

Balneario Cerro Gordo, Vega Alta

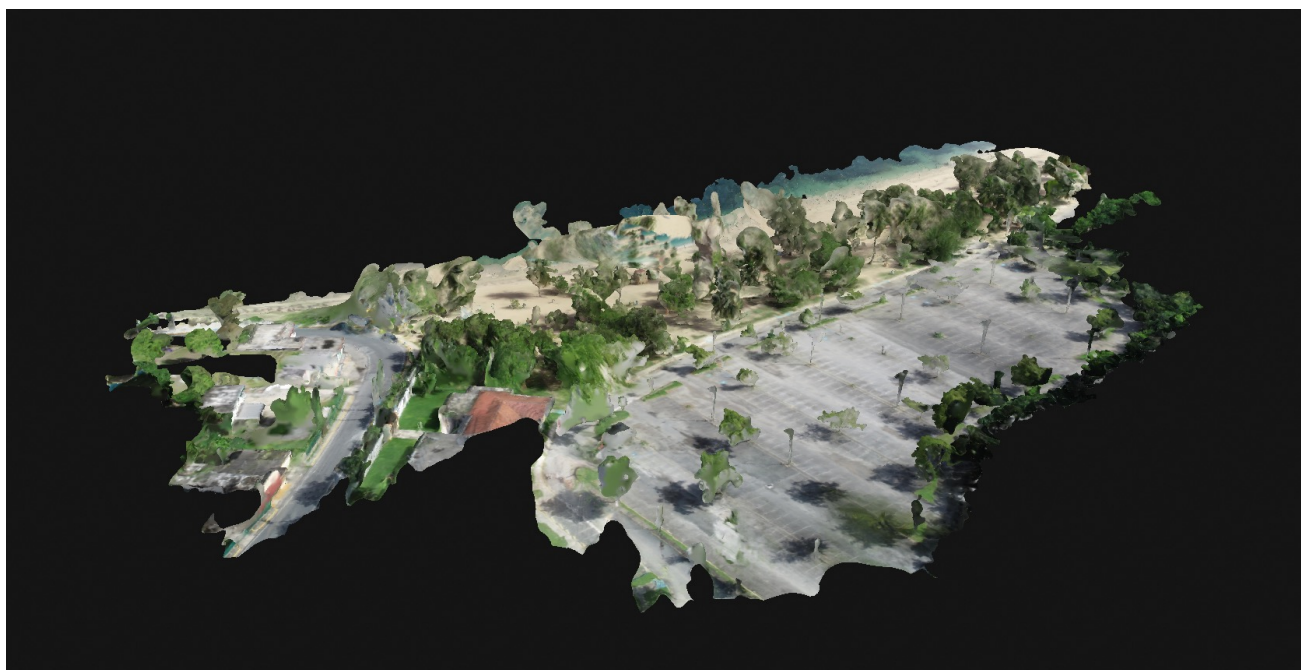
August 29, 2022



Centroid coordinates : 18.48072° N 66.34019° W

3D map

Balneario Cerro Gordo, Vega Alta



2D map



Total area of site = 4.06092ha

Beach length (m)

Balneario Cerro Gordo, Vega Alta



Beach length = 258.737 m

Density surface model
Balneario Cerro Gordo, Vega Alta



Area of the beach
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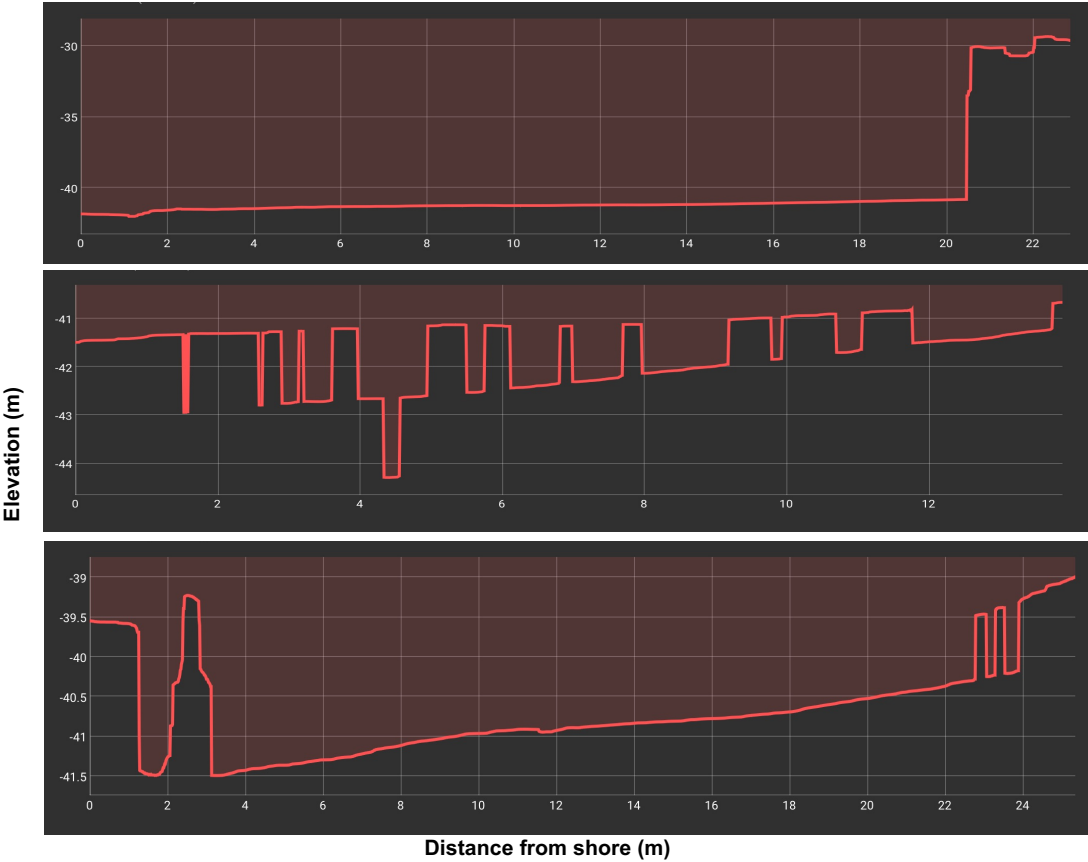
Area of the beach = 6,837.64 m²

