

# Quality Report



Generated with Pix4Denterprise version 4.5.6



**Important:** Click on the different icons for:



Help to analyze the results in the Quality Report



Additional information about the sections



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## Summary



Project	chiapeta daninhas rgb
Processed	2020-05-21 19:41:44
Camera Model Name(s)	Sequoia_4.9_4608x3456 (RGB)
Average Ground Sampling Distance (GSD)	1.86 cm / 0.73 in
Area Covered	0.064 km <sup>2</sup> / 6.3588 ha / 0.02 sq. mi. / 15.7210 acres
Time for Initial Processing (without report)	07m:02s

## Quality Check



Images	median of 74161 keypoints per image	
Dataset	383 out of 504 images calibrated (75%), all images enabled, 10 blocks	
Camera Optimization	3.63% relative difference between initial and optimized internal camera parameters	
Matching	median of 140.963 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

## Preview

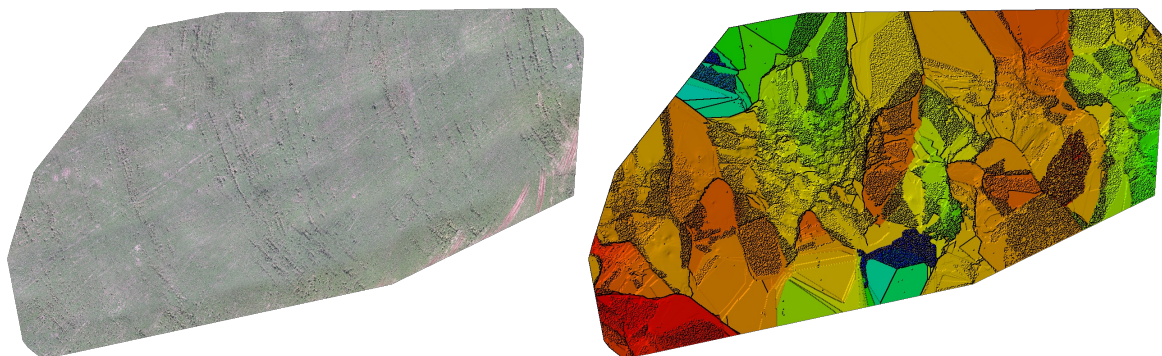


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

## Calibration Details



Number of Calibrated Images	383 out of 504
Number of Geolocated Images	504 out of 504

