

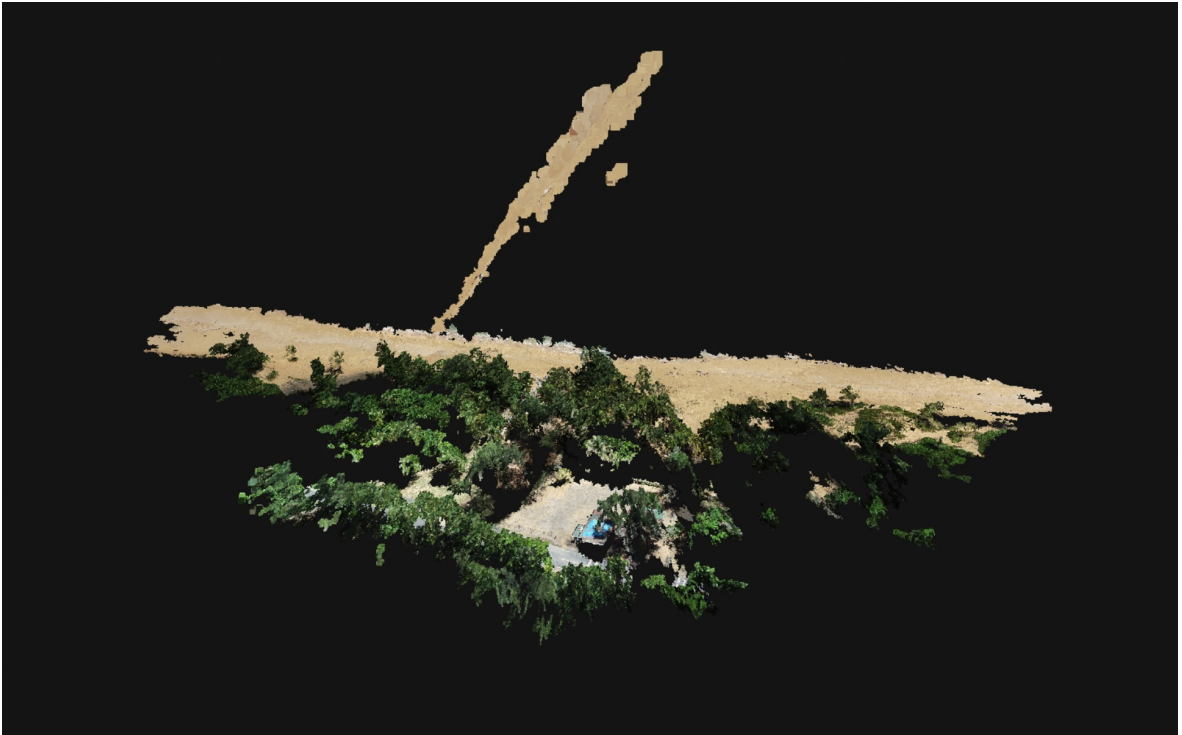
Boardwalk Playa las Tres Palmas, Loiza
August 09, 2023.



Centroid coordinates : 18.44704° N 65.94170° W

3D map

Boardwalk Playa las Tres Palmas, Loiza



2D map



Total area of site =2.93612 ha

Beach length (m)

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Beach length = 152.712 m

Density surface model

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Area of the beach

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Area of the beach = 7,076.24 m²

