Quality Report

Generated with Pix4Denterprise version 4.2.27

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	stan_5k_2_x3
Processed	2018-10-02 10:14:03
Camera Model Name(s)	FC350_3.6_4000x3000 (RGB)
Average Ground Sampling Distance (GSD)	4.69 cm / 1.84 in
Area Covered	0.602 km^2 / 60.2344 ha / 0.23 sq. mi. / 148.9194 acres
Time for Initial Processing (without report)	04h:03m:53s

Quality Check

Images	median of 12038 keypoints per image	✓
Dataset	1968 out of 1974 images calibrated (99%), all images enabled	✓
Camera Optimization	1.22% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 1356.11 matches per calibrated image	✓
Georeferencing	yes, no 3D GCP	⚠

Preview

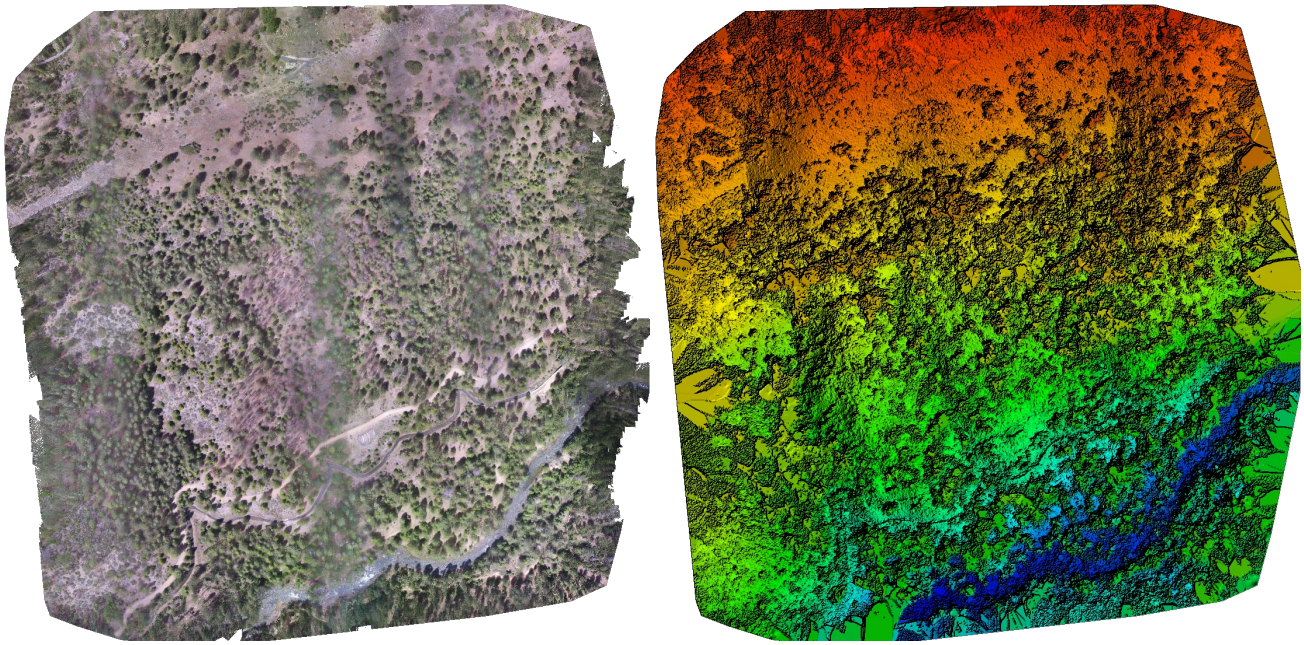


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	1968 out of 1974
Number of Geolocated Images	1974 out of 1974

