

# Quality Report



See [Quality Report Help](#) for detailed explanations. Generated with version 1.0.11

## Summary

Project:	pix4d_pokus_1_6
Processed:	2014-Apr-24 17:47:48
Camera name:	CanonEOS5DMarkIII_EF50mmf1.8II_50.0_5760x3840
Average Ground Sampling Distance (GSD):	2.81 cm
Area covered:	0.0745 km <sup>2</sup> / 7.4522 ha / 0.0288 sq. mi.
Image coordinate system:	S-JTSK / Krovak
Ground Control Point (GCP) coordinate system:	S-JTSK / Krovak
Output coordinate system:	S-JTSK / Krovak
Processing type:	full (scale 1) aerial
Time for Initial Processing (without report):	02m:51s

## Quality Check

Images:	median of 22905 keypoints per image	✓
Dataset:	30 out of 30 images calibrated (100%), all images enabled	✓
Camera optimization quality:	6.1% relative difference between initial and final focal length	⚠
Matching quality:	median of 11426 matches per calibrated image	✓
Georeferencing:	158 GCPs, 0.054 m	✓

## Preview

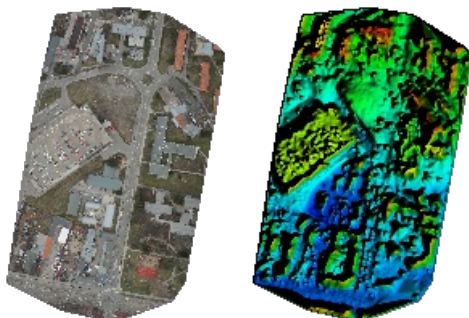
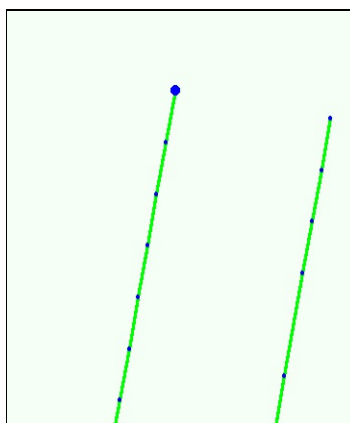


Figure 1: Ortho mosaic and the corresponding sparse digital surface model (DSM) before densification.

## Calibration details

Number of calibrated images:	30 out of 30
Number of geotagged images:	30 out of 30

## Geotag position



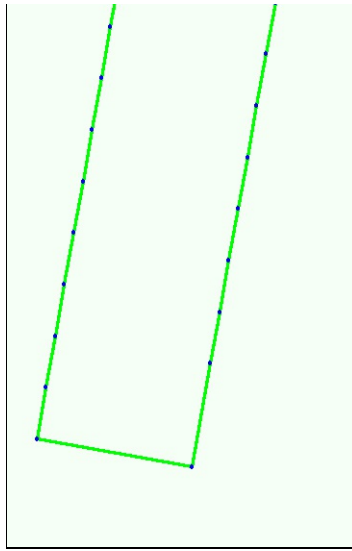


Figure 2: Top view of the geotags. The green line follows the geotags of the images in time starting from the large blue dot.

