

Quality Report



Generated with Pix4Ddiscovery 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



Click [here](#) for additional tips to analyze the Quality Report

Summary



Project	100%_ugeom_mgcp
Processed	2021-04-07 18:27:11
Camera Model Name(s)	Insta360Pro_1.9_7680x3840 (RGB)
Average Ground Sampling Distance (GSD)	0.69 cm / 0.27 in
Time for Initial Processing (without report)	05h:31m:32s

Quality Check



Images	median of 24911 keypoints per image	
Dataset	1074 out of 1074 images calibrated (100%), all images enabled	
Camera Optimization	0% relative difference between initial and optimized internal camera parameters	
Matching	median of 6947.79 matches per calibrated image	
Georeferencing	yes, 29 GCPs (29 3D), mean RMS error = 0.169 m	

Calibration Details



Number of Calibrated Images	1074 out of 1074
Number of Geolocated Images	0 out of 1074



Initial Image Positions

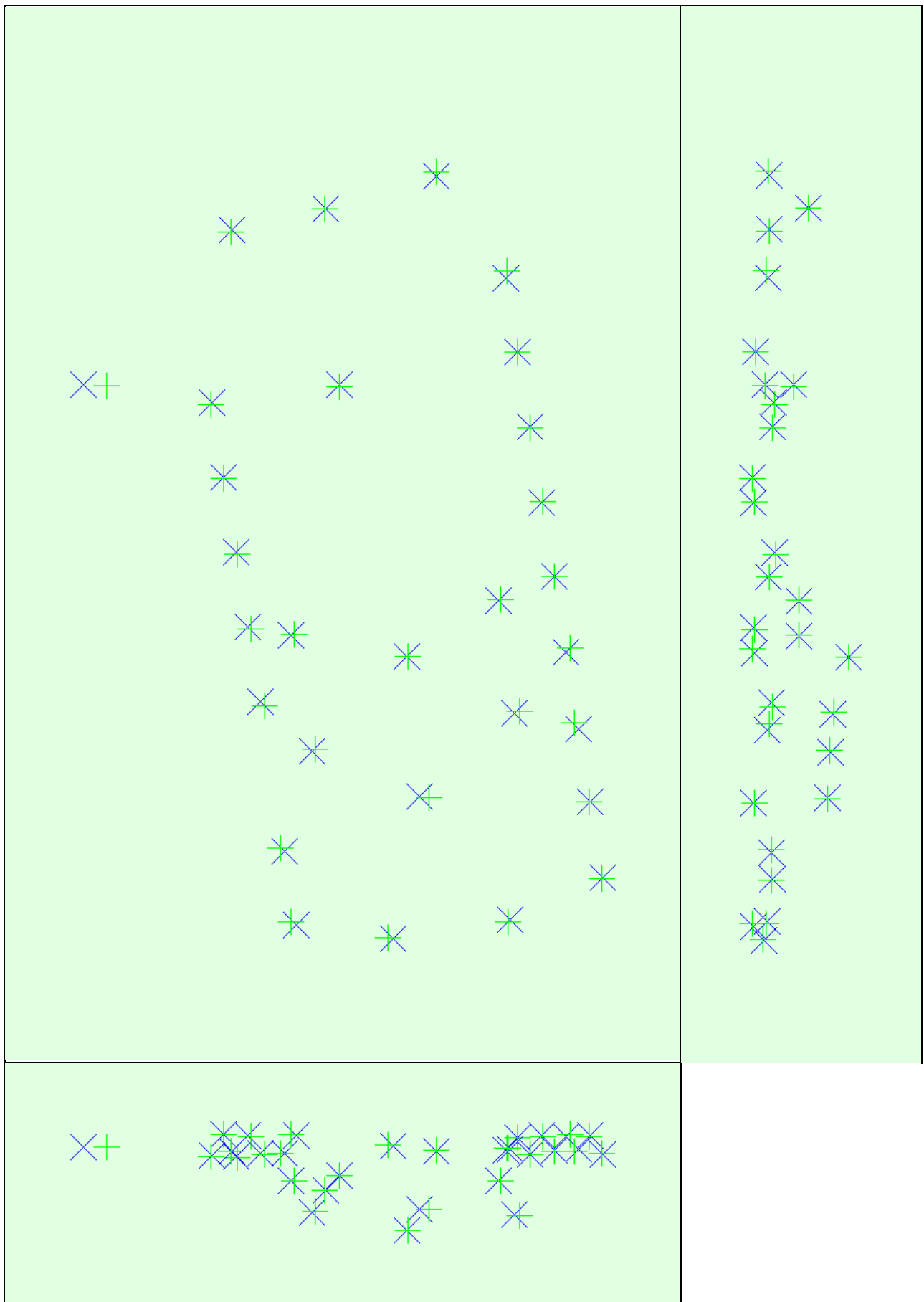


The preview is not generated for images without geolocation.



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	0.004	0.115	0.014	0.055
Sigma	0.001	0.001	0.000	0.317	0.003	0.263

Bundle Block Adjustment Details




Number of 2D Keypoint Observations for Bundle Block Adjustment	7348522
Number of 3D Points for Bundle Block Adjustment	3115812
Mean Reprojection Error [pixels]	0.487

? 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	24911	6948
Mn	15697	519
Max	30913	9720
Mean	24235	6842

? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	2725264
In 3 Images	228674
In 4 Images	70080
In 5 Images	31797
In 6 Images	17246
In 7 Images	10400
In 8 Images	6856
In 9 Images	4683
In 10 Images	3406
In 11 Images	2500
In 12 Images	1951
In 13 Images	1622
In 14 Images	1288
In 15 Images	1061
In 16 Images	955
In 17 Images	668
In 18 Images	652
In 19 Images	543

In 20 Images	455
In 21 Images	416
In 22 Images	337
