

Isla Bela, Isabela
August 01, 2023.



Centroid coordinates : 18.51236° N 67.06771°

3D map
Isla Bela, Isabela



2D map



Total area of site = 3.58705 ha

Beach length (m)
Isla Bela, Isabela



Beach length = 256.961 m

Density surface model
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Area of the beach
Isla Bela, Isabela



Area of the beach = 4,718.73 m²

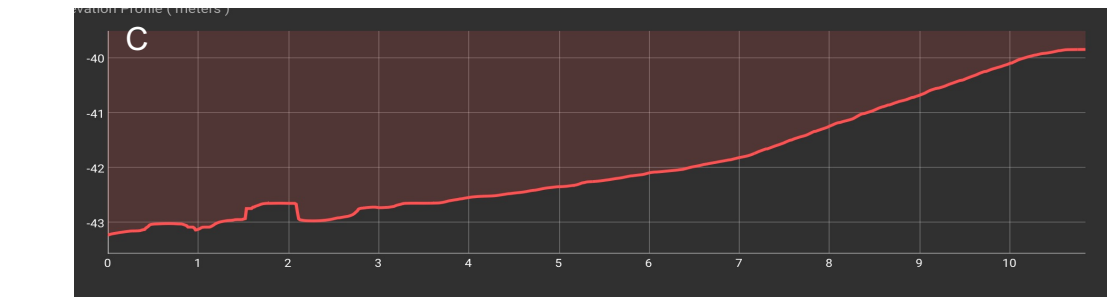
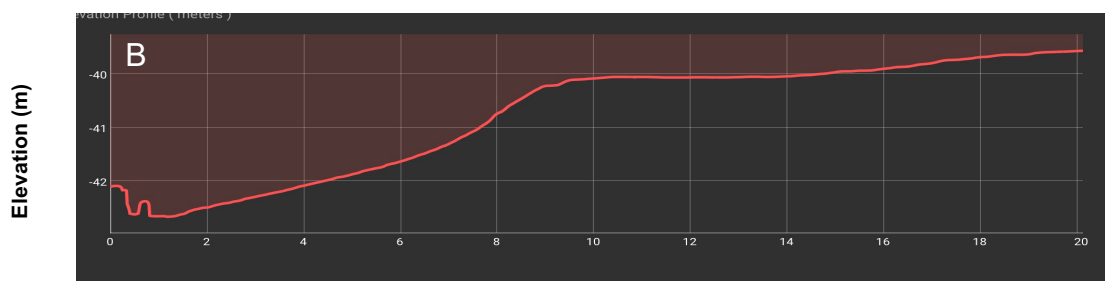
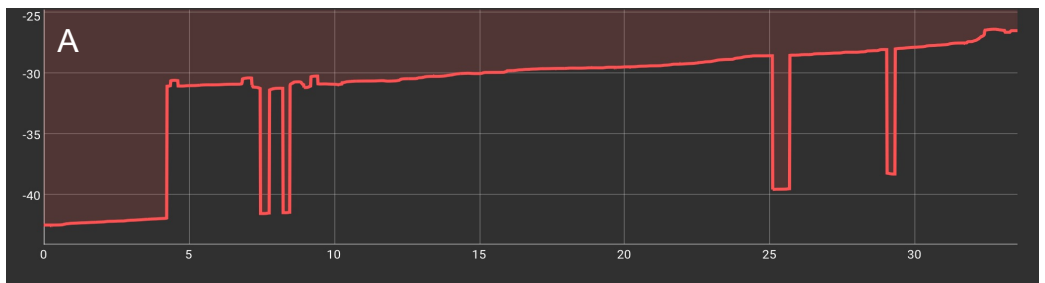
Beach volume
Isla Bela, Isabela