Beach volume

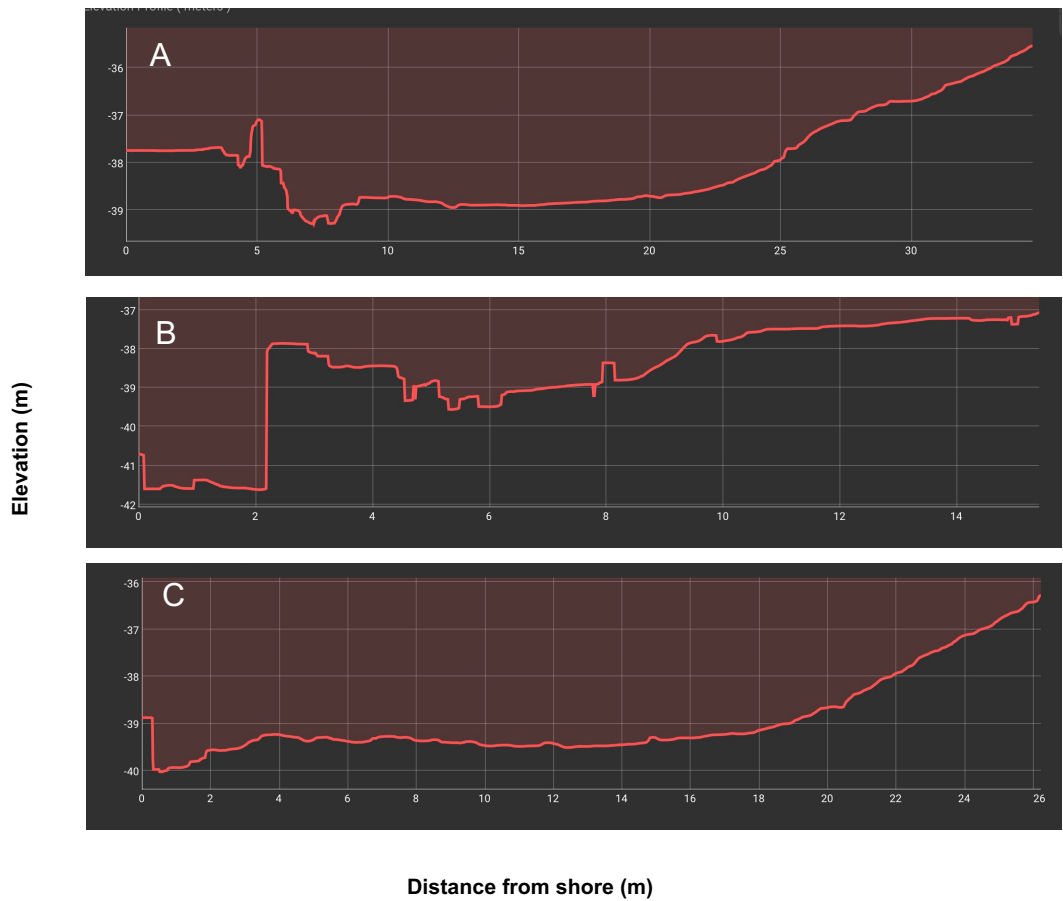
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Cut = 0.00 m³
Fill = -268,582 m³
Volume Dif. = -268,582 m³