### Optimized camera position

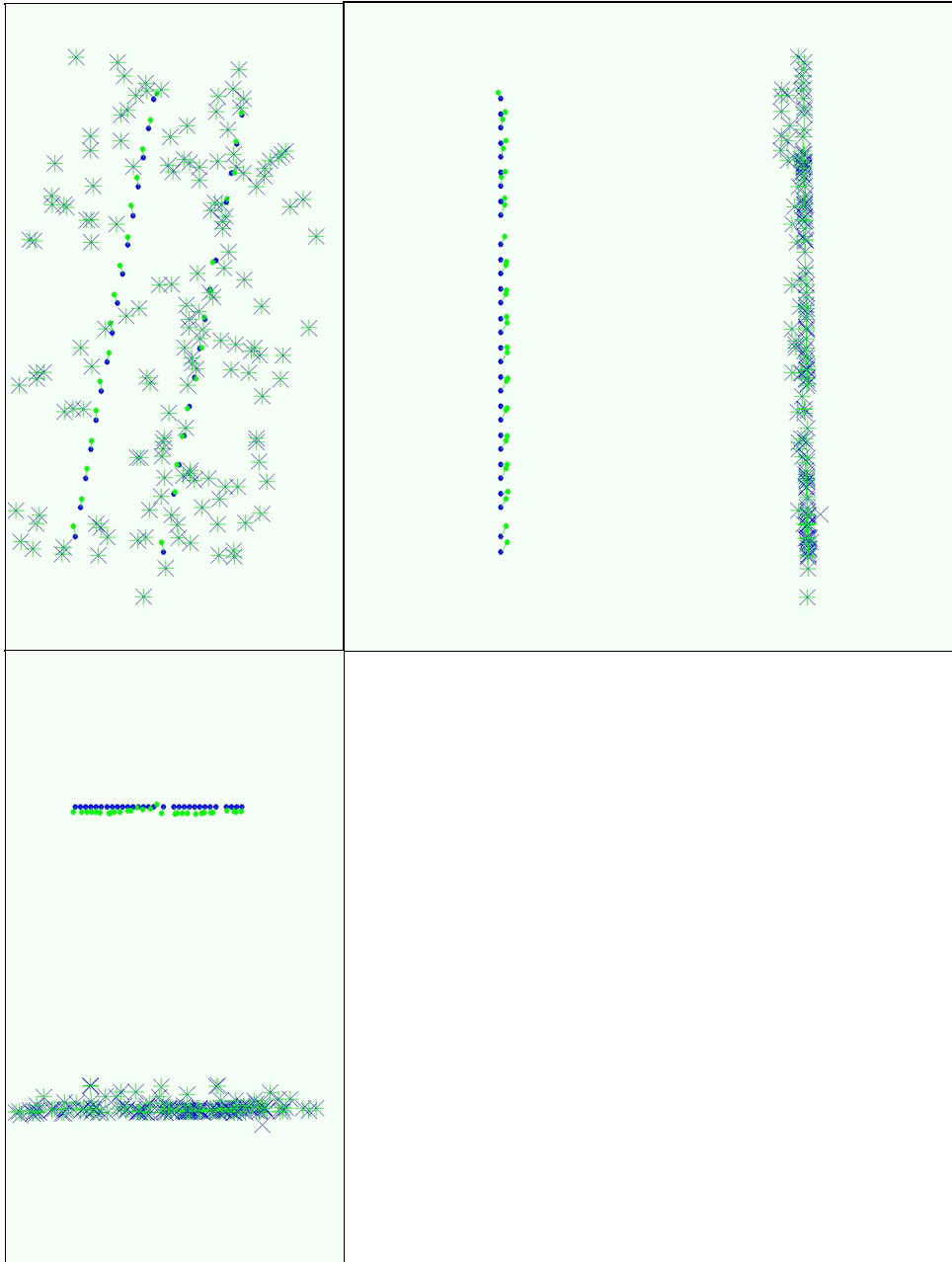


Figure 3: Offset between image geotags (blue dots) and optimized positions (green dots) as well as the offset between the GCPs positions (blue crosses) and their optimized positions (green crosses) in the top-view (XY plane), front-view (XZ plane) and side-view (YZ plane).

## Overlap

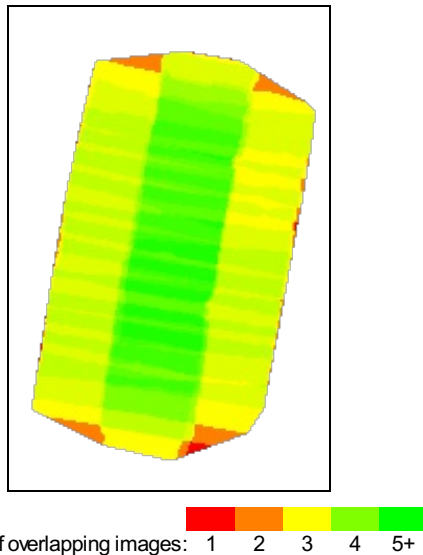


Figure 4: Overlapping score computed for each pixel of the orthomosaic. Red indicates areas where the overlap between the images is too low and could lead to poor results. For good quality results, the overlap should be over 5 images (green) for every pixel of the mosaic.

## Bundle Block Adjustment details

number total keypoint observations (automatic tie points) for bundle block adjustment	346589
number total 3D points for bundle block adjustment	113734
mean reprojection error	0.162379 [pixels]

Internal Camera Parameters 📷 CanonEOS5DMarkIII\_EF50mmf/1.8II\_50.0\_5760x3840. Sensor dimensions: 37.1 [mm] x 24.7 [mm]

EXIF ID: CanonEOS5DMarkIII\_EF50mmf/1.8II\_50.0\_5760x3840

	Focal length	Principal point x	Principal point y	R1	R2	R3	T1	T2
initial values	7831.310 [pix] 50.454 [mm]	2880.002 [pix] 18.555 [mm]	1920.001 [pix] 12.370 [mm]	0.000	0.000	0.000	0.000	0.000
optimized values	8309.264 [pix] 53.533 [mm]	2862.309 [pix] 18.441 [mm]	1919.003 [pix] 12.363 [mm]	-0.077	-0.139	0.099	-0.001	0.000

## 2D Keypoints Table

	Number of 2D keypoints per image	Number of matched 2D keypoints per image
Median	22905	11426
Min	20139	5845
Max	24494	15076
Mean	22659	11553