Cut = 0.00 m³
Fill = -173,254 m³
Volume Dif. = -173,254 m³

Beach elevation

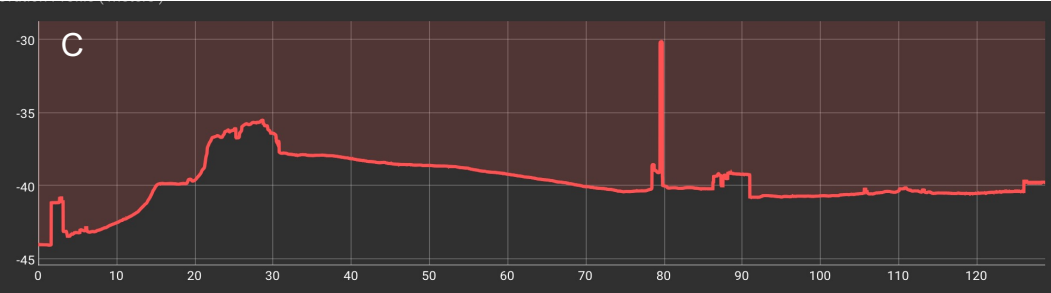
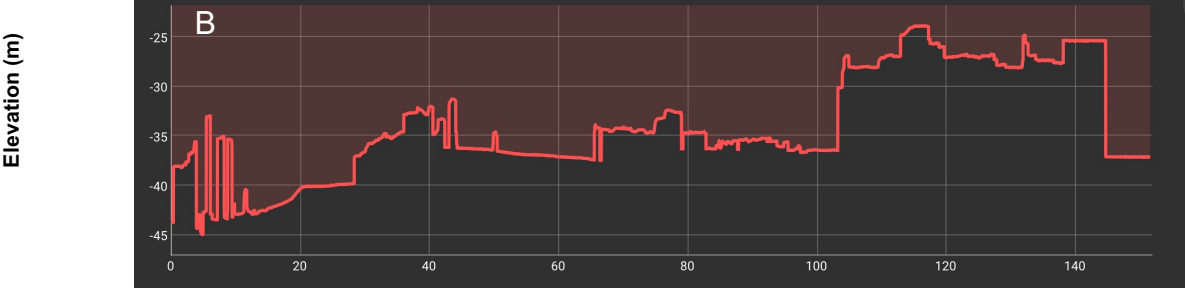
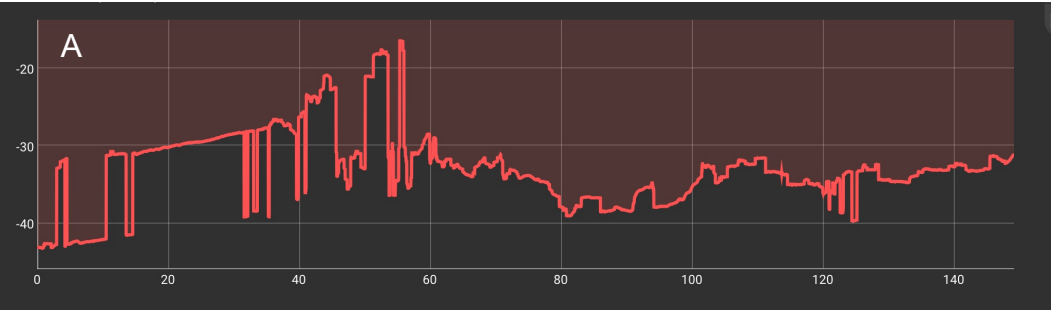
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Distance from shore (m)

Site elevation (m)

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Distance from shore (m)

Dune height (m)

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Dune height

A = 8.855 m
B = 10.525 m
C = 3.884 m

Dune width (m)
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Dune width	
A	= 21.613 m
B	= 9.53 m
C	= 10.255 m

Area and perimeter of dune

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Area and perimeter of dune

2D area = 2,709.66 m²

3D area = 2,969.41 m²

2D perimeter = 555.301 m

3D perimeter = 563.627m

Elevation difference = 20.454 m

Volume of dune

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Base surface	Triangulated
Cut volume	4,627.29 m ³
Cut error	76.2795 m ³
Fill volume	-1,882.96 m ³
Fill error	38.664 m ³
Volume difference	2,744.32 m ³

Shoreline
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Shoreline length = 263.181 m

