

## Playa Aviones, Loiza

August 10, 2023.



**Centroid coordinates :** 18.45135° N 65.96017° W

**3D map**  
Playa Aviones, Loiza



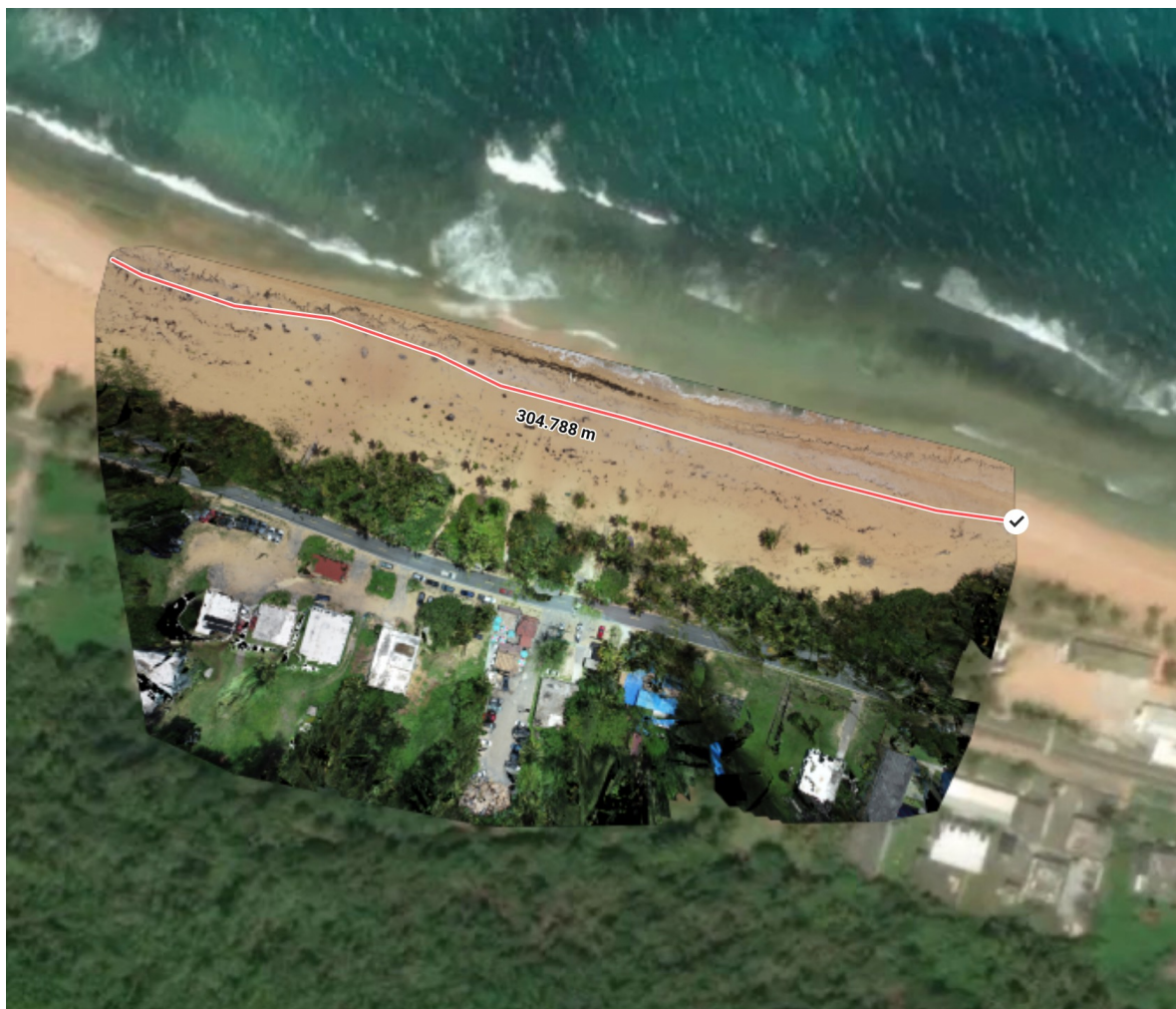
**2D map**



Total area of site =



**Beach length (m)**  
Playa Aviones, Loiza



**Beach length = 316.969 m**

**Density surface model**  
Playa Aviones, Loiza





## Area of the beach

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Area of the beach = 9,227.83 m<sup>2</sup>