Beach volume
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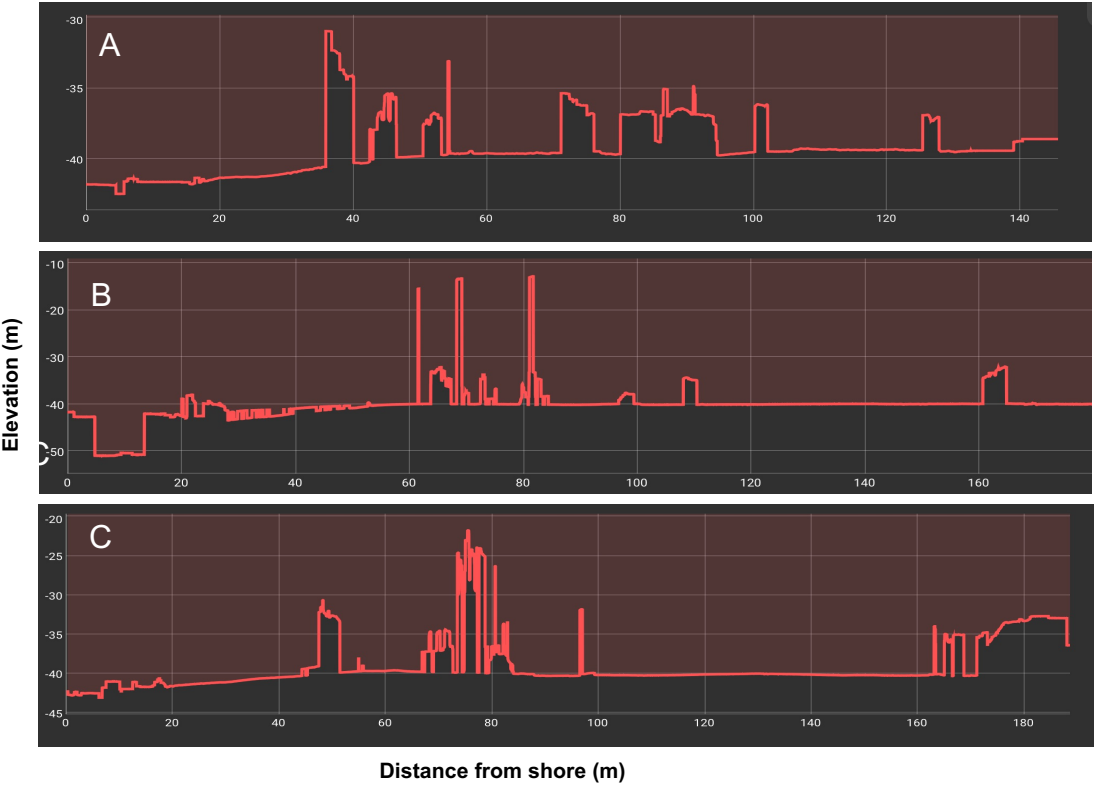


Cut = 0.00 m³
Fill = -275,988 m³
Volume Dif. = -275,988 m³

Beach elevation
Balneario Cerro Gordo, Vega Alta



Site elevation (m)
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Shoreface extension (m)
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Shoreface extension A = 15.227 m
Shoreface extension B = 8.122 m
Shoreface extension C = 10.668 m
Shoreface extension D = 11.442 m

Dune height (m)
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Dune height

A = 8.521 m

B = 9.828 m

Dune width (m)

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Dune width

A = 15.737 m

B = 21.151 m

Area and perimeter of dune

Balneario Cerro Gordo, Vega Alta



Area and perimeter of dune

2D area = 725.009 m²
3D area = 786.939 m²
2D perimeter = 130.205 m
3D perimeter = 132.93 m
Elevation difference = 8.521 m

Area and perimeter of dune

2D area = 543.274 m²
3D area = 606.405 m²
2D perimeter = 100.852 m
3D perimeter = 104.937 m
Elevation difference = 9.828 m

Volume of dune
Balneario Cerro Gordo, Vega Alta



Base surface	Triangulated
Cut volume	1,174.91 m³
Cut error	5.83508 m³
Fill volume	-563 m³
Fill error	8.75773 m³
Volume difference	611.913 m³

