East Center Villa Pesqueira Post, Camuy
January 11, 2023.

Centroid coordinates : 18.49033° N 66.86294° W

3D map
East Center Villa Pesqueira Post, Camuy

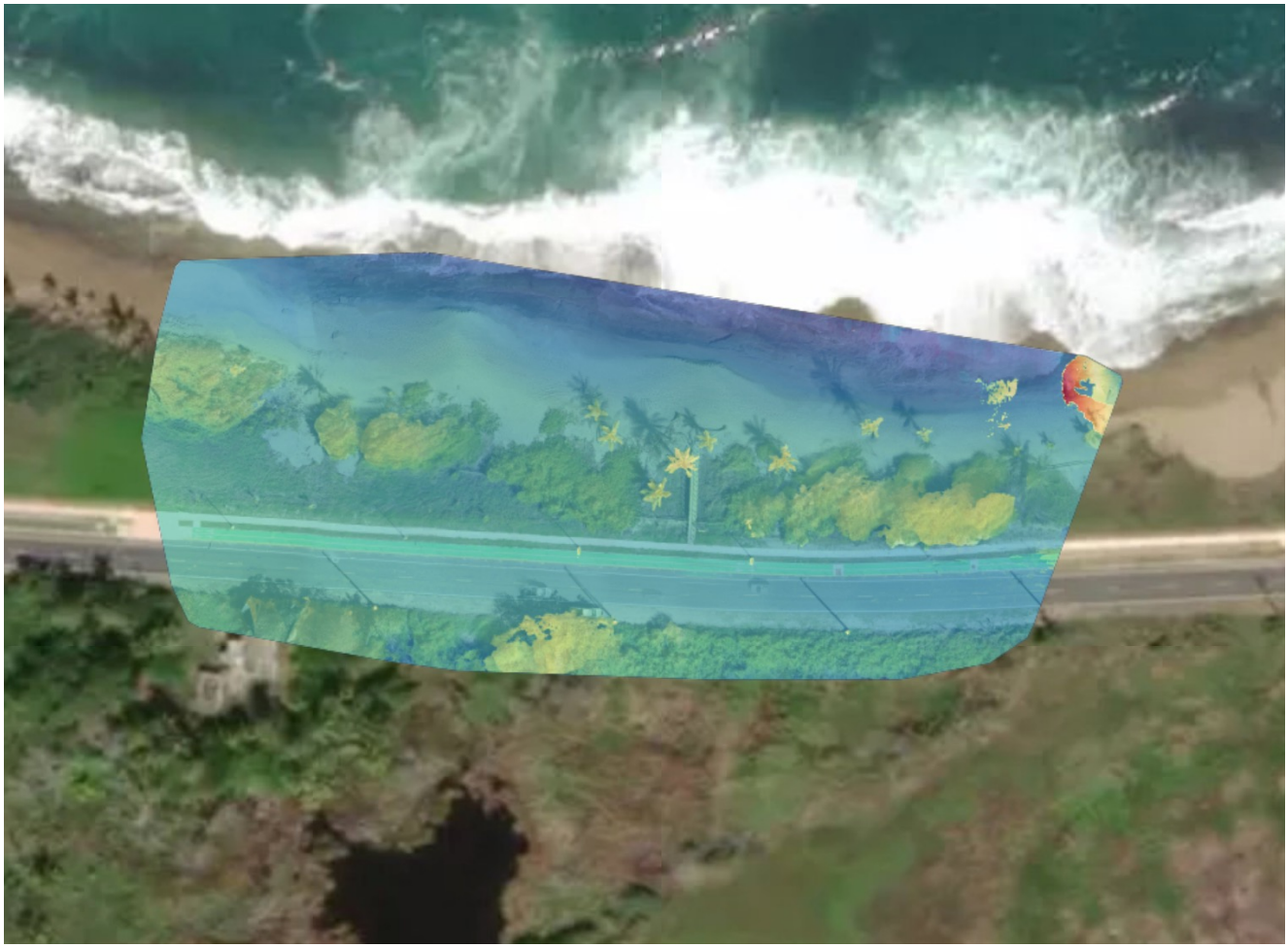
2D map

Total area of site = 1.4827 ha

Beach length (m)
East Center Villa Pesqueira Post, Camuy