## Beach volume

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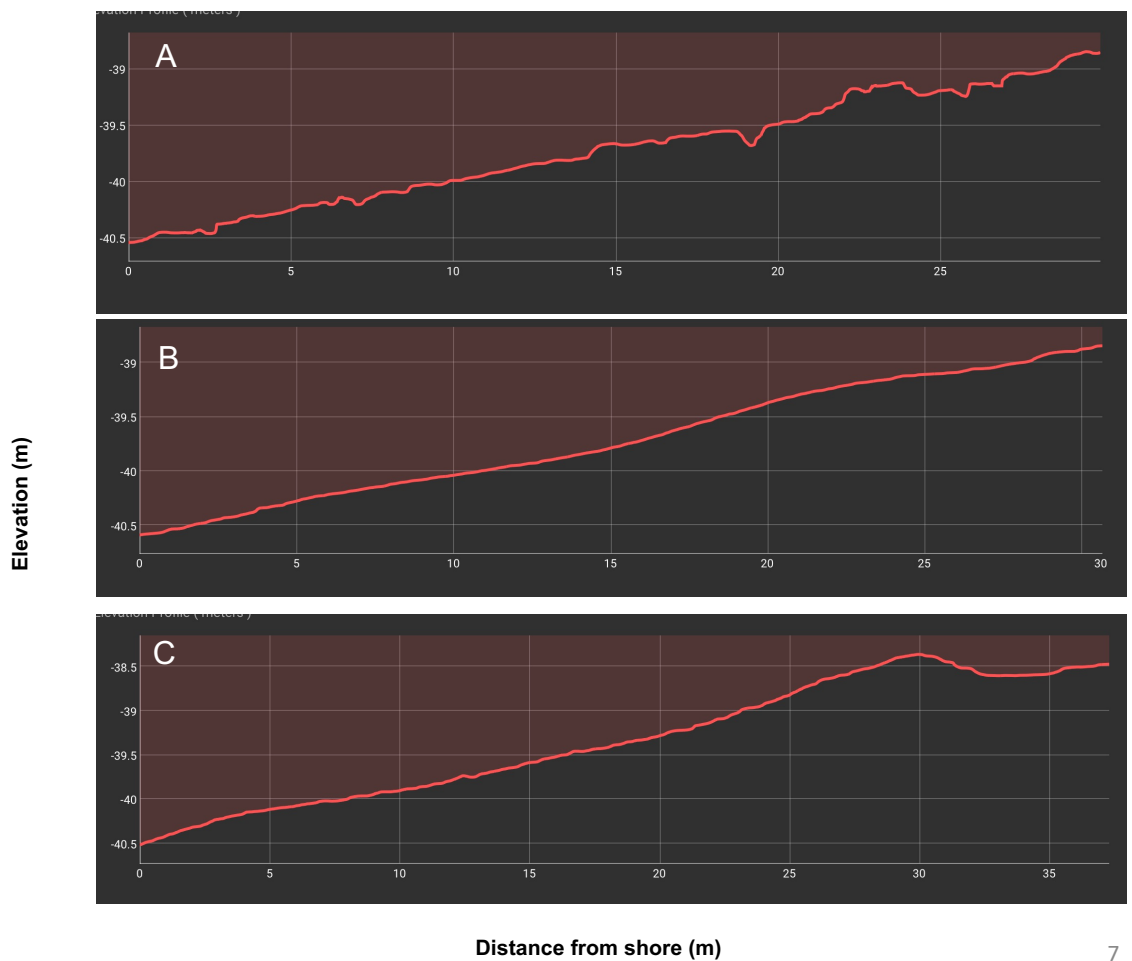


