

Quality Report



Generated with PIX4Dmapper version 4.9.0



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Additional information about the sections



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Summary



Project	Chapmans_14Apr2025
Processed	2025-04-16 20:09:41
Camera Model Name(s)	ILCE-5100_E16mmF2.8_16.0_6000x4000 (RGB)
Average Ground Sampling Distance (GSD)	1.79 cm / 0.71 in
Area Covered	0.352 km ² / 35.2390 ha / 0.14 sq. mi. / 87.1225 acres

Quality Check



Images	median of 87022 keypoints per image	
Dataset	653 out of 674 images calibrated (96%), all images enabled	
Camera Optimization	0.92% relative difference between initial and optimized internal camera parameters	
Matching	median of 21288.7 matches per calibrated image	
Georeferencing	yes, 9 GCPs (9 3D), mean RMS error = 0.047 US survey foot	

Preview

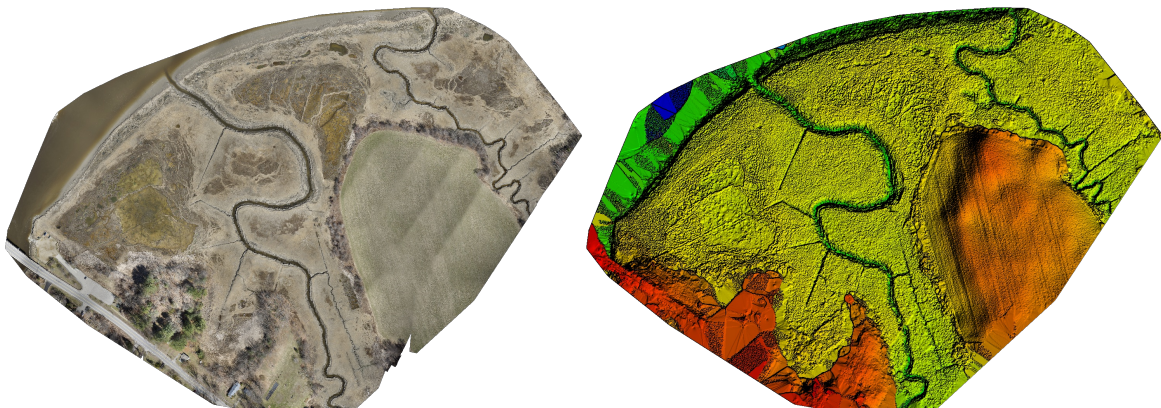


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	653 out of 674
Number of Geolocated Images	519 out of 674

