

**Monte de Oca, Isabela**  
July 31, 2023.



**Centroid coordinates :** 18.51490° N 67.08832° W

## 2D map

Monte de Oca, Isabela



Total area of site = 3.88221 ha

**Beach length (m)**  
Monte de Oca, Isabela



**Beach length = 293.294 m**

**Density surface model**  
Monte de Oca, Isabela



**Area of the beach**  
Monte de Oca, Isabela



**Area of the beach = 5,794.79 m²**

## Beach volume

Monte de Oca, Isabela



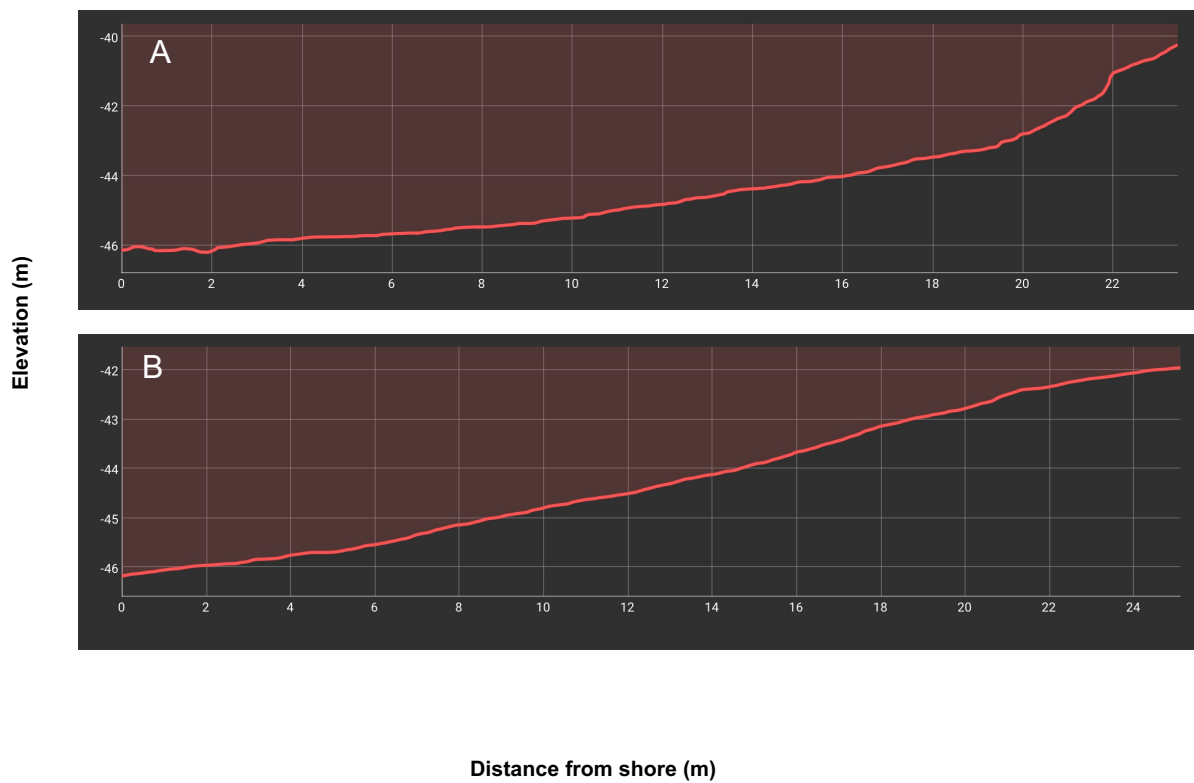
**Cut** = 0.00 m<sup>3</sup>

**Fill** = -258,663 m<sup>3</sup>

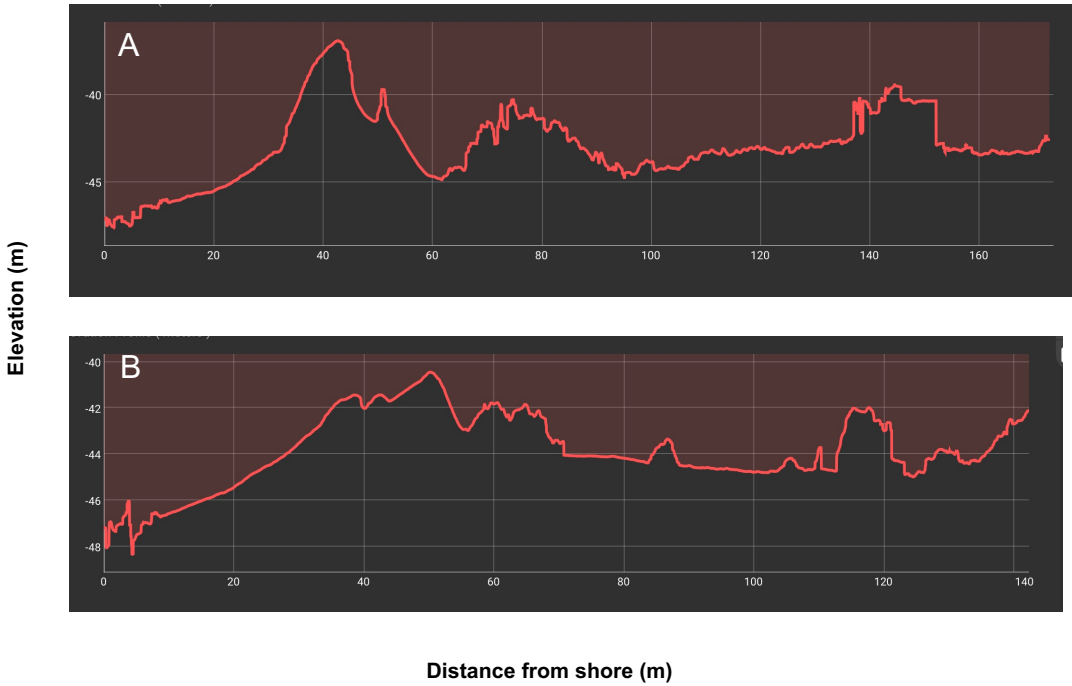
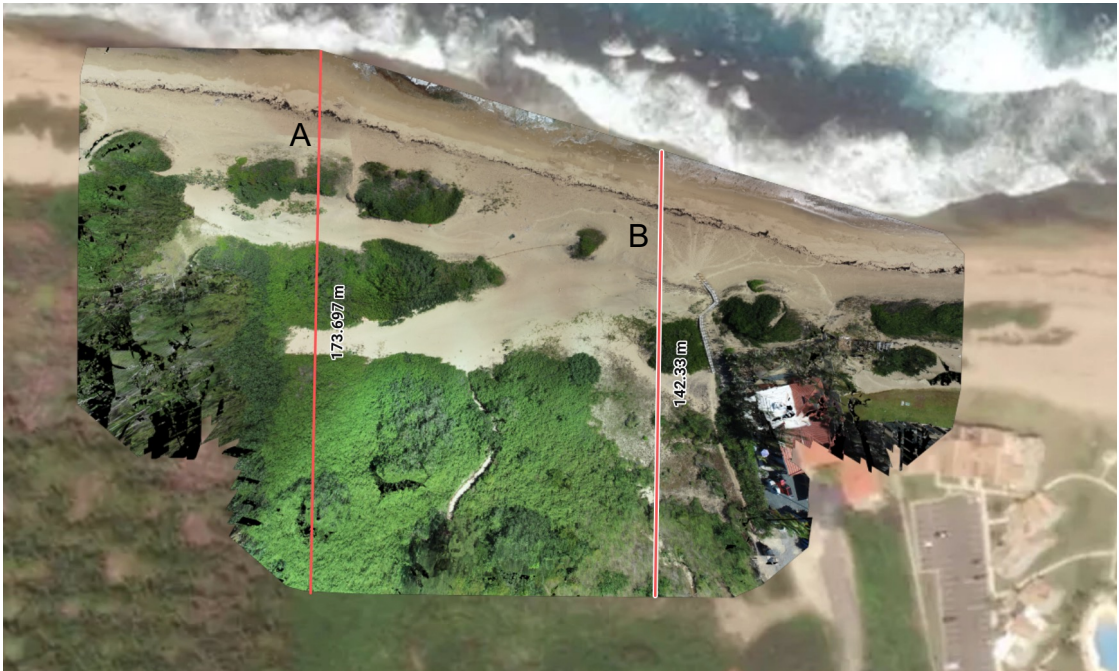
**Volume Dif.** = -258,663 m<sup>3</sup>