Base surface	Triangulated
Cut volume	442.956 m³
Cut error	1.09778 m³
Fill volume	-1,458.3 m³
Fill error	9.83845 m³
Volume difference	-1,015.35 m³

Shoreline

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Shoreline length = 275.232 m

Shoreline geolocation

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Shoreline markers

A = 18.48099° N 66.34084° W

B = 18.48136° N 66.33987° W

C = 18.48187° N 66.33927° W

Shoreline extension

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Shoreline extension

A= 5.608 m

B = 5.477 m

C = 4.551 m

Shoreline position

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Shoreline position

A = 43.274 m

B = 44.011 m

C = 35.157 m

Area of dune breaches

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Area of dune breaches

Breach A = 0.00 m
Breach B = 1.223 m
Breach C = 0.00 m

High Resolution Orthomosaic
Balneario Cerro Gordo, Vega Alta



Quality Report



Generated with Pix4Denterprise version 4.8.0
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	Balneario_Cerro_Gordo_August_29_2022
Processed	2022-08-31 17:16:11
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.34 cm / 0.53 in
Area Covered	0.040 km ² / 4.0483 ha / 0.02 sq. mi. / 10.0088 acres
Time for Initial Processing (without report)	47m:03s

Quality Check



Images	median of 53256 keypoints per image	
Dataset	314 out of 365 images calibrated (86%), all images enabled	
Camera Optimization	0.14% relative difference between initial and optimized internal camera parameters	
Matching	median of 13427.1 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

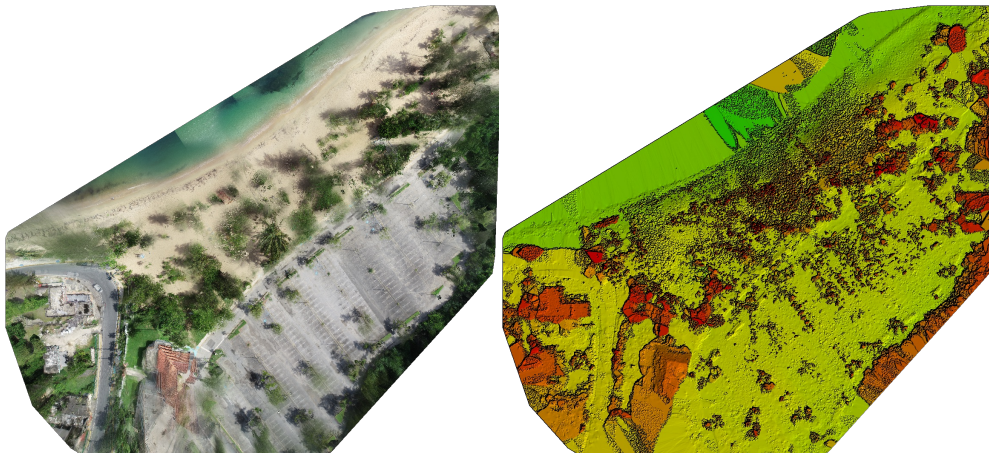


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	314 out of 365
Number of Geolocated Images	365 out of 365

? Initial Image Positions

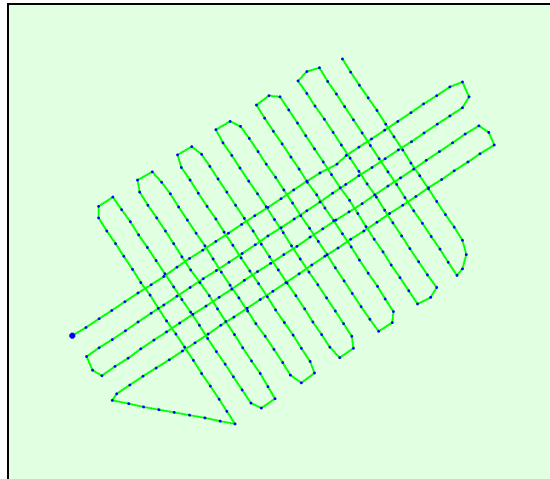
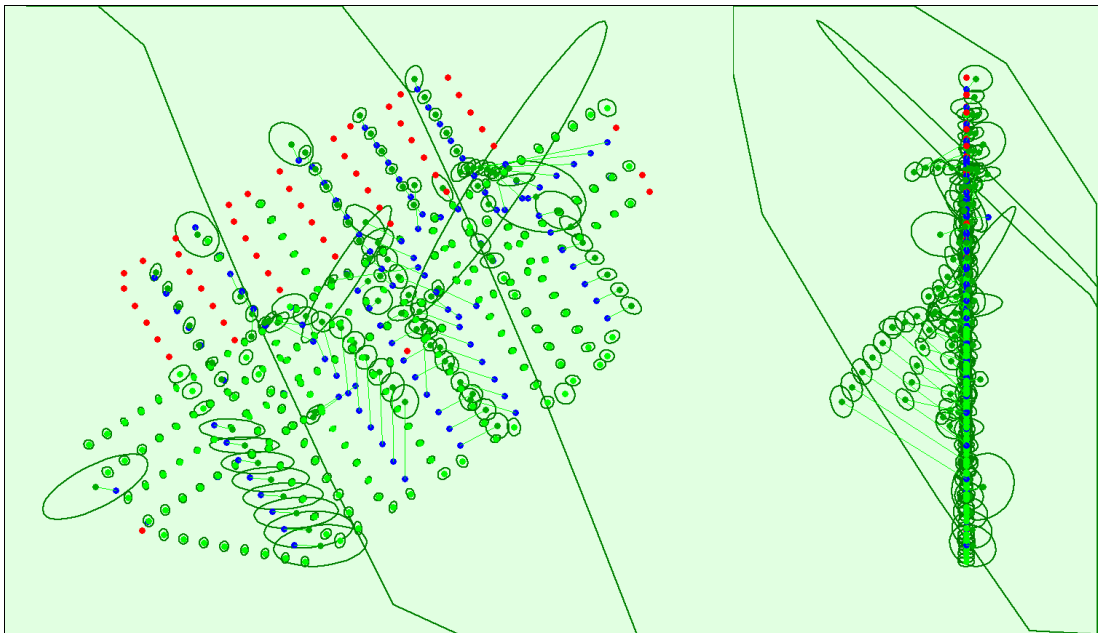
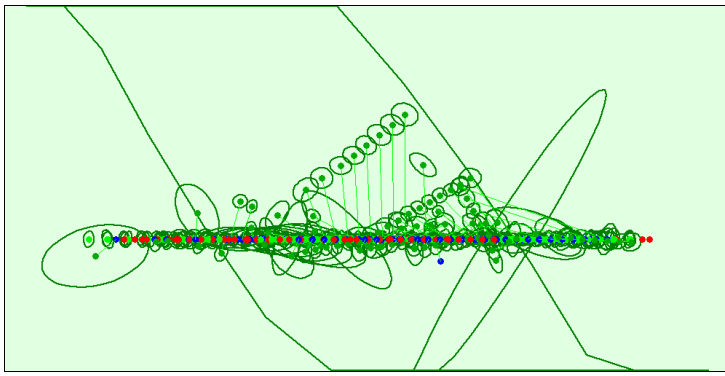


