Quality Report

Generated with Pix4Dmapper Pro version 2.0.100

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	198i clip70seg 1sc 3gcp 4mtp HO AP5
Processed	2016-01-26 21:13:54
Average Ground Sampling Distance (GSD)	45.32 cm / 17.84 in

Quality Check

Images	median of 14079 keypoints per image	✓
Dataset	198 out of 198 images calibrated (100%), 11 images disabled	✓
Camera Optimization	0.09% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 8954.08 matches per calibrated image	✓
Georeferencing	yes, 3 GCPs (3 3D), mean RMS error = 2.698 m	⚠

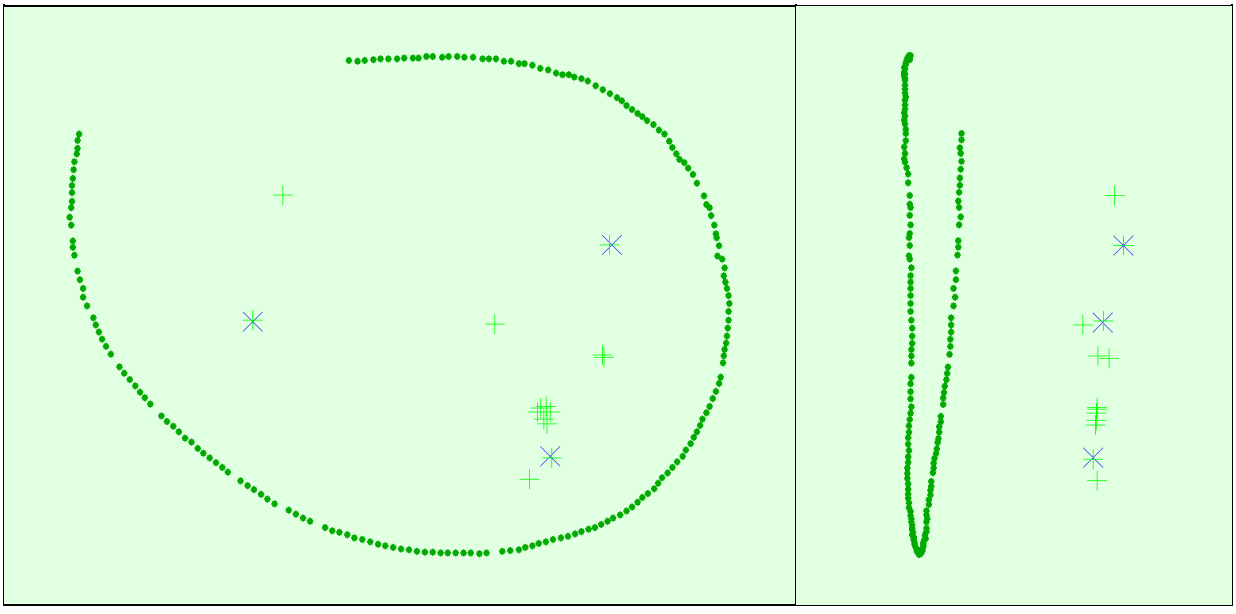
Calibration Details

Number of Calibrated Images	198 out of 209
Number of Geolocated Images	0 out of 209

Initial Image Positions

The preview is not generated for images without geolocation.