## Initial Image Positions



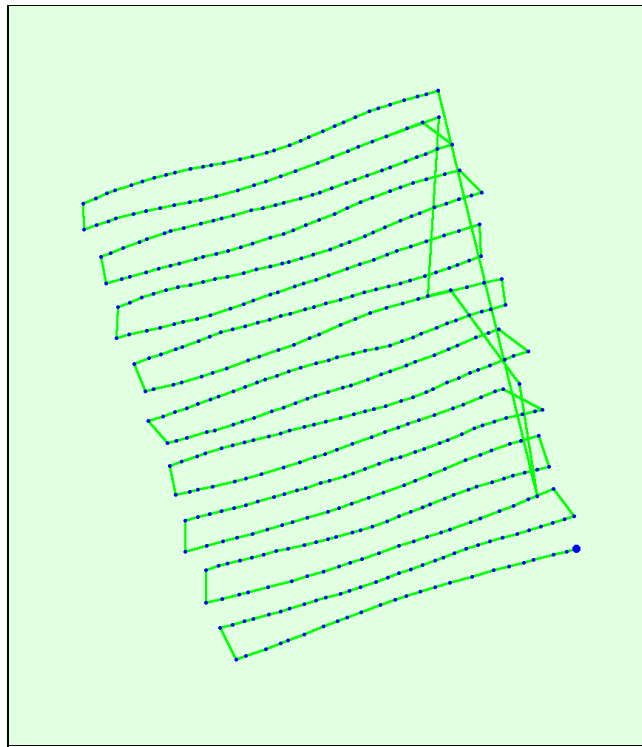
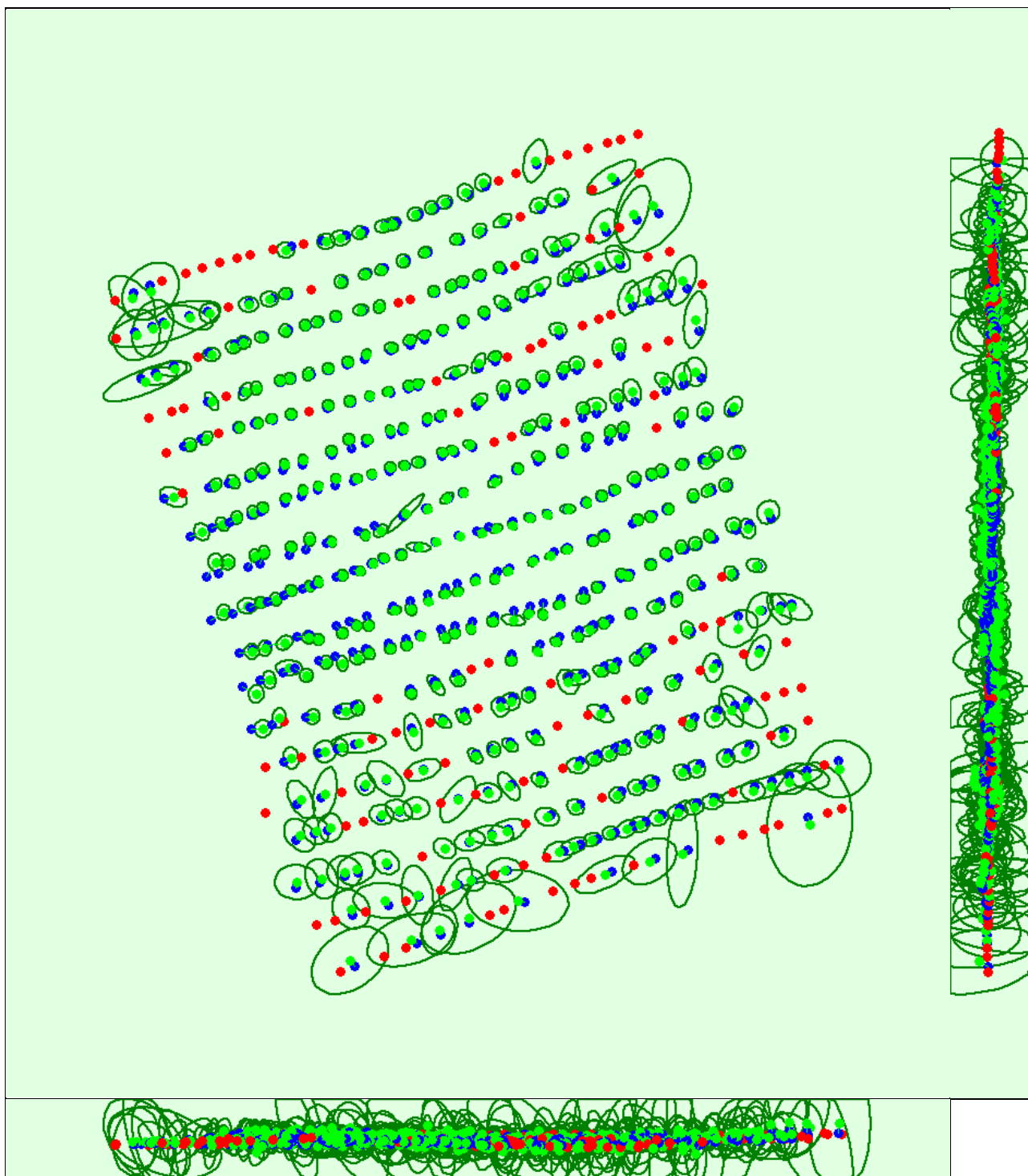


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

 Computed Image/GCPs/Manual Tie Points Positions





Uncertainty ellipses 10x 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]	Camera Displacement X[m]	Camera Displacement Y[m]	Camera Displacement Z[m]
Mean	0.684	0.650	1.085	0.392	0.384	0.378	0.771	0.573	0.953
Sigma	0.519	0.472	0.848	0.344	0.244	0.398	3.777	1.617	1.403

