Breach Between middle and Secret Spot Post, Isabela
December 19, 2022.

3.65563 ha

Centroid coordinates : 18.51256° N 67.04227° W

3D map
Breach Between middle and Secret Spot Post, Isabela

2D map

Total area of site = 3.65563 ha

Beach length (m)
Breach Between middle and Secret Spot Post, Isabela

Beach length = 245.273 m

Density surface model
Breach Between middle and Secret Spot Post, Isabela

Area of the beach
Breach Between middle and Secret Spot Post, Isabela

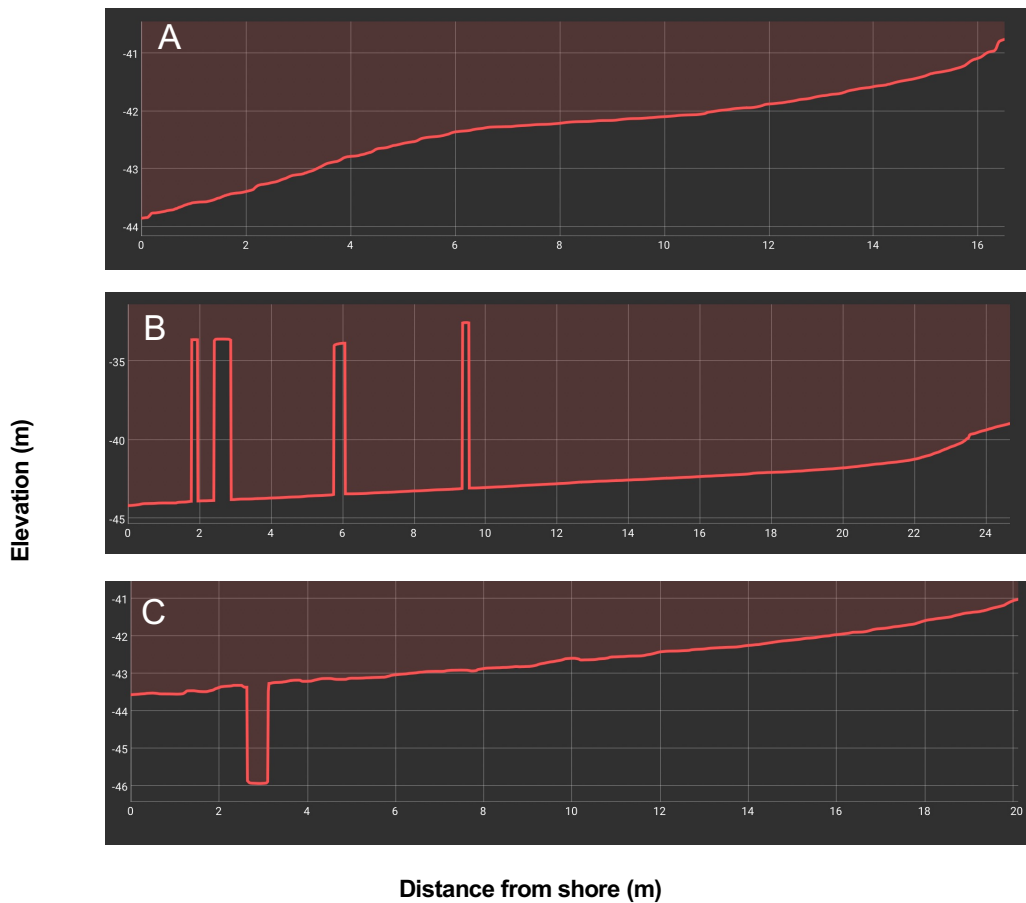**Area of the beach** = 5,587.39 m²

Beach volume
Breach Between middle and Secret Spot Post, Isabela

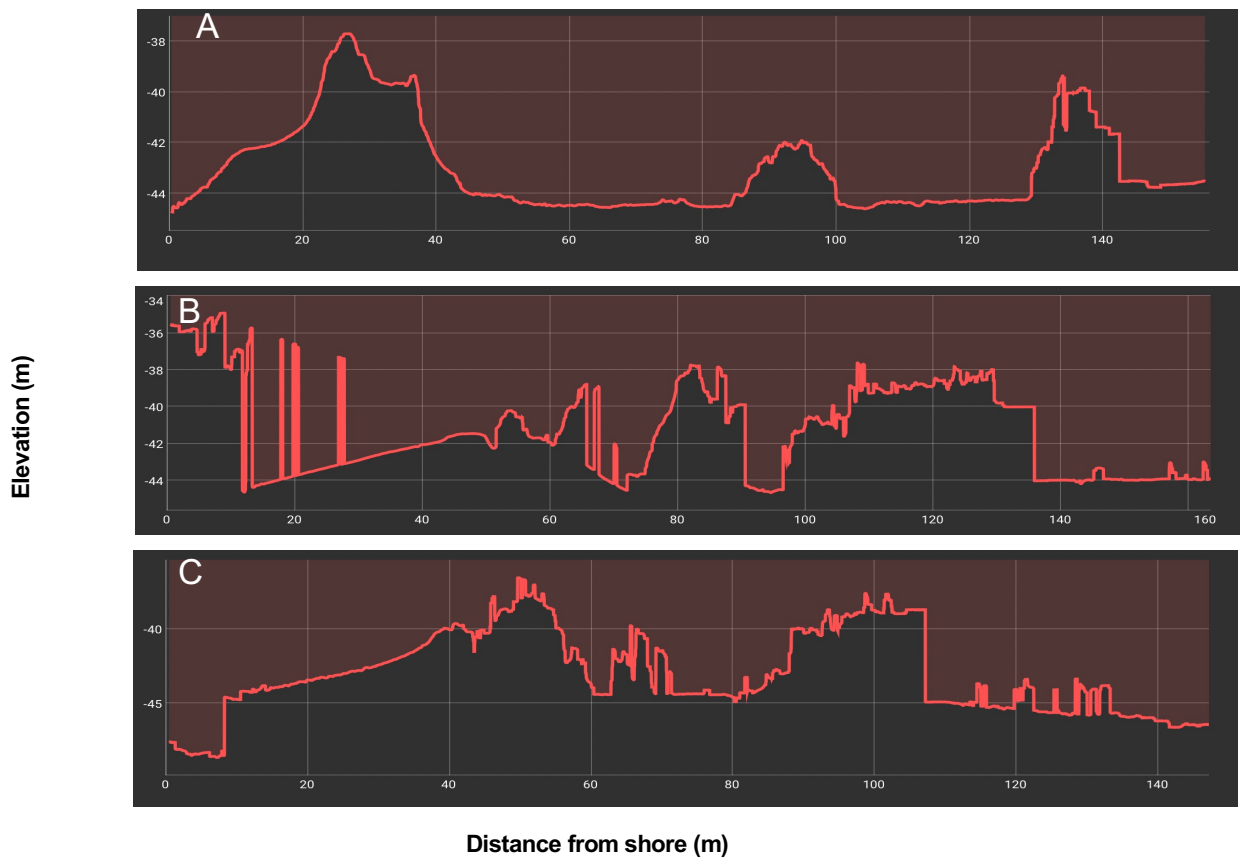**Cut** = 0.00 m³
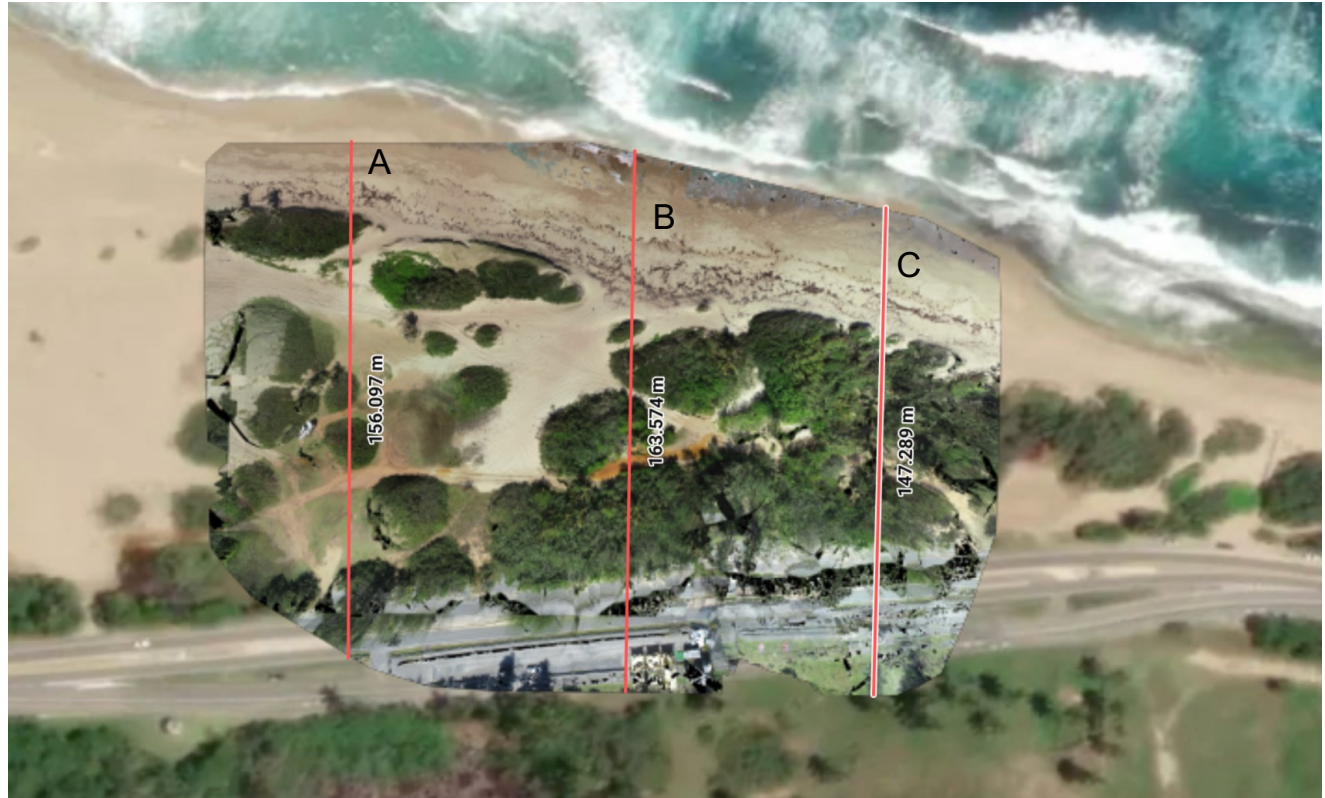**Fill** = -235,906 m³
Volume Dif. -235,906 m³