Computed Image/GCPs/Manual Tie Points Positions



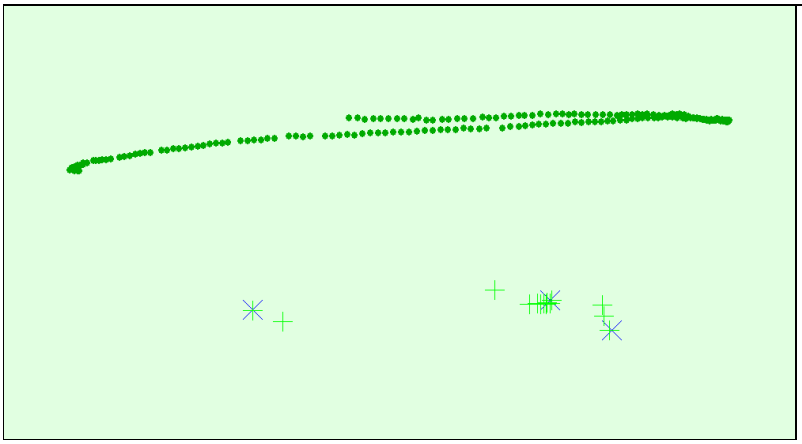


Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Red dots indicate disabled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

Bundle Block Adjustment Details

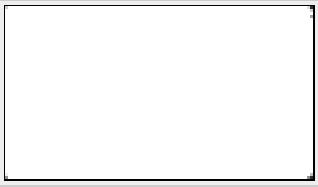
Number of 2D Keypoint Observations for Bundle Block Adjustment	1769077
Number of 3D Points for Bundle Block Adjustment	486766
Mean Reprojection Error [pixels]	0.39589

Internal Camera Parameters

_0.0_1920x1080 (RGB). Sensor Dimensions: 36.000 [mm] x 20.250 [mm]

EXIF ID: _0.0_1920x1080

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	1600.000 [pixel] 30.000 [mm]	960.000 [pixel] 18.000 [mm]	540.000 [pixel] 10.125 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	1601.511 [pixel] 30.028 [mm]	936.347 [pixel] 17.556 [mm]	520.214 [pixel] 9.754 [mm]	0.008	0.016	0.005	-0.001	-0.008



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, in average, more than 16 ATPs are extracted at this pixel location. Black indicates that, in average, 0 ATP has been extracted at this pixel location. Click on the image to the see the average direction and magnitude of the reprojection error for each pixel. Note that the vectors are scaled for better visualization.

2D Keypoints Table

	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	14079	8954
Min	10814	6904
Max	15555	11066
Mean	13715	8935

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	257932
In 3 Images	91957
In 4 Images	44498
In 5 Images	26081
In 6 Images	16552
In 7 Images	11571

In 8 Images	8183
In 9 Images	5933
In 10 Images	4456
In 11 Images	3483
In 12 Images	2780
In 13 Images	2223
In 14 Images	1754
In 15 Images	1437
In 16 Images	1210
In 17 Images	1043
In 18 Images	835
In 19 Images	708
In 20 Images	547
In 21 Images	492
In 22 Images	398
In 23 Images	335
In 24 Images	308
In 25 Images	250
In 26 Images	231
In 27 Images	196
In 28 Images	128
In 29 Images	134
In 30 Images	125
In 31 Images	103
In 32 Images	83
In 33 Images	87
In 34 Images	78
In 35 Images	65
In 36 Images	64
In 37 Images	57
In 38 Images	58
In 39 Images	34
In 40 Images	39
In 41 Images	27
In 42 Images	30
In 43 Images	16
In 44 Images	19
In 45 Images	18
In 46 Images	17
In 47 Images	23
In 48 Images	24
In 49 Images	20
In 50 Images	13
In 51 Images	9
In 52 Images	13
In 53 Images	6
In 54 Images	4
In 55 Images	5
In 56 Images	9
In 57 Images	9
In 58 Images	7
In 59 Images	8
In 60 Images	5
In 62 Images	4
In 63 Images	8
In 64 Images	1
In 65 Images	1
In 66 Images	5
In 67 Images	1
In 68 Images	3

In 69 Images	1
In 70 Images	4
In 71 Images	3
In 73 Images	2
In 77 Images	1
In 81 Images	1
In 83 Images	1

