Quality Report

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	RGB61
Processed	2024-11-04 10:35:47
Camera Model Name(s)	ILX-LR1_17mmF4DGDN|Contemporary023_17.0_9504x6336 (RGB)
Average Ground Sampling Distance (GSD)	2.87 cm / 1.13 in
Area Covered	1.882 km^2 / 188.2362 ha / 0.73 sq. mi. / 465.3826 acres
Time for Initial Processing (without report)	08m:58s

Quality Check

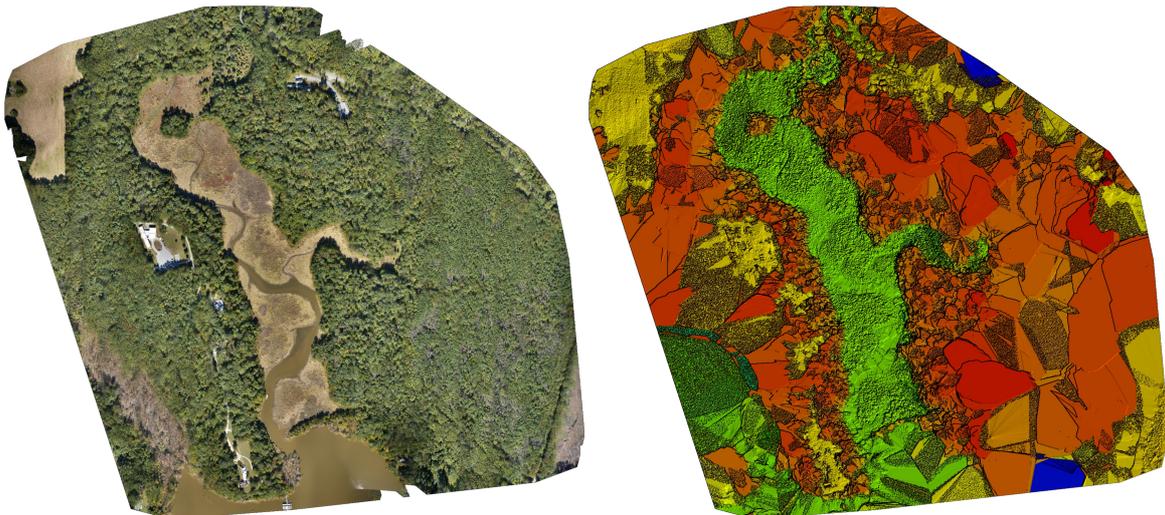|			
Images	median of 72778 keypoints per image		✓
Dataset	1242 out of 1262 images calibrated (98%), all images enabled, 57 blocks		⚠
Camera Optimization	1.05% relative difference between initial and optimized internal camera parameters		✓
Matching	median of 851.448 matches per calibrated image		⚠
Georeferencing	yes, 8 GCPs (8 3D), mean RMS error = 0.006 m		✓