**Cut = 0.00 m<sup>3</sup>**  
**Fill = -364,719 m<sup>3</sup>**  
**Volume Dif. = -364,719 m<sup>3</sup>**

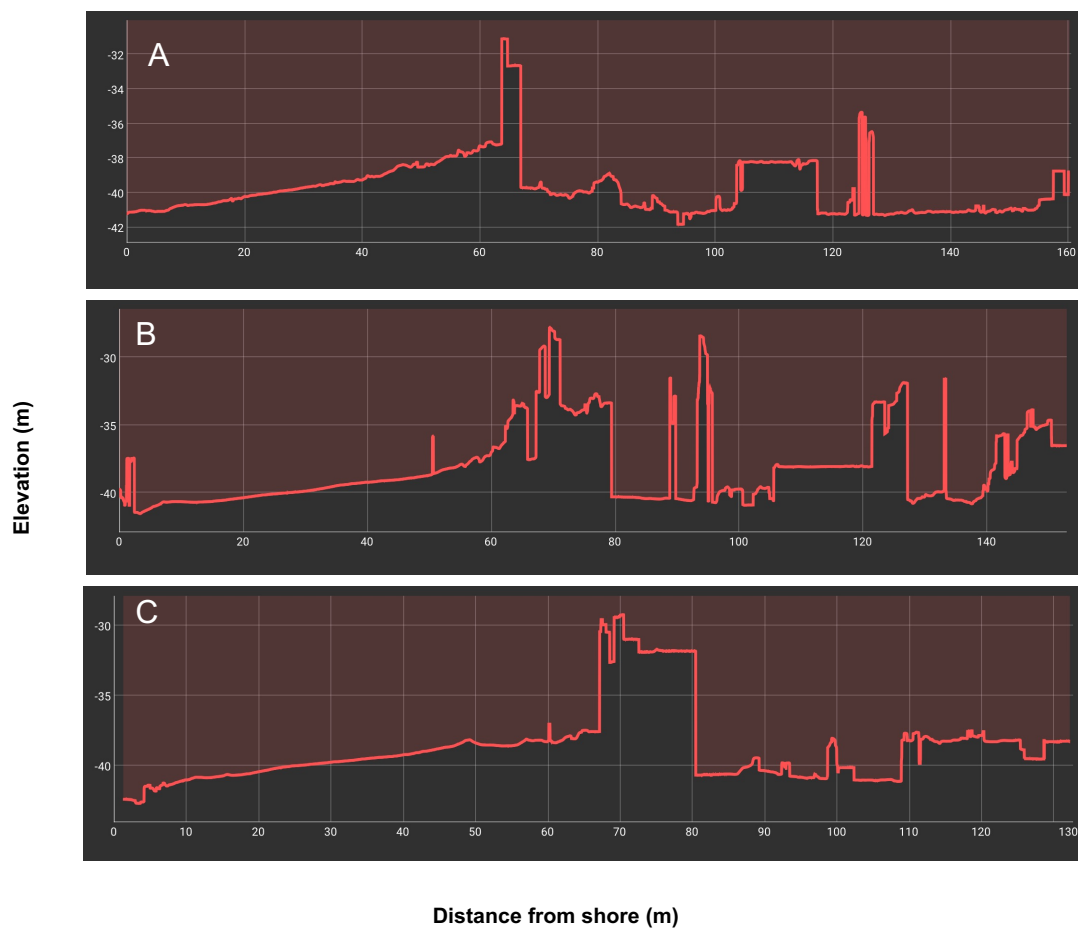
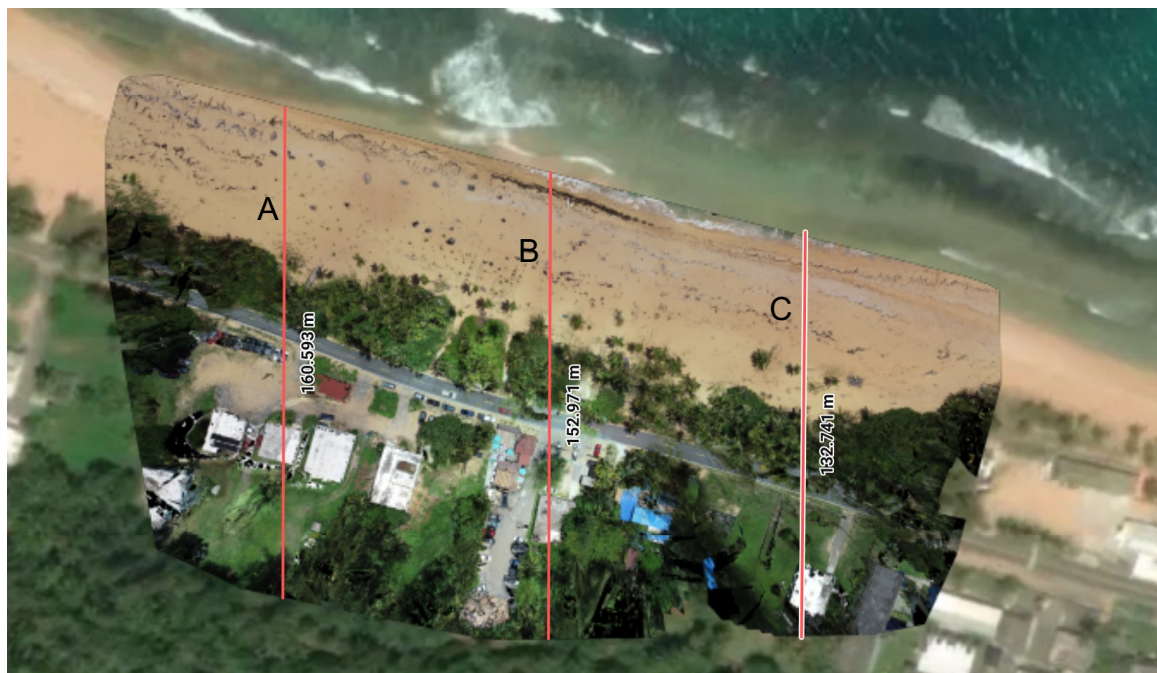