2D Keypoint Matches

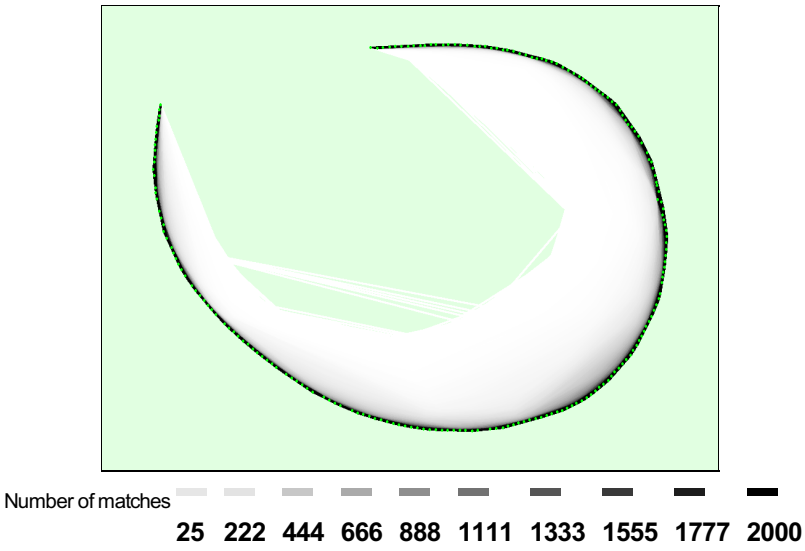


Figure 5: Top view of the image computed positions with a link between matching images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

Manual Tie Points

MTP Name	Projection Error [pixel]	Verified/Marked
mtp3n	1.102	28 / 28
mtp5n	1.354	21 / 21
mtp6n	1.503	22 / 22
mtp7n	0.948	27 / 27
mtp33	0.943	12 / 12
mtp35	1.034	12 / 12
mtp40	0.788	12 / 12
mtp41	1.095	12 / 12
mtp42	0.851	12 / 12
mtp43	0.733	12 / 12
mtp53	1.143	22 / 22

Projection errors for manual tie points.The last column counts the number of images where the manual tie point has been automatically verified vs. manually marked.

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
gcp1n (3D)	3.000/ 6.000	-4.530	3.260	-1.266	1.118	33 / 33
gcp2n (3D)	3.000/ 6.000	5.360	0.184	-0.266	1.722	28 / 28
gcp4g (3D)	3.000/ 6.000	-0.695	-3.365	1.890	1.079	28 / 28
Mean [m]		0.044873	0.026524	0.119415		

Sigma [m]		4.071346	2.707204	1.316837		
RMS Error [m]		4.071593	2.707334	1.322241		

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.