Shoreline geolocation

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Shoreline markers

A = 18.51296° N 67.06855° W

B = 18.51293° N 67.06796° W

C = 18.51287° N 67.06742° W

D = 18.51288° N 67.06685° W

Shoreline extension Isla Bela, Isabela



Shoreline extension

A = 15.017 m

B = 11.013 m

C = 10.622 m

Shoreline position

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Shoreline position

A = 16.12 m

B = 10.988 m

C = 10.255 m

Area of dune breaches

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Area of dune breaches

Breach = 2,709.66 m²

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
- i** Additional information about the sections

💡 Click [here](#) for additional tips to analyze the Quality Report

Summary



Project	233027-Project-2023-08-01T20:14:52.971Z
Processed	2023-08-01 20:53:42
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.41 cm / 0.56 in
Area Covered	0.035 km ² / 3.5451 ha / 0.01 sq. mi. / 8.7646 acres
Time for Initial Processing (without report)	23m:06s

Quality Check



? Images	median of 45072 keypoints per image	✓
? Dataset	188 out of 219 images calibrated (85%), all images enabled, 2 blocks	⚠
? Camera Optimization	1.41% relative difference between initial and optimized internal camera parameters	✓
? Matching	median of 11727.3 matches per calibrated image	✓
? Georeferencing	yes, no 3D GCP	⚠

? Preview

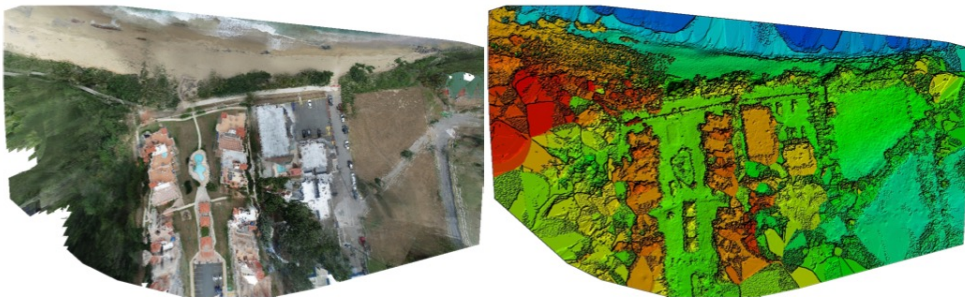


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	188 out of 219
Number of Geolocated Images	219 out of 219