Initial Image Positions

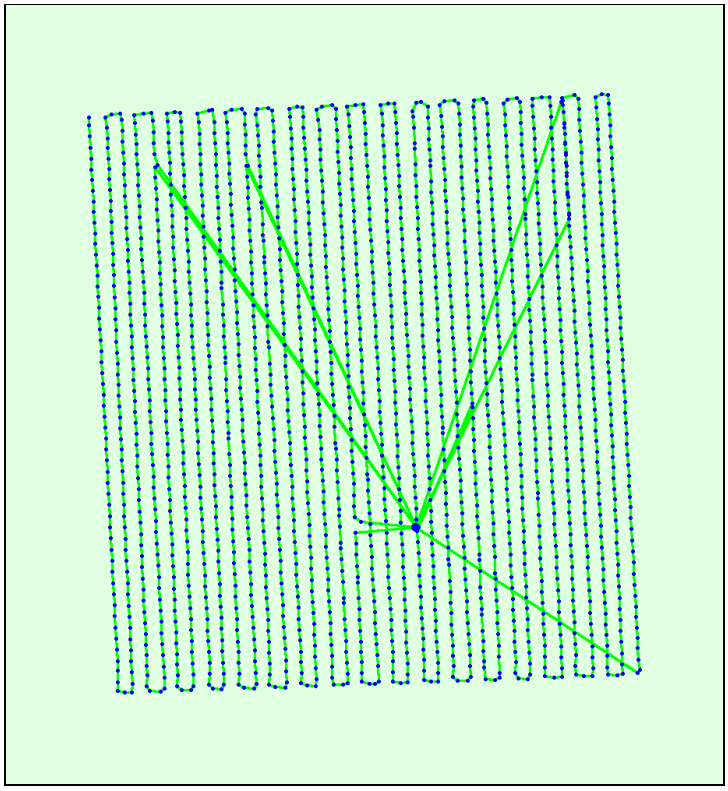
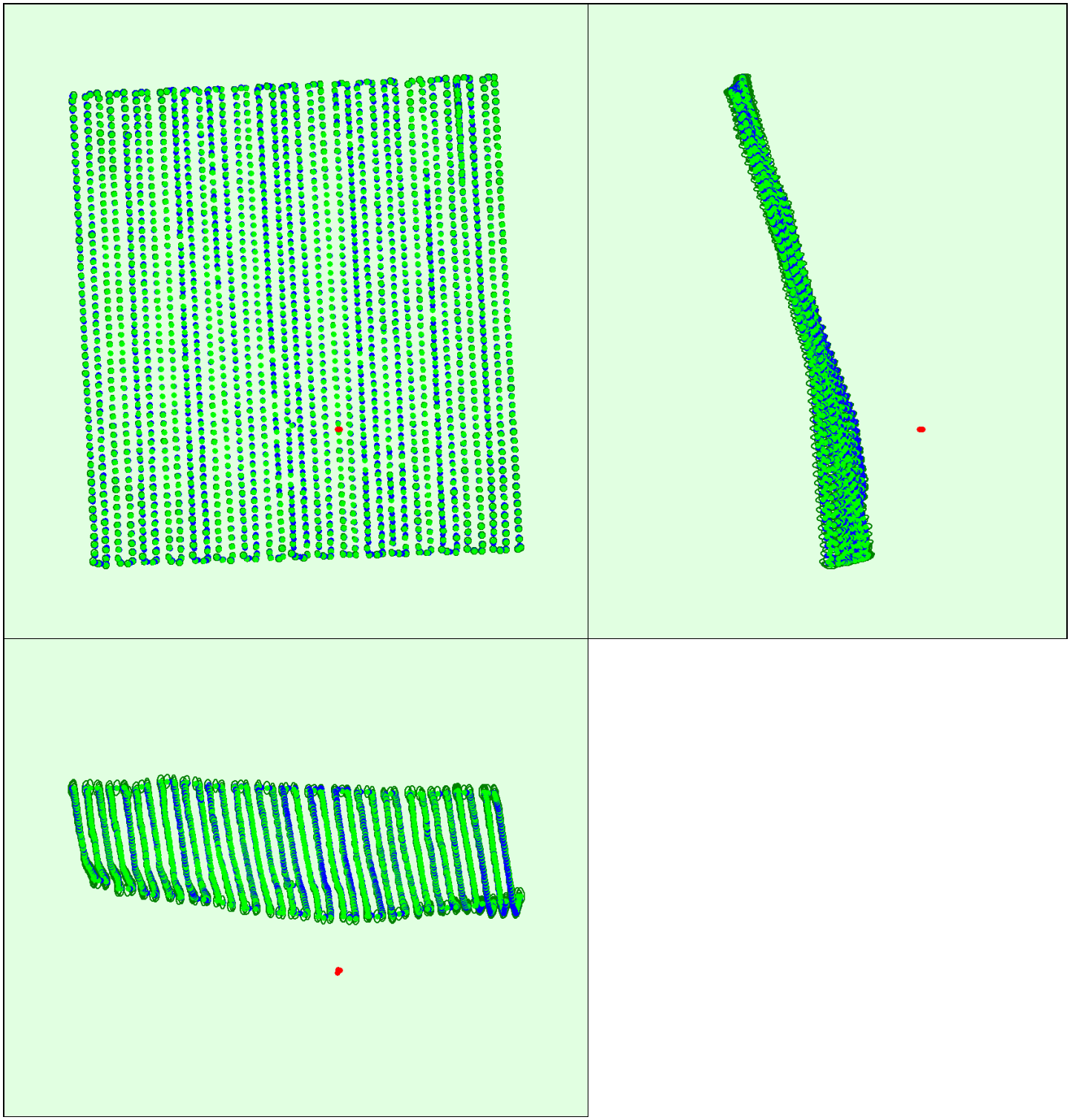


