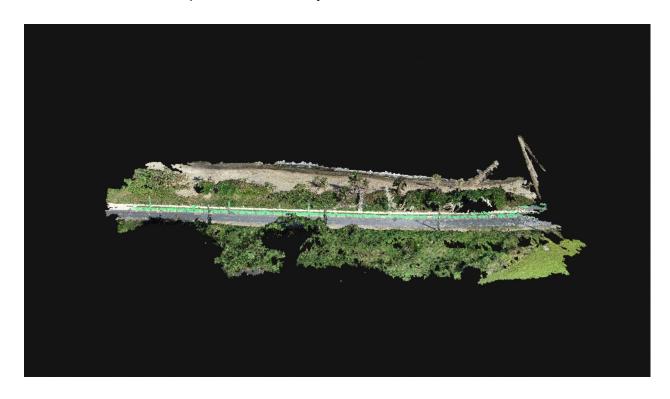
# East Center Villa Pesqueira Post, Camuy January 11, 2023.



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 m<sup>2</sup>

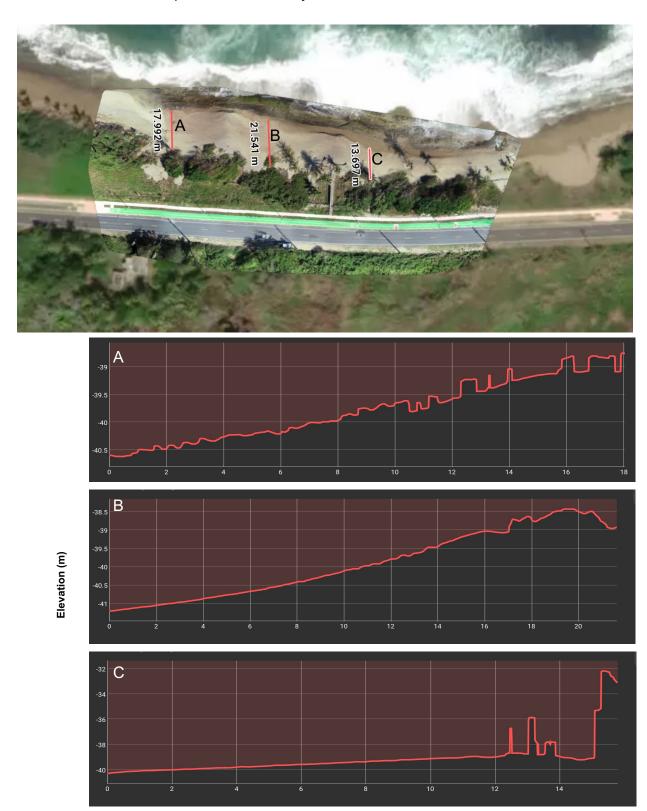
## Beach volume

# East Center Villa Pesqueira Post, Camuy



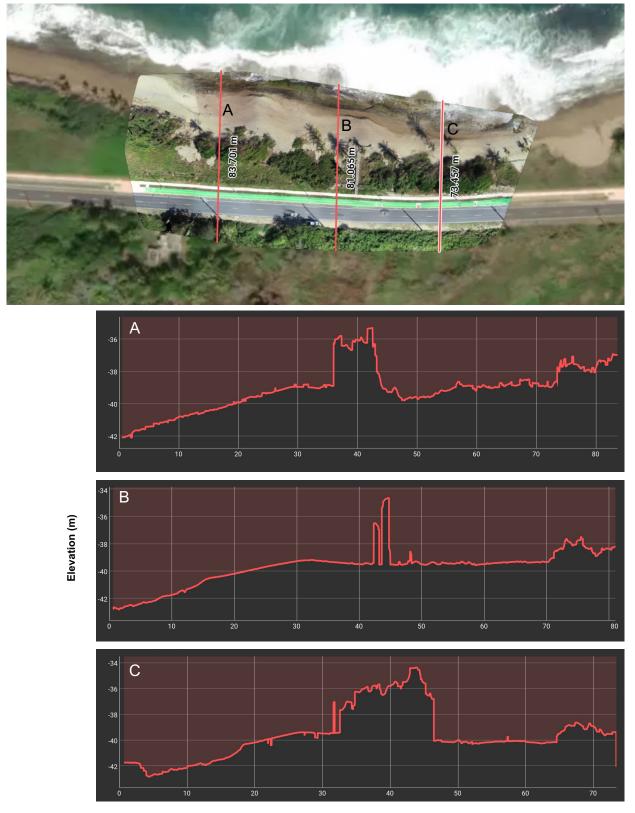
**Cut** = 0.00 m<sup>3</sup> **Fill** = -125,148 m<sup>3</sup>

**Volume Dif.** = -125,148 m<sup>3</sup>



Distance from shore (m)

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



Distance from shore (m)

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



Dune height

 $A = 4,215.7 \text{ m}^2$ 

# 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 =  $4,215.7 \text{ m}^2$ 

**3D area** =  $4,215.7 \text{ m}^2$ 

**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** =  $4,215.7 \text{ m}^2$ 

# **Quality Report**

Dixan

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 <u>here</u> for additional tips to analyze the Quality Report

#### Summary

6

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 km² / 1.4777 ha / 0.01 sq. mi. / 3.6534 acres
Time for Initial Processing (without report)	01h:02m:17s

#### **Quality Check**

đ

? Images	median of 65992 keypoints per image	<b>O</b>
? Dataset	273 out of 337 images calibrated (81%), all images enabled, 5 blocks	$\triangle$
? Camera Optimization	1.21% relative difference between initial and optimized internal camera parameters	<b>O</b>
Matching	median of 4668.67 matches per calibrated image	<b>O</b>
Georeferencing	yes, no 3D GCP	Δ