Beach elevation
Breach Between middle and Secret Spot Post, Isabela

Elevation (m)

Distance from shore (m)

Site elevation (m)

Breach Between middle and Secret Spot Post, Isabela

Dune height (m)
Breach Between middle and Secret Spot Post, Isabela

Dune height

A = 2.054 m
B = 3.09 m
C = 5.504 m

Dune width (m)

Breach Between middle and Secret Spot Post, Isabela

Dune width
A = 22.211 m
B = 21.104 m
C = 35.409 m

Area and perimeter of dune
Breach Between middle and Secret Spot Post, Isabela
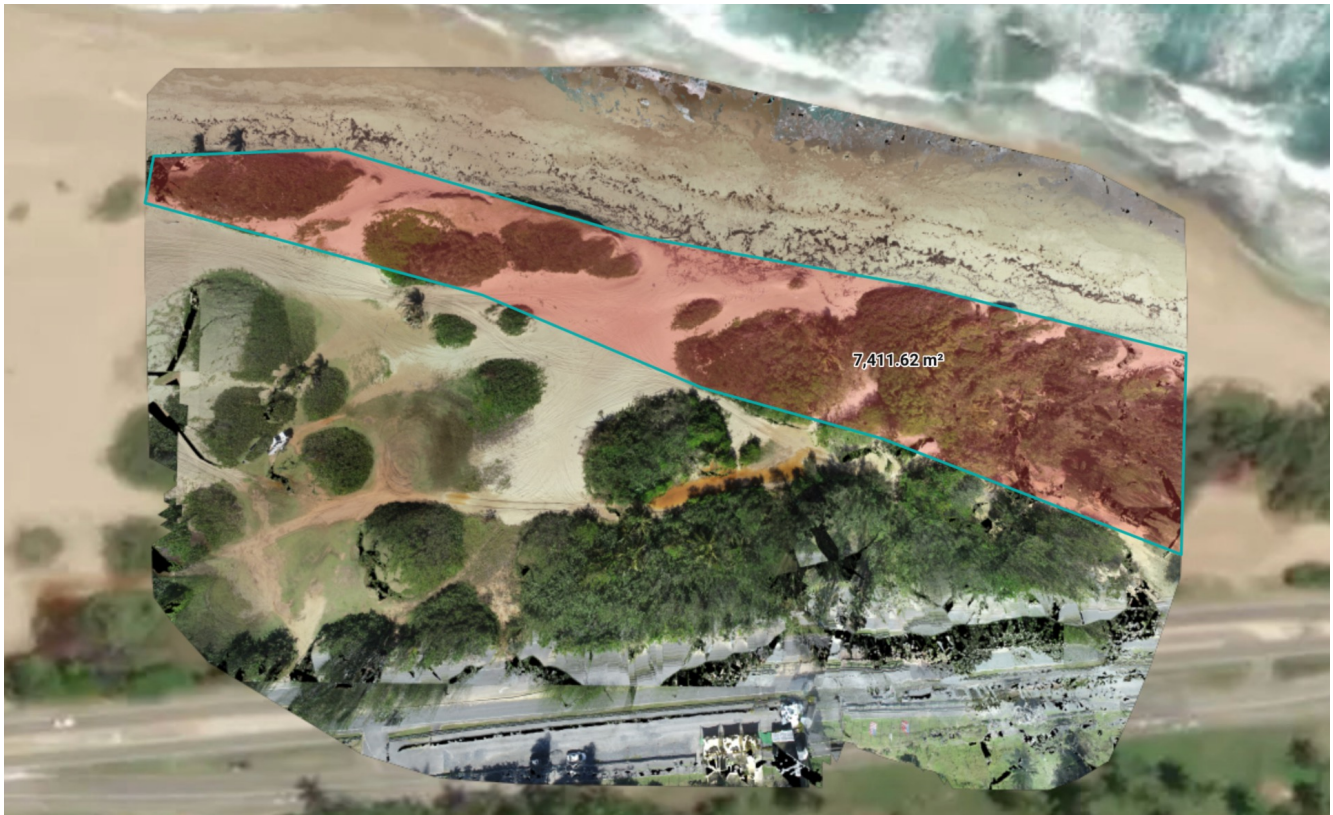
7,411.62 m²