### ? Overlap



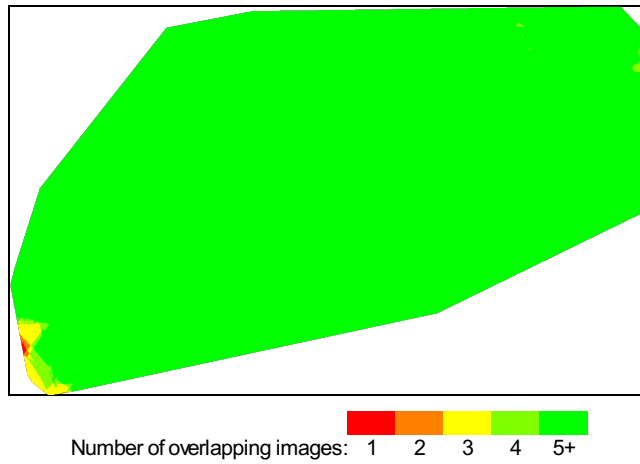


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

## Bundle Block Adjustment Details

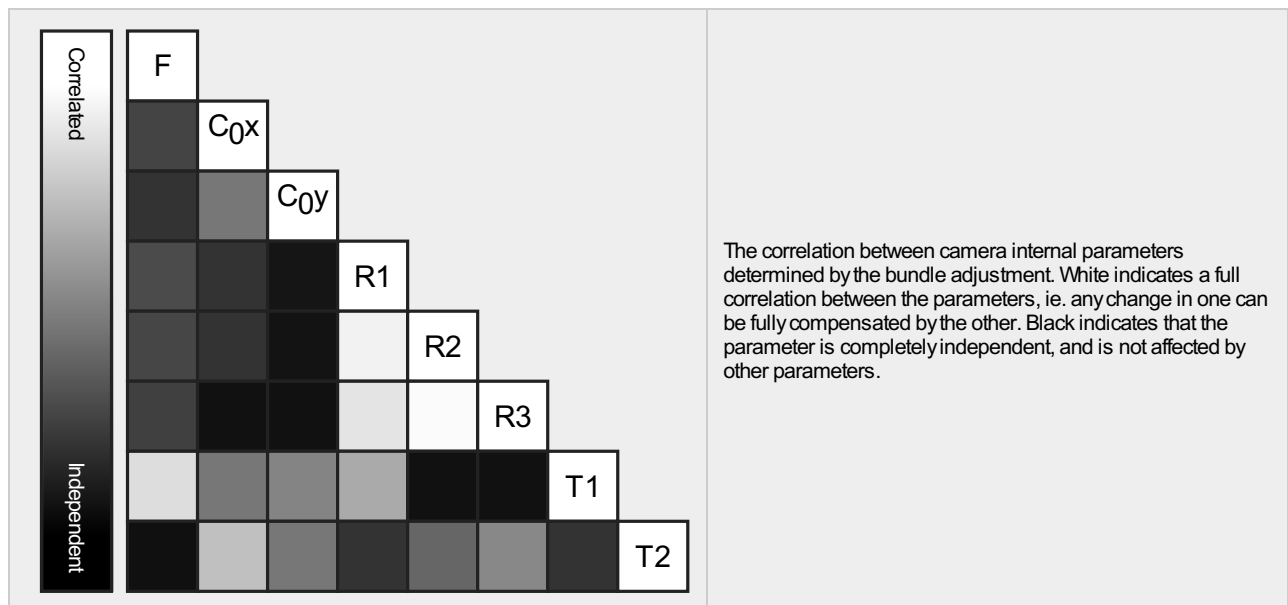
Number of 2D Keypoint Observations for Bundle Block Adjustment	269190
Number of 3D Points for Bundle Block Adjustment	132888
Mean Reprojection Error [pixels]	0.522