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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). Red dots indicate disabled or uncalibrated images. 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	0.068	0.069	0.145	0.030	0.031	0.012
Sigma	0.011	0.010	0.029	0.002	0.002	0.001

Overlap

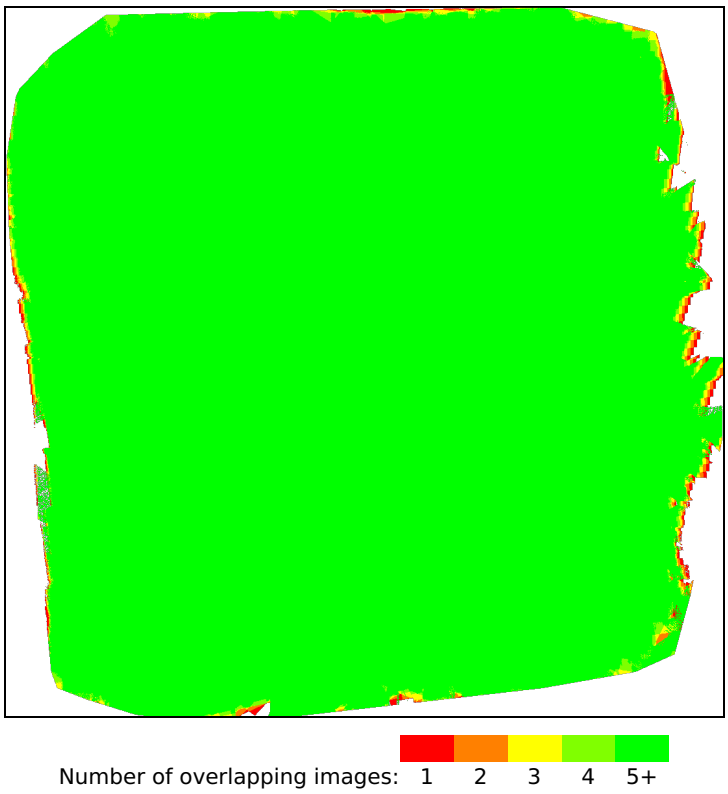


**Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.
Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint matches is also sufficient for these areas (see Figure 5 for keypoint matches).**