## Beach elevation

Playa Aviones, Loiza



# Site elevation (m) Playa Aviones, Loiza





## Dune height (m)

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### Dune height

A= 4.273 m  
B= 11.818 m  
C= 7.954 m

## Dune width (m)

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### Dune width

A= 23.355 m

B= 21.708 m

C= 23.667 m



## Area and perimeter of dune

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### Area and perimeter of dune

2D area = 7,375.71 m<sup>2</sup>

3D area= 7,375.71 m<sup>2</sup>

2D perimeter = 693.246 m

3D perimeter = 693.246 m

Elevation difference =0.00 m



## Volume of dune

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Base surface	Triangulated
Cut volume	0.00 m <sup>3</sup>
Cut error	0.00 m <sup>3</sup>
Fill volume	-257,894 m <sup>3</sup>
Fill error	677.637 m <sup>3</sup>
Volume difference	-257,894 m <sup>3</sup>

## Shoreline

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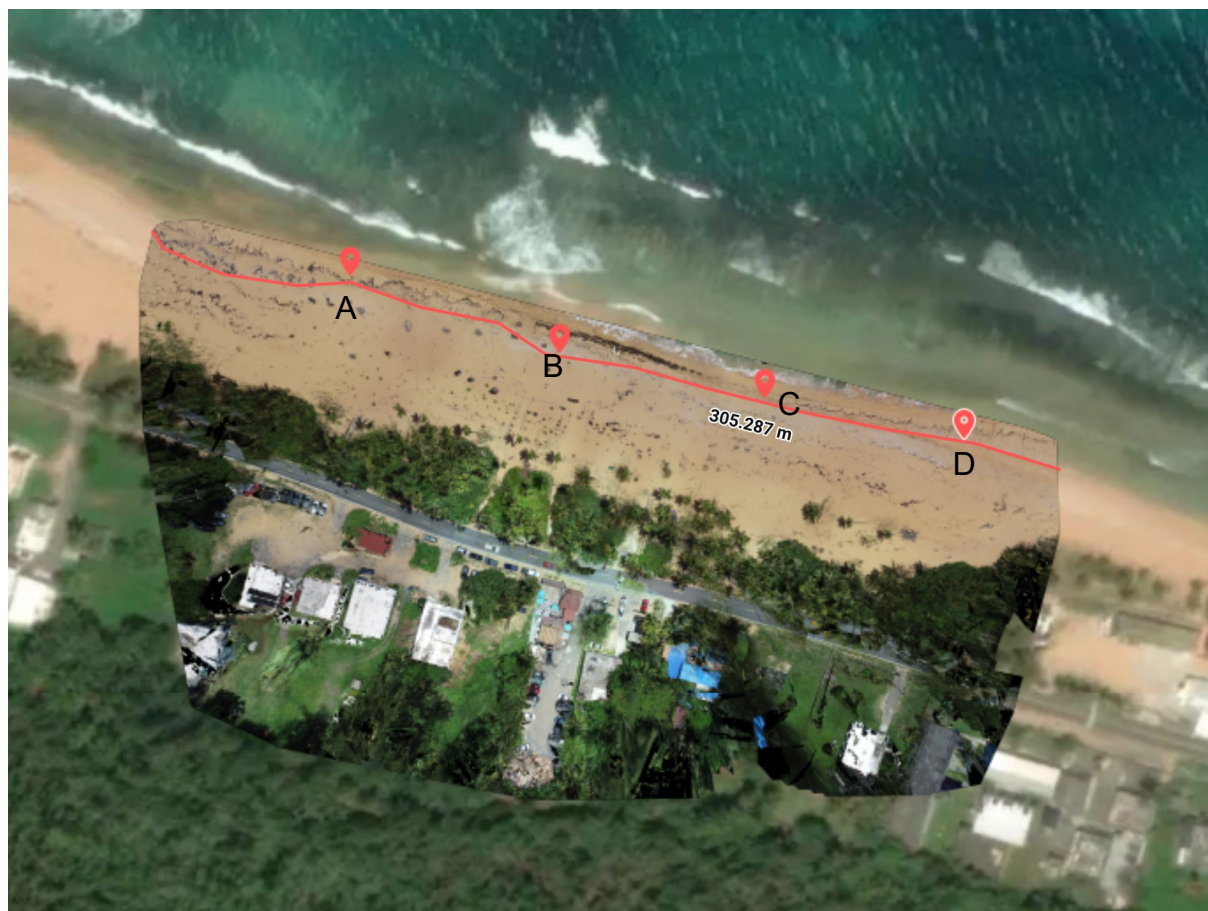