Initial Image Positions



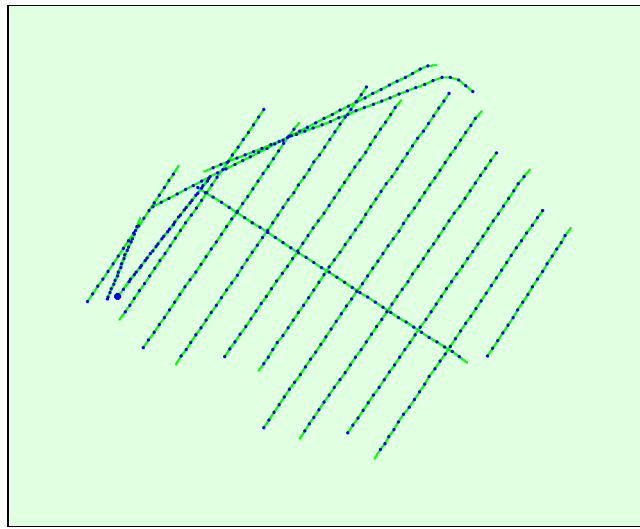
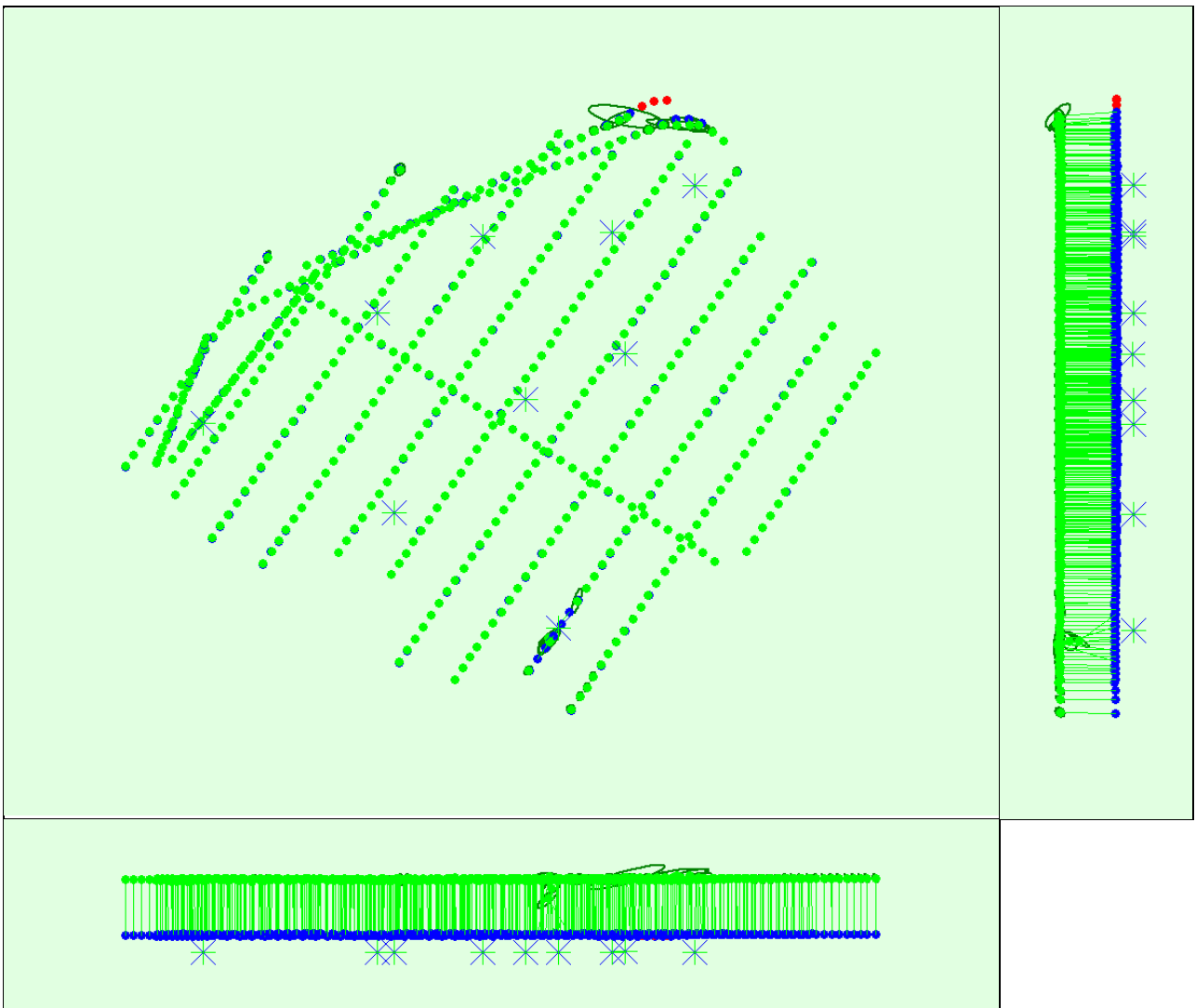


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 100x 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 [US survey foot]	Y [US survey foot]	Z [US survey foot]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.082	0.081	0.078	0.019	0.018	0.007
Sigma	0.122	0.078	0.046	0.024	0.021	0.011

 Overlap

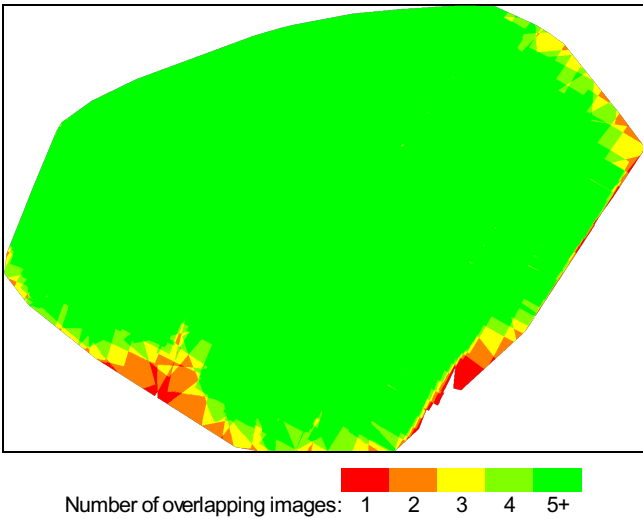


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint 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	13673371
Number of 3D Points for Bundle Block Adjustment	4971431
Mean Reprojection Error [pixels]	0.127