Preview

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

Calibration Details

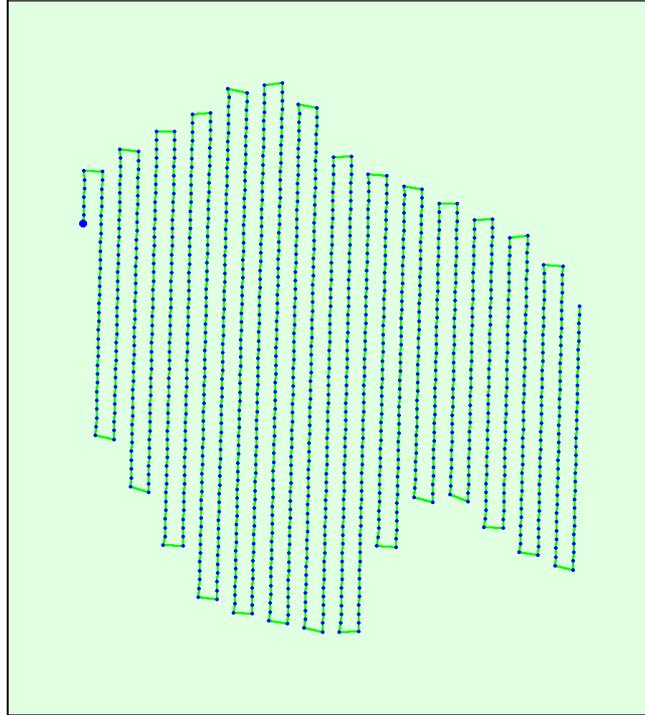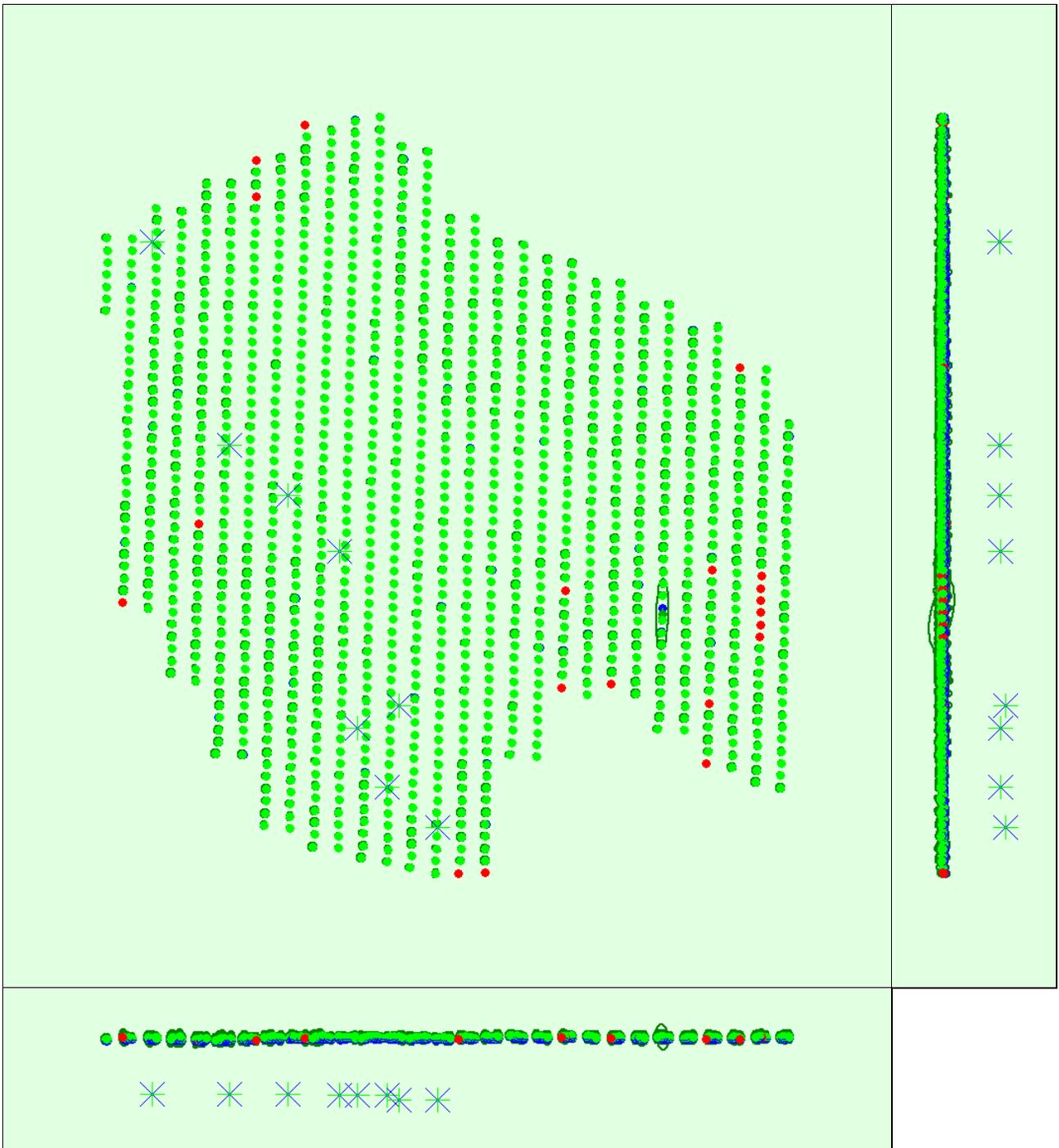|	
Number of Calibrated Images	1242 out of 1262