Beach length = 202.453 m

Density surface model
East Center Villa Pesqueira Post, Camuy



Area of the beach
East Center Villa Pesqueira Post, Camuy

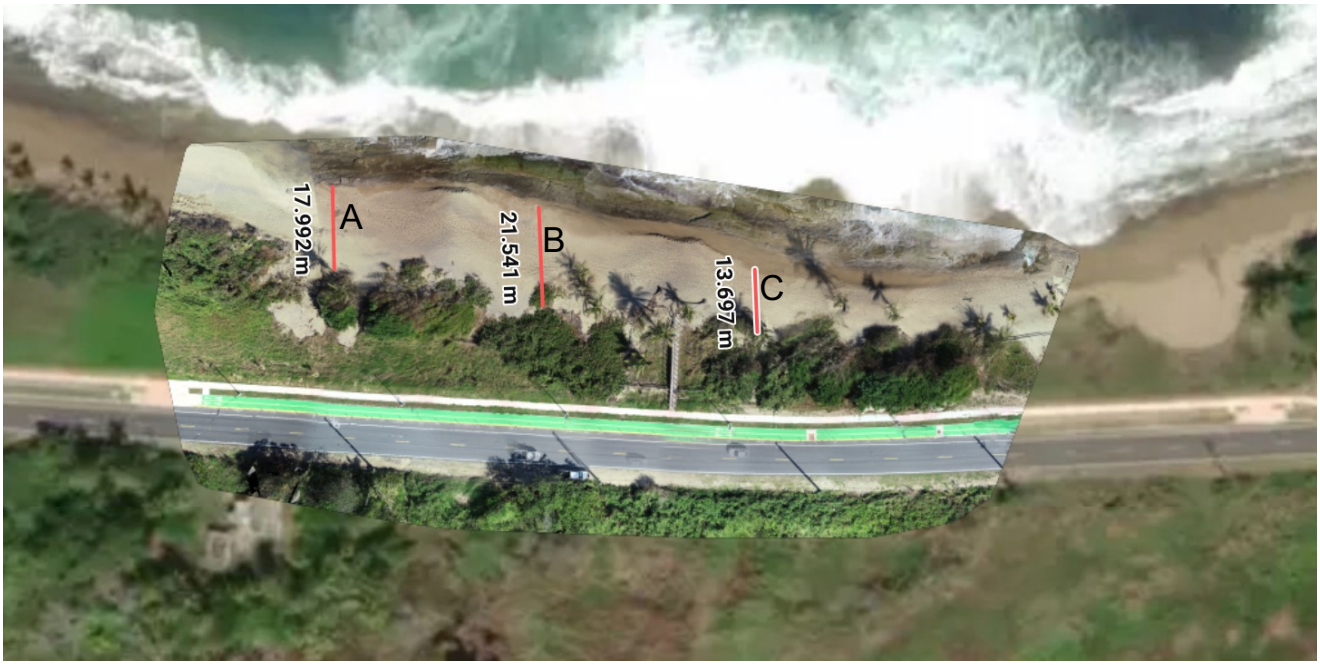
Area of the beach = 3,177.08 m²

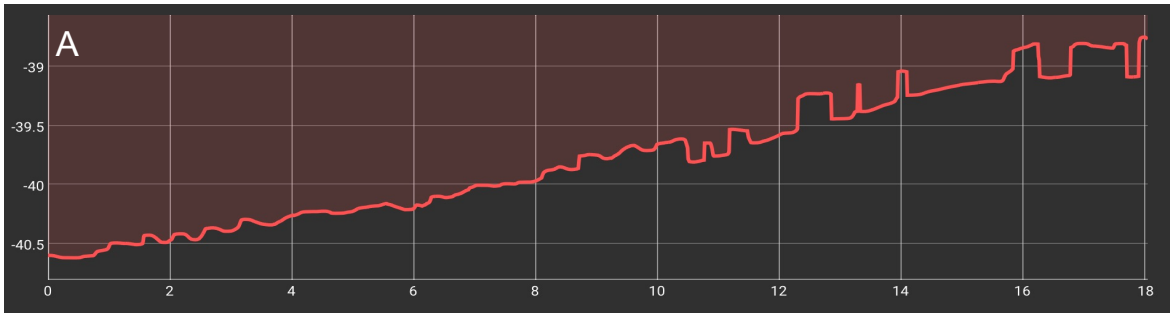
Beach volume
East Center Villa Pesqueira Post, Camuy