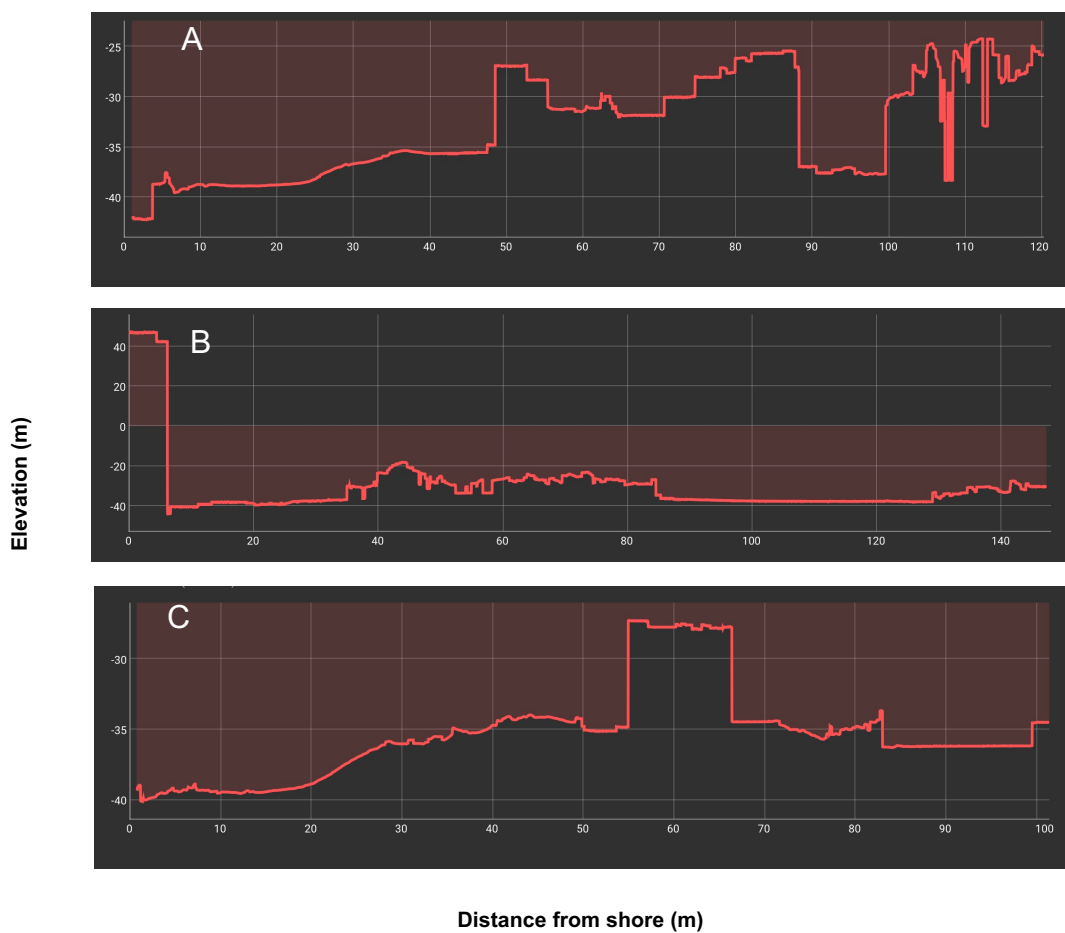
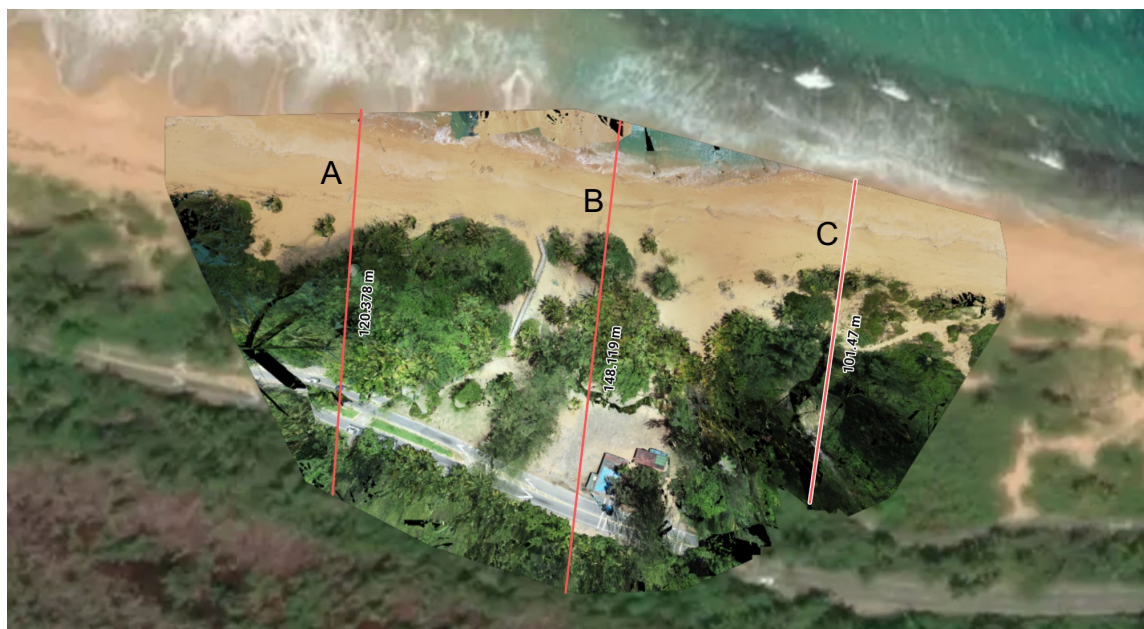
Beach elevation