❓ Initial Image Positions ℹ

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 ℹ

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

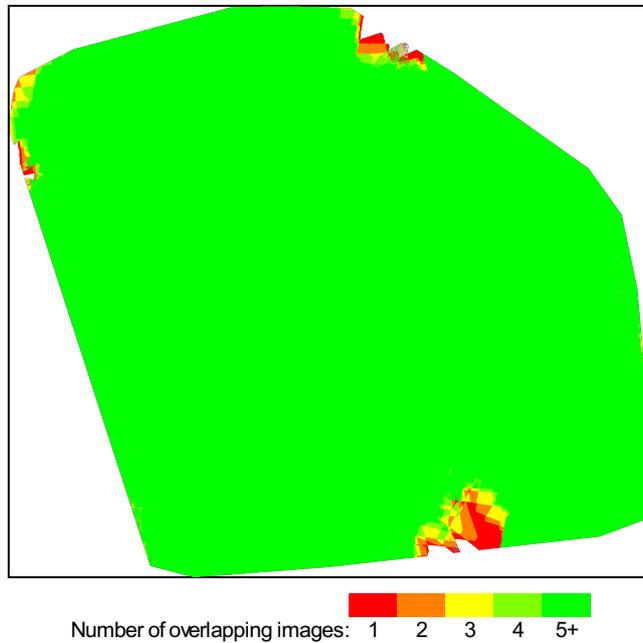|	X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.070	0.071	0.104	0.226	0.200	0.141
Sigma	0.005	0.020	0.020	0.255	0.181	0.144

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).
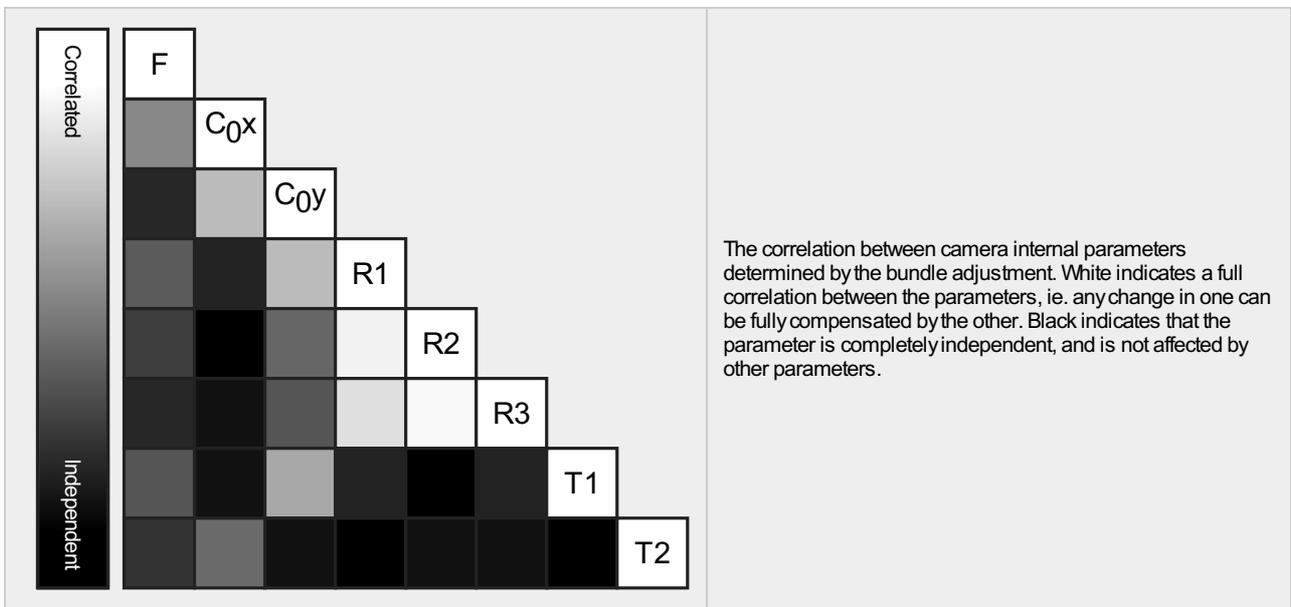
Bundle Block Adjustment Details

Number of 2D Keypoint Observations for Bundle Block Adjustment	4746980
Number of 3D Points for Bundle Block Adjustment	1875279
Mean Reprojection Error [pixels]	0.115

Internal Camera Parameters

ILX-LR1_17mmF4DGDN|Contemporary023_17.0_9504x6336 (RGB). Sensor Dimensions: 35.000 [mm] x 23.333 [mm]

EXIF ID: ILX-LR1_17mmF4DGDN|Contemporary023_17.0_9504x6336

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	4616.228 [pixel] 17.000 [mm]	4752.000 [pixel] 17.500 [mm]	3168.000 [pixel] 11.667 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	4664.912 [pixel] 17.179 [mm]	4741.479 [pixel] 17.461 [mm]	3136.862 [pixel] 11.552 [mm]	-0.068	0.013	0.001	-0.000	-0.000
Uncertainties (Sigma)	2.458 [pixel] 0.009 [mm]	1.299 [pixel] 0.005 [mm]	1.123 [pixel] 0.004 [mm]	0.000	0.001	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.