## Beach elevation

Monte de Oca, Isabela



Site elevation (m)  
Monte de Oca, Isabela



## Dune height (m)

Monte de Oca, Isabela



### Dune height

A = 3.688 m

B = 1.183 m

C = 3.714 m

**Dune width (m)**  
Monte de Oca, Isabela



**Dune width**

**A** = 19.131 m

**B** = 13.668 m

**C** = 15.614 m

## Area and perimeter of dune

Monte de Oca, Isabela



### Area and perimeter of dune

**2D area = 4,264.56 m<sup>2</sup>**

**3D area = 4,264.56 m<sup>2</sup>**

**2D perimeter = 521.066 m**

**3D perimeter = 521.066 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	-174,563 m <sup>3</sup>
Fill error	205.561 m <sup>3</sup>
Volume difference	-174,563 m <sup>3</sup>

## Shoreline

Monte de Oca, Isabela



**Shoreline length = 292.553 m**

## Shoreline geolocation

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### Shoreline markers

A = 18.51571° N 67.08923° W

B = 18.51558° N 67.08864° W

C = 18.51537° N 67.08790° W

D = 18.51523° N 67.08721° W

## Shoreline extension

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### Shoreline extension

A = 12.419 m

B = 10.861 m

C = 7.207 m

## Shoreline position

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### Shoreline position

A = 30.793 m

B = 15.597 m

C = 18.79 m

## Area of dune breaches

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Area of dune breaches

Breach = 4,264.56 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	232783-Project-2023-07-31T19:15:33.313Z
Processed	2023-07-31 19:50:43
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.61 cm / 0.63 in
Area Covered	0.038 km <sup>2</sup> / 3.8268 ha / 0.01 sq. mi. / 9.4611 acres
Time for Initial Processing (without report)	28m:08s

## Quality Check



<b>Images</b>	median of 51915 keypoints per image	
<b>Dataset</b>	211 out of 244 images calibrated (86%), all images enabled, 2 blocks	
<b>Camera Optimization</b>	1.4% relative difference between initial and optimized internal camera parameters	
<b>Matching</b>	median of 14404 matches per calibrated image	
<b>Georeferencing</b>	yes, no 3D GCP	

## Preview

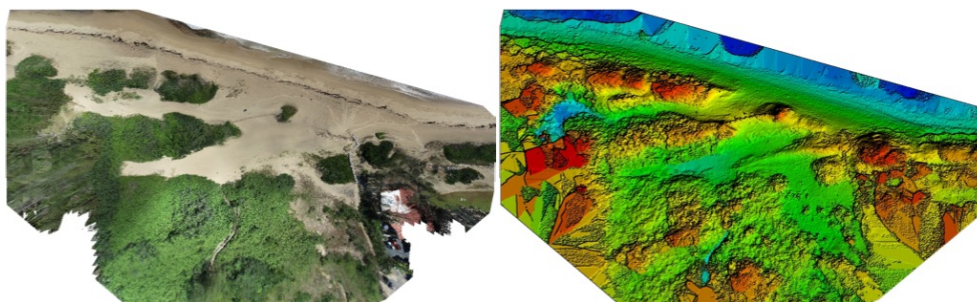


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

## Calibration Details



Number of Calibrated Images	211 out of 244
Number of Geolocated Images	244 out of 244