? Initial Image Positions



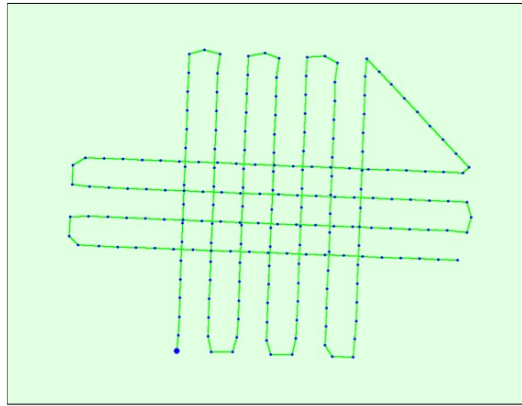
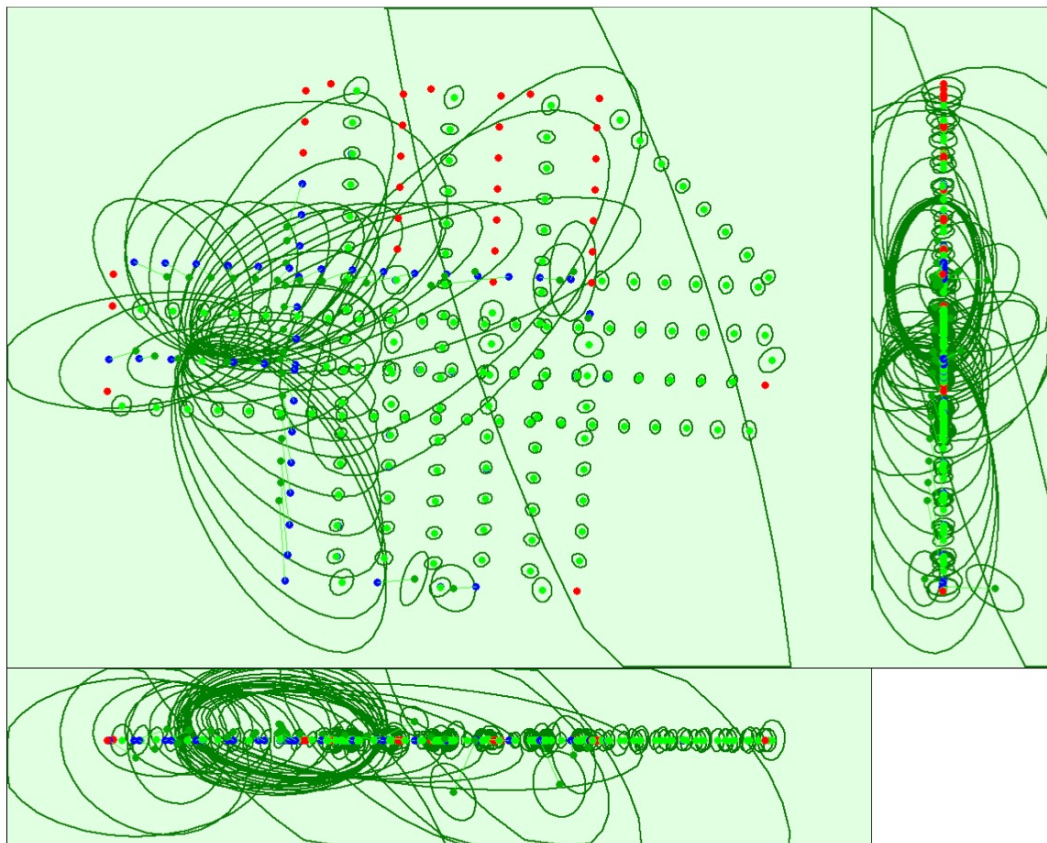


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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]
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Mean	0.005	0.004	0.004	0.007	0.006	0.008
Sigma	0.008	0.009	0.005	0.012	0.008	0.013

Overlap

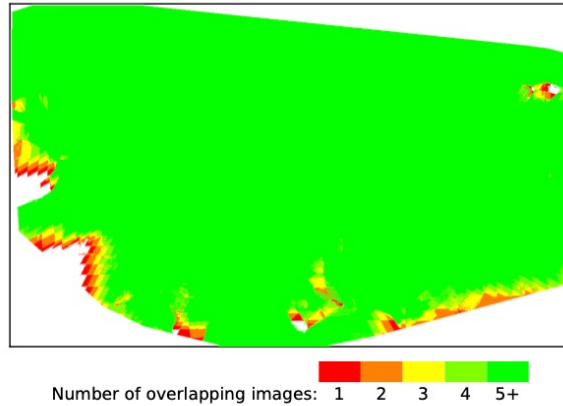


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint matches is also sufficient for these areas (see Figure 5 for keypoint matches).

