	8 / 8
16 (3D)	0.020/ 0.020	0.175	-0.066	-0.009	11.306	8 / 8
28 (3D)	0.020/ 0.020	-0.030	-0.117	-0.035	2.714	7 / 7
17 (3D)	0.020/ 0.020	-0.296	0.057	0.050	3.891	4 / 4
18 (3D)	0.020/ 0.020	-0.087	0.131	0.043	5.728	3 / 3
4 (3D)	0.020/ 0.020	-0.008	0.033	-0.026	2.943	8 / 8
5 (3D)	0.020/ 0.020	-0.009	0.029	-0.004	3.403	3 / 3
22 (3D)	0.020/ 0.020	0.083	0.102	0.026	4.159	8 / 8
1 (3D)	0.020/ 0.020	0.068	0.003	-0.024	2.101	4 / 4
2 (3D)	0.020/ 0.020	0.046	-0.048	0.100	2.692	8 / 8
3 (3D)	0.020/ 0.020	-0.150	-0.069	-0.014	5.763	8 / 8
13 (3D)	0.020/ 0.020	0.065	0.136	-0.017	5.677	8 / 8
30 (3D)	0.020/ 0.020	-0.103	-0.020	-0.011	2.344	8 / 8
29 (3D)	0.020/ 0.020	0.003	-0.069	0.037	1.348	8 / 8
23 (3D)	0.020/ 0.020	-0.078	0.102	-0.089	3.637	8 / 8
25 (3D)	0.020/ 0.020	-0.005	-0.103	0.019	1.705	8 / 8
11 (3D)	0.020/ 0.020	0.022	-0.089	-0.001	3.535	5 / 5
12 (3D)	0.020/ 0.020	-0.017	0.019	-0.003	2.208	6 / 6
15 (3D)	0.020/ 0.020	0.267	-0.074	-0.049	3.423	8 / 8
Mean [m]		-0.002987	0.000658	-0.000043		
Sigma [m]		0.117598	0.090533	0.040126		
RMS Error [m]		0.117636	0.090535	0.040126		

Localisation accuracy per GCP and mean errors in the three coordinate directions. The last column counts the number of calibrated images where the GCP has been automatically verified v.s. manually marked.

## Initial Processing Details

### System Information

Hardware	CPU: Intel(R) Core(TM) i7-9700K CPU @ 3.60GHz RAM: 16GB GPU: Intel(R) UHD Graphics 630 (Driver: 27.20.100.8681), NVIDIA GeForce RTX2070 (Driver: 27.21.14.6611)
Operating System	Windows 10 Home, 64-bit

### Coordinate Systems

Ground Control Point (GCP) Coordinate System	Arbitrary (m)
Output Coordinate System	Arbitrary (m)

Processing Options



Detected Template	No Template Available
Keypoints Image Scale	Full, Image Scale: 1
Advanced: Matching Image Pairs	Free Flight or Terrestrial
Advanced: Matching Strategy	Use Geometrically Verified Matching: yes
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	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	30m:39s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	06m:55s

Results



Number of Processed Clusters	3
Number of Generated Tiles	1
Number of 3D Densified Points	2171970
Average Density (per m <sup>3</sup> )	1459.3