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

? Computed Image/GCPs/Manual Tie Points Positions





Uncertainty ellipses 500x magnified

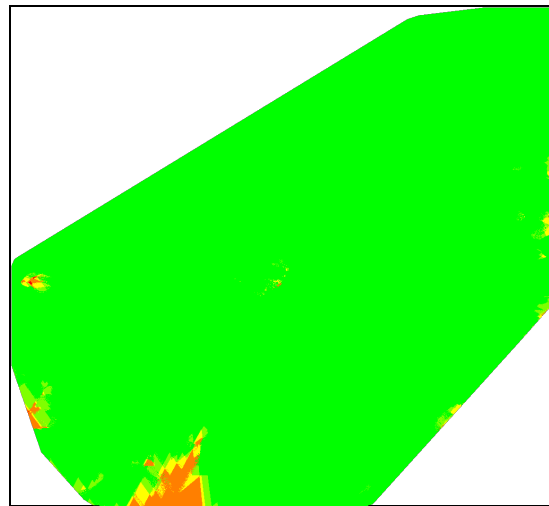
Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Red dots indicate disabled 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	0.005	0.005	0.009	0.008	0.008
Sigma	0.012	0.023	0.015	0.033	0.035	0.025

? 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



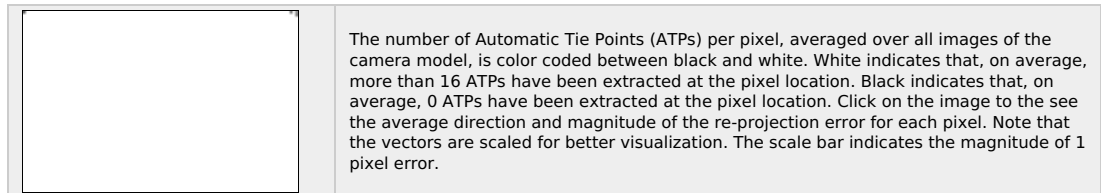
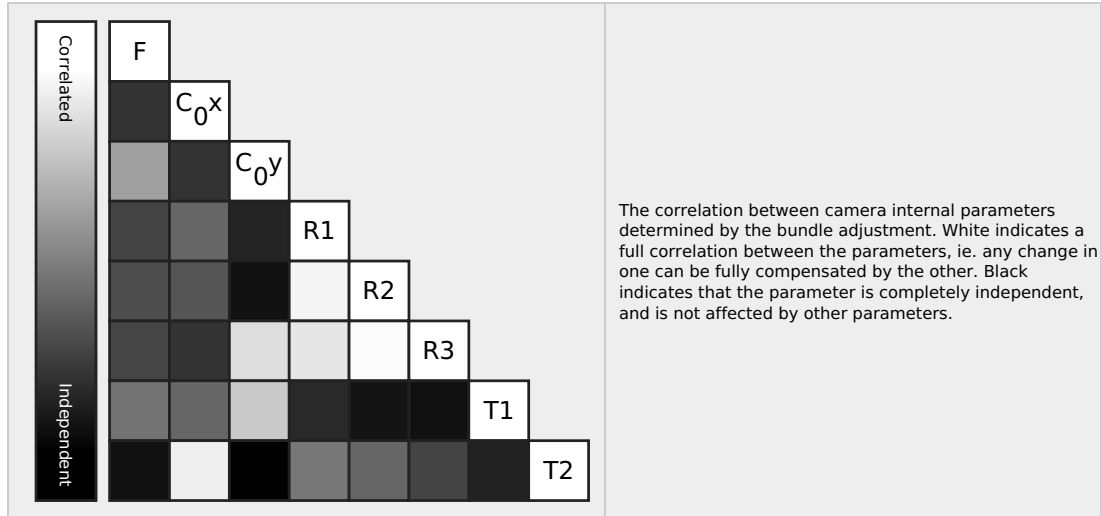
Number of 2D Keypoint Observations for Bundle Block Adjustment	4282640
Number of 3D Points for Bundle Block Adjustment	1653563
Mean Reprojection Error [pixels]	0.182