**Shoreline length = 305.287 m**



## Shoreline geolocation

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### Shoreline markers

**A** = 18.45215° N 65.96084° W

**B** = 18.45193° N 65.96020° W

**C** = 18.45180° N 65.95958° W

**D** = 18.45169° N 65.95897° W



## Shoreline extension

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### Shoreline extension

**A** = 12.631 m

**B** = 8.977 m

**C** = 8.535 m

## Shoreline position

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### Shoreline position

A = 32.634 m

B = 43.405 m

C = 46.72 m

## Area of dune breaches

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**Area of dune breaches**

**Breach = 7,375.71 m<sup>2</sup>**



# 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	234736-Project-2023-08-10T15:40:09.389Z
Processed	2023-08-10 16:33:53
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.54 cm / 0.60 in
Area Covered	0.041 km <sup>2</sup> / 4.0756 ha / 0.02 sq. mi. / 10.0763 acres
Time for Initial Processing (without report)	29m:15s

## Quality Check



<b>Images</b>	median of 42940 keypoints per image	
<b>Dataset</b>	243 out of 283 images calibrated (85%), all images enabled	
<b>Camera Optimization</b>	1.4% relative difference between initial and optimized internal camera parameters	
<b>Matching</b>	median of 9817.73 matches per calibrated image	
<b>Georeferencing</b>	yes, no 3D GCP	

## Preview

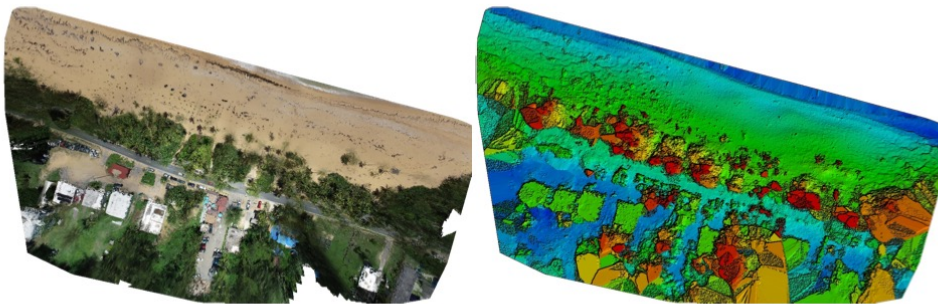


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

## Calibration Details



Number of Calibrated Images	243 out of 283
Number of Geolocated Images	283 out of 283