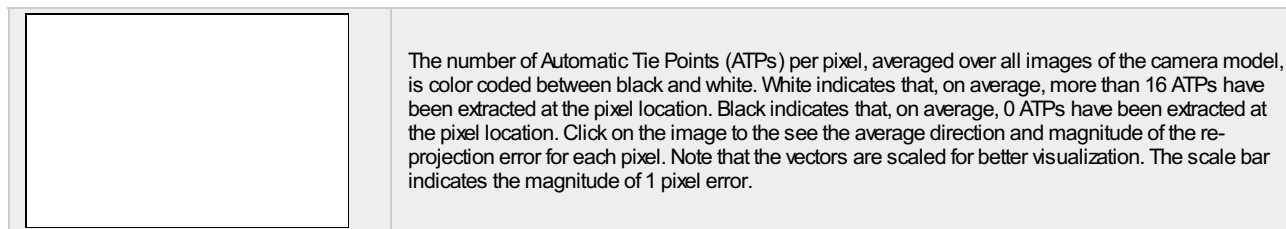
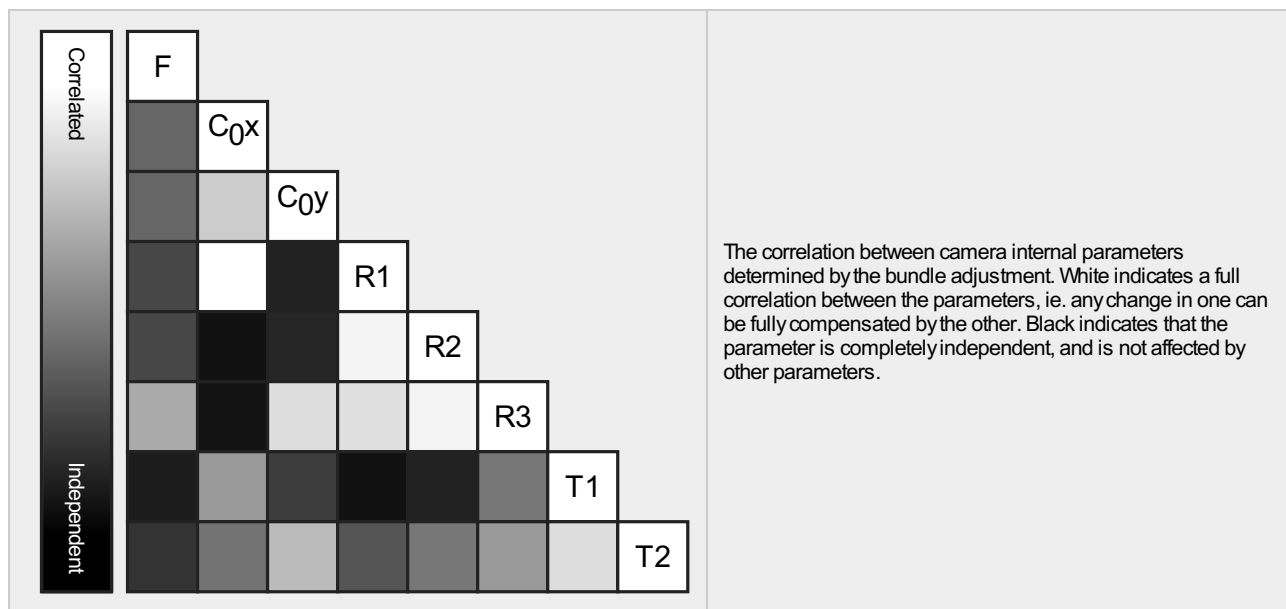
 Internal Camera Parameters

 **ILCE-5100_E16mmF2.8_16.0_6000x4000 (RGB). Sensor Dimensions: 23.333 [mm] x 15.556 [mm]**



EXIF ID: ILCE-5100_E16mmF2.8_16.0_6000x4000

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	4114.286 [pixel] 16.000 [mm]	3000.000 [pixel] 11.667 [mm]	2000.000 [pixel] 7.778 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	4076.201 [pixel] 15.852 [mm]	2947.347 [pixel] 11.462 [mm]	1967.938 [pixel] 7.653 [mm]	-0.065	0.092	0.005	-0.000	-0.003
Uncertainties (Sigma)	0.835 [pixel] 0.003 [mm]	0.151 [pixel] 0.001 [mm]	0.164 [pixel] 0.001 [mm]	0.000	0.000	0.000	0.000	0.000



2D Keypoints Table

	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	87022	21289
Min	20297	80
Max	99842	49301
Mean	75177	20939

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	3185916
In 3 Images	949995
In 4 Images	402604
In 5 Images	204222
In 6 Images	88010
In 7 Images	49176
In 8 Images	30359
In 9 Images	19349
In 10 Images	12919
In 11 Images	7690
In 12 Images	5194
In 13 Images	3945
In 14 Images	3029
In 15 Images	2395
In 16 Images	1754
In 17 Images	1183
In 18 Images	808
In 19 Images	673
In 20 Images	566
In 21 Images	440
In 22 Images	360
In 23 Images	279