Area and perimeter of dune

2D area = 7,411.62 m²
3D area = 7,411.62 m²
2D perimeter = 558.783 m
3D perimeter =558.783 m
Elevation difference = 0.00 m

Volume of dune
Breach Between middle and Secret Spot Post, Isabela
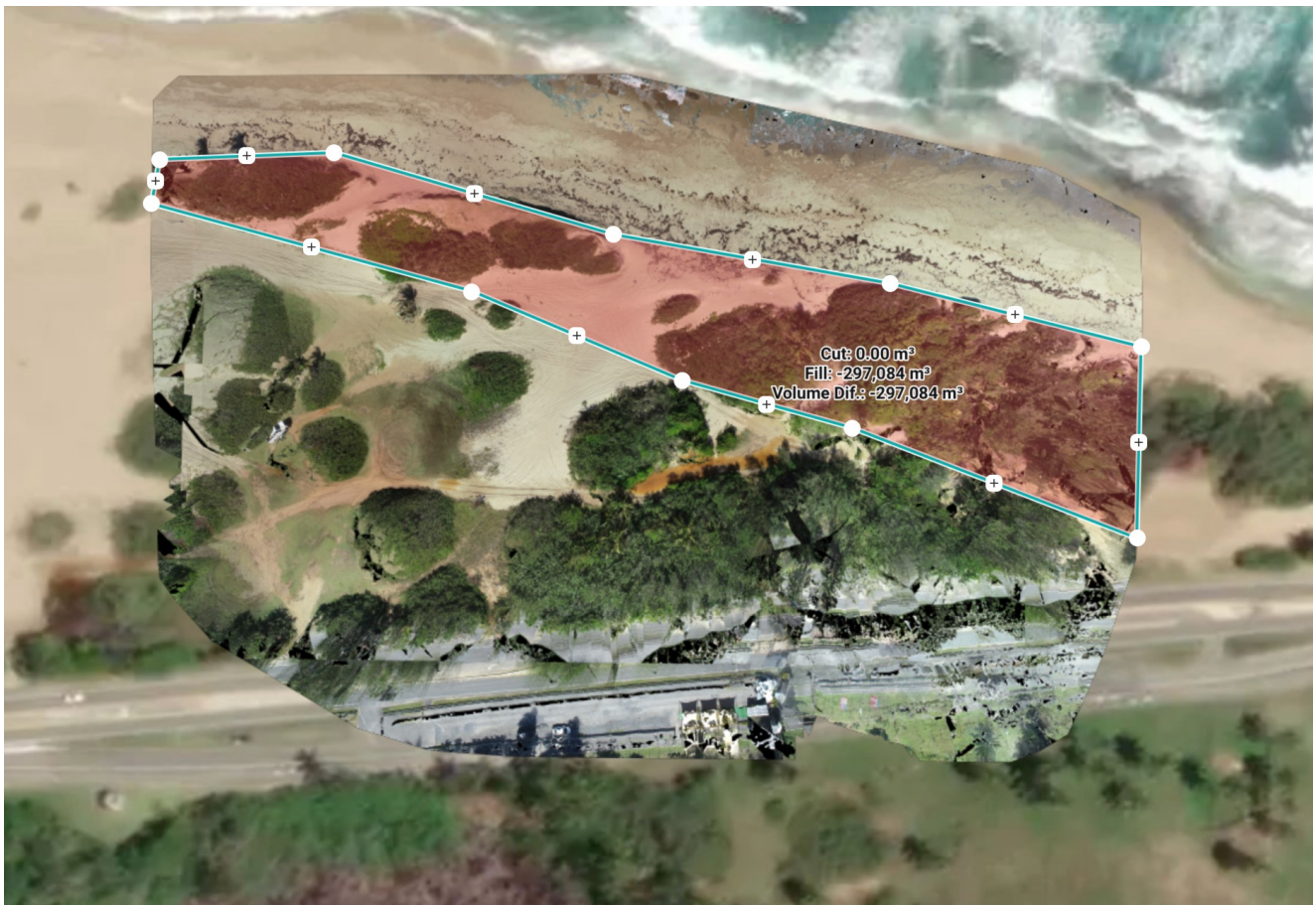
Base surface	Triangulated
Cut volume	0.00 m³
Cut error	0.00 m³
Fill volume	-297,084 m³
Fill error	637.233 m³
Volume difference	-297,084 m³