Bundle Block Adjustment Details

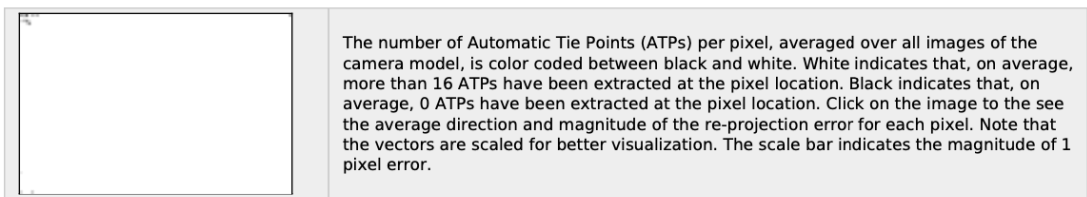
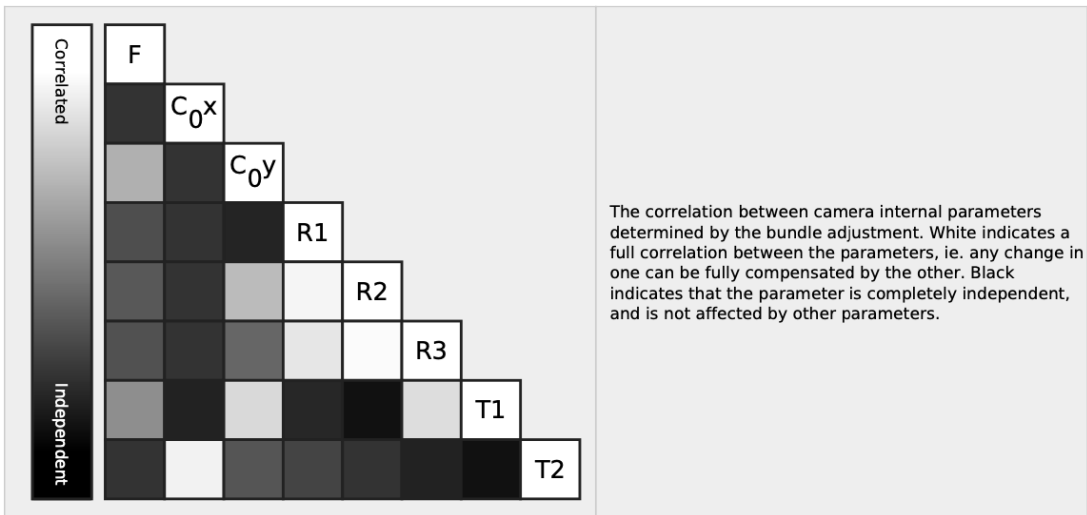
Number of 2D Keypoint Observations for Bundle Block Adjustment	1976369
Number of 3D Points for Bundle Block Adjustment	771085
Mean Reprojection Error [pixels]	0.209

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	3710.192 [pixel] 8.701 [mm]	2730.726 [pixel] 6.404 [mm]	1808.399 [pixel] 4.241 [mm]	-0.012	-0.001	0.009	-0.002	-0.001
Uncertainties (Sigma)	0.092 [pixel] 0.000 [mm]	0.138 [pixel] 0.000 [mm]	0.185 [pixel] 0.000 [mm]	0.000	0.000	0.000	0.000	0.000



2D Keypoints Table

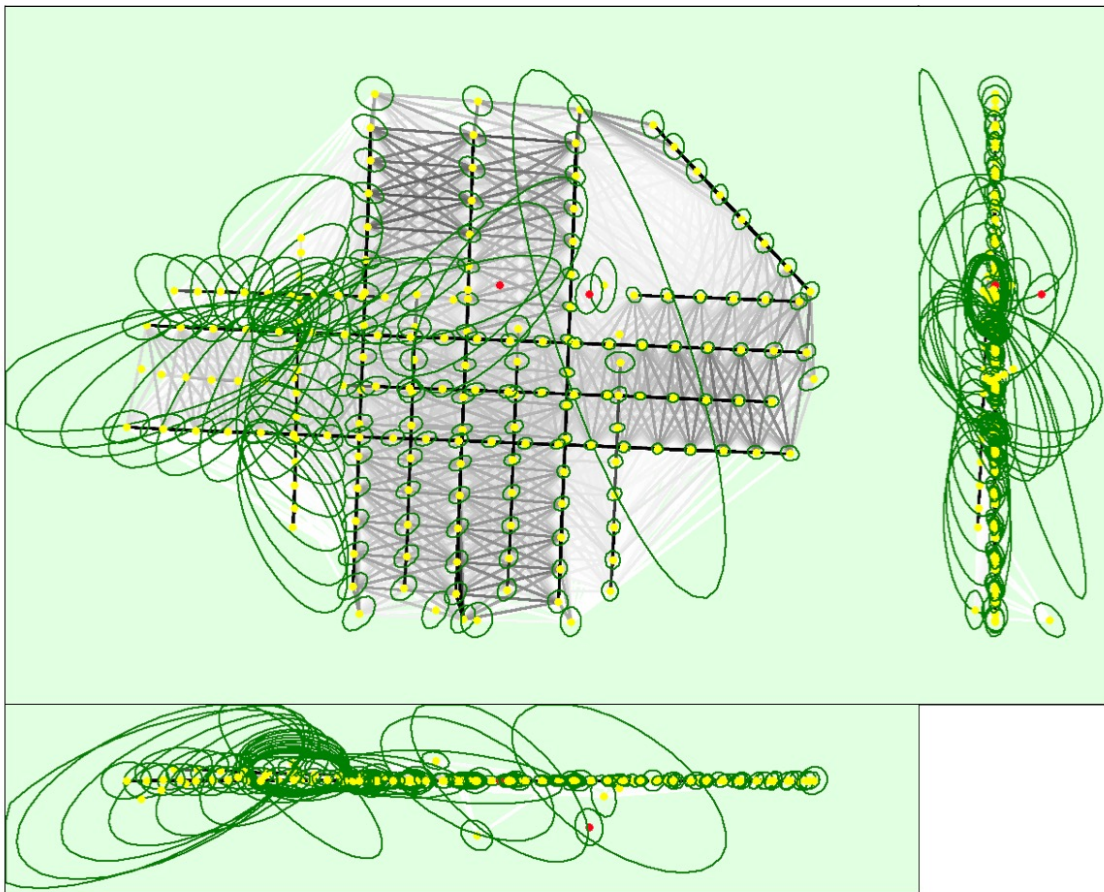
	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	45072	11727
Min	27100	184
Max	64931	18465
Mean	45916	10513