pixel count

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	72778	851
Min	20647	10
Max	79997	21475
Mean	69561	3822

3D Points from 2D Keypoint Matches

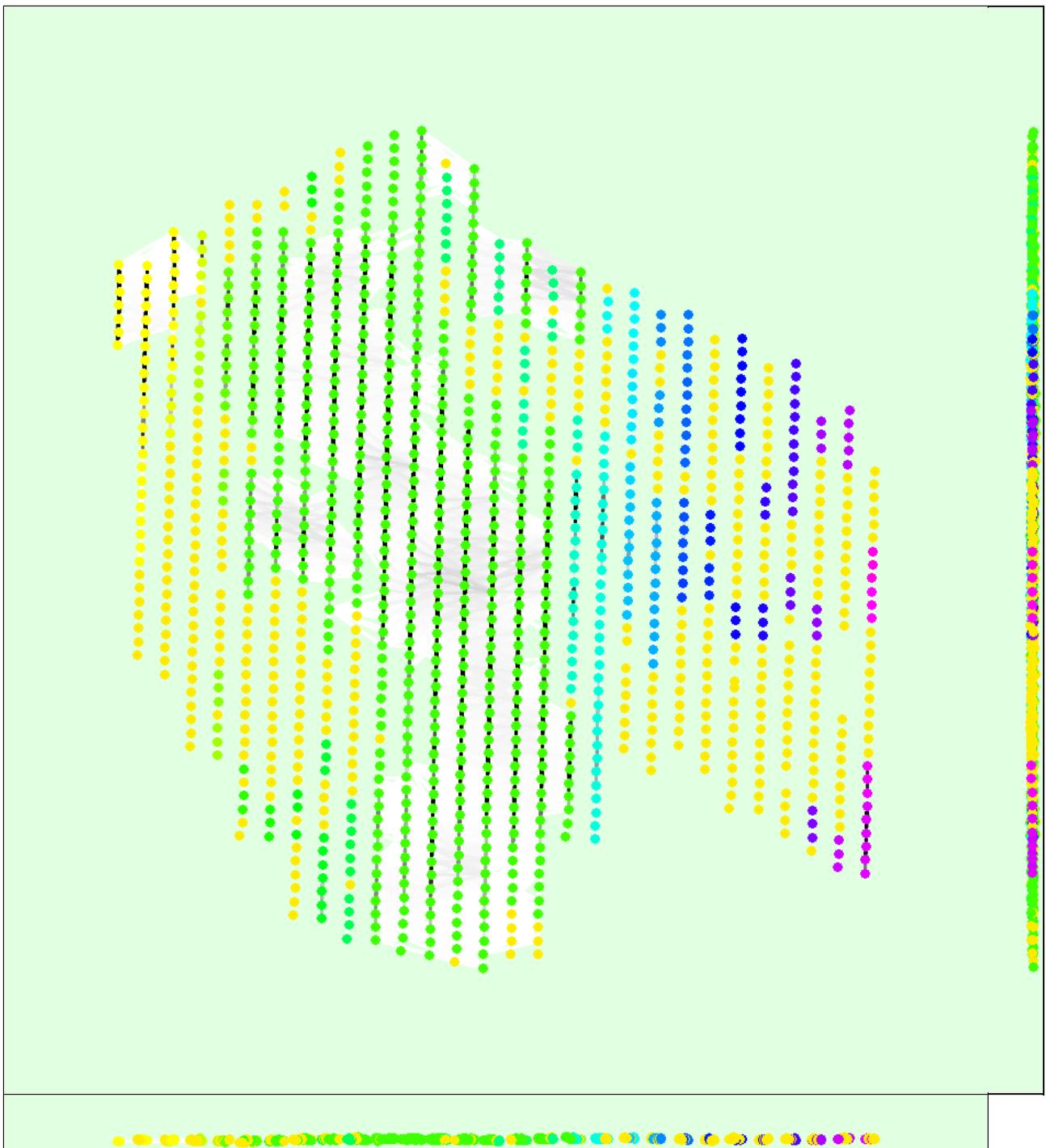|	Number of 3D Points Observed
In 2 Images	1285158
In 3 Images	351371
In 4 Images	135948
In 5 Images	59745
In 6 Images	26898
In 7 Images	12392
In 8 Images	2958
In 9 Images	372
In 10 Images	188
In 11 Images	113
In 12 Images	54
In 13 Images	45
In 14 Images	24
In 15 Images	11
In 16 Images	1
In 17 Images	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.