## Initial Image Positions



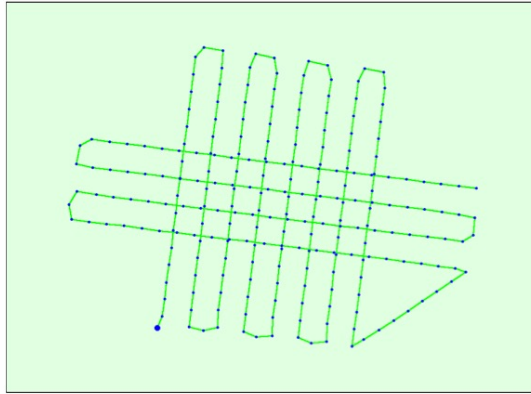
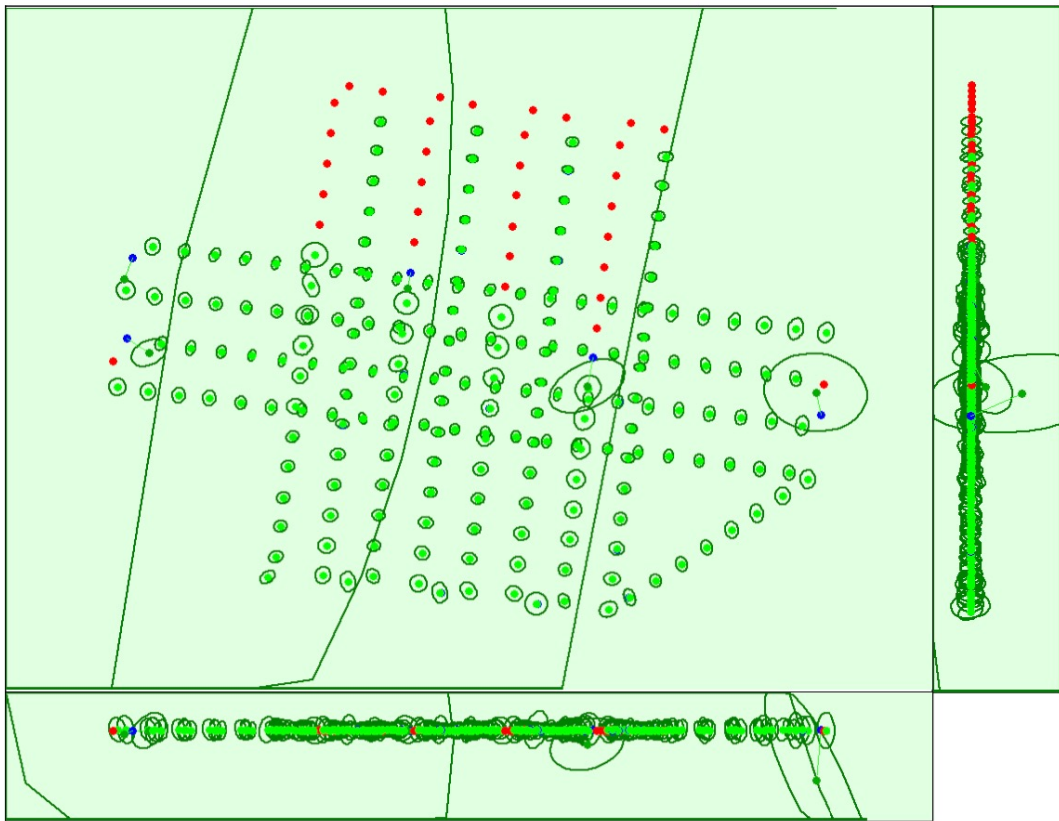


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

### Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 1000x magnified

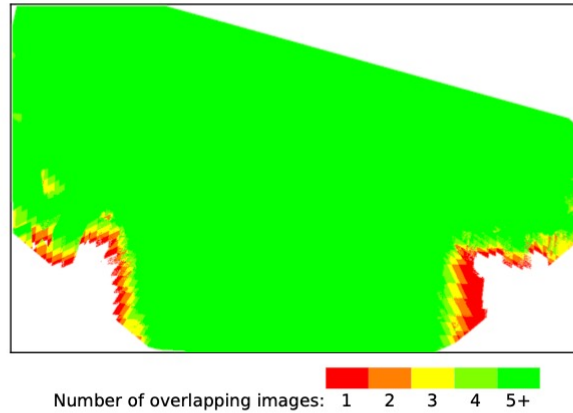
Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Red dots indicate disabled 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	0.002	0.007	0.003	0.007	0.004	0.005

Sigma	0.007	0.081	0.009	0.051	0.020	0.025
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## ? 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	3094255
Number of 3D Points for Bundle Block Adjustment	1174336
Mean Reprojection Error [pixels]	0.157