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	552658
In 3 Images	123321
In 4 Images	46732
In 5 Images	21463
In 6 Images	11098
In 7 Images	6103
In 8 Images	3552
In 9 Images	2133
In 10 Images	1297
In 11 Images	788
In 12 Images	535
In 13 Images	408
In 14 Images	291
In 15 Images	200
In 16 Images	132
In 17 Images	115
In 18 Images	67
In 19 Images	52
In 20 Images	35
In 21 Images	28
In 22 Images	19
In 23 Images	15

In 24 Images	9
In 25 Images	9
In 26 Images	5
In 27 Images	2
In 28 Images	3
In 29 Images	4
In 30 Images	3
In 31 Images	4
In 33 Images	1
In 34 Images	1
In 35 Images	1
In 36 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	0.008	0.007	0.005	0.009	0.008	0.011
Sigma	0.009	0.010	0.006	0.017	0.008	0.014

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	0.67
-0.04	-0.03	0.00	0.00	0.00
-0.03	-0.02	0.00	0.00	0.00
-0.02	-0.01	0.00	0.67	1.33
-0.01	-0.01	8.00	10.67	14.67
-0.01	0.00	38.00	37.33	32.00
0.00	0.01	52.00	44.00	32.00
0.01	0.01	2.00	7.33	15.33
0.01	0.02	0.00	0.00	3.33
0.02	0.03	0.00	0.00	0.67
0.03	0.04	0.00	0.00	0.00
0.04	-	0.00	0.00	0.00
Mean [m]		-0.000424	-0.000145	-0.000011
Sigma [m]		0.004543	0.005577	0.008012
RMS Error [m]		0.004562	0.005579	0.008012

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]	98.00	92.67	98.67	
[-2.00, 2.00]	100.00	100.00	100.00	
[-3.00, 3.00]	100.00	100.00	100.00	
Mean of Geolocation Accuracy [m]		0.010639	0.010639	0.022095
Sigma of Geolocation Accuracy [m]		0.000200	0.000200	0.000507

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

Geolocation Orientational Variance	RMS [degree]
Omega	1.946
Phi	1.690
Kappa	3.287

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 8223CL 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	09m:11s
Time for Point Cloud Classification	NA
Time for 3D Textured Mesh Generation	07m:17s

Results



Number of Generated Tiles	1
Number of 3D Densified Points	17292584
Average Density (per m ³)	1020.81

DSM, Orthomosaic and Index Details



Processing Options



DSM and Orthomosaic Resolution	1 x GSD (1.41 [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:47s
Time for Orthomosaic Generation	10m:16s
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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