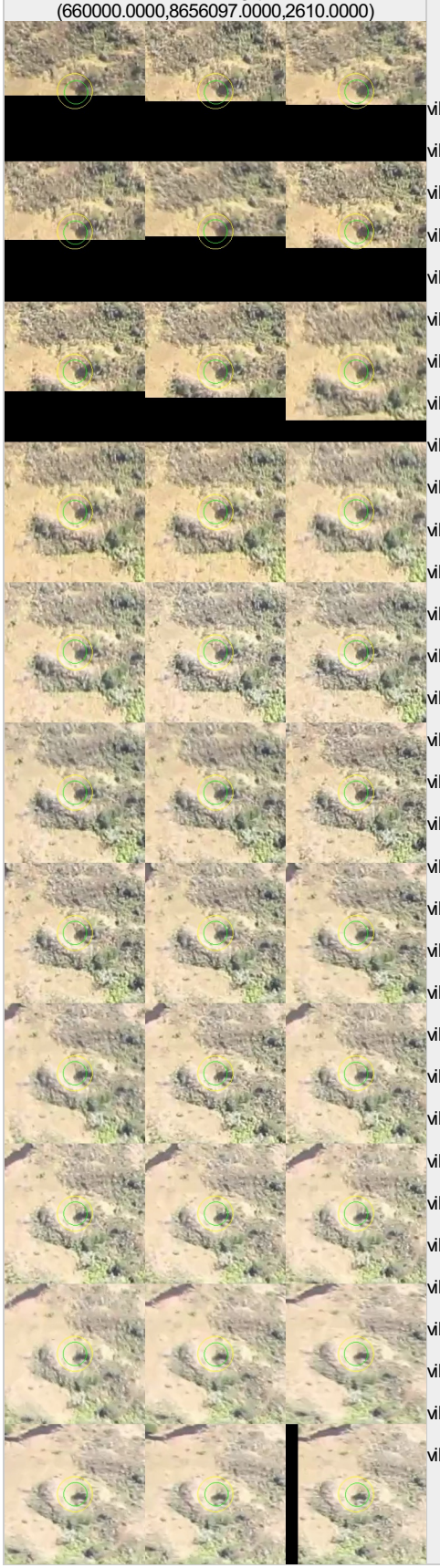
Scale Constraints

Scale Name	Initial Length [m]	Initial Length Accuracy [m]	Computed Length [m]	Computed Length Error [m]	GCP/MTP Label 1	GCP/MTP Label 2
Scale 1	72.8000	3.0000	74.9683	2.1683	mtp5n(21)	gcp1n(21)

Scale constraints errors.

Georeference Verification

GCP Name: gcp1n
(660000.0000,8656097.0000,2610.0000)