## 3D points from 2D keypoints matches

	Number of 3D points observed
In 2 images	61900
In 3 images	22476
In 4 images	13219
In 5 images	6655
In 6 images	3080
In 7 images	2556
In 8 images	2177
In 9 images	1288
In 10 images	383

2D Keypoints Graph

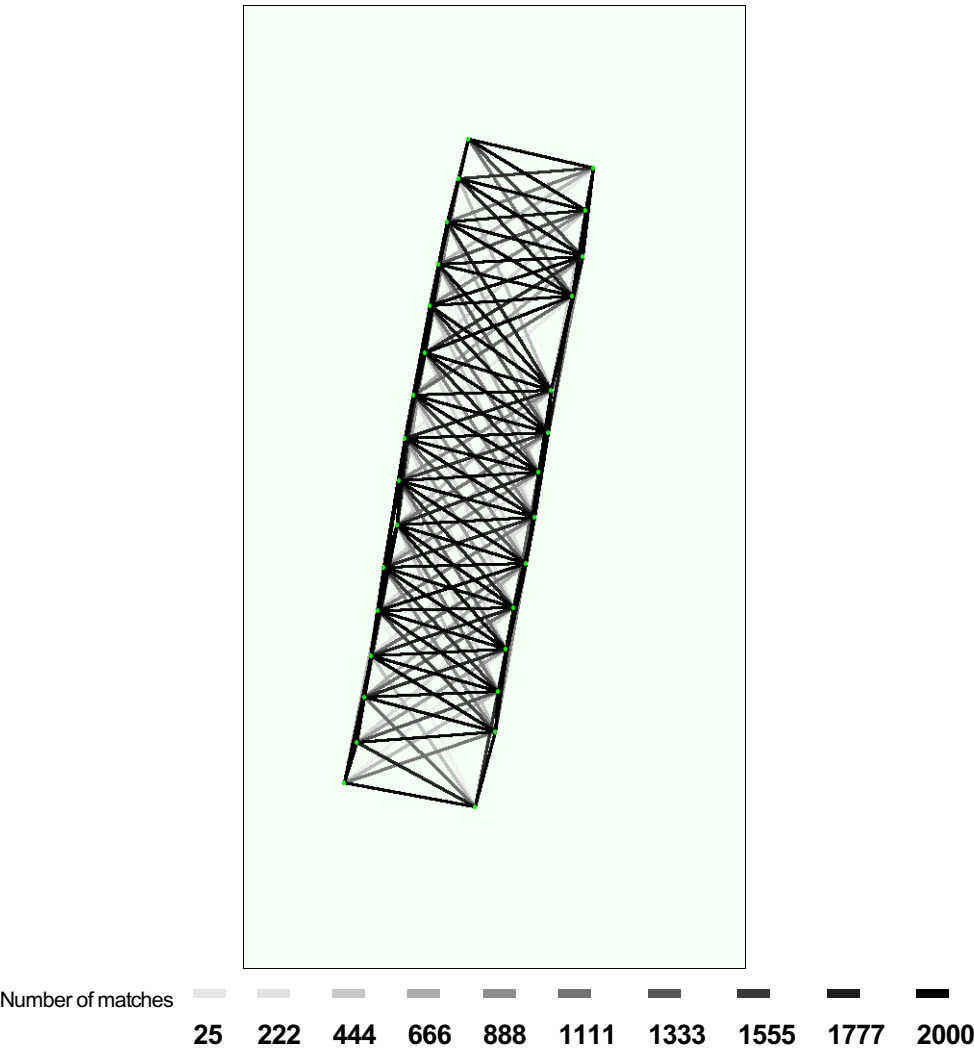


Figure 5: Top view of the geotags with a link between matching images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate low confidence and would require more overlap between the images or better quality images.