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	3652.919 [pixel] 8.567 [mm]	2736.260 [pixel] 6.417 [mm]	1822.146 [pixel] 4.273 [mm]	-0.000	-0.013	0.013	-0.000	-0.000
Uncertainties (Sigma)	0.115 [pixel] 0.000 [mm]	0.182 [pixel] 0.000 [mm]	0.226 [pixel] 0.001 [mm]	0.000	0.000	0.000	0.000	0.000



2D Keypoints Table

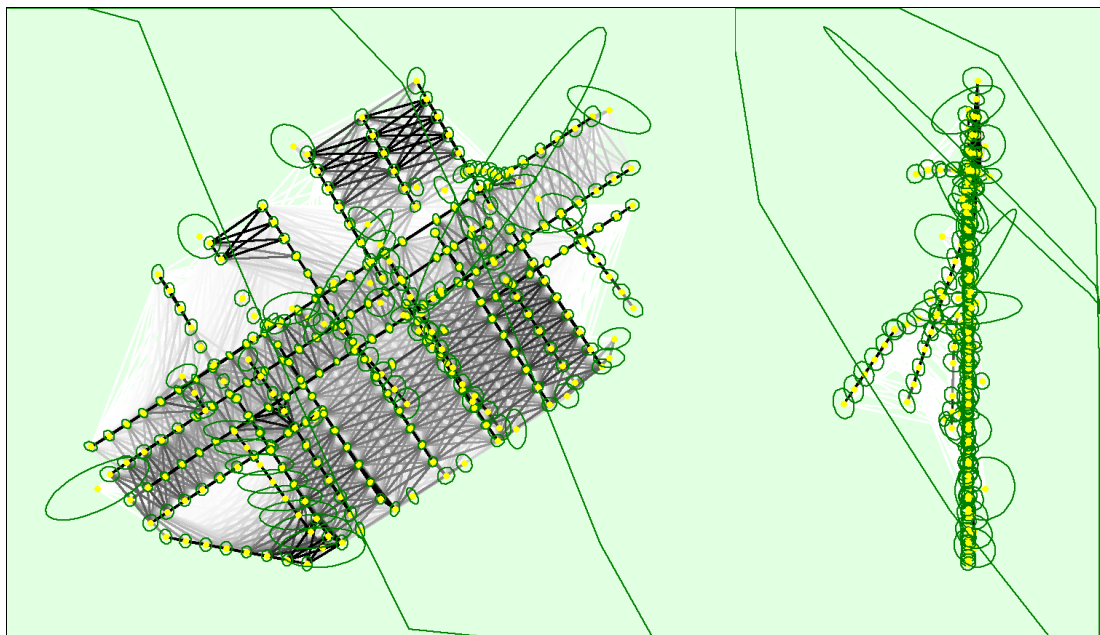
	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	53256	13427
Min	20401	363
Max	73084	34293
Mean	51940	13639

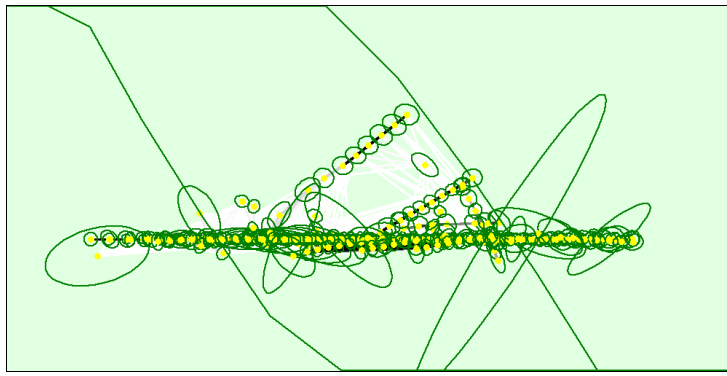
3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	1153291
In 3 Images	282437
In 4 Images	109567
In 5 Images	49948
In 6 Images	25215
In 7 Images	13385
In 8 Images	7604
In 9 Images	4364

In 10 Images	2532
In 11 Images	1584
In 12 Images	1085
In 13 Images	720
In 14 Images	545
In 15 Images	380
In 16 Images	224
In 17 Images	186
In 18 Images	132
In 19 Images	98
In 20 Images	65
In 21 Images	53
In 22 Images	35
In 23 Images	24
In 24 Images	18
In 25 Images	11
In 26 Images	11
In 27 Images	13
In 28 Images	8
In 29 Images	7
In 30 Images	5
In 31 Images	3
In 32 Images	4
In 33 Images	3
In 36 Images	2
In 39 Images	2
In 40 Images	1
In 42 Images	1