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Site elevation (m)

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Dune height (m)

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Dune height

A = 5.211 m

B = 4.226 m

Dune width (m)

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Dune width

A = 44.073 m

B = 48.196 m

Area and perimeter of dune

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Area and perimeter of dune

2D area = 48.196 m

3D area = 48.381 m

2D perimeter = -39.681 m

3D perimeter = -35.454 m

Elevation difference = 4.226 m

Volume of dune

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Base surface	Triangulated
Cut volume	0.00 m ³
Cut error	0.00 m ³
Fill volume	-428,657 m ³
Fill error	1,199.41 m ³
Volume difference	-428,657 m ³

Shoreline

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Shoreline length = 167.053 m

Shoreline geolocation

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Shoreline markers

A = 18.44765° N 65.94208° W

B = 18.44751° N 65.94137° W

Shoreline extension

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Shoreline extension

A = 11.708 m

B = 16.375 m

Shoreline position

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Shoreline position

A = 23.133 m

B = 17.208 m

Area of dune breaches

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Area of dune breaches

Breach = 1.36587 ha

Quality Report



Generated with Pix4Denterprise version 4.8.3
Preview



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	234510-Project-2023-08-09T16:31:33.169Z
Processed	2023-08-09 17:13:23
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.47 cm / 0.58 in
Area Covered	0.029 km ² / 2.9125 ha / 0.01 sq. mi. / 7.2006 acres
Time for Initial Processing (without report)	20m:00s

Quality Check



Images	median of 42979 keypoints per image	
Dataset	191 out of 244 images calibrated (78%), all images enabled, 3 blocks	
Camera Optimization	0.05% relative difference between initial and optimized internal camera parameters	
Matching	median of 5579.49 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

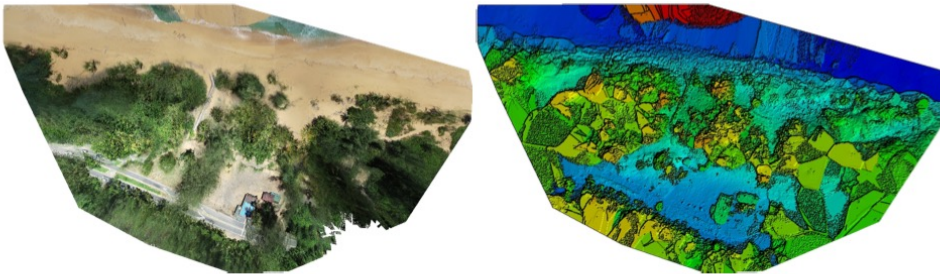


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	191 out of 244
Number of Geolocated Images	244 out of 244