Most visible 2D keypoints

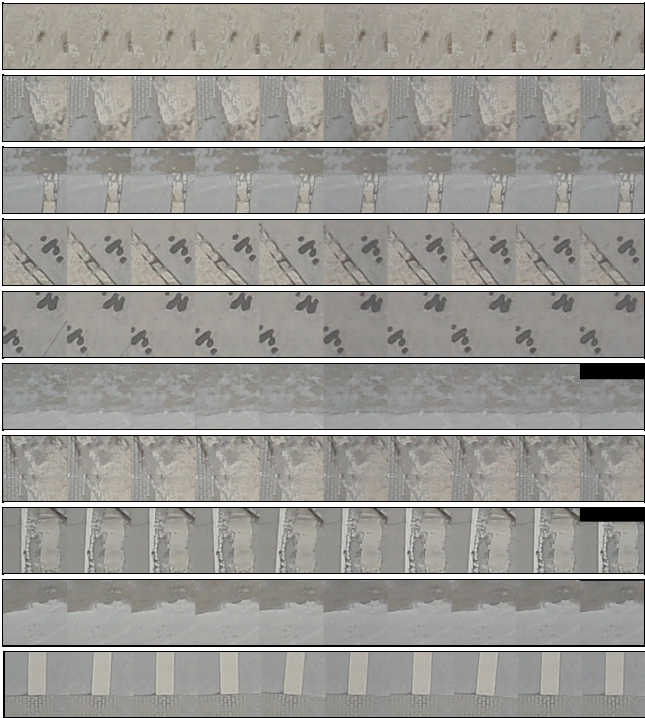


Figure 6: Cropped area of 10 3D points arising from 10 2D keypoints. Each cropped area should represent the same 3D object.

# Geo-location and Ground Control Points

GCP name	tolerance [m]	error X [m]	error Y [m]	error Z [m]	projection error [pixel]	verified/ measured
3D GCP: 1002	0.020	-0.007	0.000	0.035	0.277	7 / 7
3D GCP: 1003	0.020	0.000	-0.018	-0.015	0.262	5 / 5
3D GCP: 1004	0.020	-0.024	0.072	0.053	0.278	3 / 3
3D GCP: 1005	0.020	0.053	-0.014	-0.081	0.207	2 / 2
3D GCP: 1007	0.020	0.024	0.003	-0.030	0.458	9 / 9
3D GCP: 1008	0.020	0.046	0.012	-0.043	0.129	4 / 4
3D GCP: 1009	0.020	-0.054	-0.019	-0.026	0.556	10 / 10
3D GCP: 1010	0.020	0.037	0.036	-0.030	0.422	8 / 8
3D GCP: 1011	0.020	-0.005	0.025	0.062	0.656	8 / 8
3D GCP: 1012	0.020	0.016	-0.000	0.017	0.357	8 / 8
3D GCP: 1013	0.020	0.030	-0.008	-0.057	0.337	8 / 8
3D GCP: 1014	0.020	0.014	-0.021	-0.097	0.390	8 / 8
3D GCP: 1016	0.020	-0.021	-0.012	0.073	0.091	4 / 4
3D GCP: 1017	0.020	-0.008	0.013	0.012	0.068	3 / 3
3D GCP: 1018	0.020	-0.040	-0.047	0.116	0.583	5 / 5
3D GCP: 1019	0.020	-0.005	-0.012	-0.111	0.401	5 / 5
3D GCP: 1020	0.020	-0.027	0.019	0.019	0.564	5 / 5
3D GCP: 1021	0.020	0.010	0.021	0.007	0.359	4 / 4
3D GCP: 1022	0.020	-0.125	0.010	-0.325	0.088	2 / 2
3D GCP: 1023	0.020	-0.060	0.026	-0.103	0.527	3 / 3
3D GCP: 1024	0.020	0.012	0.006	-0.011	0.023	2 / 2
3D GCP: 1029	0.020	0.029	0.055	0.010	0.345	9 / 9
3D GCP: 1030	0.020	-0.048	0.024	0.100	0.448	5 / 5
3D GCP: 1027	0.020	0.066	-0.121	0.005	0.530	5 / 5
3D GCP: 1028	0.020	-0.047	0.001	-0.030	0.557	9 / 9
User CP: 75	0.020				0.311	9 / 9
User CP: 76	0.020				0.188	8 / 8
User CP: 1	0.020				0.338	3 / 3
User CP: 6	0.020				0.098	2 / 2
User CP: 7	0.020				0.021	2 / 2
User CP: 8	0.020				0.045	2 / 2
User CP: 9	0.020				0.160	2 / 2
User CP: 2	0.020				0.111	3 / 3
User CP: 14	0.020				0.608	3 / 3
User CP: 15	0.020				1.105	4 / 4
User CP: 10	0.020				0.464	2 / 2
User CP: 11	0.020				0.170	2 / 2
User CP: 36	0.020				0.306	7 / 7
User CP: 27	0.020				0.235	7 / 7
User CP: 74	0.020				0.243	5 / 5
User CP: 97	0.020				0.491	8 / 8
User CP: 86	0.020				0.526	5 / 5
User CP: 5	0.020				0.872	5 / 5
User CP: 13	0.020				0.666	3 / 3
User CP: 4	0.020				0.268	5 / 5
User CP: 3	0.020				0.973	5 / 5
User CP: 30	0.020				0.330	7 / 7
User CP: 128	0.020				0.299	4 / 4
User CP: 129	0.020				0.258	3 / 3
User CP: 35	0.020				0.119	4 / 4
User CP: 29	0.020				0.111	3 / 3
User CP: 24	0.020				0.341	5 / 5
User CP: 22	0.020				0.431	3 / 3
User CP: 23	0.020				0.015	2 / 2
User CP: 25	0.020				0.427	7 / 7
User CP: 31	0.020				0.253	7 / 7