## Initial Image Positions



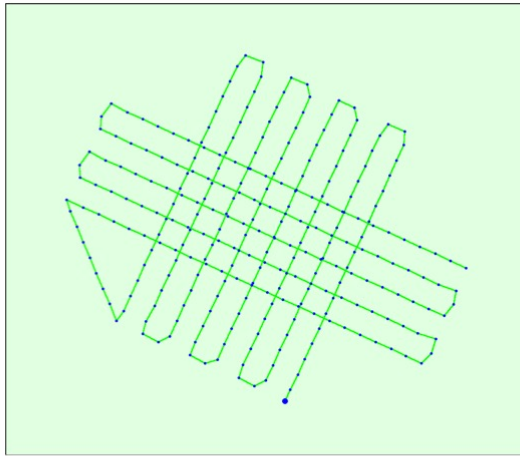
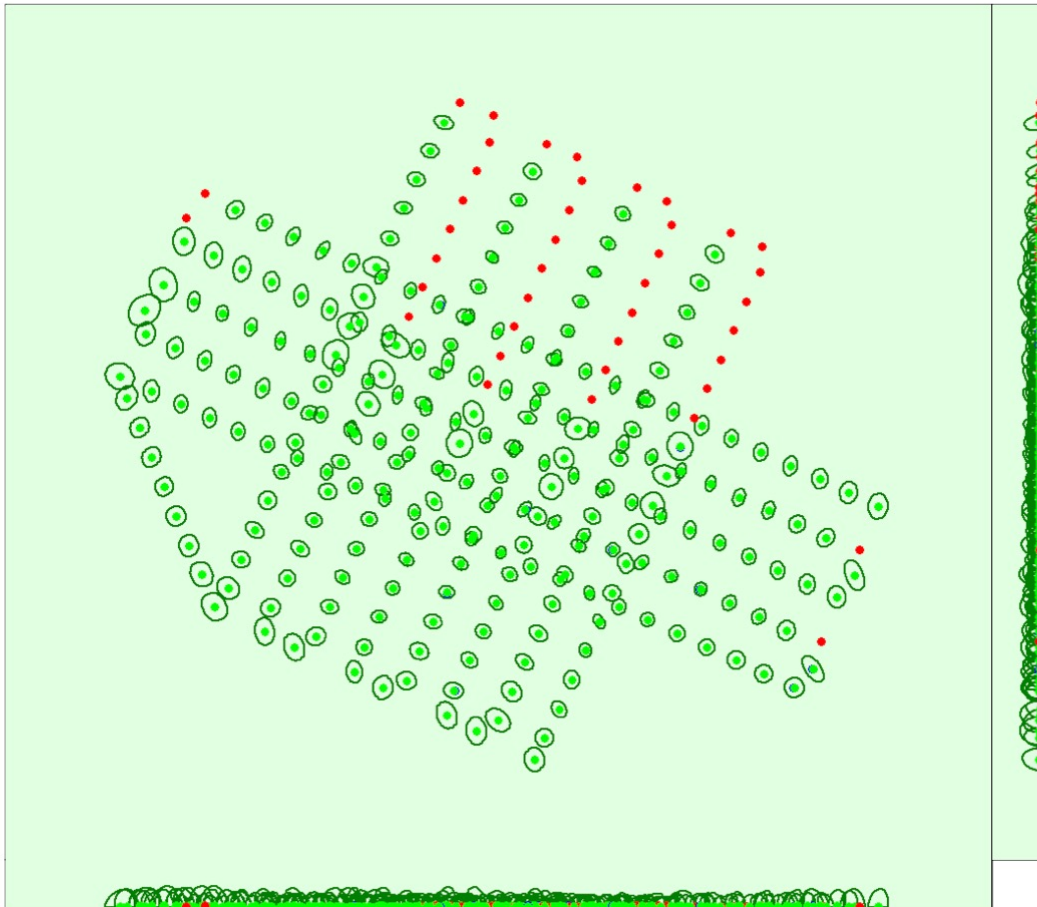


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

### ? 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	0.001	0.002	0.002	0.004	0.003	0.003
Sigma	0.000	0.000	0.000	0.001	0.001	0.001

## ? Overlap

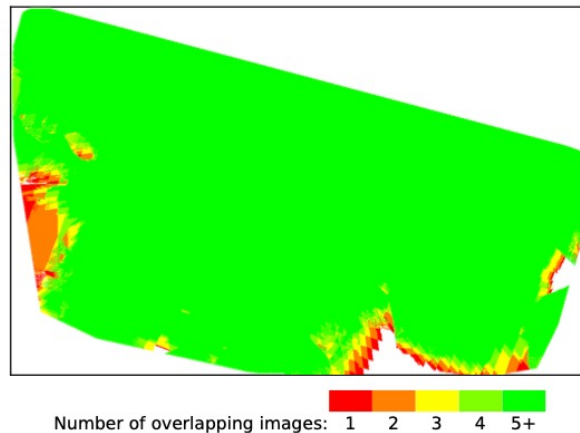


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.

