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	25%_ugeom_mgcp_8
Processed	2021-05-12 14:47:43
Camera Model Name(s)	Insta360Pro_1.9_7680x3840 (RGB)
Average Ground Sampling Distance (GSD)	0.99 cm / 0.39 in
Time for Initial Processing (without report)	20m:49s

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 4557.74 matches per calibrated image		✓
Georeferencing	yes, 30 GCPs (30 3D), mean RMS error = 0.07 m		⚠

Calibration Details

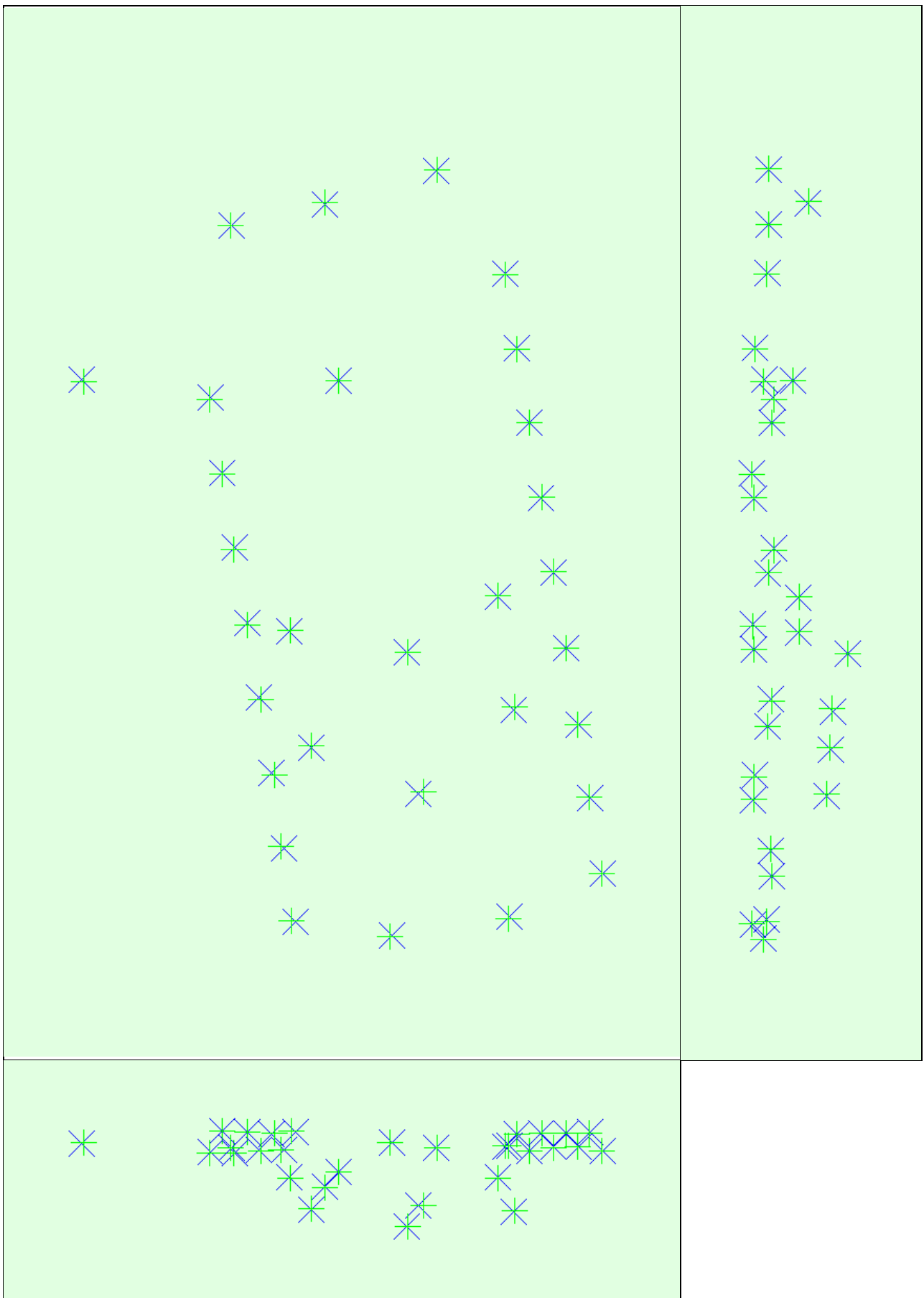|	
Number of Calibrated Images	268 out of 268
Number of Geolocated Images	0 out of 268

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.

