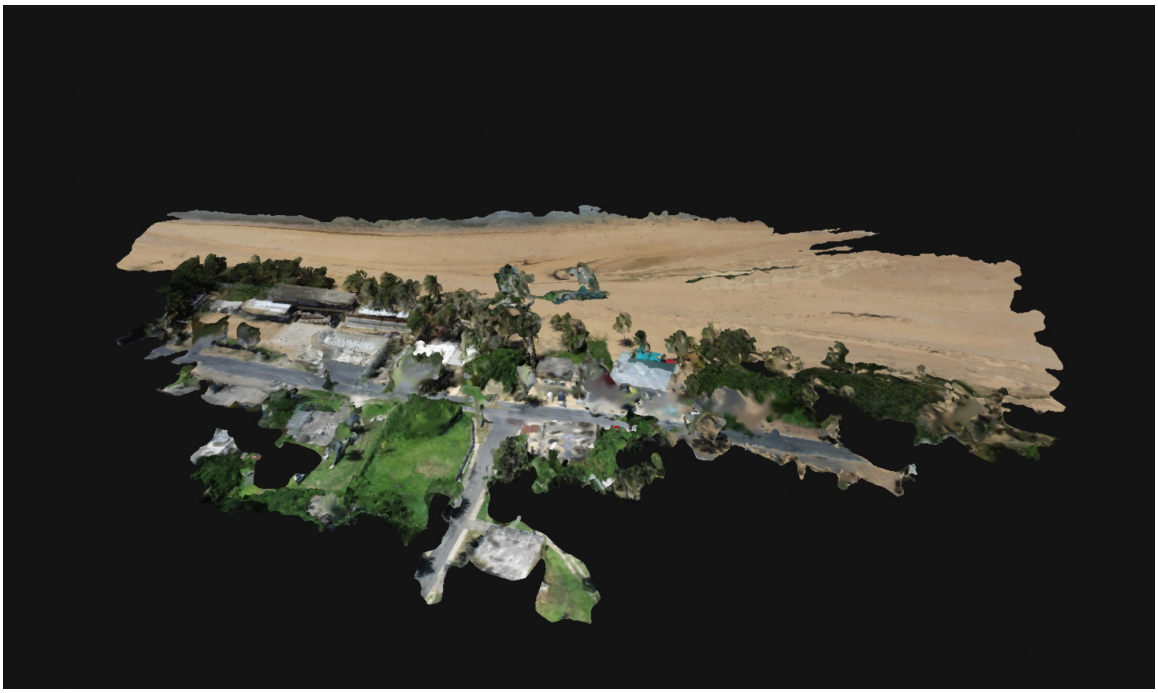
Playa dos Marullos (El K’Rajo Beach Bar), Loiza
August 03, 2023.

Centroid coordinates : 18.45092° N 65.95773° W

3D map
Playa dos Marullos (El K'Rajo Beach Bar), Loiza



2D map

Total area of site =4.54287 há

Beach length (m)
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Beach length = 167.557 m

Density surface model
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Area of the beach
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