Shoreline
Breach Between middle and Secret Spot Post, Isabela

250.934 m

Shoreline length = 250.934 m

Shoreline geolocation
Breach Between middle and Secret Spot Post, Isabela

Shoreline markers

A = 18.51332° N 67.04280° W
B = 18.51314° N 67.04212° W
C = 18.51302° N 67.04148° W

Shoreline extension
Breach Between middle and Secret Spot Post, Isabela

Shoreline extension

A = 15.673 m
B = 18.57 m
C = 18.57 m

Shoreline position
Breach Between middle and Secret Spot Post, Isabela

Shoreline position
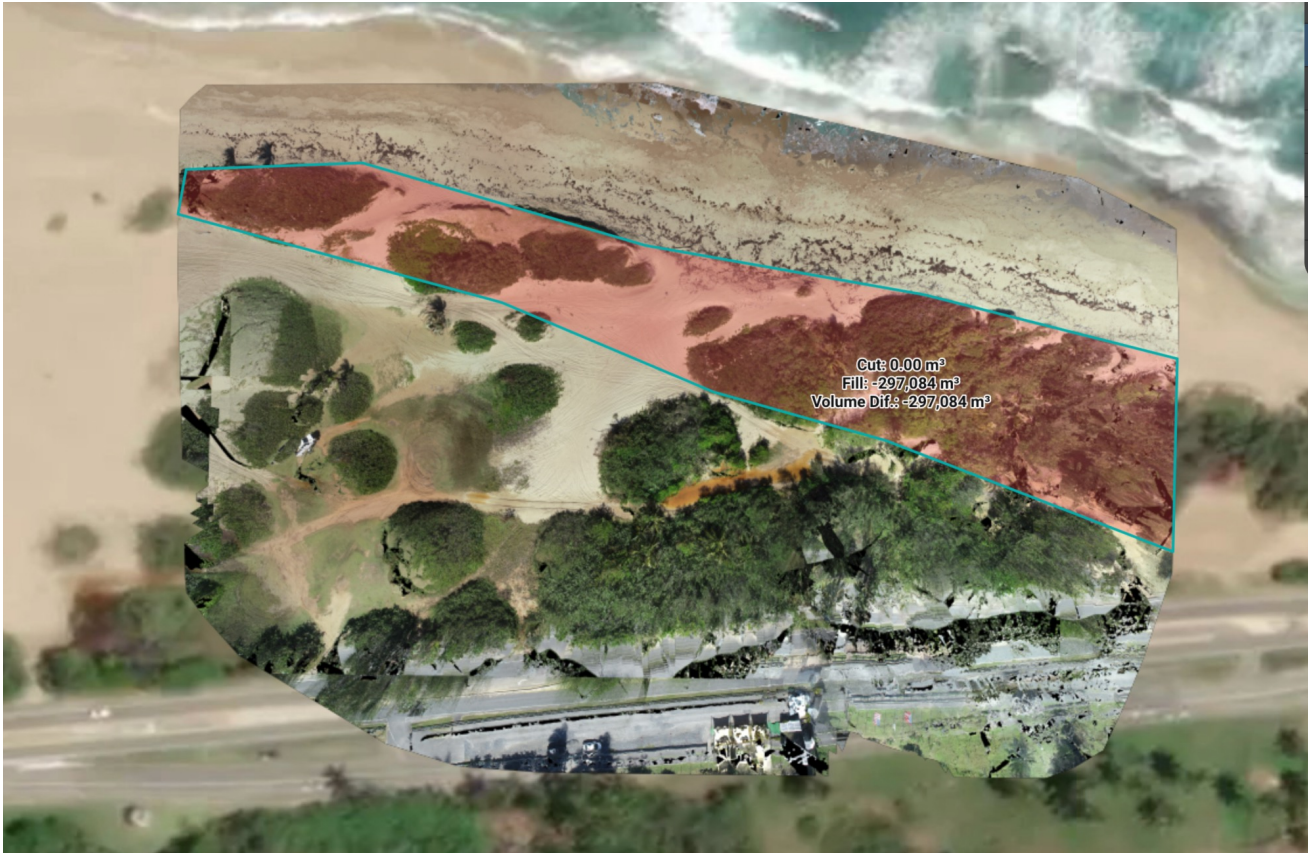
A = 21.025 m
B = 25.983 m
C = 23.46 m

Area of dune breaches
Breach Between middle and Secret Spot Post, Isabela

Cut: 0.00 m³
Fill: -297,084 m³
Volume Dif.: -297,084 m³

Area of dune breaches

Breach = 23.46 m

Quality Report

⚠ **Important**: Click on the different icons for:

❓ Help to analyze the results in the Quality Report

ℹ Additional information about the sections

💡 Click here for additional tips to analyze the Quality Report

Summary ℹ

Project	196206-Project-2022-12-20T11:44:53.447Z
Processed	2022-12-20 12:18:18
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.43 cm / 0.56 in
Area Covered	0.036 km^2 / 3.6334 ha / 0.01 sq. mi. / 8.9830 acres
Time for Initial Processing (without report)	24m:50s

Quality Check ℹ

❓ **Images**	median of 56519 keypoints per image	✓
❓ **Dataset**	167 out of 187 images calibrated (89%), all images enabled, 2 blocks	⚠
❓ **Camera Optimization**	0.15% relative difference between initial and optimized internal camera parameters	✓
❓ **Matching**	median of 17346.7 matches per calibrated image	✓
❓ **Georeferencing**	yes, no 3D GCP	⚠