User CP: 28	0.020				0.494	7 / 7
User CP: 34	0.020				0.969	9 / 9
User CP: 33	0.020				0.800	9 / 9
User CP: 127	0.020				0.522	9 / 9
User CP: 43	0.020				0.585	9 / 9
User CP: 42	0.020				0.706	8 / 8
User CP: 41	0.020				1.525	9 / 9
User CP: 37	0.020				1.095	10 / 10
User CP: 40	0.020				0.590	10 / 10
User CP: 39	0.020				1.937	9 / 9
User CP: 54	0.020				0.605	9 / 9
User CP: 114	0.020				0.647	8 / 8
User CP: 115	0.020				0.370	10 / 10
User CP: 50	0.020				0.987	5 / 5
User CP: 48	0.020				0.579	9 / 9
User CP: 51	0.020				0.677	9 / 9
User CP: 46	0.020				0.680	8 / 8
User CP: 49	0.020				0.495	9 / 9
User CP: 47	0.020				0.354	10 / 10
User CP: 55	0.020				0.558	10 / 10
User CP: 57	0.020				0.174	9 / 9
User CP: 56	0.020				0.286	9 / 9
User CP: 58	0.020				0.485	9 / 9
User CP: 64	0.020				0.344	8 / 8
User CP: 63	0.020				0.648	8 / 8
User CP: 62	0.020				1.012	8 / 8
User CP: 65	0.020				0.614	9 / 9
User CP: 66	0.020				0.792	8 / 8
User CP: 69	0.020				0.518	8 / 8
User CP: 71	0.020				0.439	9 / 9
User CP: 70	0.020				0.428	9 / 9
User CP: 72	0.020				0.377	9 / 9
User CP: 73	0.020				0.319	7 / 7
User CP: 79	0.020				0.422	7 / 7
User CP: 93	0.020				0.326	4 / 4
User CP: 94	0.020				0.166	3 / 3
User CP: 92	0.020				0.011	2 / 2
User CP: 91	0.020				0.344	4 / 4
User CP: mtp106	0.020				0.712	6 / 6
User CP: 77	0.020				0.264	9 / 9
User CP: 78	0.020				0.535	9 / 9
User CP: 84	0.020				0.905	7 / 7
User CP: 100	0.020				0.513	4 / 4
User CP: 103	0.020				0.419	4 / 4
User CP: 104	0.020				0.143	3 / 3
User CP: 109	0.020				0.470	3 / 3
User CP: 106	0.020				0.162	2 / 2
User CP: 105	0.020				0.095	2 / 2
User CP: 108	0.020				0.740	4 / 4
User CP: 107	0.020				0.493	2 / 2
User CP: 110	0.020				0.240	2 / 2
User CP: 99	0.020				0.523	5 / 5
User CP: 98	0.020				0.455	5 / 5
User CP: 102	0.020				0.308	5 / 5
User CP: 113	0.020				0.529	5 / 5
User CP: 112	0.020				0.408	5 / 5
User CP: 111	0.020				0.270	5 / 5
User CP: 148	0.020				0.440	3 / 3
User CP: 149	0.020				0.315	3 / 3
User CP: 101	0.020				0.559	4 / 4

User CP: 87_151	0.020				0.568	4 / 4
User CP: 60	0.020				0.480	9 / 9
User CP: 59	0.020				0.629	10 / 10
User CP: 138	0.020				0.625	10 / 10
User CP: 61	0.020				0.598	5 / 5
User CP: 139	0.020				0.568	4 / 4
User CP: 143	0.020				0.425	4 / 4
User CP: 144	0.020				0.277	4 / 4
User CP: 145	0.020				0.326	5 / 5
User CP: 146	0.020				0.408	5 / 5
User CP: 142	0.020				0.789	5 / 5
User CP: 147	0.020				0.587	5 / 5
User CP: 140	0.020				1.265	5 / 5
User CP: 136	0.020				0.303	4 / 4
User CP: 137	0.020				0.648	3 / 3
User CP: 130	0.020				0.373	4 / 4
User CP: 132	0.020				0.189	4 / 4
User CP: 134	0.020				0.331	4 / 4
User CP: 135	0.020				0.564	5 / 5
User CP: 133	0.020				0.834	4 / 4
User CP: 125	0.020				0.338	5 / 5
User CP: 126	0.020				0.328	4 / 4
User CP: 118	0.020				0.278	3 / 3
User CP: 116	0.020				0.628	4 / 4
User CP: 123	0.020				0.128	5 / 5
User CP: 117	0.020				0.203	4 / 4
User CP: 119	0.020				0.201	5 / 5
User CP: 53	0.020				0.399	4 / 4
User CP: 52	0.020				0.320	5 / 5
User CP: 120	0.020				0.241	5 / 5
User CP: 124	0.020				0.281	4 / 4
User CP: 83	0.020				0.312	3 / 3
User CP: 88	0.020				0.263	3 / 3
User CP: 89	0.020				0.350	4 / 4
User CP: 90	0.020				0.356	4 / 4
User CP: 80	0.020				0.228	4 / 4
User CP: 81	0.020				0.176	4 / 4
User CP: 82	0.020				0.106	3 / 3
User CP: st1	0.020				0.297	4 / 4
User CP: st2	0.020				0.237	7 / 7
User CP: st3	0.020				0.296	3 / 3
User CP: st4	0.020				0.218	4 / 4
<b>Mean</b>		-0.005280	0.001994	-0.017963		
<b>Sigma</b>		0.041623	0.035289	0.085386		