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	2414158
Number of 3D Points for Bundle Block Adjustment	903641
Mean Reprojection Error [pixels]	0.179

## ? Internal Camera Parameters

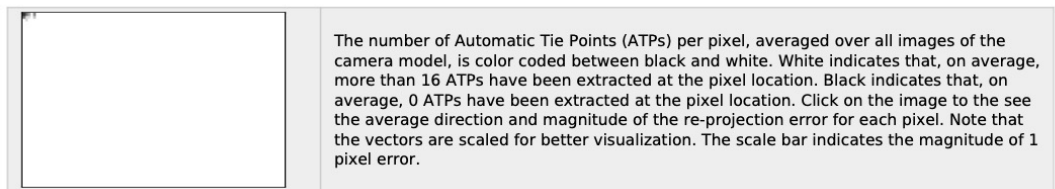
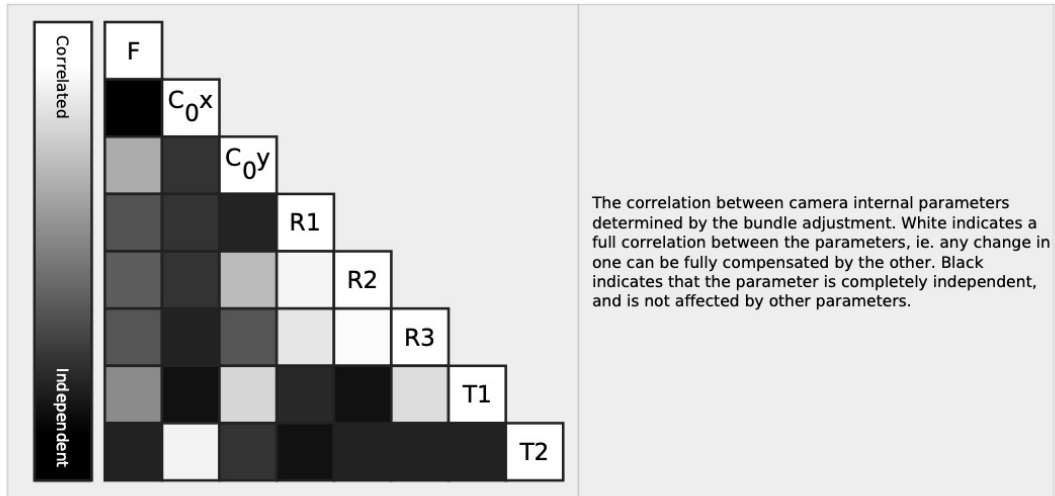
FC6310R\_8.8\_5472x3648 (RGB). Sensor Dimensions: 12.833 [mm] x 8.556 [mm]



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	3709.781 [pixel] 8.700 [mm]	2730.780 [pixel] 6.404 [mm]	1808.723 [pixel] 4.242 [mm]	-0.013	0.002	0.007	-0.002	-0.001
Uncertainties (Sigma)	0.077 [pixel] 0.000 [mm]	0.128 [pixel] 0.000 [mm]	0.164 [pixel] 0.000 [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	42940	9818
Min	23627	3308
Max	74462	17255
Mean	44289	9935

## 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	618775
In 3 Images	151594
In 4 Images	61313
In 5 Images	30714
In 6 Images	16391
In 7 Images	9228
In 8 Images	5427
In 9 Images	3239
In 10 Images	2151
In 11 Images	1383
In 12 Images	969
In 13 Images	645
In 14 Images	471
In 15 Images	349
In 16 Images	249
In 17 Images	166
In 18 Images	145
In 19 Images	98
In 20 Images	78
In 21 Images	61
In 22 Images	57
In 23 Images	41

In 24 Images	24
In 25 Images	20
In 26 Images	8
In 27 Images	9
In 28 Images	17
In 29 Images	5
In 30 Images	3
In 31 Images	1
In 32 Images	3
In 33 Images	3
In 36 Images	1
In 37 Images	2
In 40 Images	1