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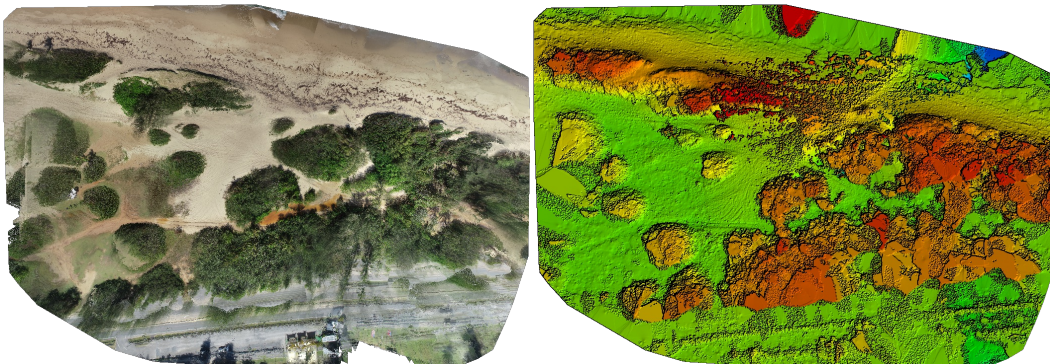
Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details ℹ

Number of Calibrated Images	167 out of 187
Number of Geolocated Images	187 out of 187

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 initia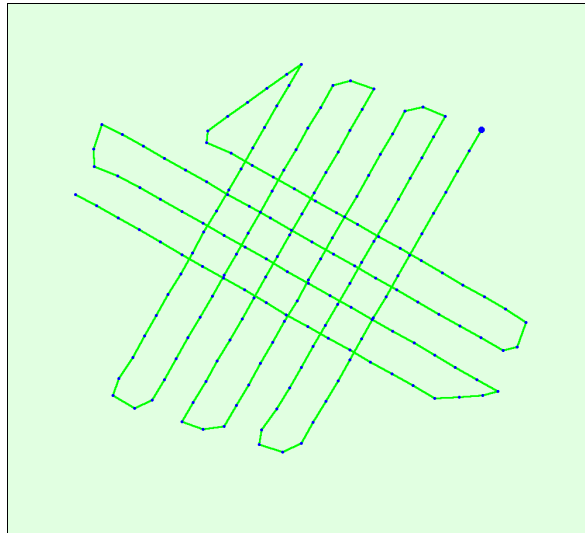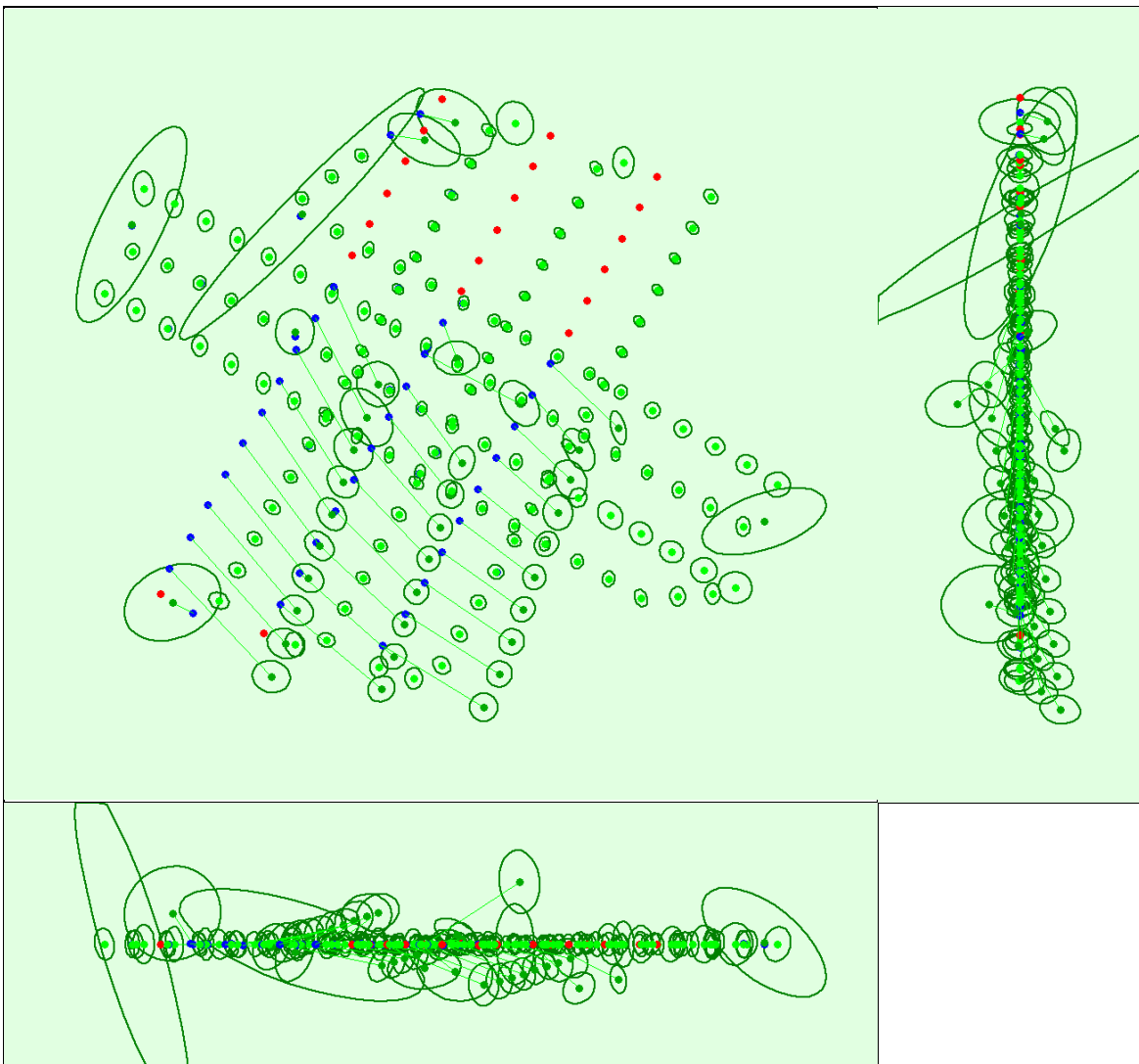l positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Red dots indicate disabled or uncalibrated images. Dark green ellipses indicate the absolute position uncertainty of the bundle block adjustment result.