Bundle Block Adjustment Details

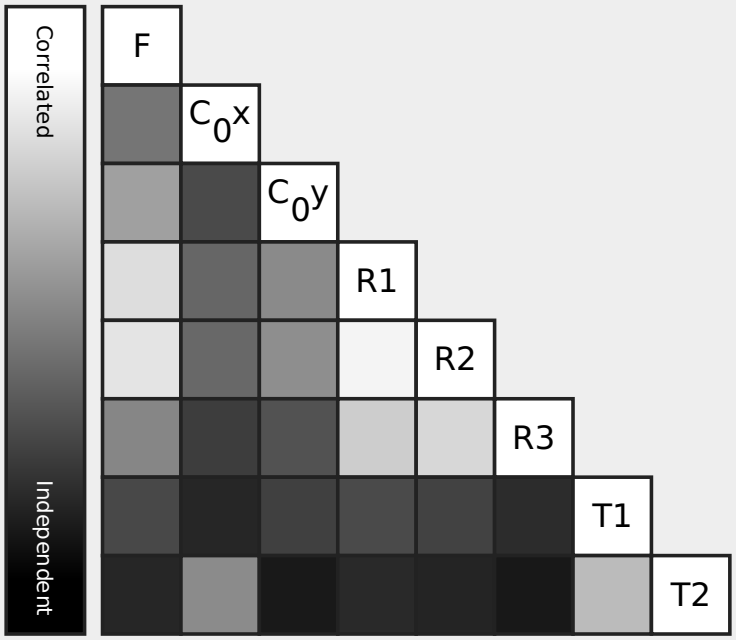
Number of 2D Keypoint Observations for Bundle Block Adjustment	2919759
Number of 3D Points for Bundle Block Adjustment	877475
Mean Reprojection Error [pixels]	0.129

Internal Camera Parameters

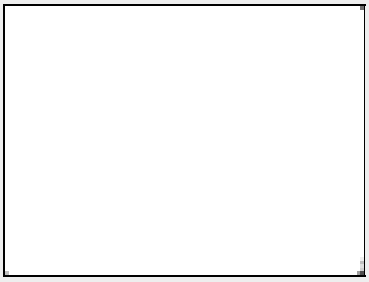
FC350_3.6_4000x3000 (RGB). Sensor Dimensions: 6.317 [mm] x 4.738 [mm]

EXIF ID: FC350_3.6_4000x3000

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	2285.722 [pixel] 3.610 [mm]	2000.006 [pixel] 3.159 [mm]	1500.003 [pixel] 2.369 [mm]	-0.130	0.106	-0.016	-0.000	0.000
Optimized Values	2313.793 [pixel] 3.654 [mm]	1984.960 [pixel] 3.135 [mm]	1503.322 [pixel] 2.374 [mm]	-0.129	0.110	-0.015	0.001	0.000
Uncertainties (Sigma)	1.360 [pixel] 0.002 [mm]	0.036 [pixel] 0.000 [mm]	0.037 [pixel] 0.000 [mm]	0.000	0.000	0.000	0.000	0.000



The correlation between camera internal parameters determined by the bundle adjustment. White indicates a full correlation between the parameters, ie. any change in one can be fully compensated by the other. Black indicates that the parameter is completely independent, and is not affected by other 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	12038	1356
Min	9445	306
Max	15758	3850
Mean	11896	1484

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	539127
In 3 Images	147379
In 4 Images	65890
In 5 Images	36197
In 6 Images	22042
In 7 Images	14894
In 8 Images	10473
In 9 Images	7598
In 10 Images	5971
In 11 Images	4511
In 12 Images	3664
In 13 Images	2882
In 14 Images	2346
In 15 Images	1918
In 16 Images	1498

In 17 Images	1349
In 18 Images	1133
In 19 Images	1012
In 20 Images	755
In 21 Images	788
In 22 Images	610
In 23 Images	513
In 24 Images	474
In 25 Images	453
In 26 Images	402
In 27 Images	334
In 28 Images	262
In 29 Images	268
In 30 Images	237
In 31 Images	218
In 32 Images	207
In 33 Images	174
In 34 Images	161
In 35 Images	150
In 36 Images	138
In 37 Images	132
In 38 Images	104
In 39 Images	96
In 40 Images	103
In 41 Images	82
In 42 Images	70
In 43 Images	69
In 44 Images	78
In 45 Images	49
In 46 Images	41
In 47 Images	35
In 48 Images	46
In 49 Images	49
In 50 Images	28
In 51 Images	49
In 52 Images	25
In 53 Images	22
In 54 Images	28
In 55 Images	18
In 56 Images	23
In 57 Images	15
In 58 Images	21
In 59 Images	13
In 60 Images	17
In 61 Images	23
In 62 Images	14
In 63 Images	8
In 64 Images	15
In 65 Images	16
In 66 Images	11
In 67 Images	12
In 68 Images	8
In 69 Images	6