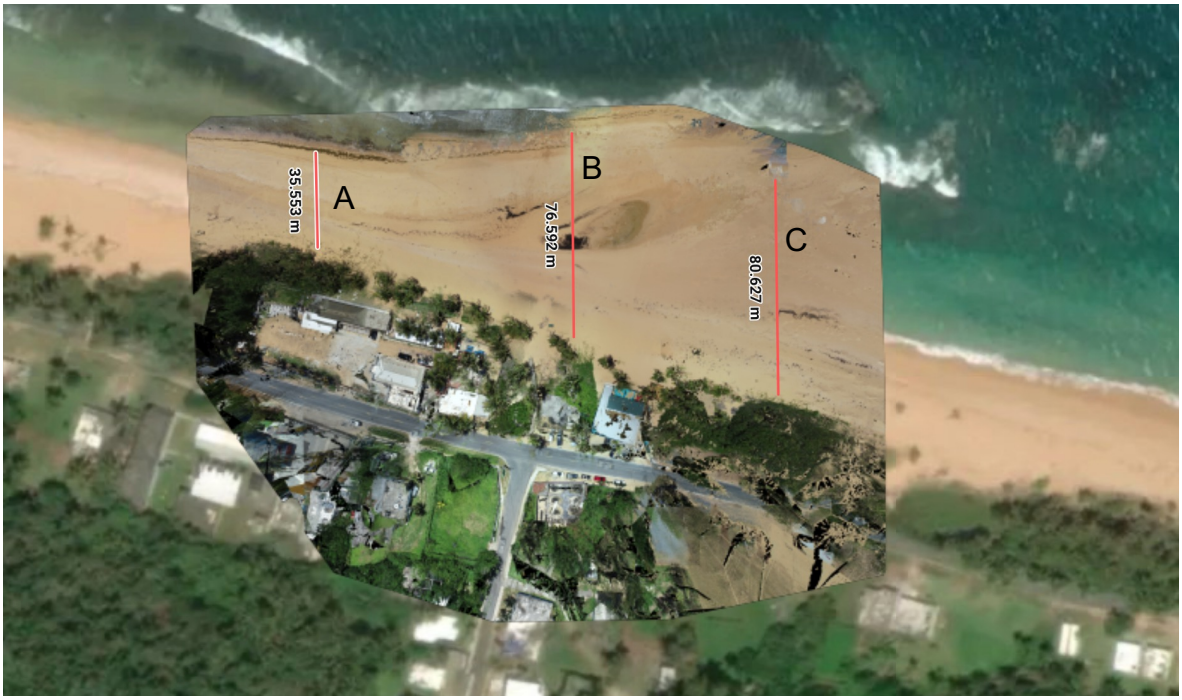
Area of the beach = 1.7735 ha

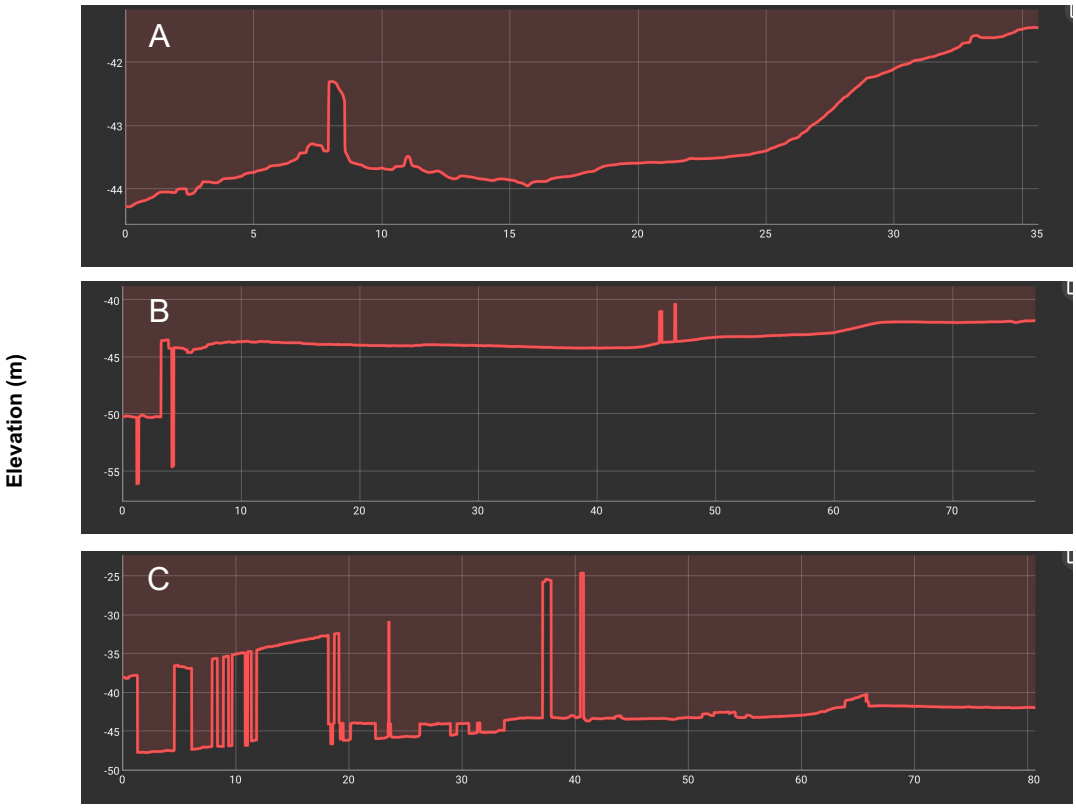
Beach volume
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Cut = 0.00 m³
Fill = -767,380 m³
Volume Dif. = -767,380 m³