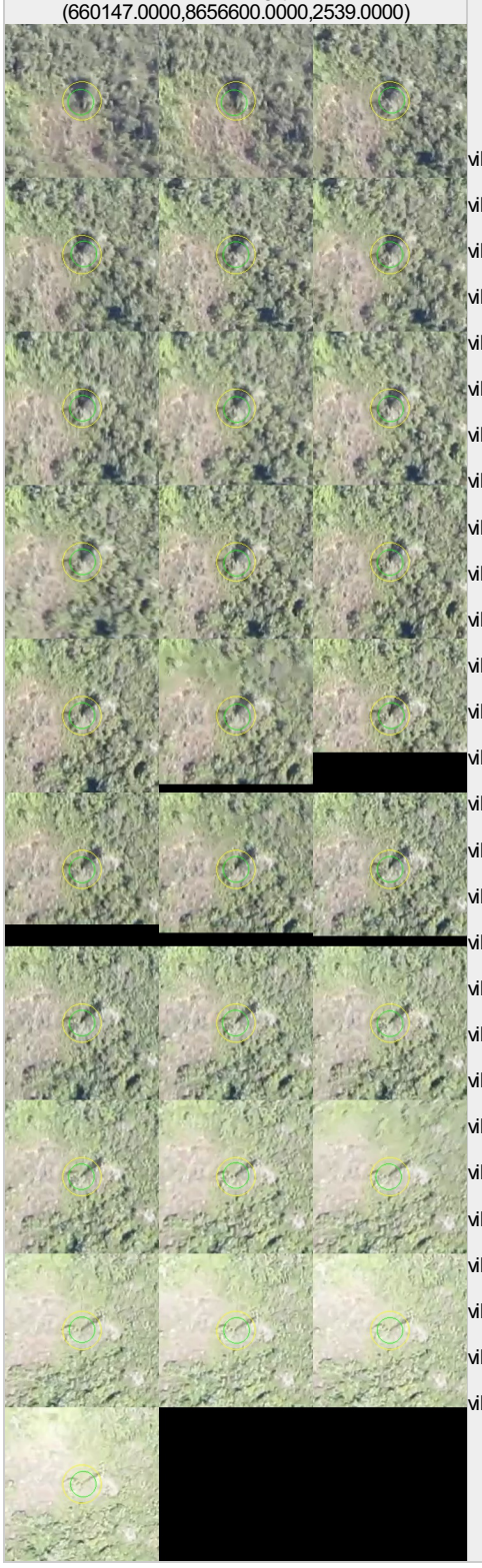


clip 70 seg vilca_frame00090.jpg
clip 70 seg vilca_frame00091.jpg
clip 70 seg vilca_frame00092.jpg
clip 70 seg vilca_frame00093.jpg
clip 70 seg vilca_frame00094.jpg
clip 70 seg vilca_frame00097.jpg
clip 70 seg vilca_frame00098.jpg
clip 70 seg vilca_frame00099.jpg
clip 70 seg vilca_frame00100.jpg
clip 70 seg vilca_frame00101.jpg
clip 70 seg vilca_frame00102.jpg
clip 70 seg vilca_frame00103.jpg
clip 70 seg vilca_frame00104.jpg
clip 70 seg vilca_frame00105.jpg
clip 70 seg vilca_frame00106.jpg
clip 70 seg vilca_frame00107.jpg
clip 70 seg vilca_frame00108.jpg
clip 70 seg vilca_frame00109.jpg
clip 70 seg vilca_frame00110.jpg
clip 70 seg vilca_frame00111.jpg
clip 70 seg vilca_frame00112.jpg
clip 70 seg vilca_frame00113.jpg
clip 70 seg vilca_frame00114.jpg
clip 70 seg vilca_frame00115.jpg
clip 70 seg vilca_frame00116.jpg
clip 70 seg vilca_frame00117.jpg
clip 70 seg vilca_frame00118.jpg
clip 70 seg vilca_frame00119.jpg
clip 70 seg vilca_frame00120.jpg
clip 70 seg vilca_frame00121.jpg
clip 70 seg vilca_frame00122.jpg
clip 70 seg vilca_frame00123.jpg
clip 70 seg vilca_frame00124.jpg

GCP gcp1n was not marked on the following images (only up to 6 images shown). If the circle is too far away from the initial GCP position, also measure the GCP in these images to improve the accuracy.

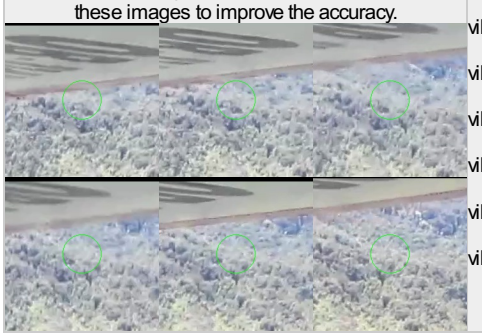
clip 70 seg vilca_frame00007.jpg
clip 70 seg vilca_frame00008.jpg
clip 70 seg vilca_frame00009.jpg
clip 70 seg vilca_frame00010.jpg
clip 70 seg vilca_frame00011.jpg
clip 70 seg vilca_frame00012.jpg

GCP Name: gcp2n (660147.0000,8656600.0000,2539.0000)