In 70 Images	7
In 71 Images	3
In 72 Images	7
In 73 Images	3
In 74 Images	8
In 75 Images	8
In 76 Images	3
In 77 Images	4
In 78 Images	6
In 79 Images	9
In 80 Images	4
In 81 Images	3
In 82 Images	1
In 83 Images	5
In 84 Images	6
In 85 Images	6
In 86 Images	2
In 87 Images	2
In 88 Images	4
In 89 Images	3
In 90 Images	2
In 93 Images	2
In 94 Images	3
In 95 Images	3
In 97 Images	1
In 98 Images	1
In 99 Images	1
In 100 Images	1
In 103 Images	1
In 104 Images	2
In 107 Images	1
In 109 Images	3
In 110 Images	2
In 117 Images	1
In 118 Images	1
In 123 Images	1
In 127 Images	1

2D Keypoint Matches

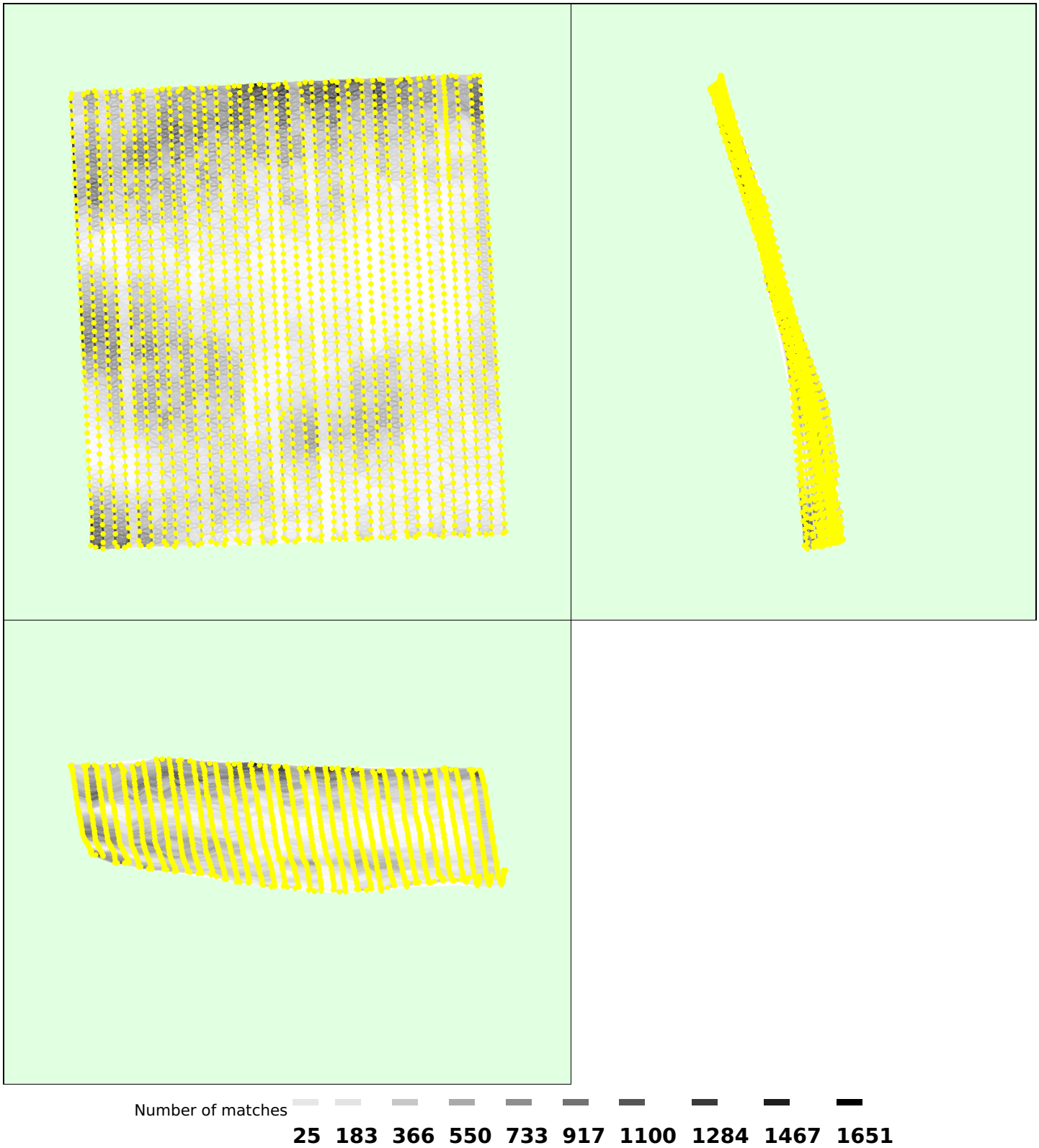


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images.

Geolocation Details

Absolute Geolocation Variance

Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]

-	-15.00	0.00	0.00	0.00
-15.00	-12.00	0.00	0.00	0.00
-12.00	-9.00	0.00	0.00	0.00
-9.00	-6.00	0.00	0.00	0.00
-6.00	-3.00	0.00	11.48	2.39
-3.00	0.00	47.21	35.32	49.64
0.00	3.00	51.83	40.96	46.29
3.00	6.00	0.97	12.14	1.68
6.00	9.00	0.00	0.10	0.00
9.00	12.00	0.00	0.00	0.00
12.00	15.00	0.00	0.00	0.00
15.00	-	0.00	0.00	0.00
Mean [m]		-0.000000	0.000000	0.000000
Sigma [m]		0.646382	2.402854	1.377695
RMS Error [m]		0.646382	2.402854	1.377695

Min Error and Max Error represent geolocation error intervals between -1.5 and 1.5 times the maximum accuracy of all the images. Columns X, Y, Z show the percentage of images with geolocation errors within the predefined error intervals. The geolocation error is the difference between the initial and computed image positions. Note that the image geolocation errors do not correspond to the accuracy of the observed 3D points.

Relative Geolocation Variance

Relative Geolocation Error	Images X [%]	Images Y [%]	Images Z [%]
[-1.00, 1.00]	99.95	99.09	100.00