Initial Image Positions



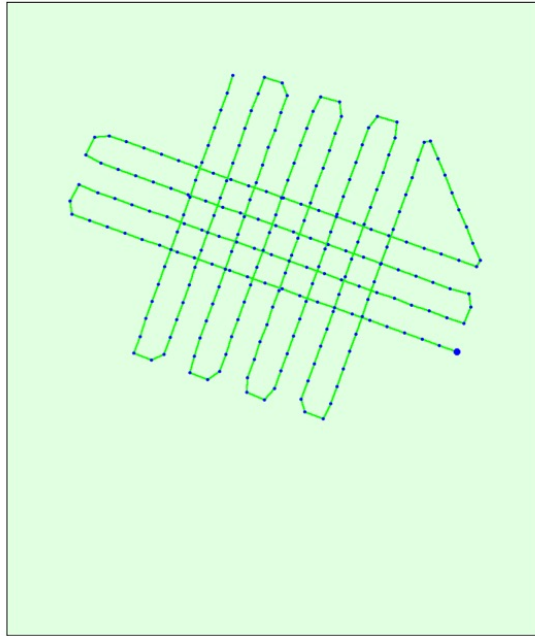
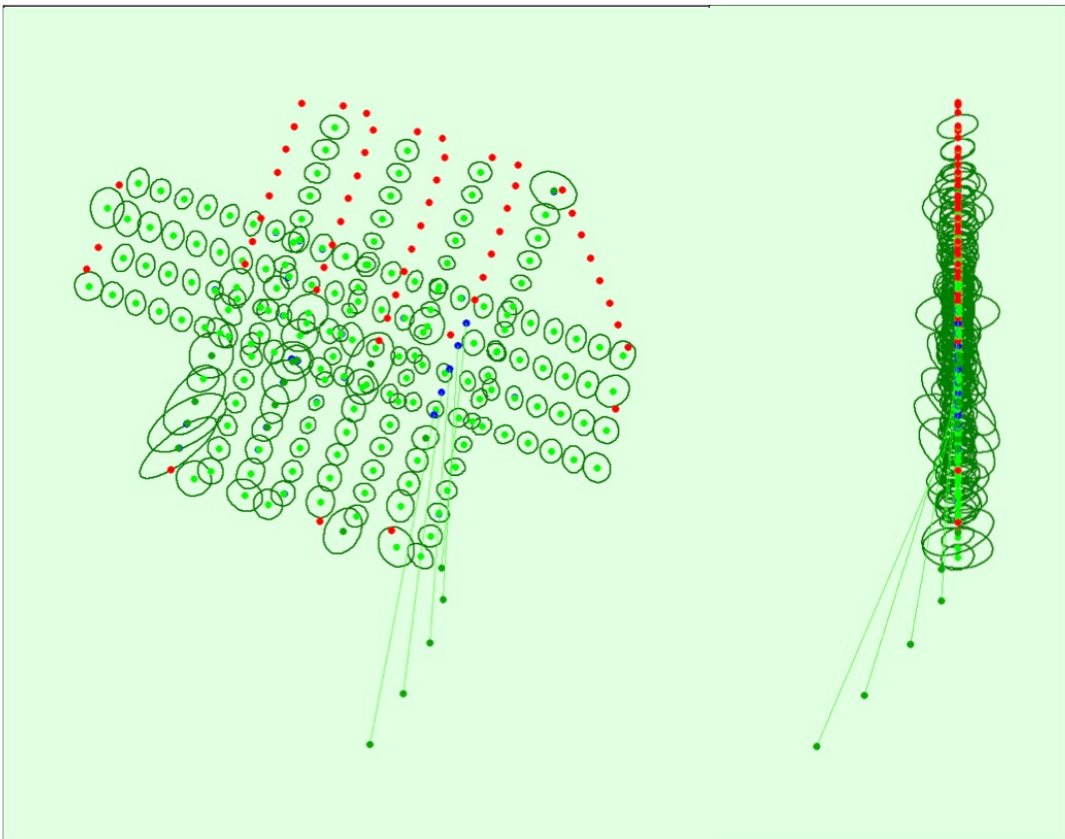
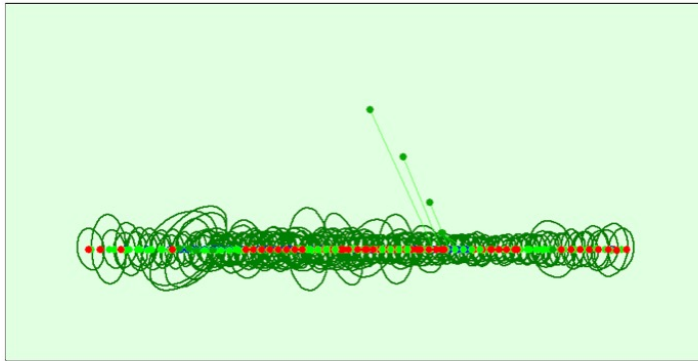