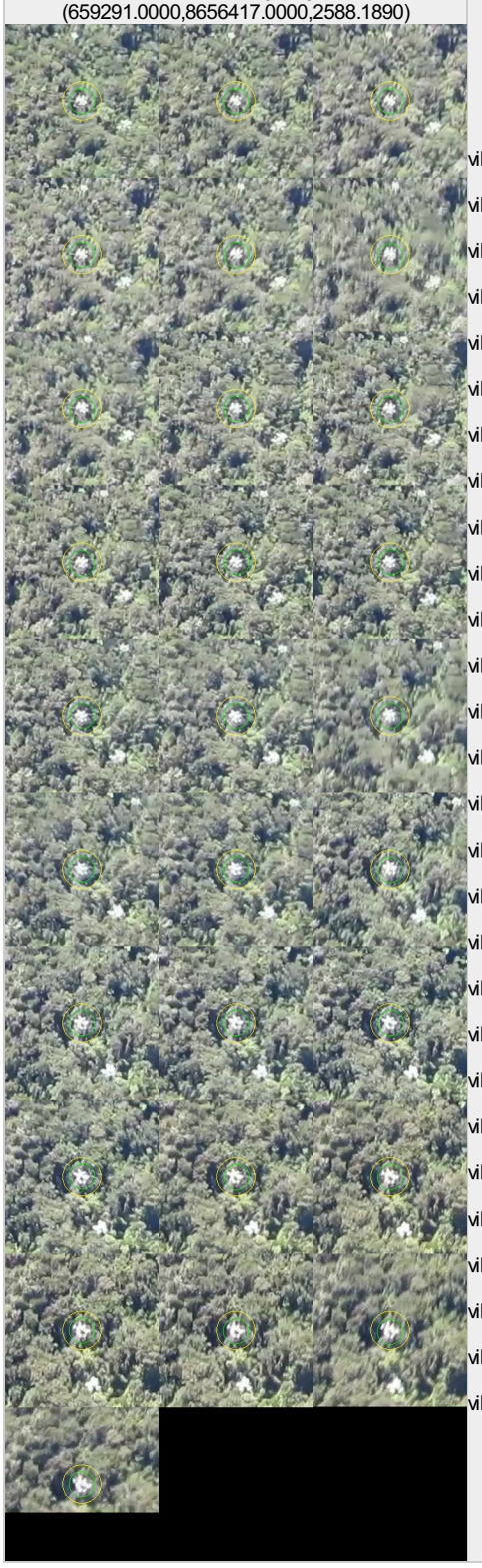
clip 70 seg vilca_frame00122.jpg
clip 70 seg vilca_frame00123.jpg
clip 70 seg vilca_frame00138.jpg
clip 70 seg vilca_frame00139.jpg
clip 70 seg vilca_frame00140.jpg
clip 70 seg vilca_frame00141.jpg
clip 70 seg vilca_frame00142.jpg
clip 70 seg vilca_frame00143.jpg
clip 70 seg vilca_frame00144.jpg
clip 70 seg vilca_frame00145.jpg
clip 70 seg vilca_frame00146.jpg
clip 70 seg vilca_frame00147.jpg
clip 70 seg vilca_frame00148.jpg
clip 70 seg vilca_frame00149.jpg
clip 70 seg vilca_frame00150.jpg
clip 70 seg vilca_frame00151.jpg
clip 70 seg vilca_frame00152.jpg
clip 70 seg vilca_frame00153.jpg
clip 70 seg vilca_frame00154.jpg
clip 70 seg vilca_frame00156.jpg
clip 70 seg vilca_frame00157.jpg
clip 70 seg vilca_frame00158.jpg
clip 70 seg vilca_frame00161.jpg
clip 70 seg vilca_frame00162.jpg
clip 70 seg vilca_frame00163.jpg
clip 70 seg vilca_frame00164.jpg
clip 70 seg vilca_frame00165.jpg
clip 70 seg vilca_frame00166.jpg

GCP gcp2n was not marked on the following images (only up to 6 images shown). If the circle is too far away from the initial GCP position, also measure the GCP in these images to improve the accuracy.



clip 70 seg vilca_frame00025.jpg
clip 70 seg vilca_frame00026.jpg
clip 70 seg vilca_frame00027.jpg
clip 70 seg vilca_frame00028.jpg
clip 70 seg vilca_frame00029.jpg
clip 70 seg vilca_frame00030.jpg