In 24 Images	177
In 25 Images	137
In 26 Images	89
In 27 Images	64
In 28 Images	38
In 29 Images	27
In 30 Images	11
In 31 Images	11
In 32 Images	3
In 33 Images	5
In 34 Images	3

? 2D Keypoint Matches

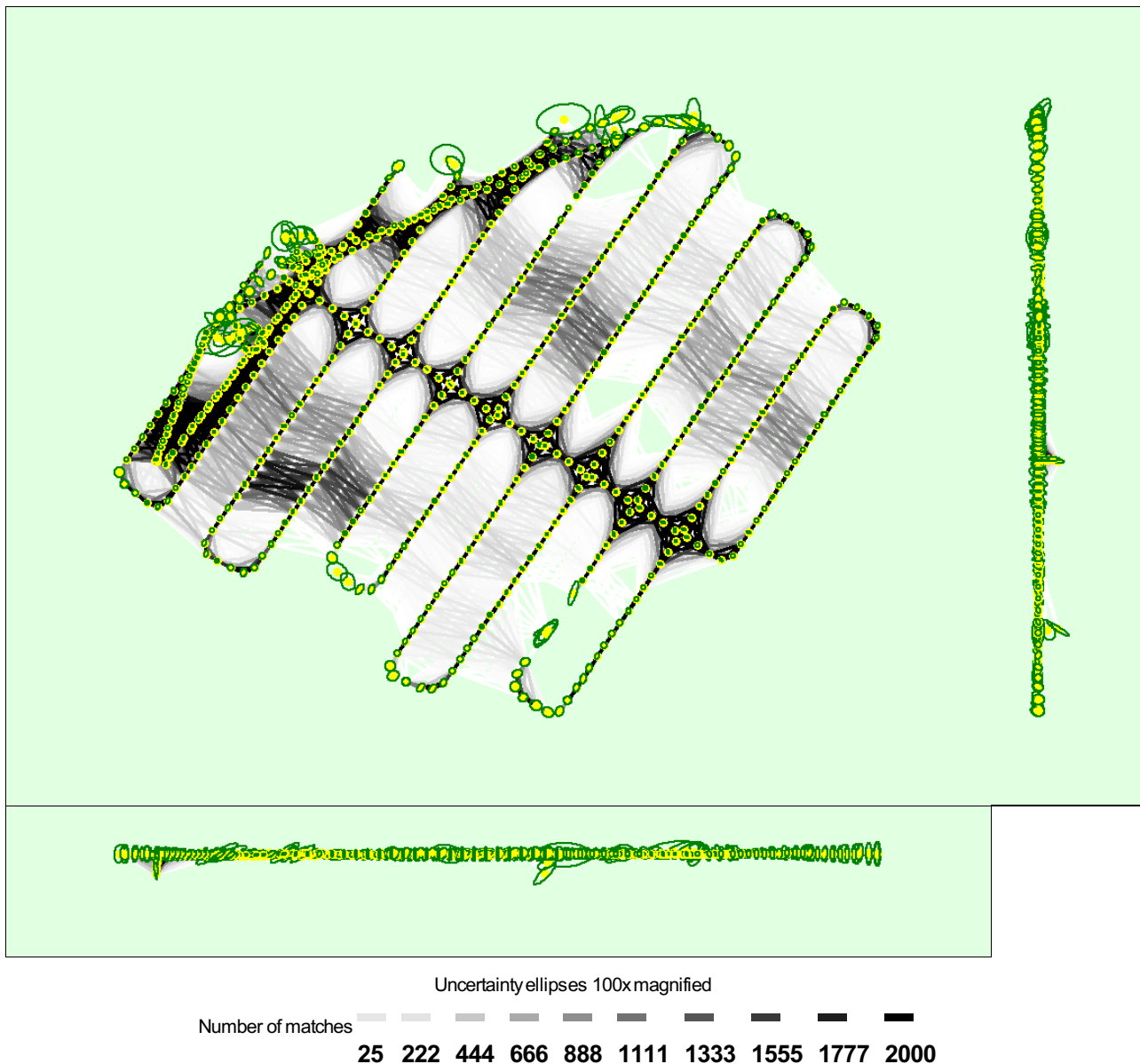


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty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

? Relative camera position and orientation uncertainties



	X [US survey foot]	Y [US survey foot]	Z [US survey foot]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.084	0.085	0.124	0.029	0.026	0.009
Sigma	0.089	0.075	0.066	0.021	0.018	0.010