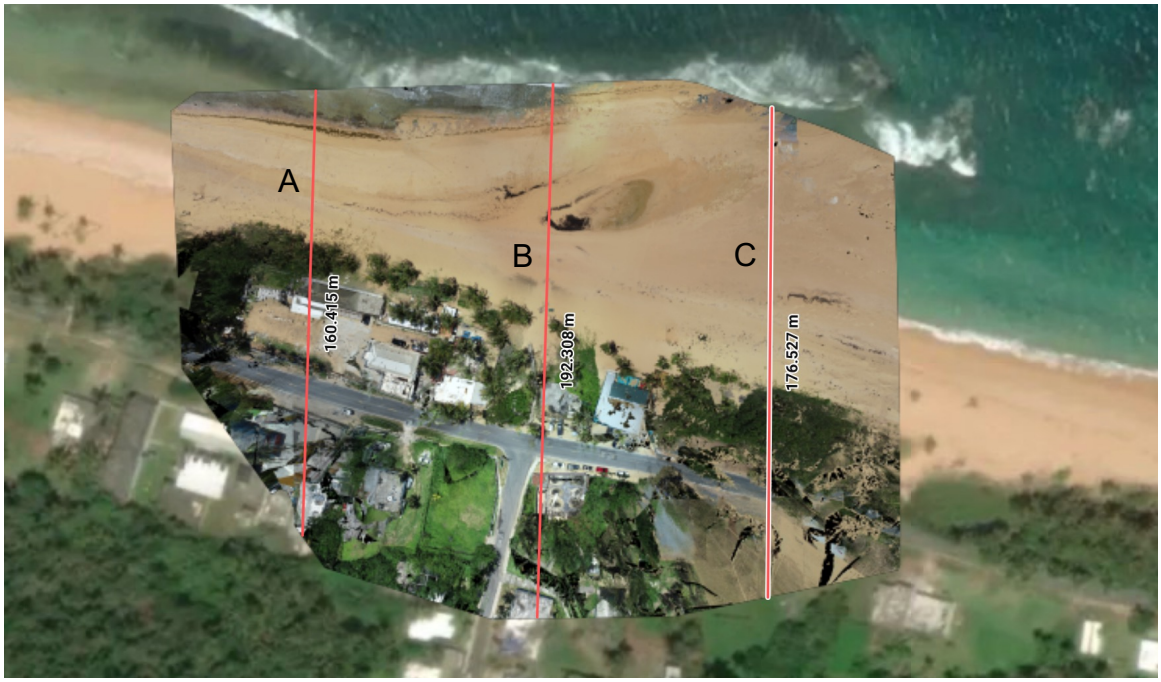
Beach elevation

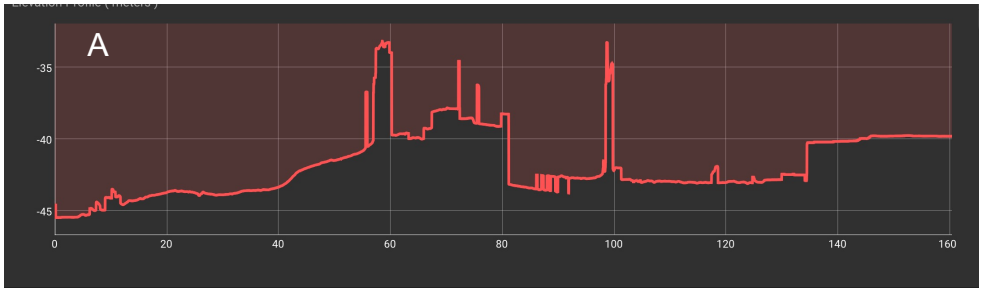
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