2D Keypoint Matches





Uncertainty ellipses 500x magnified

Number of 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	0.005	0.006	0.005	0.010	0.008	0.008
Sigma	0.012	0.025	0.016	0.035	0.038	0.027

Geolocation Details



? Absolute Geolocation Variance



Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-4.90	0.00	0.00	0.47
-4.90	-3.92	0.00	0.00	0.00
-3.92	-2.94	0.00	0.00	0.00
-2.94	-1.96	0.00	0.00	0.00
-1.96	-0.98	0.00	0.00	0.00
-0.98	0.00	51.89	46.70	47.17
0.00	0.98	47.64	53.30	52.36
0.98	1.96	0.47	0.00	0.00
1.96	2.94	0.00	0.00	0.00
2.94	3.92	0.00	0.00	0.00
3.92	4.90	0.00	0.00	0.00
4.90	-	0.00	0.00	0.00
Mean [m]		0.007038	0.000036	-0.029080
Sigma [m]		0.113897	0.011392	0.427991
RMS Error [m]		0.114114	0.011392	0.428977

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]	89.15	88.68	79.72
[-2.00, 2.00]	98.11	99.06	97.17
[-3.00, 3.00]	100.00	100.00	98.11
Mean of Geolocation Accuracy [m]	0.019971	0.019971	0.052452
Sigma of Geolocation Accuracy [m]	0.070771	0.070771	0.221854

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

Geolocation Orientational Variance	RMS [degree]
Omega	0.790
Phi	0.813
Kappa	2.153

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 5.15.0-1017-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	14m:05s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	09m:13s

Results



Number of Generated Tiles	1
Number of 3D Densified Points	23490421
Average Density (per m ³)	1210.1

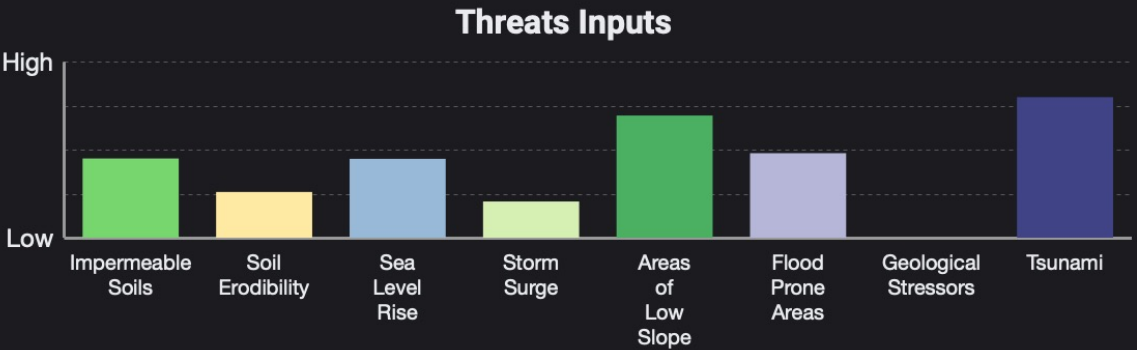
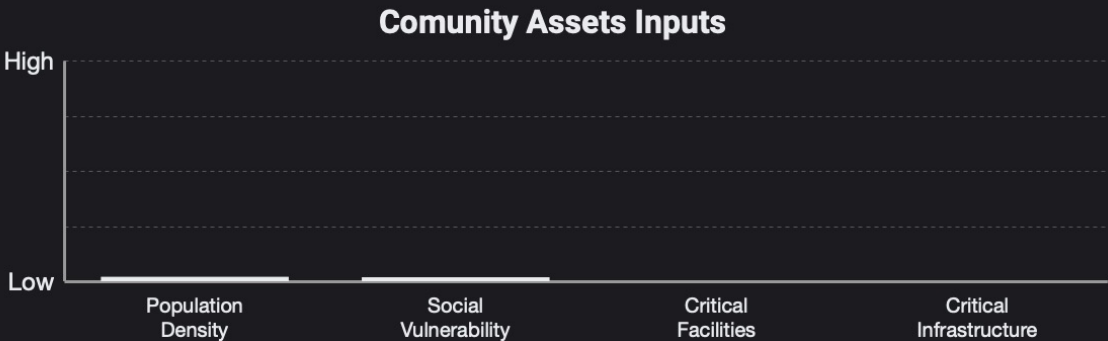
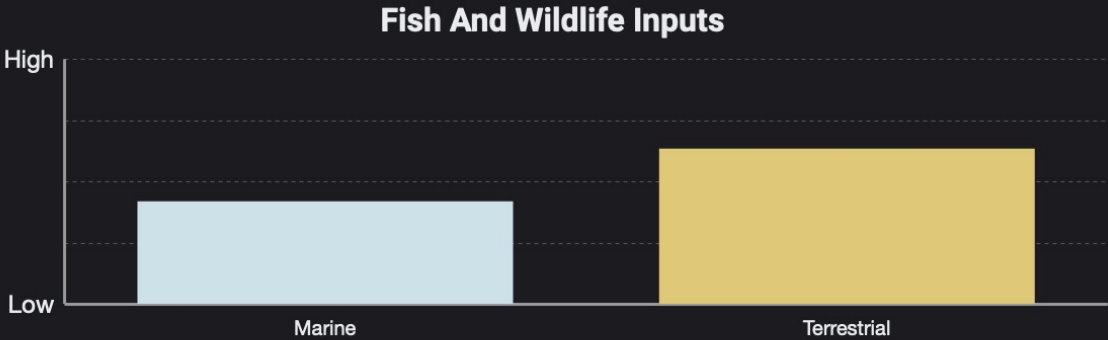
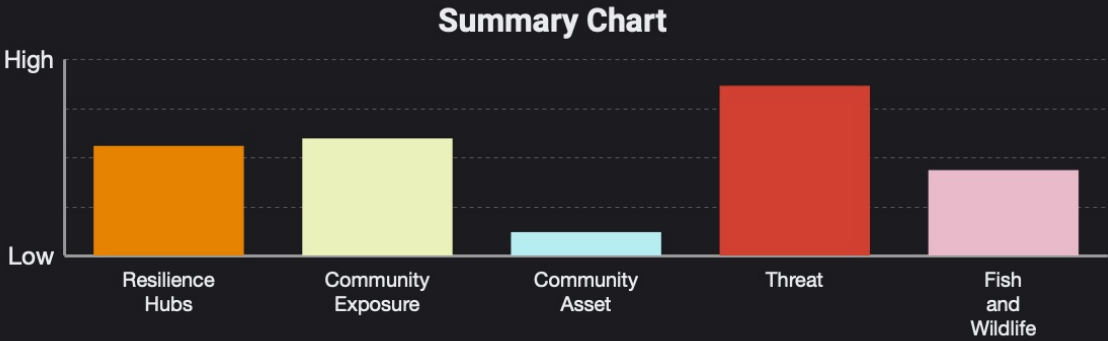
DSM, Orthomosaic and Index Details