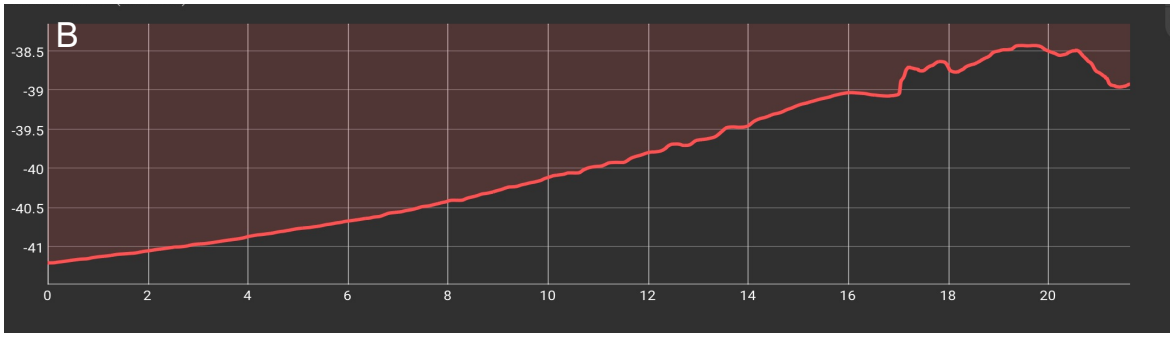
Cut = 0.00 m³
Fill = -125,148 m³
Volume Dif. = -125,148 m³