Absolute camera position and orientation uncertainties

	X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.004	0.004	0.003	0.101	0.015	0.040
Sigma	0.001	0.001	0.001	0.202	0.003	0.248

Bundle Block Adjustment Details ⓘ

Number of 2D Keypoint Observations for Bundle Block Adjustment	1150363
Number of 3D Points for Bundle Block Adjustment	483186
Mean Reprojection Error [pixels]	0.476

❓ 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 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	24957	4558
Min	16023	856
Max	30554	7038
Mean	24240	4292

❓ 3D Points from 2D Keypoint Matches ⓘ

	Number of 3D Points Observed
In 2 Images	421079
In 3 Images	34976
In 4 Images	11284
In 5 Images	5273
In 6 Images	2888
In 7 Images	1785
In 8 Images	1167
In 9 Images	831
In 10 Images	592
In 11 Images	454
In 12 Images	386
In 13 Images	267
In 14 Images	220
In 15 Images	203
In 16 Images	154
In 17 Images	132
In 18 Images	118
In 19 Images	111
In 20 Images	109
In 21 Images	80
In 22 Images	61

In 23 Images	72
In 24 Images	60
In 25 Images	51
In 26 Images	53
In 27 Images	37
In 28 Images	41
In 29 Images	32
In 30 Images	37
In 31 Images	21
In 32 Images	26
In 33 Images	20
In 34 Images	24
In 35 Images	21
In 36 Images	17
In 37 Images	27
In 38 Images	23
In 39 Images	16
In 40 Images	14
In 41 Images	4
In 42 Images	21
In 43 Images	15
In 44 Images	15
In 45 Images	15
In 46 Images	8
In 47 Images	11
In 48 Images	12
In 49 Images	15
In 50 Images	9
In 51 Images	10
In 52 Images	11
In 53 Images	7
In 54 Images	9
In 55 Images	5
In 56 Images	6
In 57 Images	7
In 58 Images	5
In 59 Images	9
In 60 Images	7
In 61 Images	3
In 62 Images	12
In 63 Images	7
In 64 Images	7
In 65 Images	7
In 66 Images	5
In 67 Images	5
In 68 Images	10
In 69 Images	6
In 70 Images	4
In 71 Images	3
In 72 Images	6
In 73 Images	6
In 74 Images	6
In 75 Images	5
In 76 Images	7
In 77 Images	1
In 78 Images	2
In 79 Images	6
In 80 Images	6
In 81 Images	4

|	
In 82 Images	10
In 83 Images	2
In 84 Images	5
In 85 Images	3
In 86 Images	6
In 87 Images	2
In 88 Images	4
In 89 Images	4
In 91 Images	1
In 92 Images	2
In 93 Images	2
In 95 Images	2
In 96 Images	1
In 97 Images	3
In 98 Images	4
In 99 Images	3
In 100 Images	5
In 101 Images	2
In 102 Images	1
In 103 Images	4
In 104 Images	2
In 105 Images	3
In 106 Images	1
In 107 Images	2
In 109 Images	4
In 110 Images	7
In 111 Images	2
In 112 Images	1
In 113 Images	2
In 116 Images	4
In 117 Images	1
In 118 Images	2
In 119 Images	1
In 120 Images	1
In 121 Images	1
In 122 Images	2
In 124 Images	1
In 136 Images	1
In 147 Images	1

2D Keypoint Matches
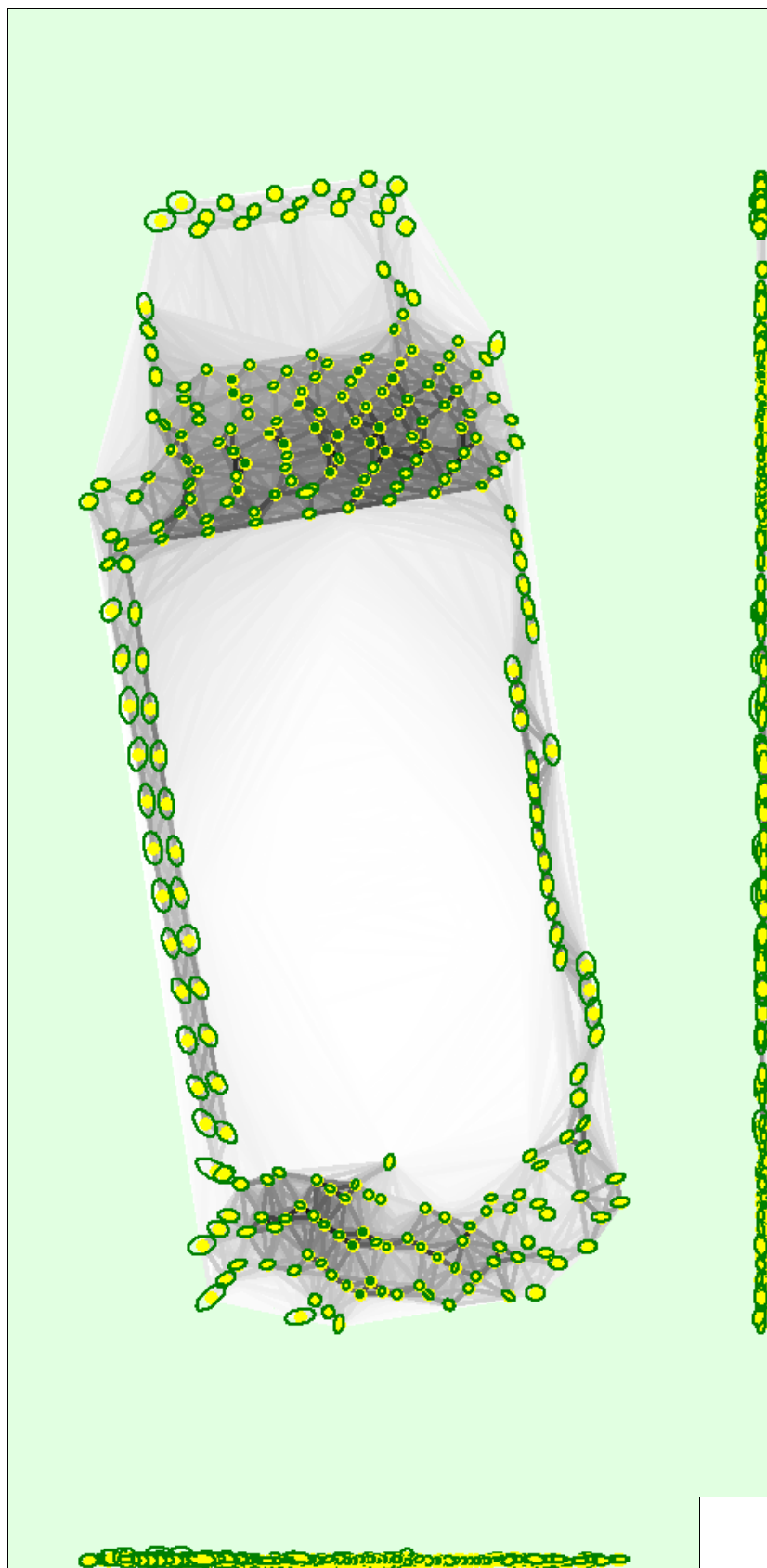
Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.003	0.003	0.002	0.082	0.014	0.032
Sigma	0.001	0.001	0.001	0.160	0.003	0.196