Localisation accuracy of the individual GCP, their mean error distance and the mean errors in the three coordinate directions. The last column counts the number of images where the GCP has been measured (clicked on the images) and on how many of them have been automatically verified.  
0 out of 0 GCPs have been labeled as inaccurate (see Figure below).

### Geotag variance

Geotag localisation variance	sigma m
Longitude direction (x)	1.3399
Latitude direction (y)	5.3567
Altitude direction (z)	4.2690

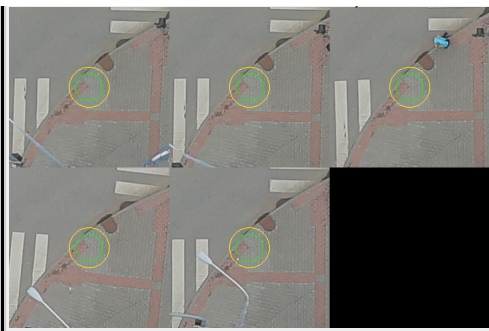
Geotag variance: The difference between the image geotags and the optimized camera positions. Please note that these images geotag errors do not correspond to the accuracy on the observed 3D points.

### Ground control points

GCP name: 1002 (-595956.7050,-1160296.6850,202.3900)	GCP name: 1003 (-595921.8490,-1160304.1050,202.3300)
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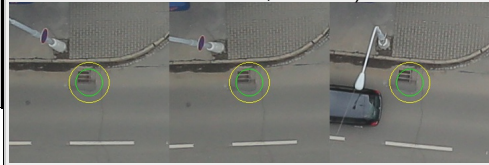


13.JPG  
14.JPG  
15.JPG  
16.JPG  
17.JPG  
19.JPG  
20.JPG



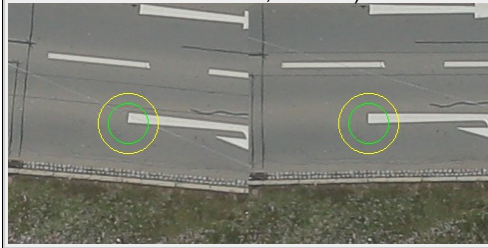
14.JPG  
15.JPG  
16.JPG  
17.JPG  
19.JPG

GCP name: 1004 (-595906.3530,-  
1160327.8920,202.2610)



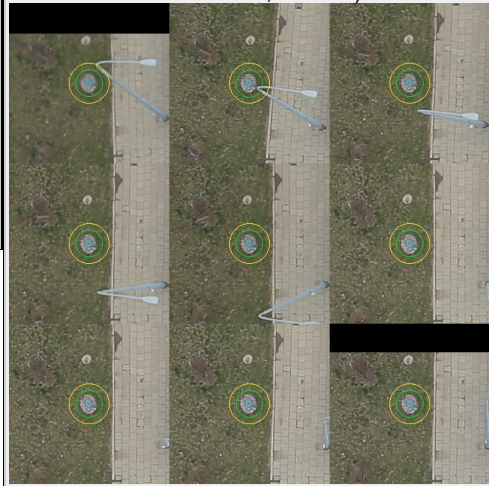
15.JPG  
16.JPG  
17.JPG

GCP name: 1005 (-595865.2910,-  
1160318.1590,202.2860)



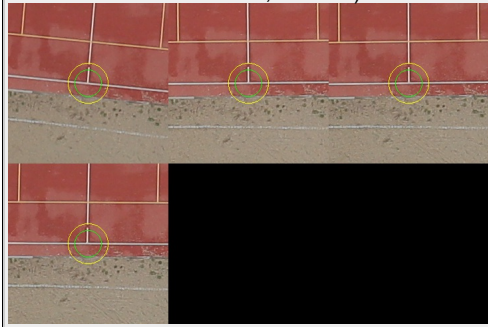
17.JPG  
19.JPG

GCP name: 1007 (-595892.5450,-  
1160256.2010,202.8670)