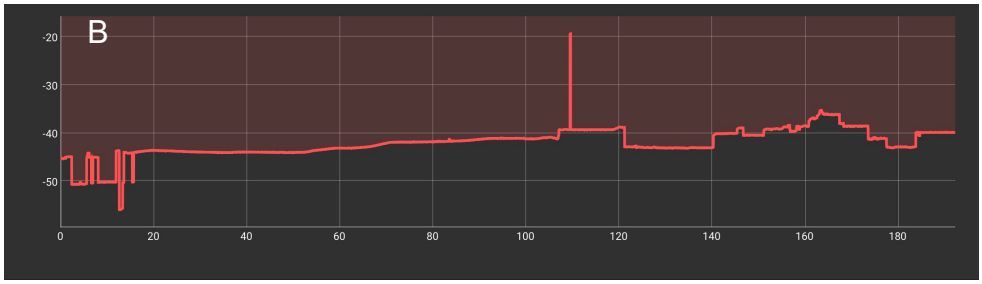


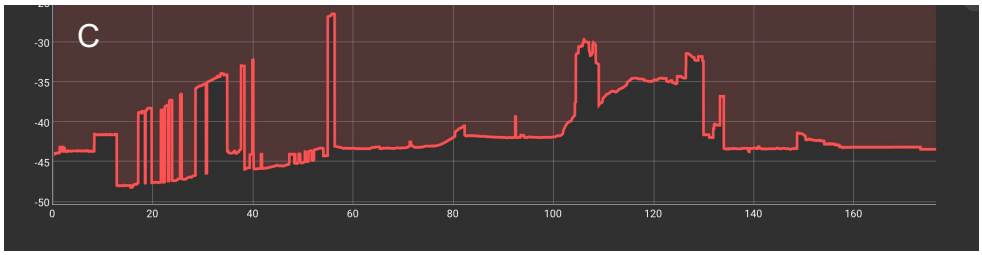


Site elevation (m)
Playa dos Marullos (El K'Rajo Beach Bar), Loiza









Elevation (m)

Distance from shore (m)

Dune height (m)
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Dune height
A = 3.108 m **B** = 1.075 m

Dune width (m)
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Dune width
A = 36.365 m **B** = 87.088 m

Area and perimeter of dune
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

A - Area and perimeter of dune

2D area = 6,047.97 m²
3D area = 6,047.97 m²
2D perimeter = 651.984 m
3D perimeter = 651.984 m
Elevation difference = 0.00 m

Volume of dune
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Base surface	Triangulated
Cut volume	0.00 m³
Cut error	0.00 m³
Fill volume	-230,762 m³
Fill error	547.003 m³
Volume difference	-230,762 m³

Shoreline
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Shoreline length = 160.952 m

Shoreline geolocation
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Shoreline markers

A = 18.45174° N 65.95856° W
B = 18.45175° N 65.95773° W

Shoreline extension
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Shoreline extension
A = 15.823 m **B** = 15.209 m

Shoreline position
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Shoreline position
A = 39.692 m **B** = 61.014 m

Area of dune breaches
Playa dos Marullos (El K'Rajo Beach Bar), Loiza

Area of dune breaches

Breach = 6,047.97 m²

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	234511-Project-2023-08-09T16:40:33.628Z
Processed	2023-08-09 17:52:57
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.51 cm / 0.60 in
Area Covered	0.045 km^2 / 4.5065 ha / 0.02 sq. mi. / 11.1417 acres
Time for Initial Processing (without report)	20m:05s

Quality Check

Images	median of 36067 keypoints per image	✓
Dataset	242 out of 256 images calibrated (94%), all images enabled, 3 blocks	⚠
Camera Optimization	1.41% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 7940.72 matches per calibrated image	✓
Georeferencing	yes, no 3D GCP	⚠

Preview

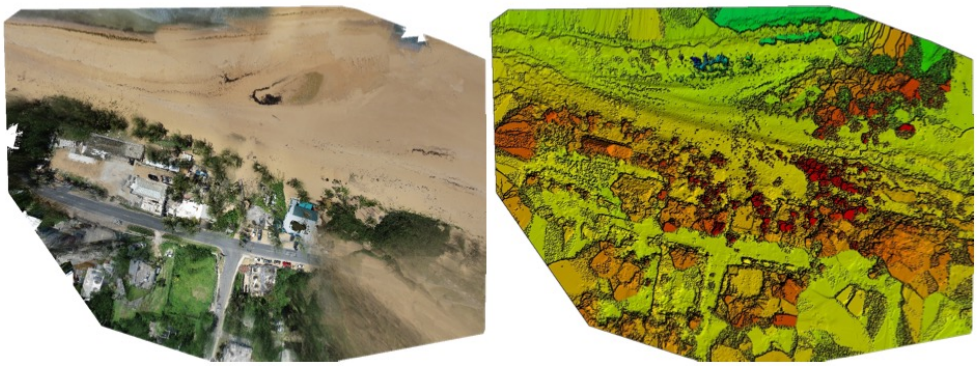


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	242 out of 256
Number of Geolocated Images	256 out of 256