**6** 



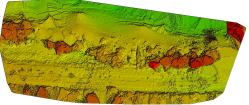


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

# **Calibration Details**

•

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

Initial Image Positions

6

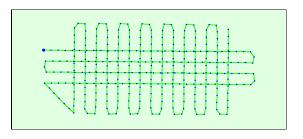
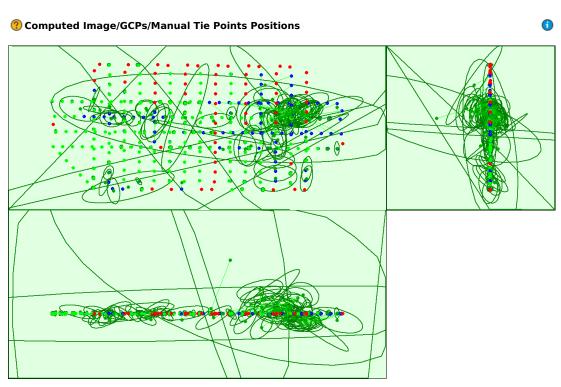


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.



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.

### ② Absolute camera position and orientation uncertainties

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	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



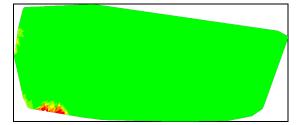


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.

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**

1

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

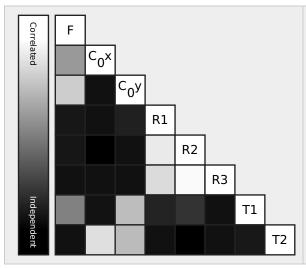
#### Internal Camera Parameters

#### **号 FC6310R 8.8 5472x3648 (RGB). Sensor Dimensions: 12.833 [mm] x 8.556 [mm]**

**(1**)

#### 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.

### ② 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

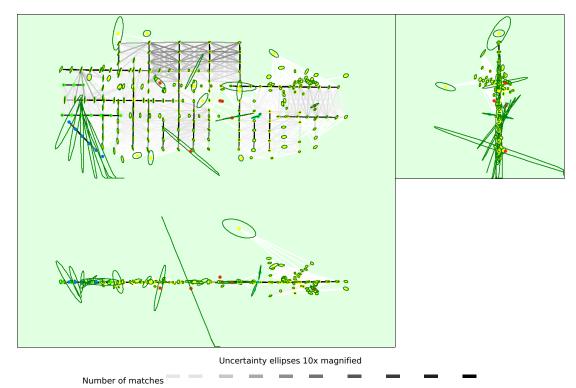
### ? 3D Points from 2D Keypoint Matches

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	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





25 222 444 666 888 1111 1333 1555 1777 2000

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 0

### Absolute Geolocation Variance

1

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
<b>RMS Error [m]</b> 0.020538		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

0

Mean of Geolocation Accuracy [m] Sigma of Geolocation Accuracy [m]	0.012932	0.012932	0.026603 0.005825
[-3.00, 3.00]	94.15	95.21	90.96
[-2.00, 2.00]	91.49	91.49	84.57
[-1.00, 1.00]	81.38	84.04	61.17
Relative Geolocation Error	Images X [%]	Images Y [%]	Images Z [%]

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
Карра	5.689

Geolocation RMS error of the orientation angles given by the difference between the initial and computed image orientation angles.

## Initial Processing Details

mage Coordinate System  MGS 84  Dutput Coordinate System  WGS 84 / UTM zone 19N  Processing Options  Detected Template  Reypoints Image Scale Advanced: Matching Image Pairs Advanced: Matching Strategy  Advanced: Keypoint Extraction  Advanced: Keypoint Extraction  Advanced: Calibration  Detected Template  Cloud-3d-maps-1*  Full, Image Scale: 1  Aerial Grid or Corridor  Use Geometrically Verified Matching: no  Targeted Number of Keypoints: Automatic  Calibration Method: Standard Internal Parameters Optimization: All External Parameters Optimization: All Rematch: Auto, yes  Point Cloud Densification details	RAM: 69GB GPU: no info (Driver: unknown)  Diperating System  Linux 5.15.0-1026-aws x86_64  Doordinate Systems  Image Coordinate System  Dutput Coordinate System  Dutput Coordinate System  Dutput Coordinate System  Dutput Coordinate System  Detected Template  Recypoints Image Scale  Detected Template  Recypoints Image Scale  Full, Image Scale: 1  Advanced: Matching Image Pairs  Advanced: Matching Image Pairs  Advanced: Keypoint Extraction  Date of Recypoints Image Stand Internal Parameters Optimization: All Internal Parameters Optimization: All Rematch: Auto, yes  Point Cloud Densification details  Processing Options  Processing Options  Image Scale  multiscale, 1/2 (Half image size, Default)  Optimal  Minimum Number of Matches  3		RAM: 69GB GPU: no info (Driver:	l) Platinum 8	124M CPU @ 3.00GHz
Image Coordinate System  Output Coordinate System  WGS 84  Output Coordinate System  WGS 84 / UTM zone 19N  rocessing Options  Detected Template  Keypoints Image Scale Advanced: Matching Image Pairs Advanced: Matching Strategy  Advanced: Keypoint Extraction  Advanced: Keypoint Extraction  Advanced: Calibration  Advanced: Calibration  Point Cloud Densification details  Point Cloud Densification details	Image Coordinate System  Output Coordinate S	Operating System	Linux 5.15.0-1026-av	unknown)	
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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