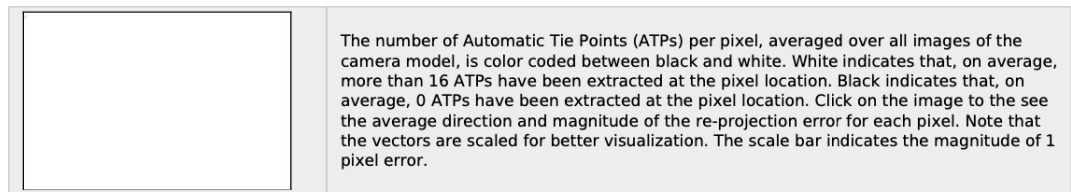
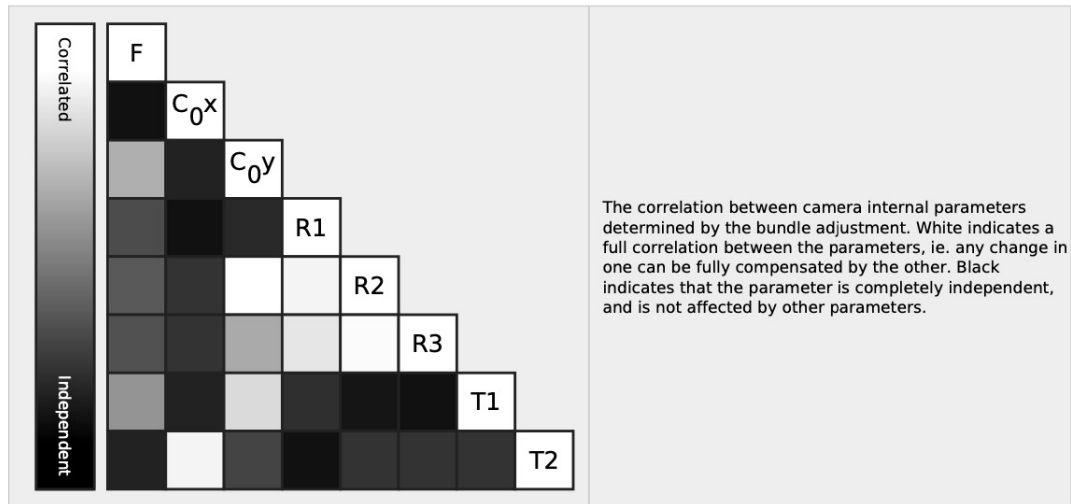
## ? Internal Camera Parameters

**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	3709.517 [pixel] 8.700 [mm]	2730.966 [pixel] 6.405 [mm]	1808.945 [pixel] 4.242 [mm]	-0.013	0.002	0.007	-0.002	-0.001
Uncertainties (Sigma)	0.068 [pixel] 0.000 [mm]	0.112 [pixel] 0.000 [mm]	0.142 [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	51915	14404
Min	25091	110
Max	86465	28518
Mean	54344	14665

## ? 3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	823516
In 3 Images	189803
In 4 Images	74374
In 5 Images	35479
In 6 Images	19914
In 7 Images	11399
In 8 Images	6844
In 9 Images	4120
In 10 Images	2695
In 11 Images	1818
In 12 Images	1202
In 13 Images	853
In 14 Images	604
In 15 Images	460
In 16 Images	319
In 17 Images	231
In 18 Images	176
In 19 Images	123
In 20 Images	102
In 21 Images	66
In 22 Images	59
In 23 Images	45

In 24 Images	38
In 25 Images	20
In 26 Images	13
In 27 Images	16
In 28 Images	9
In 29 Images	7
In 30 Images	6
In 31 Images	7
In 32 Images	3
In 34 Images	1
In 35 Images	2
In 36 Images	2
In 37 Images	4
In 38 Images	2
In 39 Images	1
In 42 Images	1
In 43 Images	1
In 48 Images	1