Initial Image Positions

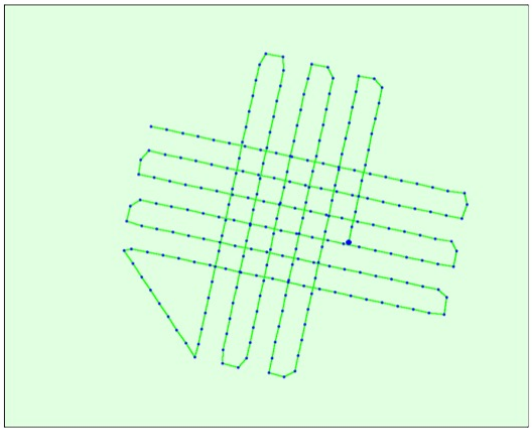
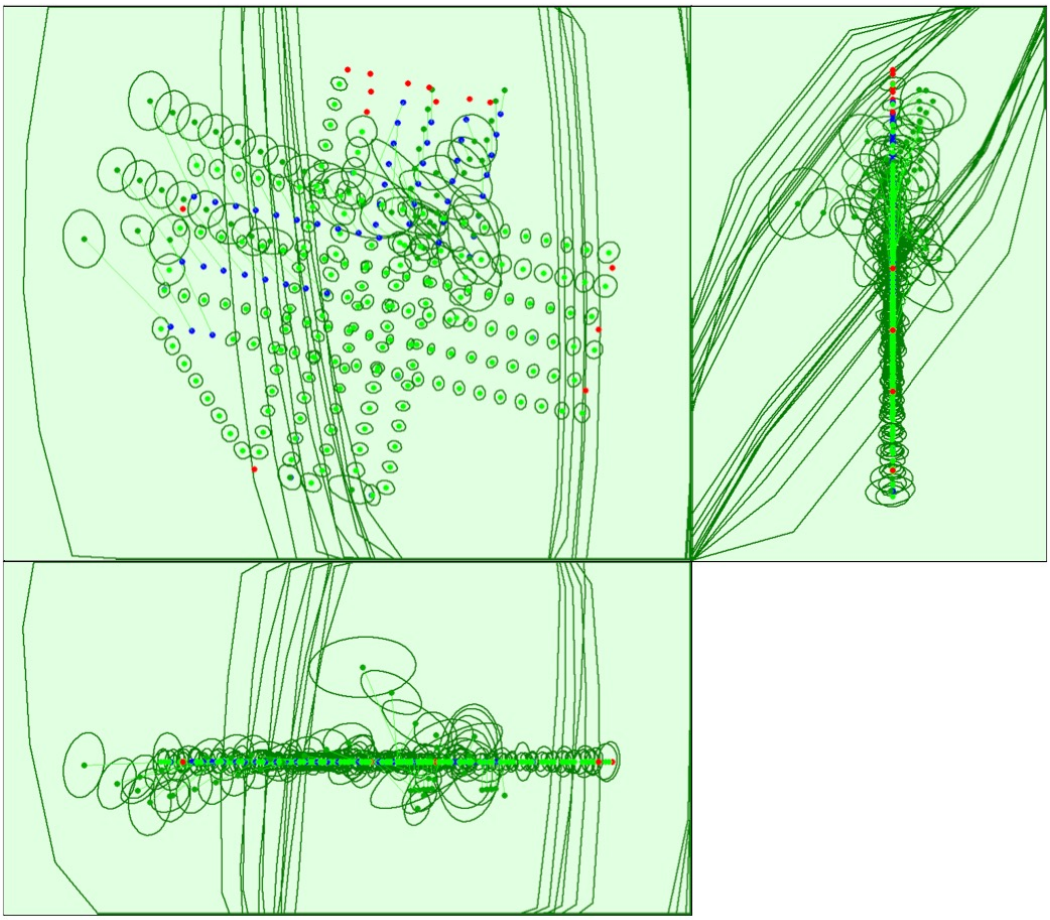