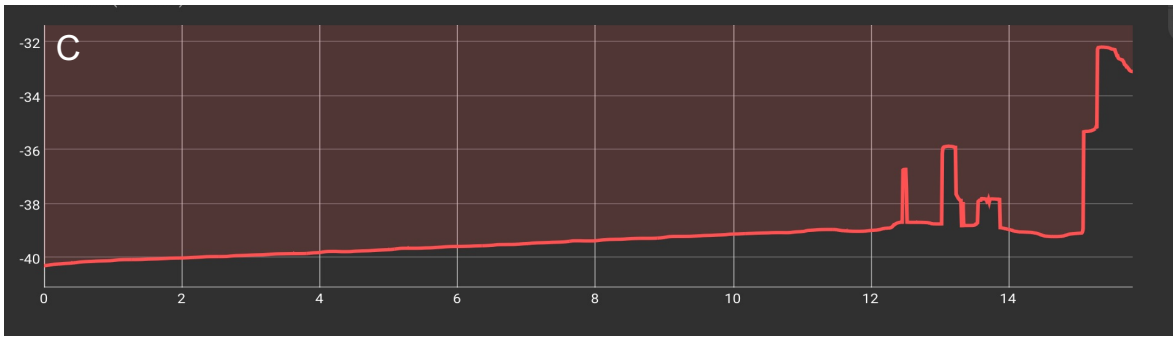
Beach elevation

East Center Villa Pesqueira Post, Camuy





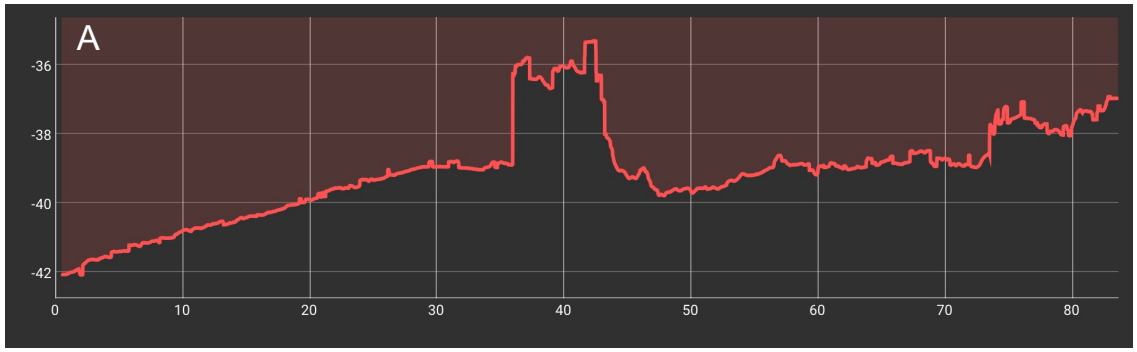


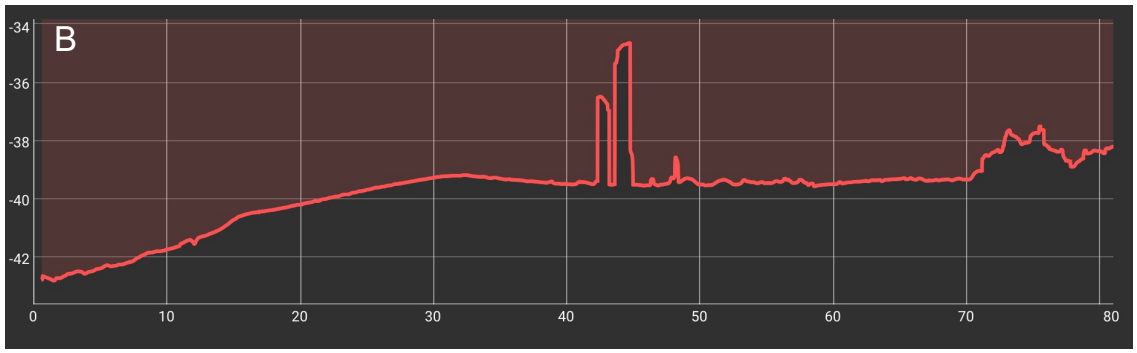


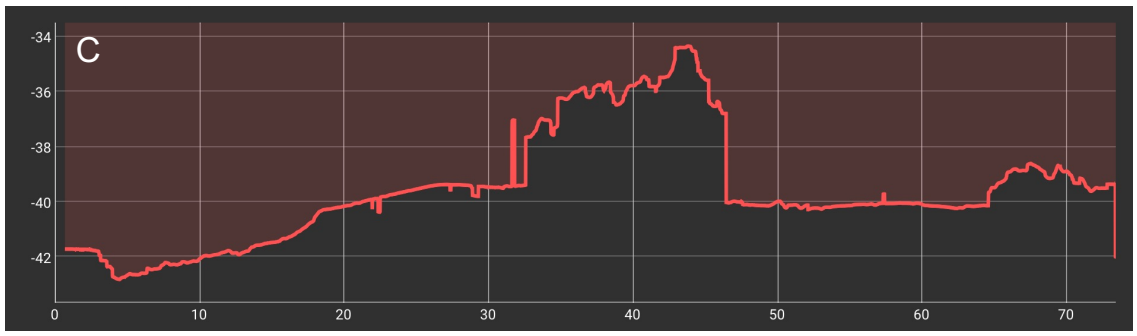
Elevation (m)

Distance from shore (m)

Site elevation (m)
East Center Villa Pesqueira Post, Camuy







Elevation (m)

Distance from shore (m)

Dune height (m)
East Center Villa Pesqueira Post, Camuy

Dune height
A = 4,215.7 m²

Dune width (m)
East Center Villa Pesqueira Post, Camuy

Dune width
A = 34.45 m
B = 23.73 m
C = 21.523 m
D = 17.219 m
E = 18.839 m

Area and perimeter of dune
East Center Villa Pesqueira Post, Camuy

Area and perimeter of dune

2D area = 4,215.7 m²
3D area = 4,215.7 m²
2D perimeter = 435.491 m
3D perimeter = 435.491 m
Elevation difference = 0.00 m

Volume of dune
East Center Villa Pesqueira Post, Camuy

Base surface	Triangulated
Cut volume	0.00 m³
Cut error	0.00 m³
Fill volume	-160,133 m³
Fill error	252.689 m³
Volume difference	-160,133 m³