In 23 Images	300
In 24 Images	291
In 25 Images	273
In 26 Images	240
In 27 Images	206
In 28 Images	188
In 29 Images	174
In 30 Images	167
In 31 Images	147
In 32 Images	139
In 33 Images	118
In 34 Images	115
In 35 Images	132
In 36 Images	101
In 37 Images	103
In 38 Images	85
In 39 Images	78
In 40 Images	91
In 41 Images	77
In 42 Images	66
In 43 Images	59
In 44 Images	74
In 45 Images	58
In 46 Images	45
In 47 Images	52
In 48 Images	59
In 49 Images	41
In 50 Images	42
In 51 Images	45
In 52 Images	31
In 53 Images	34
In 54 Images	49
In 55 Images	35
In 56 Images	29
In 57 Images	32
In 58 Images	20
In 59 Images	32
In 60 Images	29
In 61 Images	26
In 62 Images	33
In 63 Images	31
In 64 Images	18
In 65 Images	16
In 66 Images	15
In 67 Images	21
In 68 Images	14
In 69 Images	20
In 70 Images	25
In 71 Images	12
In 72 Images	9
In 73 Images	16
In 74 Images	20
In 75 Images	21
In 76 Images	13
In 77 Images	13
In 78 Images	14

In 79 Images	12
In 80 Images	11
In 81 Images	9
In 82 Images	9
In 83 Images	20
In 84 Images	9
In 85 Images	14
In 86 Images	7
In 87 Images	15
In 88 Images	12
In 89 Images	10
In 90 Images	6
In 91 Images	7
In 92 Images	15
In 93 Images	8
In 94 Images	13
In 95 Images	8
In 96 Images	7
In 97 Images	6
In 98 Images	8
In 99 Images	13
In 100 Images	11
In 101 Images	9
In 102 Images	6
In 103 Images	11
In 104 Images	7
In 105 Images	7
In 106 Images	8
In 107 Images	6
In 108 Images	4
In 109 Images	5
In 110 Images	8
In 111 Images	3
In 112 Images	5
In 113 Images	7
In 114 Images	2
In 115 Images	4
In 116 Images	6
In 117 Images	6
In 118 Images	5
In 119 Images	9
In 120 Images	3
In 121 Images	5
In 122 Images	5
In 123 Images	5
In 124 Images	5
In 125 Images	3
In 126 Images	2
In 127 Images	3
In 128 Images	5
In 129 Images	3
In 130 Images	4
In 131 Images	3
In 132 Images	5
In 133 Images	4
In 135 Images	4
In 136 Images	5
In 137 Images	6
In 138 Images	1