GCP Name: gcp4g (659291.0000,8656417.0000,2588.1890)



clip 70 seg vilca_frame00005.jpg
clip 70 seg vilca_frame00006.jpg
clip 70 seg vilca_frame00007.jpg
clip 70 seg vilca_frame00008.jpg
clip 70 seg vilca_frame00009.jpg
clip 70 seg vilca_frame00010.jpg
clip 70 seg vilca_frame00011.jpg
clip 70 seg vilca_frame00012.jpg
clip 70 seg vilca_frame00013.jpg
clip 70 seg vilca_frame00015.jpg
clip 70 seg vilca_frame00016.jpg
clip 70 seg vilca_frame00017.jpg
clip 70 seg vilca_frame00019.jpg
clip 70 seg vilca_frame00020.jpg
clip 70 seg vilca_frame00021.jpg
clip 70 seg vilca_frame00022.jpg
clip 70 seg vilca_frame00023.jpg
clip 70 seg vilca_frame00025.jpg
clip 70 seg vilca_frame00026.jpg
clip 70 seg vilca_frame00027.jpg
clip 70 seg vilca_frame00028.jpg
clip 70 seg vilca_frame00029.jpg
clip 70 seg vilca_frame00030.jpg
clip 70 seg vilca_frame00032.jpg
clip 70 seg vilca_frame00033.jpg
clip 70 seg vilca_frame00034.jpg
clip 70 seg vilca_frame00035.jpg
clip 70 seg vilca_frame00036.jpg

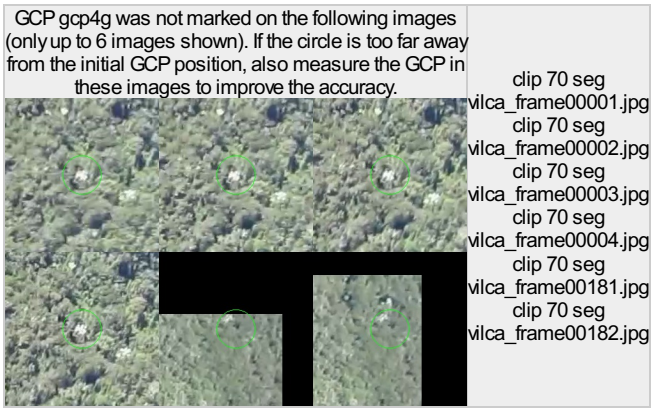


Figure 7: Images in which GCPs have been marked (yellow circle) and in which their computed 3D points have been projected (green circle). A green circle outside of the yellow circle indicates either an accuracy issue or a GCP issue.

Processing Options

Hardware	CPU: Intel(R) Core(TM) i7-4710HQ CPU @ 2.50GHz RAM: 24GB GPU: NVIDIA GeForce GTX 980M (Driver: 10.18.13.5582)
Operating System	Windows 8.1 Single Language, 64-bit
Camera Model Name	_0.0_1920x1080 (RGB)
Image Coordinate System	WGS84 (egm96)
Ground Control Point (GCP) Coordinate System	WGS84 / UTM zone 18S
Output Coordinate System	WGS84 / UTM zone 18S
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: yes

Point Cloud Densification details

Processing Options

Image Scale	multiscale, 1 (Original image size, Slow)
Point Density	High (Slow)
Minimum Number of Matches	3
3D Textured Mesh Generation	yes, Maximum Number of Triangles: 10000000, Texture Size: 16384x16384
Advanced: Matching Window Size	9x9 pixels
Advanced: Image Groups	group1
Advanced: Use Densification Area	yes
Advanced: Use Annotations	yes
Advanced: Limit Camera Depth Automatically	yes
Time for Point Cloud Densification	02h:22m:55s
Time for 3D Textured Mesh Generation	17m:46s

Results

Number of Generated Tiles	4
Number of 3D Densified Points	21455743
Average Density (per m^3)	0.58

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (45.3 [cm/pixel])
DSM Filters	Noise Filtering: yes, Surface Smoothing: yes, Sharp
DSM Generation	yes, Method: Inverse Distance Weighting, Merge Tiles: yes
Contour Lines Generation	yes, Contour Base [m]: 0, Elevation Interval [m]: 5, Resolution [cm]: 100, Minimum Line Size [vertices]: 20
Time for DSM Generation	05m:35s
Time for Orthomosaic Generation	13m:14s
Time for Contour Lines Generation	01s