Absolute camera position and orientation uncertainties

	X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.002	0.002	0.002	0.004	0.003	0.004
Sigma	0.002	0.002	0.002	0.004	0.003	0.003

Overlap

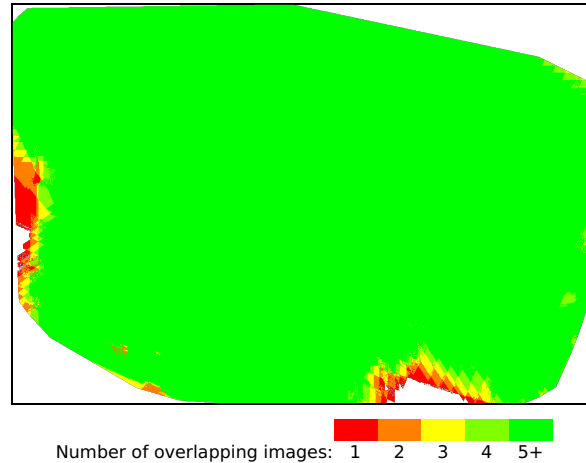Number of overlapping images: 1 2 3 4 5+

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	2862208
Number of 3D Points for Bundle Block Adjustment	993981
Mean Reprojection Error [pixels]	0.167

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	3652.688 [pixel] 8.567 [mm]	2735.128 [pixel] 6.415 [mm]	1820.335 [pixel] 4.269 [mm]	0.000	-0.014	0.014	-0.001	-0.001
Uncertainties (Sigma)	0.078 [pixel] 0.000 [mm]	0.117 [pixel] 0.000 [mm]	0.151 [pixel] 0.000 [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	56519	17347
Min	28710	366
Max	79898	35243
Mean	57648	17139

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	629833
In 3 Images	174951
In 4 Images	78241
In 5 Images	42691
In 6 Images	24551
In 7 Images	14943
In 8 Images	9468
In 9 Images	5754
In 10 Images	4043
In 11 Images	2666
In 12 Images	1887
In 13 Images	1290
In 14 Images	978
In 15 Images	672
In 16 Images	490
In 17 Images	389
In 18 Images	270
In 19 Images	224
In 20 Images	155
In 21 Images	102
In 22 Images	74
In 23 Images	65

In 24 Images	46
In 25 Images	33
In 26 Images	31
In 27 Images	23
In 28 Images	21
In 29 Images	7
In 30 Images	14
In 31 Images	15
In 32 Images	9
In 33 Images	6
In 34 Images	10
In 35 Images	6
In 36 Images	6
In 37 Images	7
In 38 Images	1
In 39 Images	2
In 40 Images	1
In 41 Images	2
In 43 Images	3
In 47 Images	1