Shoreline
East Center Villa Pesqueira Post, Camuy

Shoreline length = 204.066 m

Shoreline geolocation
East Center Villa Pesqueira Post, Camuy

Shoreline markers

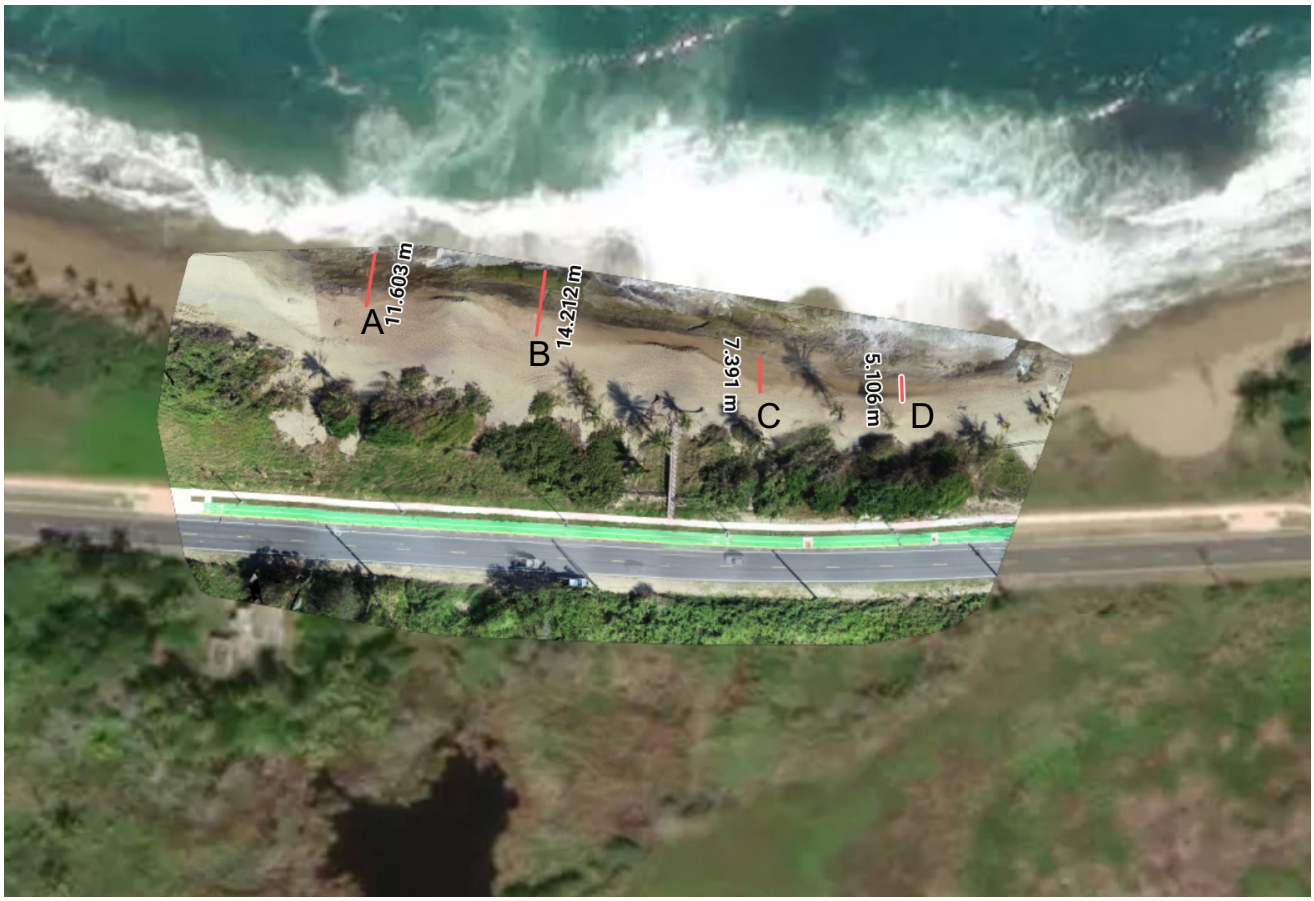
A = 18.49065° N 66.86356°
B = 18.49066° N 66.86319° W
C = 18.49056° N 66.86294° W
D = 18.49047° N 66.86255° W
E = 18.49048° N 66.86221° W

Shoreline extension
East Center Villa Pesqueira Post, Camuy

Shoreline extension

A = 8.491 m
B = 9.27 m
C = 8.424 m
D = 12.416 m
E = 14.364 m

Shoreline position
East Villa Pesqueira Post, Camuy



Shoreline position
A = 11.603 m **B** = 14.212 m **C** = 7.391 m **D** = 5.106 m

Area of dune breaches
East Villa Pesqueira Post, Camuy

Area of dune breaches

Breach = 4,215.7 m²

Quality Report

Generated with Pix4Denterprise version 4.8.2 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	198259-Project-2023-01-12T17:18:38.467Z
Processed	2023-01-12 18:35:27
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.00 cm / 0.39 in
Area Covered	0.015 km^2 / 1.4777 ha / 0.01 sq. mi. / 3.6534 acres
Time for Initial Processing (without report)	01h:02m:17s