In 139 Images	2
In 140 Images	4
In 141 Images	6
In 142 Images	4
In 144 Images	2
In 145 Images	5
In 146 Images	3
In 147 Images	3
In 148 Images	4
In 149 Images	4
In 150 Images	2
In 152 Images	1
In 153 Images	2
In 154 Images	3
In 156 Images	3
In 157 Images	5
In 158 Images	2
In 159 Images	4
In 160 Images	1
In 161 Images	1
In 162 Images	5
In 163 Images	5
In 164 Images	3
In 165 Images	2
In 166 Images	2
In 168 Images	1
In 170 Images	1
In 171 Images	1
In 173 Images	6
In 174 Images	3
In 175 Images	3
In 176 Images	1
In 178 Images	2
In 179 Images	3
In 180 Images	1
In 181 Images	2
In 183 Images	1
In 186 Images	1
In 187 Images	3
In 188 Images	1
In 190 Images	6
In 191 Images	1
In 193 Images	1
In 194 Images	2
In 195 Images	1
In 196 Images	1
In 198 Images	2
In 199 Images	1
In 200 Images	2
In 201 Images	5
In 202 Images	2
In 203 Images	3
In 204 Images	3
In 206 Images	2
In 207 Images	1
In 209 Images	2
In 210 Images	3
In 211 Images	1
In 212 Images	1

In 213 Images	3
In 214 Images	4
In 215 Images	1
In 216 Images	1
In 218 Images	1
In 219 Images	4
In 220 Images	2
In 222 Images	2
In 223 Images	2
In 225 Images	2
In 229 Images	1
In 230 Images	2
In 233 Images	3
In 235 Images	2
In 236 Images	1
In 237 Images	1
In 238 Images	1
In 240 Images	1
In 241 Images	2
In 242 Images	1
In 244 Images	1
In 245 Images	2
In 247 Images	2
In 248 Images	1
In 250 Images	2
In 251 Images	4
In 252 Images	2
In 253 Images	1
In 255 Images	1
In 258 Images	3
In 260 Images	1
In 261 Images	2
In 263 Images	2
In 264 Images	1
In 267 Images	2
In 269 Images	1
In 270 Images	2
In 272 Images	1
In 274 Images	1
In 275 Images	1
In 276 Images	1
In 277 Images	1
In 278 Images	1
In 281 Images	3
In 283 Images	1
In 285 Images	2
In 286 Images	1
In 288 Images	1
In 289 Images	1
In 291 Images	2
In 293 Images	1
In 295 Images	1
In 296 Images	1
In 297 Images	3
In 298 Images	2
In 301 Images	2
In 302 Images	1
In 304 Images	2
In 311 Images	1

In 312 Images	1
In 313 Images	1
In 314 Images	1
In 315 Images	1
In 317 Images	1
In 318 Images	2
In 322 Images	1
In 323 Images	1
In 325 Images	3
In 326 Images	1
In 328 Images	2
In 329 Images	2
In 332 Images	1
In 333 Images	1
In 334 Images	1
In 338 Images	2
In 339 Images	1
In 340 Images	1
In 344 Images	2
In 345 Images	1
In 347 Images	1
In 349 Images	2
In 350 Images	1
In 351 Images	1
In 353 Images	1
In 355 Images	1
In 359 Images	1
In 360 Images	1
In 366 Images	3
In 370 Images	1
In 371 Images	1
In 372 Images	1
In 373 Images	2
In 374 Images	1
In 376 Images	1
In 379 Images	1
In 380 Images	1
In 382 Images	1
In 383 Images	3
In 387 Images	2
In 388 Images	1
In 392 Images	1
In 394 Images	1
In 397 Images	2
In 398 Images	1
In 404 Images	2
In 406 Images	1
In 407 Images	1
In 410 Images	1
In 418 Images	1
In 421 Images	1
In 424 Images	2
In 427 Images	2
In 430 Images	1
In 433 Images	1
In 435 Images	2
In 439 Images	1
In 440 Images	2
In 442 Images	2