Number of matches

25 222 444 666 888 1111 1333 1555 1777 2000

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
0 (3D)	0.020/ 0.020	-0.003	-0.008	0.009	0.198	10 / 11
1 (3D)	0.020/ 0.020	-0.008	0.009	0.007	0.281	6 / 8
2 (3D)	0.020/ 0.020	-0.005	-0.012	-0.013	0.179	12 / 12
3 (3D)	0.020/ 0.020	-0.003	-0.000	-0.003	0.192	16 / 16

4 (3D)	0.020/ 0.020	0.008	0.001	-0.001	0.175	16 / 20
5 (3D)	0.020/ 0.020	-0.000	0.003	-0.002	0.310	7 / 8
6 (3D)	0.020/ 0.020	0.014	0.006	0.001	0.194	12 / 12
7 (3D)	0.020/ 0.020	-0.002	0.001	-0.000	0.315	11 / 13
Mean [m]		0.000069	0.000093	-0.000142		
Sigma [m]		0.006888	0.006646	0.006378		
RMS Error [m]		0.006889	0.006646	0.006380		

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.

❓ Absolute Geolocation Variance ℹ️

Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-0.06	7.98	0.08	13.62
-0.06	-0.05	1.69	0.08	1.77
-0.05	-0.04	2.90	0.16	2.82
-0.04	-0.02	5.00	1.13	4.51
-0.02	-0.01	9.11	4.43	10.56
-0.01	0.00	22.24	43.19	17.49
0.00	0.01	23.61	44.80	16.44
0.01	0.02	10.15	4.67	10.48
0.02	0.04	5.24	0.97	5.48
0.04	0.05	3.30	0.16	2.34
0.05	0.06	1.77	0.24	1.85
0.06	-	7.01	0.08	12.65
Mean [m]		0.004469	0.037744	-2.069341
Sigma [m]		0.048885	0.009106	0.143609
RMS Error [m]		0.049089	0.038827	2.074318

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 [m]	0.004345	0.037729	-2.068111

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

❓ Relative Geolocation Variance ℹ️

Relative Geolocation Error	Images X [%]	Images Y [%]	Images Z [%]
[-1.00, 1.00]	60.68	95.97	62.05
[-2.00, 2.00]	77.92	99.36	74.38
[-3.00, 3.00]	85.01	99.84	80.26
Mean of Geolocation Accuracy [m]	0.020000	0.020000	0.031378
Sigma of Geolocation Accuracy [m]	0.000000	0.000000	0.003447

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

Geolocation Orientational Variance	RMS [degree]
Omega	12.539
Phi	3.699
Kappa	2.019

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 Threadripper PRO 7975WX 32-Cores RAM: 255GB GPU: NVIDIA GeForce RTX 4090 (Driver: 31.0.15.5241)
Operating System	Windows 11, 64-bit

Coordinate Systems

Image Coordinate System	WGS 84
Ground Control Point (GCP) Coordinate System	WGS 84 / UTM zone 18N
Output Coordinate System	WGS 84 / UTM zone 18N

Processing Options

Detected Template	No Template Available
Keypoints Image Scale	Full, Image Scale: 0.5
Advanced: Matching Image Pairs	Custom Use Capture Time: yes, Number of Neighboring Images: 1 Use Triangulation of Image Geolocation: yes Use Distance: no Use Image Similarity: yes, Maximum Number of Pairs for Each Image Based on Similarity: 1 Use MTPs: yes, Maximum Number of Image Pairs per MTP: 5 Use Time for Multiple Cameras: no
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

Point Cloud Densification details

Processing Options

Image Scale	multiscale, 1/2 (Half image size, Default)
Point Density	Optimal
Minimum Number of Matches	2
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	01h:28m:56s
Time for Point Cloud Classification	14m:21s
Time for 3D Textured Mesh Generation	24m:09s

Results

Number of Generated Tiles	22
Number of 3D Densified Points	524455092
Average Density (per m^3)	15.73

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (2.87 [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
Raster DTM	Generated: yes Merge Tiles: yes
DTM Resolution	5 x GSD (2.87 [cm/pixel])
Time for DSM Generation	26m:24s
Time for Orthomosaic Generation	01h:38m:04s
Time for DTM Generation	29m:00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s