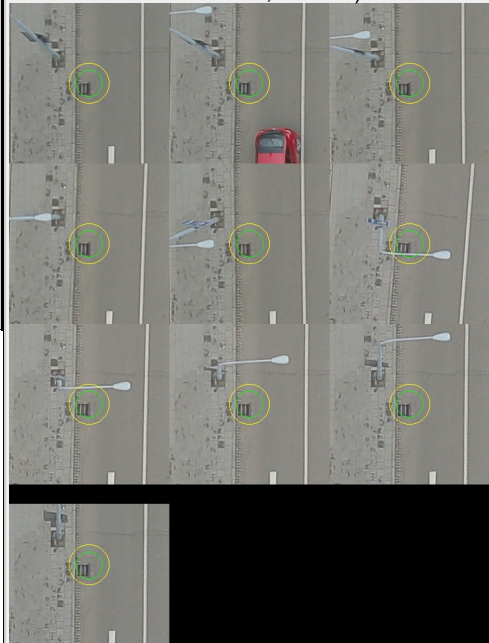
11.JPG  
12.JPG  
13.JPG  
14.JPG  
15.JPG  
19.JPG  
20.JPG  
21.JPG  
22.JPG

GCP name: 1008 (-595864.6750,-  
1160274.3730,202.6340)



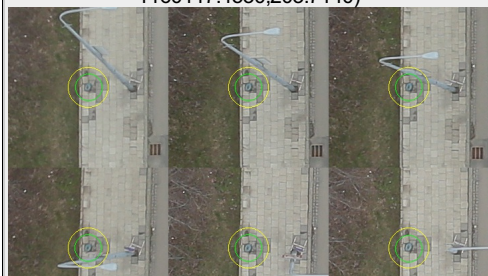
17.JPG  
19.JPG  
20.JPG  
21.JPG

GCP name: 1009 (-595877.4490,-  
1160142.6860,203.2830)



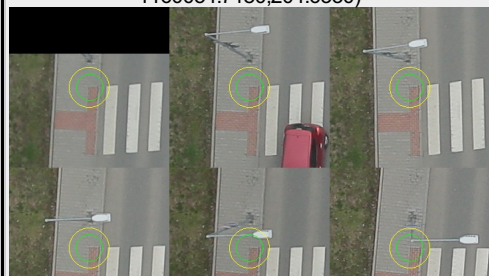
06.JPG  
07.JPG  
08.JPG  
09.JPG  
10.JPG  
23.JPG  
24.JPG  
25.JPG  
26.JPG  
27.JPG

GCP name: 1010 (-595869.6940,-  
1160117.4530,203.7140)

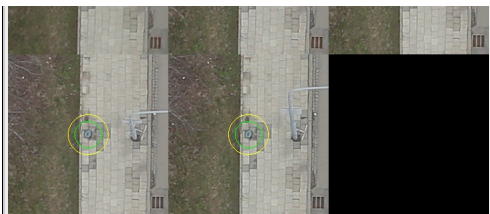

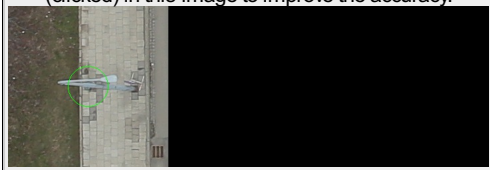

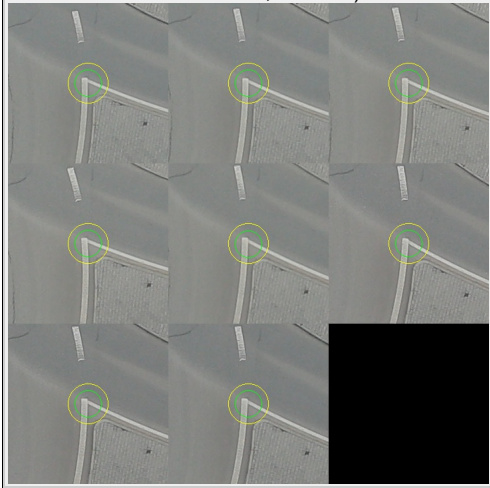
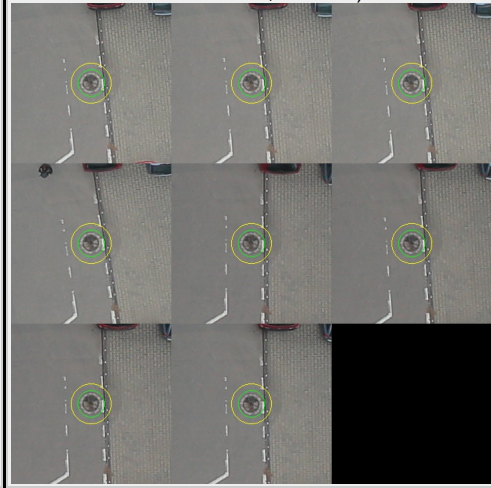