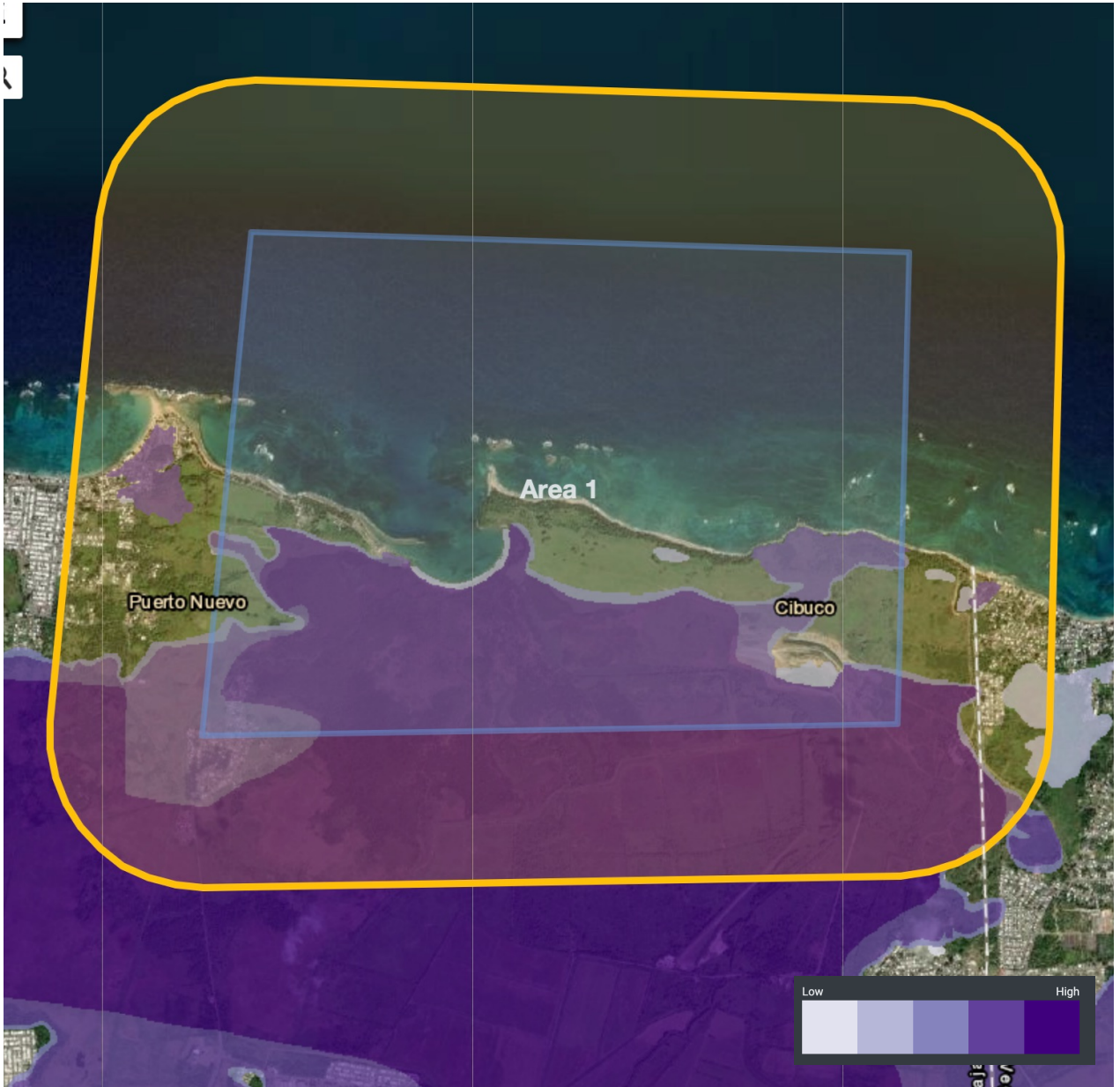
Processing Options



DSM and Orthomosaic Resolution	1 x GSD (1.34 [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	06m:19s
Time for Orthomosaic Generation	23m:21s
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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Flood-Prone Areas