In 443 Images	1
In 444 Images	1
In 450 Images	2
In 456 Images	1
In 458 Images	1
In 460 Images	1
In 462 Images	1
In 464 Images	1
In 467 Images	1
In 474 Images	1
In 477 Images	1
In 482 Images	1
In 484 Images	1
In 489 Images	1
In 490 Images	1
In 509 Images	1
In 576 Images	1
In 577 Images	1

2D Keypoint Matches



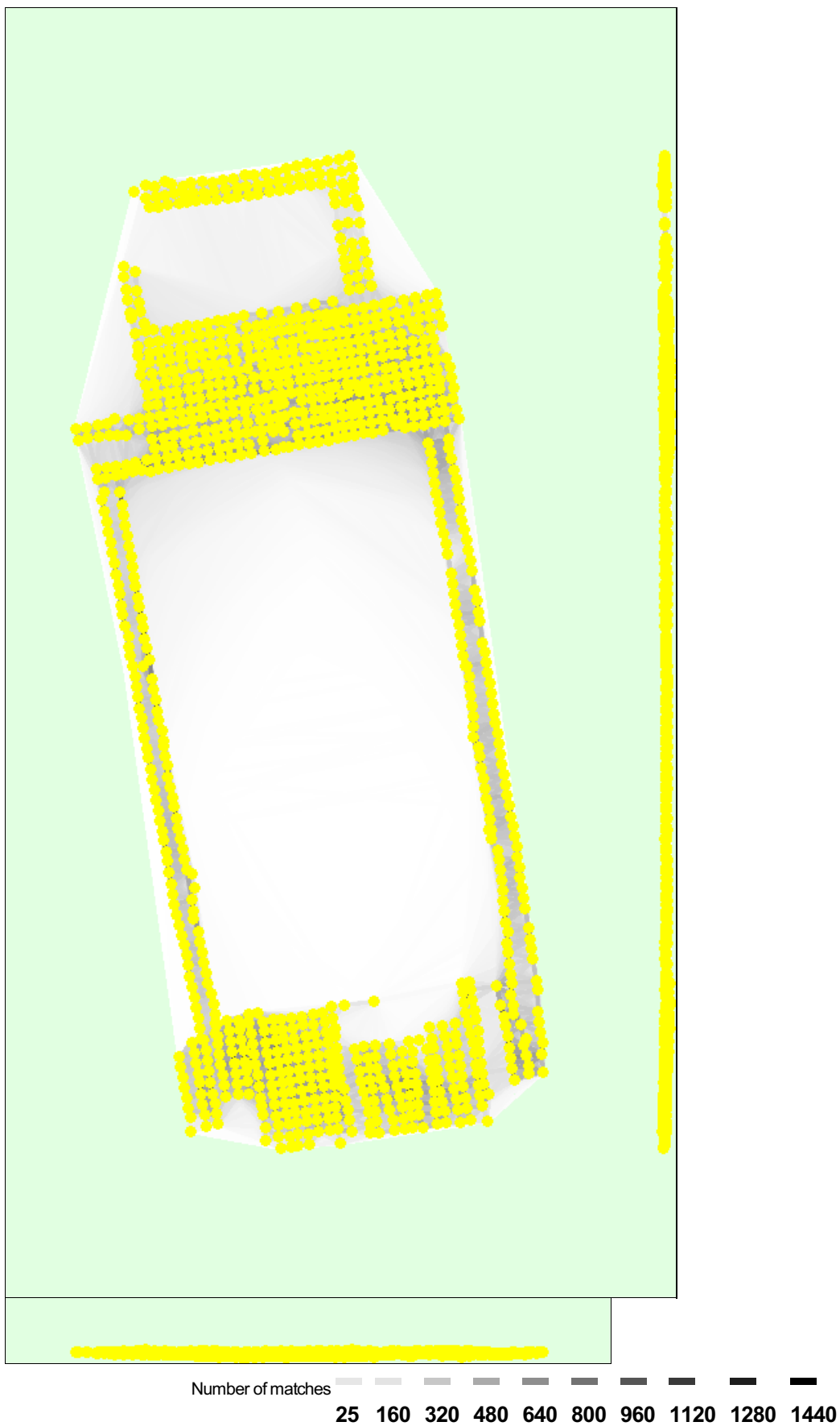


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

Geolocation Details



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	-0.154	0.155	0.014	1.891	2 / 2
20 (3D)	0.020/ 0.020	-0.088	0.160	0.050	3.366	3 / 3
21 (3D)	0.020/ 0.020	-0.015	0.115	0.027	13.222	4 / 4
24 (3D)	0.020/ 0.020	0.010	0.064	0.018	0.622	2 / 2
6 (3D)	0.020/ 0.020	-0.029	0.016	0.041	3.794	4 / 4
7 (3D)	0.020/ 0.020	-0.016	-0.026	0.055	0.864	2 / 2
8 (3D)	0.020/ 0.020	-0.021	-0.020	0.052	1.673	4 / 4
9 (3D)	0.020/ 0.020	-0.222	-0.213	-0.138	2.301	2 / 2
10 (3D)	0.020/ 0.020	0.251	-0.331	0.086	1.642	2 / 2
26 (3D)	0.020/ 0.020	-0.317	-0.129	0.003	0.066	2 / 2
27 (3D)	0.020/ 0.020	-0.534	0.049	0.043	0.110	2 / 2
14 (3D)	0.020/ 0.020	0.281	-0.044	-0.031	3.191	3 / 3
16 (3D)	0.020/ 0.020	0.274	-0.183	-0.022	2.901	3 / 4
28 (3D)	0.020/ 0.020	-0.184	-0.110	-0.059	1.057	2 / 2
17 (3D)	0.020/ 0.020	0.000	0.000	0.000	-1.000	1 / 2