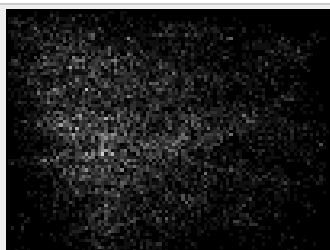
### Internal Camera Parameters

Sequoia\_4.9\_4608x3456 (RGB). Sensor Dimensions: 6.100 [mm] x 4.575 [mm]

EXIF ID: Sequoia\_4.9\_4608x3456

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3610.289 [pixel] 4.779 [mm]	2296.145 [pixel] 3.040 [mm]	1728.474 [pixel] 2.288 [mm]	0.194	-0.532	0.455	0.000	-0.000
Optimized Values	3741.589 [pixel] 4.953 [mm]	2289.592 [pixel] 3.031 [mm]	1728.994 [pixel] 2.289 [mm]	0.160	-0.451	0.358	0.003	-0.001
Uncertainties (Sigma)	14.096 [pixel] 0.019 [mm]	4.194 [pixel] 0.006 [mm]	5.254 [pixel] 0.007 [mm]	0.005	0.020	0.026	0.000	0.000





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	74161	141
Mn	70601	8
Max	81099	7552
Mean	74485	703

## ? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	129739
In 3 Images	2913
In 4 Images	211
In 5 Images	21
In 6 Images	4