2D Keypoint Matches
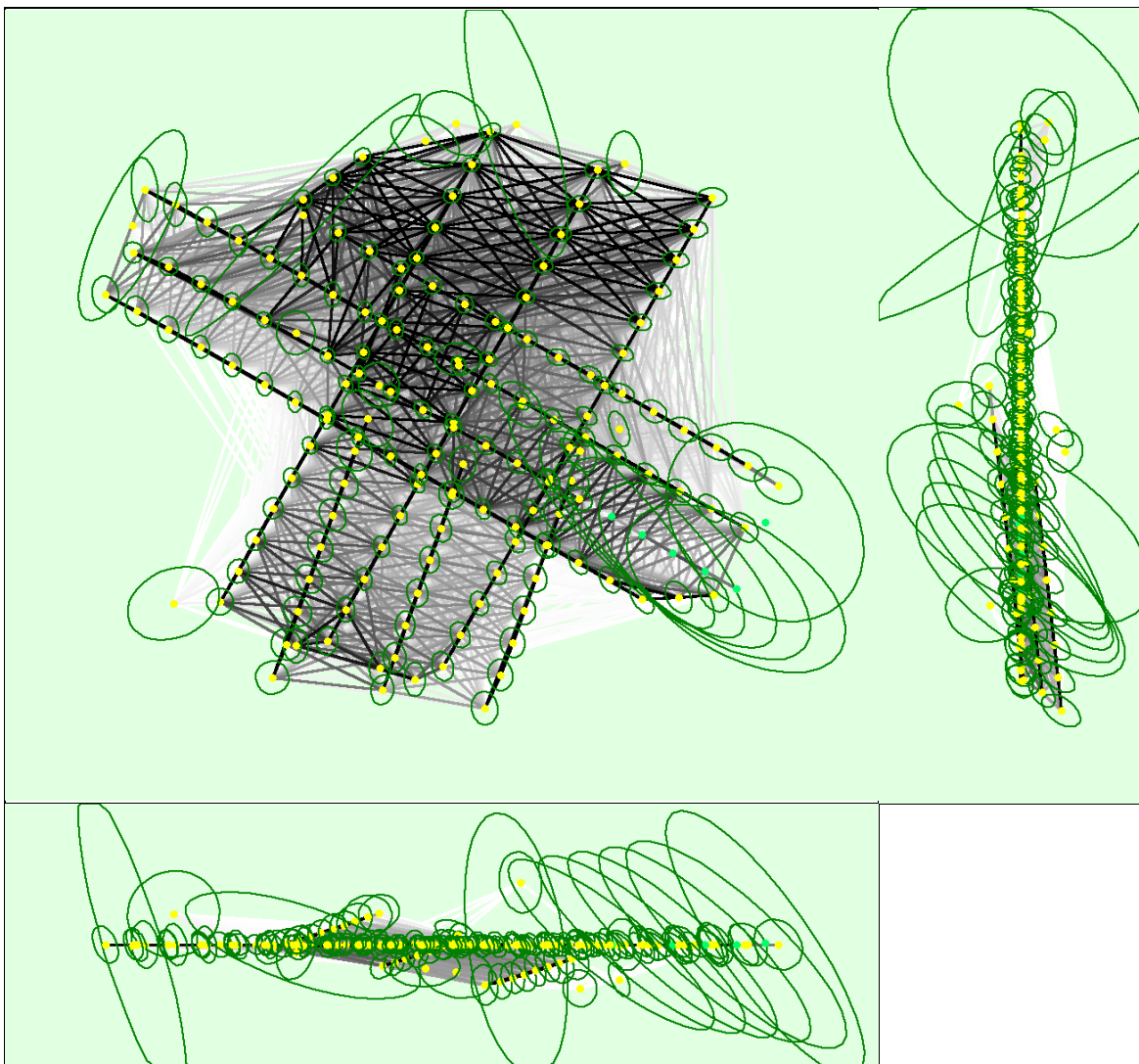
Uncertainty ellipses 1000x magnified

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	0.003	0.003	0.003	0.005	0.004	0.005
Sigma	0.003	0.003	0.004	0.005	0.003	0.005

Geolocation Details

Absolute Geolocation Variance

Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-0.54	0.00	0.00	0.00
-0.54	-0.43	0.00	0.00	0.00
-0.43	-0.32	0.00	0.00	0.00
-0.32	-0.22	0.00	0.00	0.00
-0.22	-0.11	0.00	0.00	0.00
-0.11	0.00	57.69	47.69	46.92
0.00	0.11	42.31	52.31	53.08
0.11	0.22	0.00	0.00	0.00
0.22	0.32	0.00	0.00	0.00
0.32	0.43	0.00	0.00	0.00
0.43	0.54	0.00	0.00	0.00
0.54	-	0.00	0.00	0.00
Mean [m]		0.000358	-0.000021	0.001383
Sigma [m]		0.007587	0.006864	0.016434
RMS Error [m]		0.007595	0.006864	0.016492

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]	94.62	96.92	97.69
[-2.00, 2.00]	99.23	100.00	100.00
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	0.015819	0.015819	0.037527
Sigma of Geolocation Accuracy [m]	0.004535	0.004535	0.041547

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

Geolocation Orientational Variance	RMS [degree]
Omega	1.130
Phi	1.368
Kappa	3.085

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	08m:09s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	05m:56s

Results ⓘ

Number of Generated Tiles	1
Number of 3D Densified Points	13806950
Average Density (per m^3)	850.26

DSM, Orthomosaic and Index Details

Processing Options

DSM and Orthomosaic Resolution	1 x GSD (1.43 [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:09s
Time for Orthomosaic Generation	10m:05s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s

Breach Between middle and Secret Spot Post, Isabela