18 (3D)	0.020/ 0.020	-0.252	0.254	0.051	1.750	3 / 3
4 (3D)	0.020/ 0.020	-0.061	-0.385	-0.104	1.929	2 / 2
5 (3D)	0.020/ 0.020	-0.026	0.006	0.008	6.561	2 / 2
22 (3D)	0.020/ 0.020	0.031	0.119	0.026	5.787	4 / 4
1 (3D)	0.020/ 0.020	0.067	0.092	0.007	2.010	2 / 2
2 (3D)	0.020/ 0.020	0.093	-0.039	0.026	2.552	2 / 2
3 (3D)	0.020/ 0.020	0.045	-0.229	-0.033	2.387	2 / 2
13 (3D)	0.020/ 0.020	0.112	0.124	-0.036	8.738	3 / 3
30 (3D)	0.020/ 0.020	-0.015	0.014	0.016	2.987	2 / 2
29 (3D)	0.020/ 0.020	-0.241	-0.042	0.021	2.288	2 / 2
23 (3D)	0.020/ 0.020	-1.402	0.065	-0.011	2.754	2 / 2
25 (3D)	0.020/ 0.020	-0.149	-0.050	0.008	0.234	2 / 2
11 (3D)	0.020/ 0.020	0.070	0.042	0.007	0.122	2 / 2
12 (3D)	0.020/ 0.020	0.090	0.087	-0.026	3.084	3 / 3
15 (3D)	0.020/ 0.020	0.345	-0.147	-0.066	3.097	3 / 3
Mean [m]		-0.070961	-0.020207	0.001150		
Sigma [m]		0.313322	0.146474	0.048290		
RMS Error [m]		0.321257	0.147862	0.048304		

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 RTX 2070 (Driver: 27.21.14.5671)
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	01h:34m:59s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	20m:51s

Results



Number of Processed Clusters	15
Number of Generated Tiles	1
Number of 3D Densified Points	7085390
Average Density (per m ³)	3213.98