## ? 2D Keypoint Matches



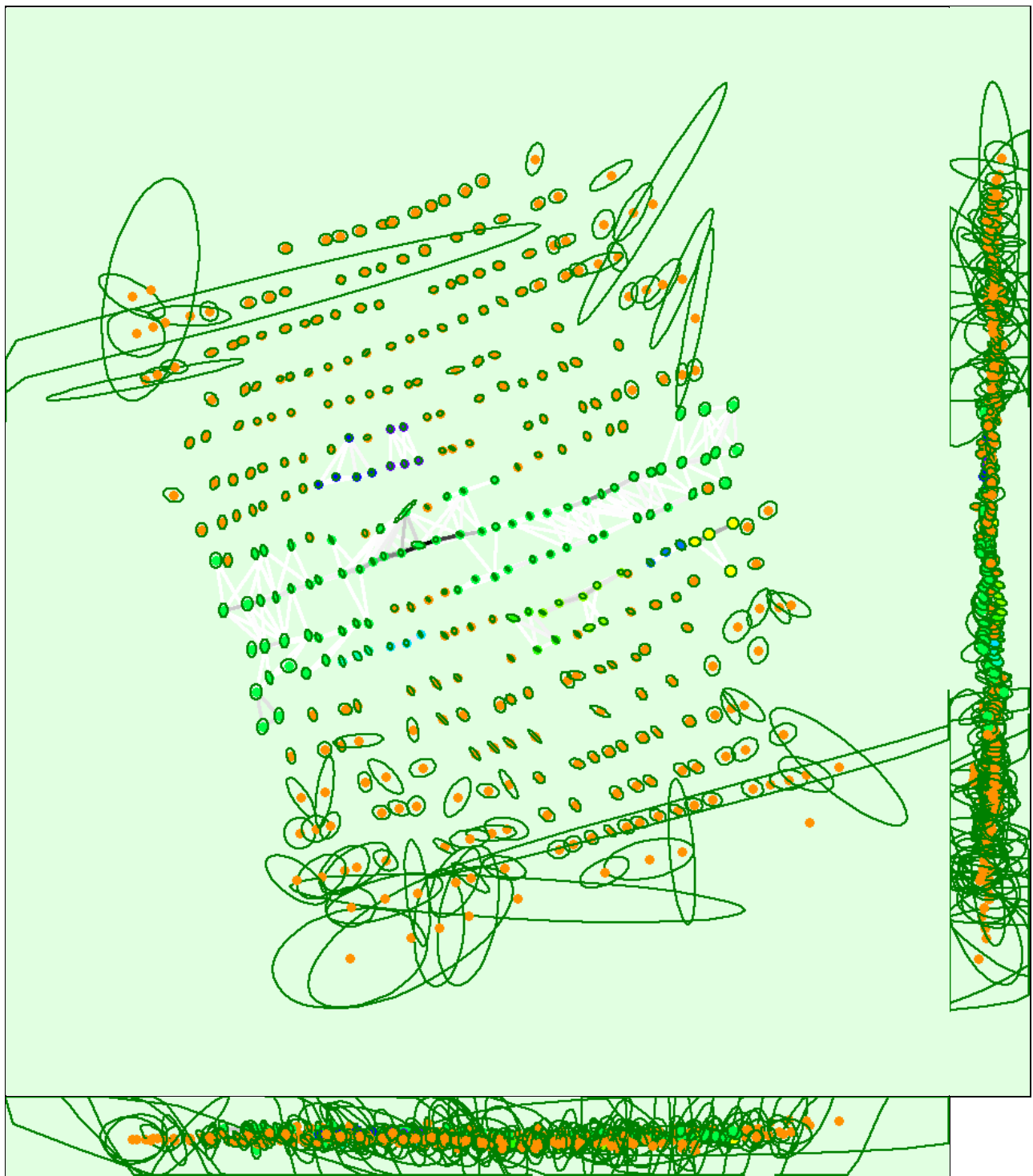


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty of the bundle block adjustment result.

## ? Relative camera position and orientation uncertainties



	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]	Camera Displacement X[m]	Camera Displacement Y[m]	Camera Displacement Z[m]
Mean	1.485	1.275	1.907	0.679	0.628	0.632	1.198	0.883	1.717
Sigma	4.149	2.001	3.355	1.160	0.883	1.115	5.555	2.105	3.691

# Geolocation Details



## ? Absolute Geolocation Variance



Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-2.70	14.62	18.54	15.40
-2.70	-2.16	0.78	6.27	5.22
-2.16	-1.62	5.22	6.01	5.48
-1.62	-1.08	7.57	6.53	6.27
-1.08	-0.54	9.66	6.79	9.66
-0.54	0.00	8.62	8.62	8.62
0.00	0.54	11.23	4.18	8.62
0.54	1.08	12.53	4.70	11.23
1.08	1.62	6.53	6.27	5.22
1.62	2.16	8.36	6.27	6.79
2.16	2.70	6.27	4.70	5.22
2.70	-	8.62	21.15	12.27
Mean [m]		-0.288001	0.004644	-0.181228
Sigma [m]		2.750079	3.108189	2.547535
RMS Error [m]		2.765118	3.108192	2.553973

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]	30.29	18.80	41.78
[-2.00, 2.00]	54.57	36.03	70.23
[-3.00, 3.00]	72.06	52.74	89.56
Mean of Geolocation Accuracy [m]	0.774794	0.774794	1.289269
Sigma of Geolocation Accuracy [m]	0.088869	0.088869	0.160547

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

Geolocation Orientational Variance	RMS [degree]
Omega	1.941
Phi	2.525
Kappa	4.709