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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	0.005	0.011	0.010	0.007	0.008	0.009
Sigma	0.013	0.040	0.031	0.007	0.013	0.017

Overlap

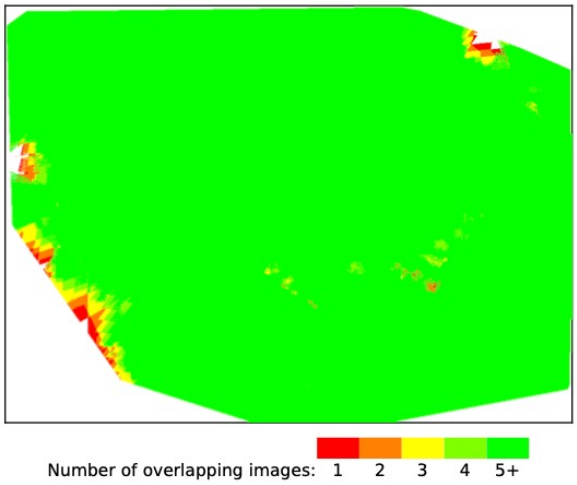


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.
Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

Bundle Block Adjustment Details

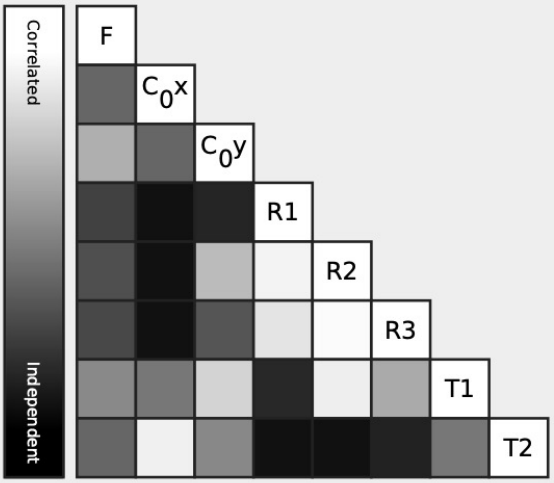
Number of 2D Keypoint Observations for Bundle Block Adjustment	2046001
Number of 3D Points for Bundle Block Adjustment	768031
Mean Reprojection Error [pixels]	0.192

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	3710.129 [pixel] 8.701 [mm]	2731.300 [pixel] 6.406 [mm]	1809.373 [pixel] 4.243 [mm]	-0.013	0.002	0.007	-0.002	-0.001
Uncertainties (Sigma)	0.108 [pixel] 0.000 [mm]	0.182 [pixel] 0.000 [mm]	0.232 [pixel] 0.001 [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	36067	7941
Min	20121	44
Max	64286	22087
Mean	36293	8455

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	527162
In 3 Images	128271
In 4 Images	52354
In 5 Images	25900
In 6 Images	13733
In 7 Images	7593
In 8 Images	4628
In 9 Images	2717
In 10 Images	1747
In 11 Images	1142
In 12 Images	796
In 13 Images	502
In 14 Images	400
In 15 Images	316
In 16 Images	205
In 17 Images	147
In 18 Images	109
In 19 Images	93
In 20 Images	49
In 21 Images	47
In 22 Images	32
In 23 Images	24

In 24 Images	17
In 25 Images	9
In 26 Images	8
In 27 Images	8
In 28 Images	4
In 29 Images	4
In 30 Images	5
In 31 Images	3
In 32 Images	2
In 34 Images	1
In 38 Images	2
In 39 Images	1