Geolocation Details



Ground Control Points



GCP Name	Accuracy XYZ [US survey foot]	Error X [US survey foot]	Error Y [US survey foot]	Error Z [US survey foot]	Projection Error [pixel]	Verified/Marked
1 (3D)	0.020/ 0.020	-0.002	0.006	0.000	0.200	10 / 10
2 (3D)	0.020/ 0.020	0.002	0.003	-0.007	0.209	10 / 10
3 (3D)	0.020/ 0.020	0.024	-0.014	-0.012	0.176	9 / 9
4 (3D)	0.020/ 0.020	-0.000	0.000	0.002	0.233	9 / 9
5 (3D)	0.020/ 0.020	-0.266	-0.053	-0.058	7.285	7 / 7
7 (3D)	0.020/ 0.020	0.013	-0.016	0.011	0.266	10 / 10
8 (3D)	0.020/ 0.020	-0.038	-0.025	0.102	1.461	9 / 9
9 (3D)	0.020/ 0.020	-0.004	0.015	0.011	0.326	9 / 9
10 (3D)	0.020/ 0.020	-0.006	-0.014	-0.010	0.172	9 / 9
Mean [US survey foot]		-0.030838	-0.010945	0.004331		
Sigma [US survey foot]		0.084720	0.019076	0.039741		
RMS Error [US survey foot]		0.090158	0.021993	0.039977		

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.

Absolute Geolocation Variance



Mn Error [US survey foot]	Max Error [US survey foot]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-49.21	0.00	0.19	0.00
-49.21	-39.37	0.00	0.00	0.00
-39.37	-29.53	0.19	0.00	0.00
-29.53	-19.68	0.00	0.19	0.00
-19.68	-9.84	0.19	0.00	0.00
-9.84	0.00	55.62	66.86	68.60
0.00	9.84	43.22	31.59	31.01
9.84	19.69	0.39	0.58	0.00
19.69	29.53	0.00	0.19	0.00
29.53	39.37	0.19	0.00	0.19
39.37	49.21	0.00	0.19	0.00
49.21	-	0.19	0.19	0.19
Mean [US survey foot]		0.206863	0.073888	-177.659673
Sigma [US survey foot]		3.996801	5.299303	3.255278
RMS Error [US survey foot]		4.002151	5.299819	177.689494

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.

Geolocation Bias	X	Y	Z
Translation [US survey foot]	0.201811	0.067811	-177.664435

Bias between image initial and computed geolocation given in output coordinate system.

Relative Geolocation Variance



Relative Geolocation Error	Images X [%]	Images Y [%]	Images Z [%]
[-1.00, 1.00]	99.42	98.64	99.81
[-2.00, 2.00]	99.42	99.42	100.00
[-3.00, 3.00]	99.81	99.61	100.00
Mean of Geolocation Accuracy [US survey foot]	16.404167	16.404167	32.808333
Sigma of Geolocation Accuracy [US survey foot]	0.000003	0.000003	0.000006

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

Geolocation Orientational Variance	RMS [degree]
Omega	1.441
Phi	1.034
Kappa	0.623

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: AMD Ryzen 7 1800X Eight-Core Processor RAM: 64GB GPU: NVIDIA GeForce GTX 1080 (Driver: 32.0.15.7216)
Operating System	Windows 10 Pro, 64-bit

Coordinate Systems

Image Coordinate System	WGS 84 (EGM96 Geoid)
Ground Control Point (GCP) Coordinate System	NAD83(2011) / New Hampshire (ftUS) (2D)
Output Coordinate System	NAD83(2011) / New Hampshire (ftUS) (2D)

Processing Options

Detected Template	 3d map no las or mesh*
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: 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
Mnimum Number of Matches	3
3D Textured Mesh Generation	no
LOD	Generated: no
Advanced: Image Groups	group1
Advanced: Use Processing Area	yes
Advanced: Use Annotations	yes

Time for Point Cloud Densification	49m:17s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	NA

Results



Number of Generated Tiles	6
Number of 3D Densified Points	84678066
Average Density (per US survey foot ³)	14.8

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (1.79 [cm/pixel])
DSM Filters	Noise Filtering: yes Surface Smoothing: yes, Type: Sharp
Raster DSM	Generated: yes Method: Inverse Distance Weighting Merge Tiles: yes
Orthomosaic	Generated: yes Merge Tiles: yes GeoTIFF Without Transparency: no Google Maps Tiles and KML: no
Time for DSM Generation	27m:32s
Time for Orthomosaic Generation	52m:42s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s