Quality Check

Images	median of 65992 keypoints per image	✓
Dataset	273 out of 337 images calibrated (81%), all images enabled, 5 blocks	⚠
Camera Optimization	1.21% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 4668.67 matches per calibrated image	✓
Georeferencing	yes, no 3D GCP	⚠

Preview

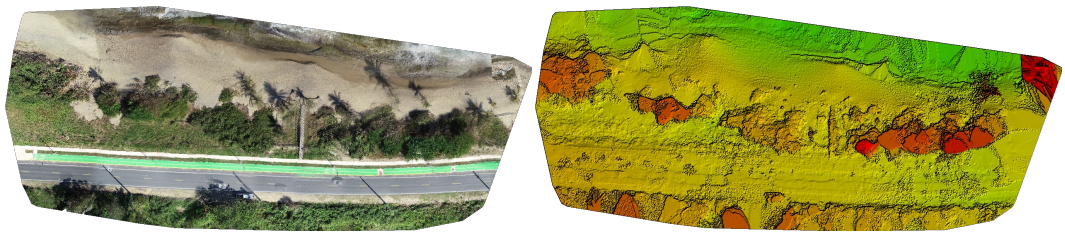


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	273 out of 337
Number of Geolocated Images	337 out of 337

Initial Image Positions

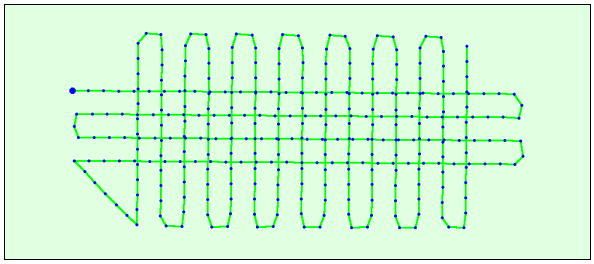
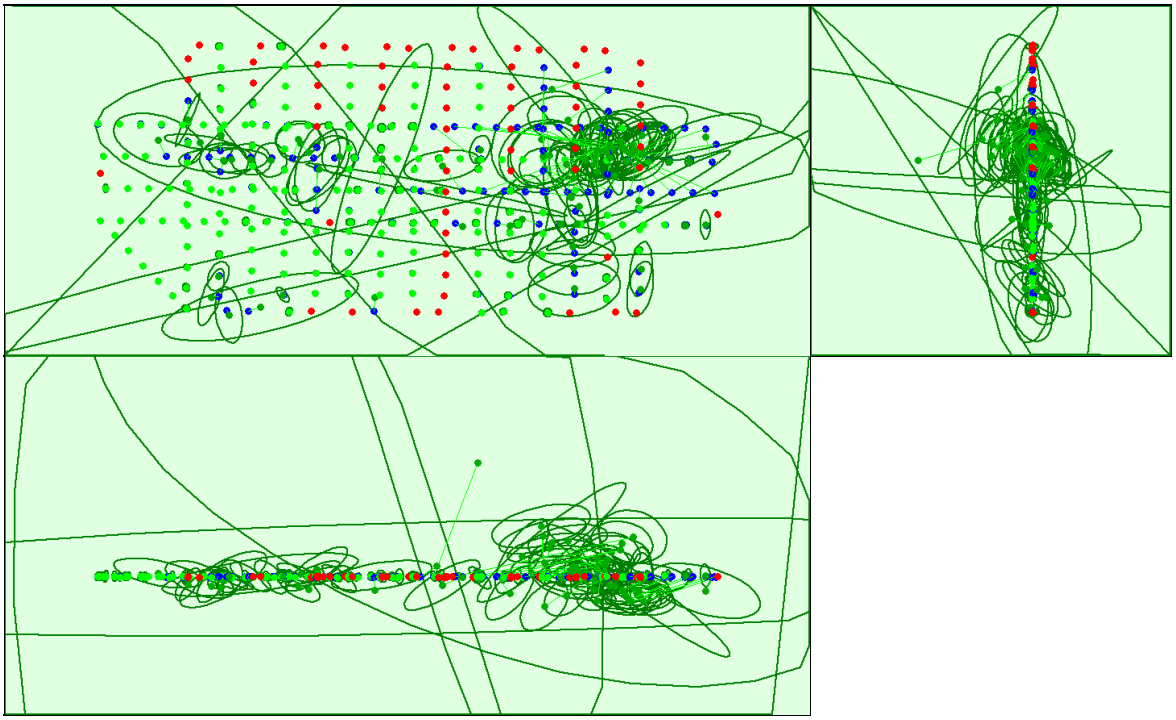