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions





Uncertainty ellipses 1000x magnified

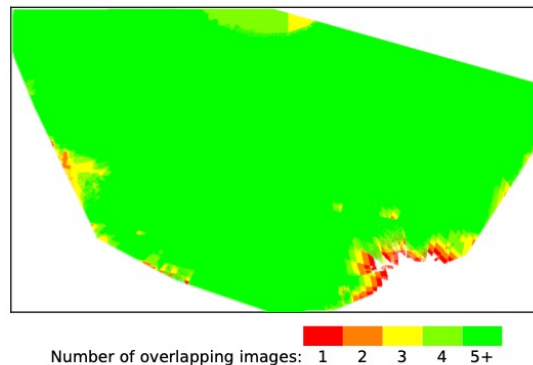
Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Red dots indicate disabled 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	0.003	0.003	0.004	0.008	0.007	0.007
Sigma	0.001	0.001	0.001	0.002	0.002	0.003

? Overlap



Number of overlapping images: 1 2 3 4 5+

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	1033894
Number of 3D Points for Bundle Block Adjustment	411769
Mean Reprojection Error [pixels]	0.209

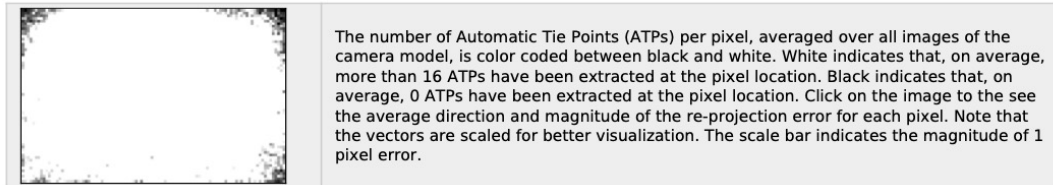
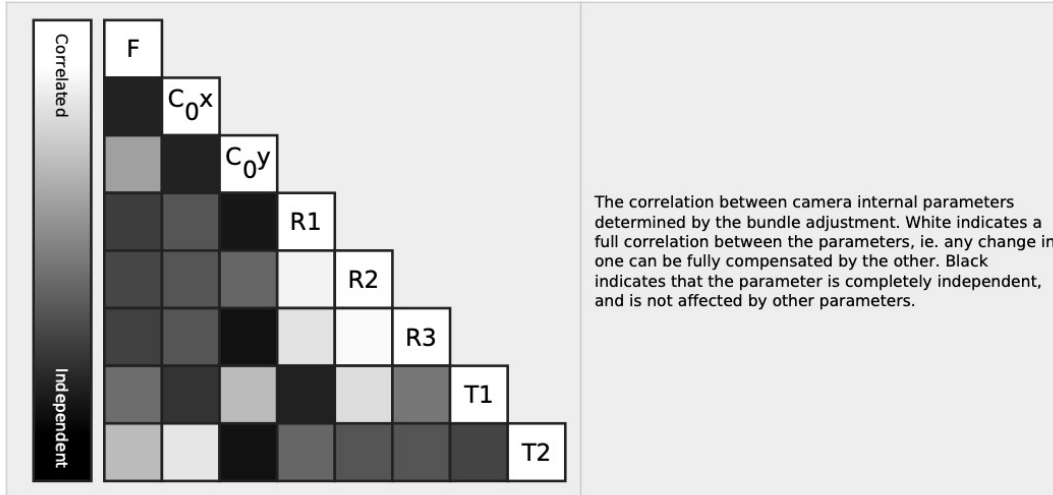
? Internal Camera Parameters