Areas considered by FEMA to be in the 100- and 500-year flood zones, as well as the floodway. Frequently and occasionally flooded soil designations are used to identify areas outside of FEMA coverage. Highest values suggest areas directly in the floodway, whereas low values suggest occasionally flooded soils outside of the floodplain.

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Population Density

A ranking of population density by census block groups based on the 2016 American Community Survey. Areas are ranked from low to high using the ratio of people per square kilometer.

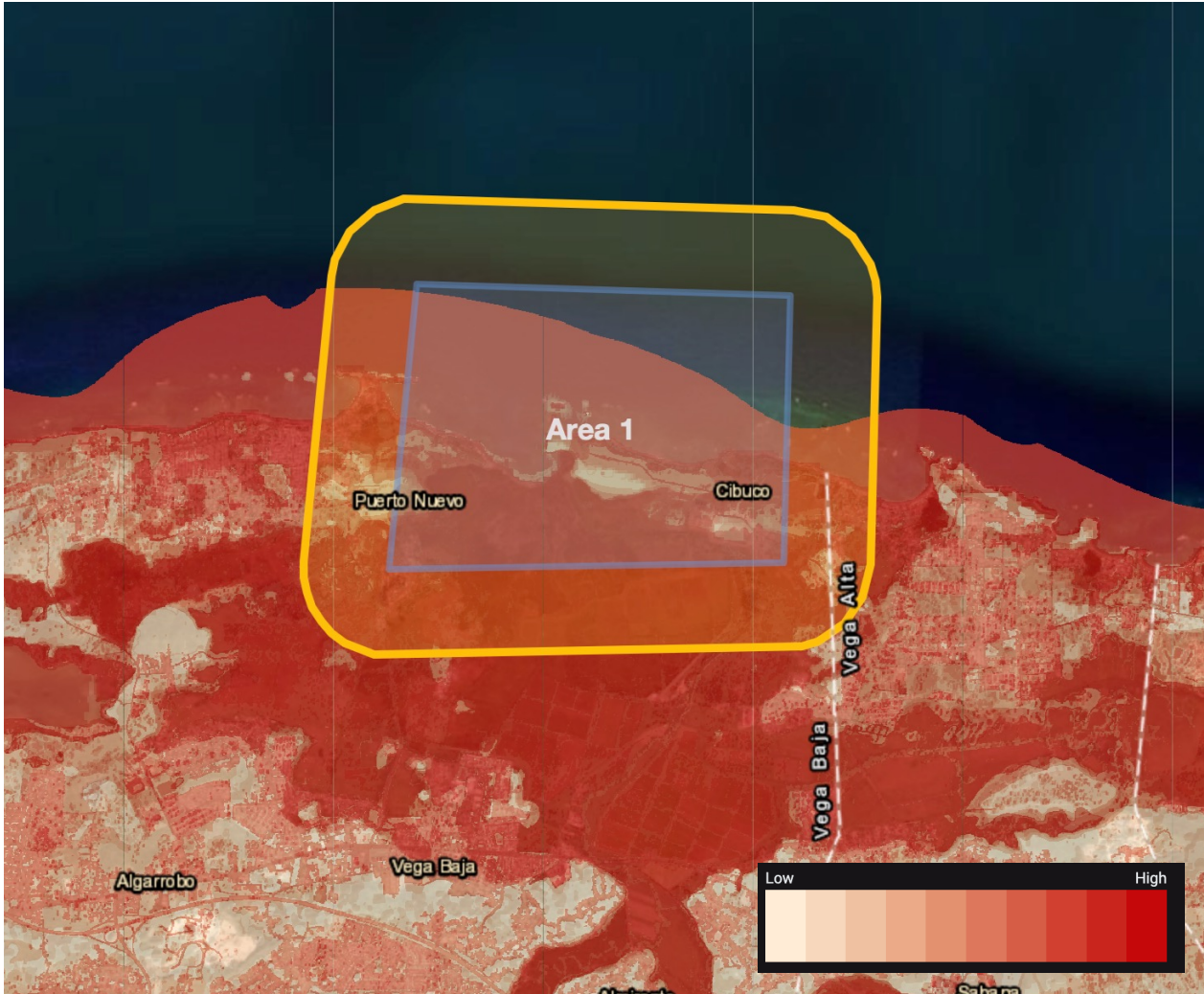
Balneario Cerro Gordo, Vega Alta



Tsunami

Represents the potential inundation height above the ground from a tsunami in Puerto Rico. A higher rank indicates a higher inundation depth.

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Threat Index

Index of flood-related datasets, including storm surge scenarios and landscape characteristics that exacerbate flood potential. High values in the Index represent those areas on the landscape where there are multiple high values of individual inputs.