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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 [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.323	0.060	0.141	0.114	0.108	0.098
Sigma	4.609	0.447	1.782	0.296	0.313	0.295

Overlap

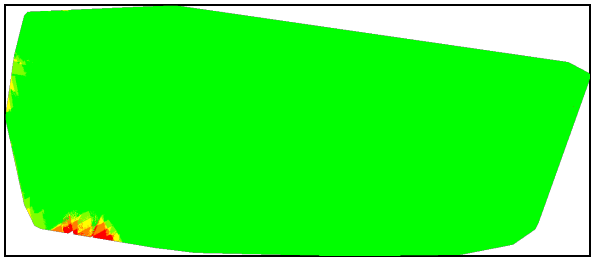


**Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.
Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

Bundle Block Adjustment Details

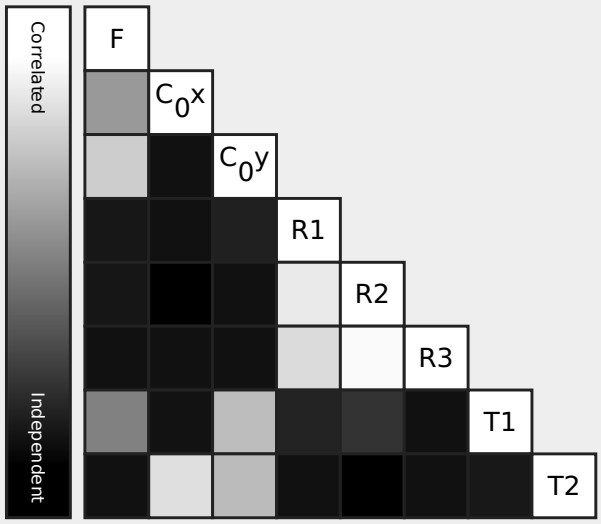
Number of 2D Keypoint Observations for Bundle Block Adjustment	1691079
Number of 3D Points for Bundle Block Adjustment	731706
Mean Reprojection Error [pixels]	0.179

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	3613.758 [pixel] 8.475 [mm]	2734.967 [pixel] 6.414 [mm]	1855.357 [pixel] 4.351 [mm]	-0.000	-0.034	0.036	0.001	-0.000
Uncertainties (Sigma)	1.189 [pixel] 0.003 [mm]	0.821 [pixel] 0.002 [mm]	1.422 [pixel] 0.003 [mm]	0.000	0.001	0.001	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	65992	4669
Min	45339	31

Max	79264	22713
Mean	65414	6194

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	584187
In 3 Images	98643
In 4 Images	30571
In 5 Images	11008
In 6 Images	4354
In 7 Images	1610
In 8 Images	666
In 9 Images	305
In 10 Images	185
In 11 Images	95
In 12 Images	36
In 13 Images	24
In 14 Images	15
In 15 Images	1
In 16 Images	2
In 17 Images	1
In 22 Images	1
In 24 Images	1
In 26 Images	1