## ? 2D Keypoint Matches

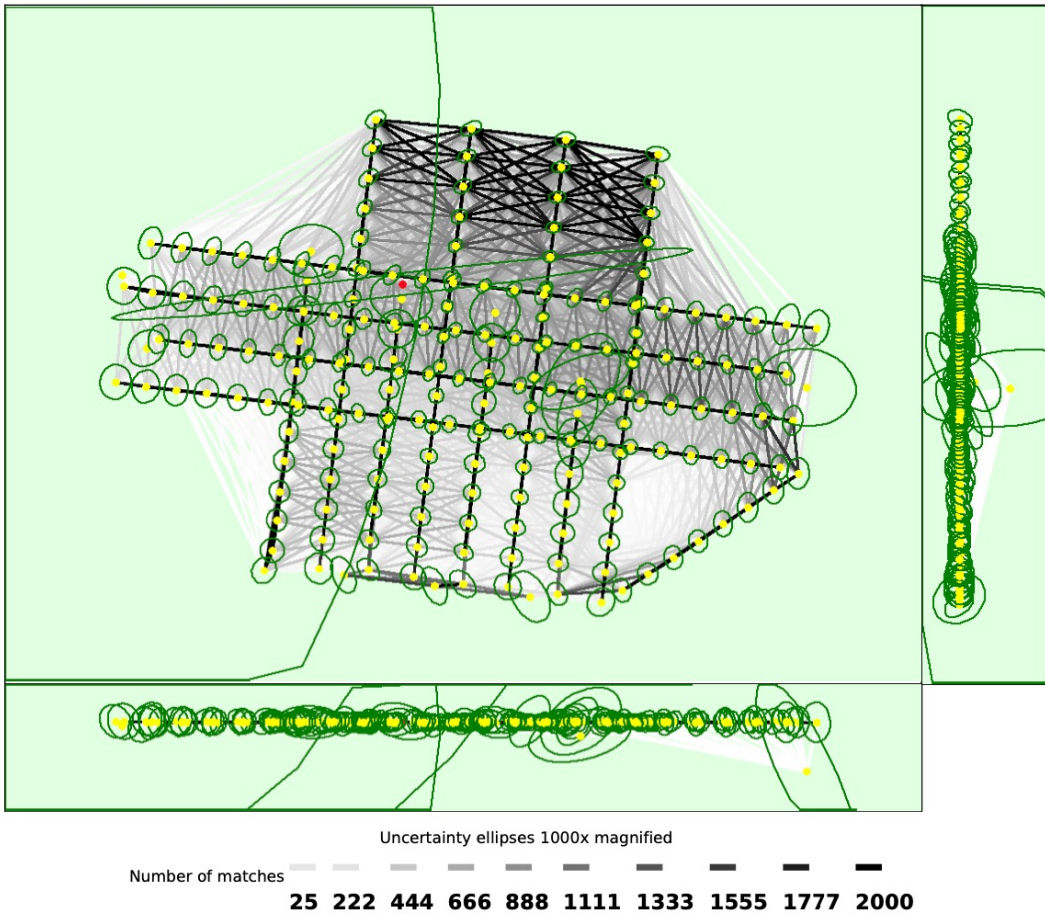


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.002	0.003	0.003	0.007	0.005	0.006
Sigma	0.005	0.008	0.007	0.042	0.019	0.020

## 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	0.00
-0.03	-0.02	0.00	0.00	0.97
-0.02	-0.02	0.00	0.00	1.94
-0.02	-0.01	1.46	2.43	11.65
-0.01	0.00	45.63	50.49	28.16
0.00	0.01	51.46	42.72	43.69
0.01	0.02	1.46	4.37	13.11
0.02	0.02	0.00	0.00	0.49
0.02	0.03	0.00	0.00	0.00
0.03	0.04	0.00	0.00	0.00
0.04	-	0.00	0.00	0.00
<b>Mean [m]</b>		0.000006	-0.000010	0.000043
<b>Sigma [m]</b>		0.003351	0.004332	0.007905
<b>RMS Error [m]</b>		0.003351	0.004332	0.007905

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]	99.51	96.12	99.03
[-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>	0.009451	0.009451	0.025220
<b>Sigma of Geolocation Accuracy [m]</b>	0.000149	0.000149	0.000397

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

Geolocation Orientational Variance	RMS [degree]
Omega	3.320
Phi	2.035
Kappa	5.261

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 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:09s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	01m:50s

### Results



Number of Generated Tiles	1
Number of 3D Densified Points	19581259
Average Density (per m <sup>3</sup> )	1026.97

## DSM, Orthomosaic and Index Details



### Processing Options



DSM and Orthomosaic Resolution	1 x GSD (1.61 [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	05m:56s
Time for Orthomosaic Generation	09m:21s
Time for DTM Generation	00s
Time for Contour Lines Generation	00s
Time for Reflectance Map Generation	00s
Time for Index Map Generation	00s

## Monte de Oca, Isabela