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

## ? Rolling Shutter Statistics



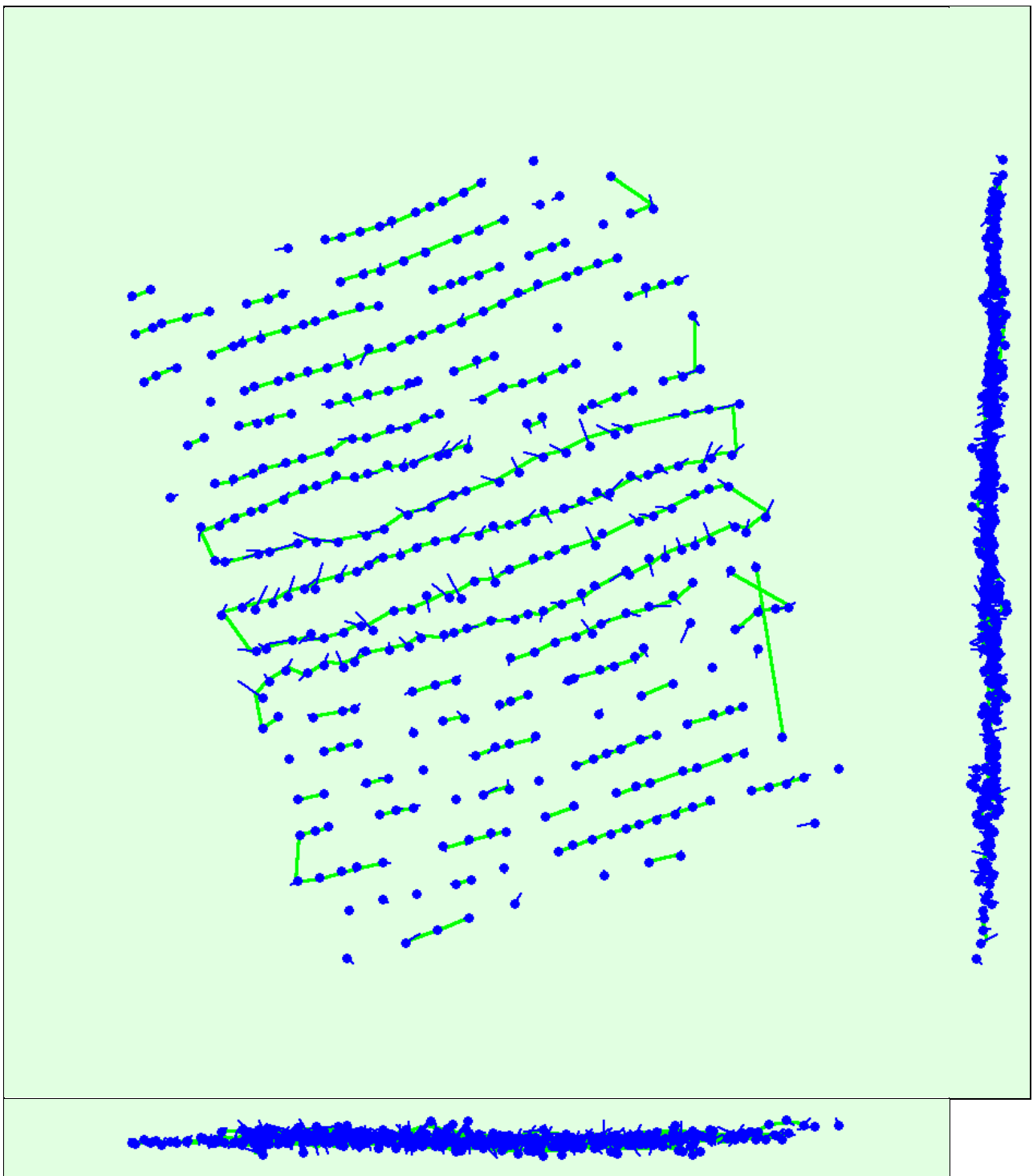


Figure 6: Camera movement estimated by the rolling shutter camera model. The green line follows the computed image positions. The blue dots represent the camera position at the start of the exposure. The blue lines represent the camera motion during the rolling shutter readout, re-scaled by a project dependant scaling factor for better visibility.

Median Camera Speed	12.5572 [m/s]
Median Camera Displacement During Sensor Readout)	4.1957 [m]
Median Rolling Shutter Readout Time	375.2028 [ms]

## Initial Processing Details



### System Information



Hardware	CPU: Intel(R) Core(TM) i7-8750H CPU @ 2.20GHz RAM: 16GB GPU: Intel(R) UHD Graphics 630 (Driver: 26.20.100.6911), NVIDIA GeForce GTX 1050 Ti (Driver: 26.21.14.4587)
Operating System	Windows 10 Pro, 64-bit



## Coordinate Systems



Image Coordinate System	WGS 84 (EGM96 Geoid)
Output Coordinate System	WGS 84 / UTMzone 22S (EGM96 Geoid)

## Processing Options



Detected Template	No Template Available
Keypoints Image Scale	Full, Image Scale: 1
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: Geolocation Based Internal Parameters Optimization: All External Parameters Optimization: All Rematch: Auto, no