2D Keypoint Matches

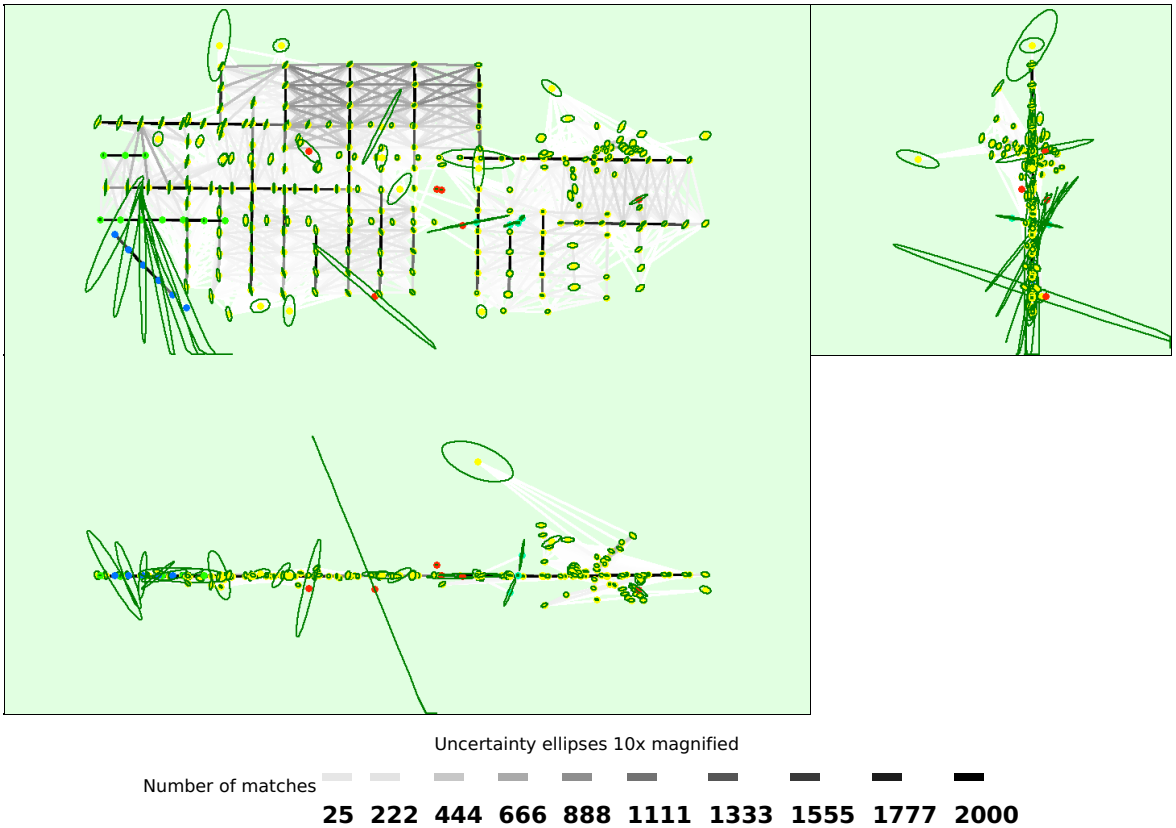


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.098	0.169	0.106	0.257	0.328	0.249
Sigma	0.179	0.351	0.286	0.408	1.438	0.763

Geolocation Details

Absolute Geolocation Variance

Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-0.10	0.00	0.00	4.26
-0.10	-0.08	0.00	0.00	2.66
-0.08	-0.06	1.06	0.53	4.26
-0.06	-0.04	1.06	0.53	5.32
-0.04	-0.02	3.19	3.72	7.45
-0.02	0.00	48.94	42.02	25.53
0.00	0.02	38.83	48.40	24.47
0.02	0.04	3.19	1.60	18.09
0.04	0.06	0.53	1.60	6.38
0.06	0.08	2.13	0.53	1.60
0.08	0.10	0.00	0.53	0.00
0.10	-	1.06	0.53	0.00
Mean [m]		0.001470	0.001475	-0.007100
Sigma [m]		0.020486	0.017921	0.045484
RMS Error [m]		0.020538	0.017982	0.046035

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]	81.38	84.04	61.17
[-2.00, 2.00]	91.49	91.49	84.57
[-3.00, 3.00]	94.15	95.21	90.96
Mean of Geolocation Accuracy [m]	0.012932	0.012932	0.026603
Sigma of Geolocation Accuracy [m]	0.002549	0.002549	0.005825

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

Geolocation Orientational Variance	RMS [degree]
Omega	5.407
Phi	1.202
Kappa	5.689

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 5.15.0-1026-aws x86_64

Coordinate Systems

Image Coordinate System	WGS 84
Output Coordinate System	WGS 84 / UTM zone 19N

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:00s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	08m:26s

Results

Number of Generated Tiles	1
Number of 3D Densified Points	18734103
Average Density (per m^3)	2613.12

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (1 [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:20s
Time for Orthomosaic Generation	11m:18s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s

East Villa Pesqueira Post, Camuy