## 2D Keypoint Matches

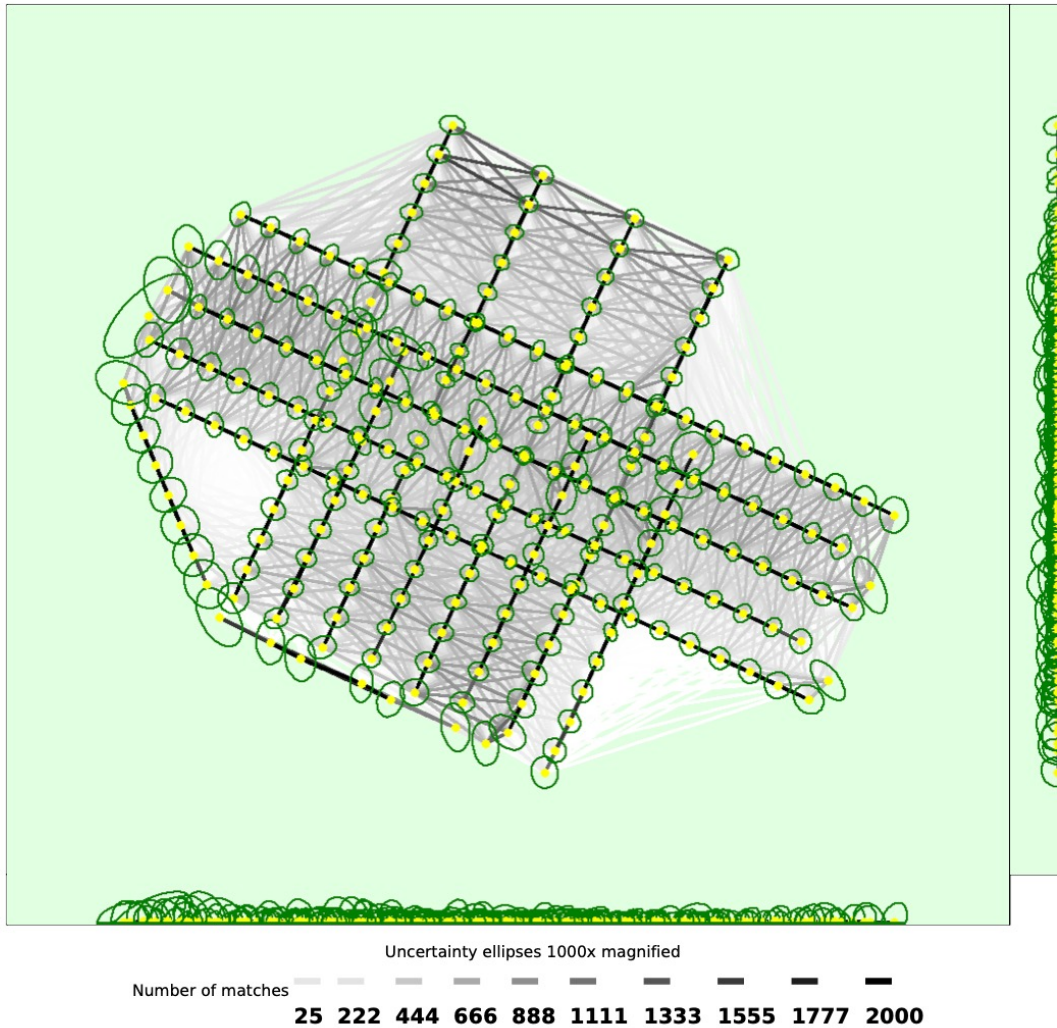


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty of the bundle block adjustment result.

## Relative camera position and orientation uncertainties

X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
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Mean	0.002	0.002	0.002	0.004	0.003	0.004
Sigma	0.001	0.001	0.001	0.001	0.001	0.001

## 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	0.00
-0.04	-0.03	0.00	0.00	0.41
-0.03	-0.02	0.00	0.00	0.82
-0.02	-0.02	0.00	0.00	4.53
-0.02	-0.01	6.17	7.82	14.81
-0.01	0.00	44.03	40.74	27.16
0.00	0.01	44.86	46.91	33.33
0.01	0.02	4.53	4.12	12.35
0.02	0.02	0.41	0.41	5.35
0.02	0.03	0.00	0.00	1.23
0.03	0.04	0.00	0.00	0.00
0.04	-	0.00	0.00	0.00
<b>Mean [m]</b>		-0.000007	-0.000013	0.000077
<b>Sigma [m]</b>		0.004977	0.005070	0.009305
<b>RMS Error [m]</b>		0.004977	0.005070	0.009306

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]	93.00	93.42	96.71
[-2.00, 2.00]	100.00	100.00	100.00
[-3.00, 3.00]	100.00	100.00	100.00
<b>Mean of Geolocation Accuracy [m]</b>		0.009339	0.009339
<b>Sigma of Geolocation Accuracy [m]</b>		0.000175	0.000175
		0.000175	0.000671

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

Geolocation Orientational Variance	RMS [degree]
Omega	1.497
Phi	2.050
Kappa	3.244

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	13m:26s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	07m:45s

## Results



Number of Generated Tiles	1
Number of 3D Densified Points	21607131
Average Density (per m <sup>3</sup> )	1125.97

## DSM, Orthomosaic and Index Details



## Processing Options



DSM and Orthomosaic Resolution	1 x GSD (1.54 [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:46s
Time for Orthomosaic Generation	13m:38s
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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