05.JPG  
06.JPG  
07.JPG  
09.JPG  
24.JPG  
25.JPG  
26.JPG

GCP name: 1011 (-595859.9380,-  
1160054.7180,204.6330)



02.JPG  
03.JPG  
04.JPG  
05.JPG  
06.JPG  
27.JPG  
28.JPG

	26.JPG 27.JPG		29.JPG 30.JPG
<p>GCP 1010 was not measured in the following images. If the circle is too far away from the real GCP position, this indicates that the GCP should be also measured (clicked) in this image to improve the accuracy.</p> 		08.JPG	<p>GCP name: 1012 (-595851.4480,-1160016.5490,205.3580)</p>  <p>01.JPG 02.JPG 03.JPG 04.JPG 29.JPG 30.JPG 31.JPG 32.JPG</p>
<p>GCP name: 1013 (-595879.9620,-1160026.6890,204.9920)</p> 	01.JPG 02.JPG 03.JPG 04.JPG 05.JPG 29.JPG 30.JPG 31.JPG	<p>GCP name: 1014 (-595902.6370,-1159992.8130,206.0180)</p> 	01.JPG 02.JPG 03.JPG 04.JPG 29.JPG 30.JPG 31.JPG 32.JPG
<p>GCP name: 1016 (-595813.3430,-1160003.9630,205.8930)</p> 	29.JPG 30.JPG 31.JPG 32.JPG	<p>GCP name: 1017 (-595789.4850,-1160070.2570,205.6500)</p> 	27.JPG 29.JPG 30.JPG
		<p>GCP name: 1018 (-595848.6240,-1159970.1190,205.2730)</p> 	01.JPG 02.JPG 30.JPG 31.JPG 32.JPG
<p>GCP name: 1019 (-595931.2500,-1160016.0220,204.8070)</p> 	01.JPG 02.JPG 03.JPG 04.JPG	<p>GCP name: 1020 (-595992.3510,-1160013.4470,204.8960)</p> 	02.JPG 03.JPG 04.JPG 05.JPG

  	05.JPG	  	06.JPG
<p>GCP name: 1021 (-595967.7160,-1160057.9020,203.7650)</p>     	04.JPG 05.JPG 06.JPG 07.JPG	<p>GCP name: 1022 (-595975.9030,-1159931.1560,209.4080)</p>  	01.JPG 02.JPG
		<p>GCP name: 1023 (-596008.1330,-1160073.7120,203.7370)</p>   	05.JPG 07.JPG 08.JPG
		<p>GCP 1023 was not measured in the following images. If the circle is too far away from the real GCP position, this indicates that the GCP should be also measured (clicked) in this image to improve the accuracy.</p> 	06.JPG
<p>GCP name: 1024 (-595923.4830,-1160350.0910,202.3590)</p>  	16.JPG 17.JPG	<p>GCP name: 1029 (-595901.8530,-1160107.3230,202.9010)</p>         	05.JPG 06.JPG 07.JPG 08.JPG 09.JPG 24.JPG 25.JPG 26.JPG 27.JPG
<p>GCP name: 1030 (-595963.8630,-1160171.3990,202.3690)</p>      	08.JPG 09.JPG 10.JPG 11.JPG 12.JPG	<p>GCP name: 1027 (-595795.0810,-1160141.4280,203.7000)</p>      	23.JPG 24.JPG 25.JPG 26.JPG 27.JPG
<p>GCP name: 1028 (-595928.2600,-1160073.7120,203.7370)</p>			

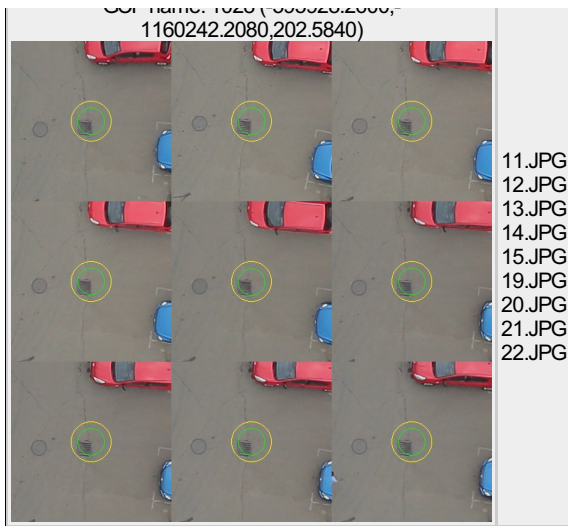


Figure 7: Images in which GCPs have been measured (yellow circle) and in which the 3D point have been projected (green circle). A green circle outside of the yellow circle indicates either an accuracy issue or a GCP issue.