[-2.00, 2.00]	100.00	100.00	100.00
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	5.000000	5.000000	10.000000
Sigma of Geolocation Accuracy [m]	0.000000	0.000000	0.000000

Images X, Y, Z represent the percentage of images with a relative geolocation error in X, Y, Z.

Geolocation Orientational Variance	RMS [degree]
Omega	0.614
Phi	0.987
Kappa	5.886

Geolocation RMS error of the orientation angles given by the difference between the initial and computed image orientation angles.

Initial Processing Details

System Information

Hardware	CPU: Intel(R) Xeon(R) Platinum 8124M CPU @ 3.00GHz RAM: 69GB GPU: no info (Driver: unknown)
Operating System	Linux 4.15.0-1021-aws x86_64

Coordinate Systems

Image Coordinate System	WGS84 (egm96)
Output Coordinate System	WGS 84 / UTM zone 10N (egm96)

Processing Options

Detected Template	No Template Available
Keypoints Image Scale	Custom, Image Scale: 0.5
Advanced: Matching Image Pairs	Aerial Grid or Corridor
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, no

Point Cloud Densification details

Processing Options

Image Scale	multiscale, 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	02h:19m:33s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	50m:09s

Results

Number of Generated Tiles	4
Number of 3D Densified Points	84498780
Average Density (per m^3)	34.73

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (4.69 [cm/pixel])
DSM Filters	Noise Filtering: yes Surface Smoothing: yes, Type: Sharp

Raster DSM	Generated: yes Method: Triangulation Merge Tiles: yes
Orthomosaic	Generated: yes Merge Tiles: yes GeoTIFF Without Transparency: no Google Maps Tiles and KML: no
Time for DSM Generation	07m:57s
Time for Orthomosaic Generation	07h:01m:54s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s