FC6310R_8.8_5472x3648 (RGB). Sensor Dimensions: 12.833 [mm] x 8.556 [mm]



EXIF ID: FC6310R_8.8_5472x3648

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3658.300 [pixel] 8.580 [mm]	2722.500 [pixel] 6.385 [mm]	1835.100 [pixel] 4.304 [mm]	-0.269	0.112	-0.033	0.000	-0.001
Optimized Values	3656.165 [pixel] 8.575 [mm]	2729.311 [pixel] 6.401 [mm]	1856.517 [pixel] 4.354 [mm]	-0.014	-0.001	0.009	-0.001	-0.001
Uncertainties (Sigma)	0.200 [pixel] 0.000 [mm]	0.310 [pixel] 0.001 [mm]	0.449 [pixel] 0.001 [mm]	0.000	0.001	0.001	0.000	0.000



? 2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	42979	5579
Min	22456	131
Max	79753	15651
Mean	47985	5413

? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	306372
In 3 Images	60464
In 4 Images	21828
In 5 Images	9971
In 6 Images	5132
In 7 Images	2927
In 8 Images	1708
In 9 Images	1057
In 10 Images	746
In 11 Images	476
In 12 Images	353
In 13 Images	224
In 14 Images	153
In 15 Images	118
In 16 Images	62

In 17 Images	52
In 18 Images	36
In 19 Images	30
In 20 Images	24
In 21 Images	15
In 22 Images	9
In 23 Images	4
In 24 Images	3
In 25 Images	4
In 26 Images	1