Geolocation Details

Ground Control Points

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	-0.029	0.121	-0.018	3.370	4 / 4
20 (3D)	0.020/ 0.020	0.041	0.097	0.028	3.240	5 / 5
21 (3D)	0.020/ 0.020	0.046	0.083	-0.002	4.345	3 / 3
24 (3D)	0.020/ 0.020	-0.007	0.011	-0.006	2.727	8 / 8
6 (3D)	0.020/ 0.020	-0.035	-0.040	0.023	2.378	5 / 5
7 (3D)	0.020/ 0.020	-0.031	-0.044	0.028	2.014	5 / 5
8 (3D)	0.020/ 0.020	-0.020	-0.026	0.046	1.490	5 / 5
9 (3D)	0.020/ 0.020	-0.027	0.025	0.008	3.585	6 / 6
10 (3D)	0.020/ 0.020	0.045	-0.045	0.046	1.943	5 / 5
26 (3D)	0.020/ 0.020	-0.061	-0.134	-0.044	2.117	7 / 7
27 (3D)	0.020/ 0.020	-0.293	-0.070	-0.008	1.827	6 / 6
14 (3D)	0.020/ 0.020	0.142	0.078	-0.024	4.182	8 / 8
16 (3D)	0.020/ 0.020	0.182	-0.120	0.017	2.798	8 / 8
28 (3D)	0.020/ 0.020	-0.011	-0.098	-0.031	2.320	7 / 7
17 (3D)	0.020/ 0.020	-0.216	0.118	-0.019	2.729	4 / 4
18 (3D)	0.020/ 0.020	-0.083	0.102	0.034	4.856	3 / 3
4 (3D)	0.020/ 0.020	-0.021	0.048	-0.022	2.797	8 / 8
5 (3D)	0.020/ 0.020	-0.026	0.057	-0.006	1.745	3 / 3
22 (3D)	0.020/ 0.020	0.068	0.118	0.045	4.310	8 / 8
1 (3D)	0.020/ 0.020	0.049	-0.013	-0.012	1.412	4 / 4
2 (3D)	0.020/ 0.020	0.001	-0.144	0.043	4.316	8 / 8
3 (3D)	0.020/ 0.020	-0.064	-0.061	-0.019	4.524	8 / 8
13 (3D)	0.020/ 0.020	0.045	0.124	-0.024	4.874	8 / 8
30 (3D)	0.020/ 0.020	-0.072	-0.017	0.005	3.307	8 / 8
29 (3D)	0.020/ 0.020	-0.019	-0.050	0.034	1.363	8 / 8
23 (3D)	0.020/ 0.020	-0.092	0.128	-0.063	4.168	8 / 8
25 (3D)	0.020/ 0.020	-0.005	-0.073	0.015	1.332	8 / 8
11 (3D)	0.020/ 0.020	0.046	-0.060	0.006	2.426	5 / 5
12 (3D)	0.020/ 0.020	0.037	-0.037	-0.011	1.684	6 / 6
15 (3D)	0.020/ 0.020	0.232	-0.060	-0.046	4.180	8 / 8
Mean [m]		-0.005985	0.000563	0.000781		
Sigma [m]		0.098547	0.083187	0.029021		
RMS Error [m]		0.098729	0.083189	0.029032		

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 vs. 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 RTX 2070 (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	🗄 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	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	39m:48s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	06m:57s

Results

Number of Processed Clusters	3
Number of Generated Tiles	1
Number of 3D Densified Points	2575158
Average Density (per m^3)	1130.4