2D Keypoint Matches

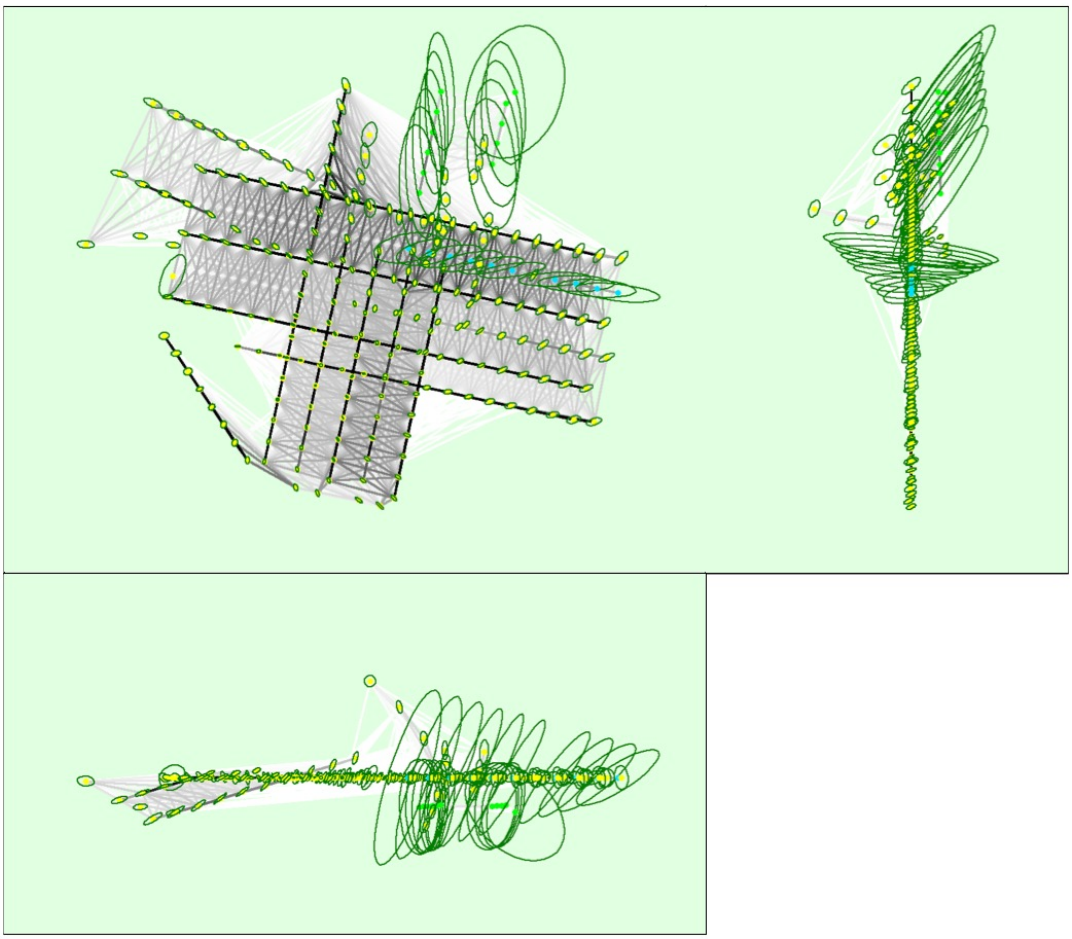


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.016	0.019	0.024	0.026	0.021	0.027

Sigma	0.020	0.034	0.038	0.010	0.032	0.038

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	1.57
-0.04	-0.03	0.00	0.00	0.00
-0.03	-0.02	0.00	0.00	1.05
-0.02	-0.02	0.52	0.52	3.66
-0.02	-0.01	3.66	4.19	10.47
-0.01	0.00	48.69	44.50	27.23
0.00	0.01	40.84	47.64	29.84
0.01	0.02	5.24	2.62	20.94
0.02	0.02	1.05	0.52	3.14
0.02	0.03	0.00	0.00	1.57
0.03	0.04	0.00	0.00	0.52
0.04	-	0.00	0.00	0.00
Mean [m]		-0.000084	-0.000137	0.000663
Sigma [m]		0.005201	0.004701	0.011776
RMS Error [m]		0.005202	0.004703	0.011795

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]	95.29	95.81	94.76
[-2.00, 2.00]	100.00	100.00	98.95
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	0.011279	0.011279	0.023136
Sigma of Geolocation Accuracy [m]	0.000268	0.000268	0.000484

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

Geolocation Orientational Variance	RMS [degree]
Omega	1.921
Phi	1.869
Kappa	3.491

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	11m:56s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	08m:04s

Results

Number of Generated Tiles	1
Number of 3D Densified Points	19595445
Average Density (per m^3)	815.97

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (1.51 [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:35s
Time for Orthomosaic Generation	13m:51s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s

Playa dos Marullos (El K'Rajo Beach Bar), Loiza