? 2D Keypoint Matches

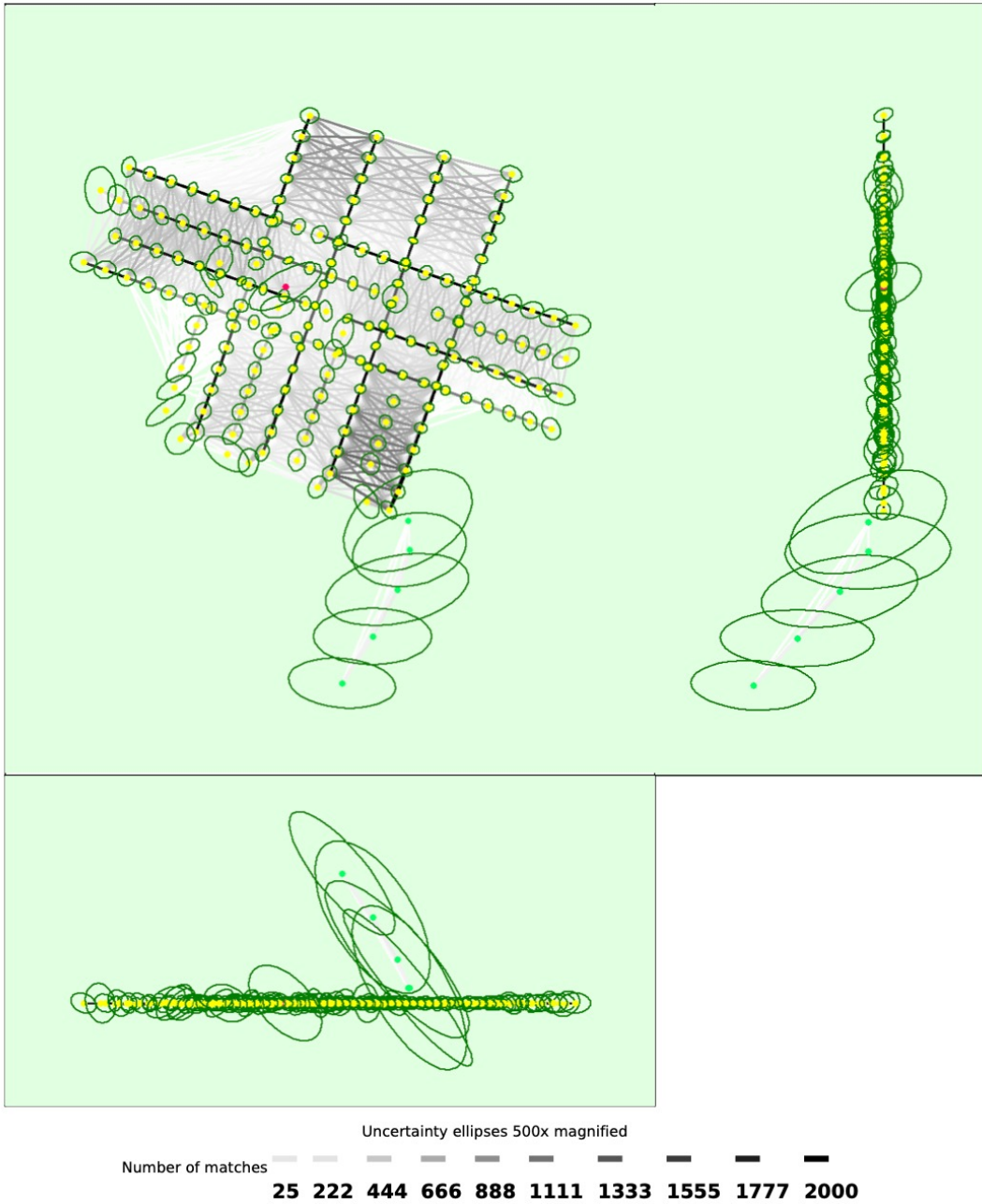


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty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

Relative camera position and orientation uncertainties

	X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.005	0.004	0.005	0.016	0.013	0.012
Sigma	0.005	0.003	0.006	0.044	0.032	0.023

Geolocation Details

Absolute Geolocation Variance

Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-0.04	0.00	0.00	25.43
-0.04	-0.03	0.00	0.00	7.51
-0.03	-0.03	5.20	0.58	5.78
-0.03	-0.02	2.31	4.05	4.05
-0.02	-0.01	12.14	13.87	3.47
-0.01	0.00	24.86	33.53	4.05
0.00	0.01	36.42	31.21	4.05
0.01	0.02	16.76	12.14	6.36
0.02	0.03	0.58	4.05	7.51
0.03	0.03	1.16	0.58	4.62
0.03	0.04	0.00	0.00	4.05
0.04	-	0.58	0.00	23.12
Mean [m]		-0.000072	-0.000029	-0.001160
Sigma [m]		0.011188	0.009879	0.059511
RMS Error [m]		0.011188	0.009879	0.059522

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]	69.94	72.25	23.70
[-2.00, 2.00]	90.17	93.64	56.65
[-3.00, 3.00]	99.42	100.00	76.88
Mean of Geolocation Accuracy [m]	0.009865	0.009865	0.023283
Sigma of Geolocation Accuracy [m]	0.000280	0.000280	0.001114

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

Geolocation Orientational Variance	RMS [degree]
Omega	2.953
Phi	1.784
Kappa	4.477

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 5.15.0-1040-aws x86_64


Coordinate Systems



Image Coordinate System	WGS 84
Output Coordinate System	WGS 84 / UTM zone 20N

Processing Options



Detected Template	 cloud-3d-maps-1*
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, yes

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	07m:33s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	06m:15s

Results



Number of Generated Tiles	1
Number of 3D Densified Points	11681961
Average Density (per m ³)	714.82

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (1.47 [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	04m:07s
Time for Orthomosaic Generation	12m:37s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s

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