Quality Report

Generated with Pix4Dmapper Pro version 4.2.26

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	Barrage-Salanfe
Processed	2018-08-22 17:42:56
Camera Model Name(s)	S.O.D.A_10.6_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	3.40 cm / 1.34 in
Area Covered	0.226 km^2 / 22.6480 ha / 0.09 sq. mi. / 55.9934 acres
Time for Initial Processing (without report)	21m:37s

Quality Check

Images	median of 52895 keypoints per image	✓
Dataset	231 out of 277 images calibrated (83%), 33 images disabled	⚠
Camera Optimization	0.42% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 12971.4 matches per calibrated image	✓
Georeferencing	yes, no 3D GCP	⚠

Preview

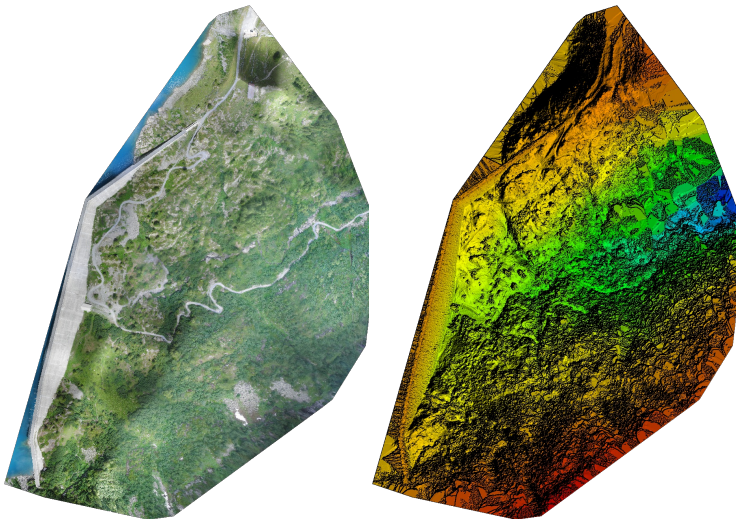


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	231 out of 310
Number of Geolocated Images	310 out of 310

Initial Image Positions

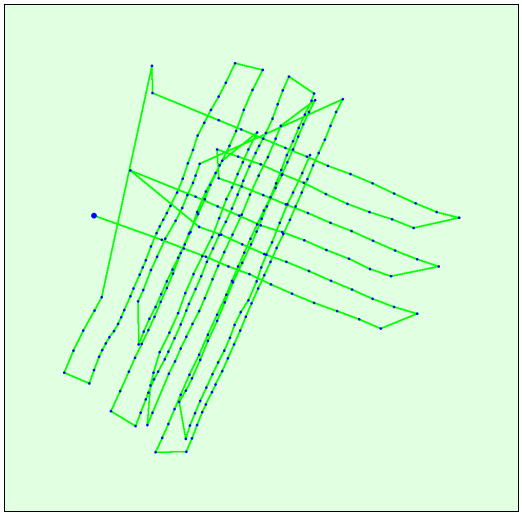
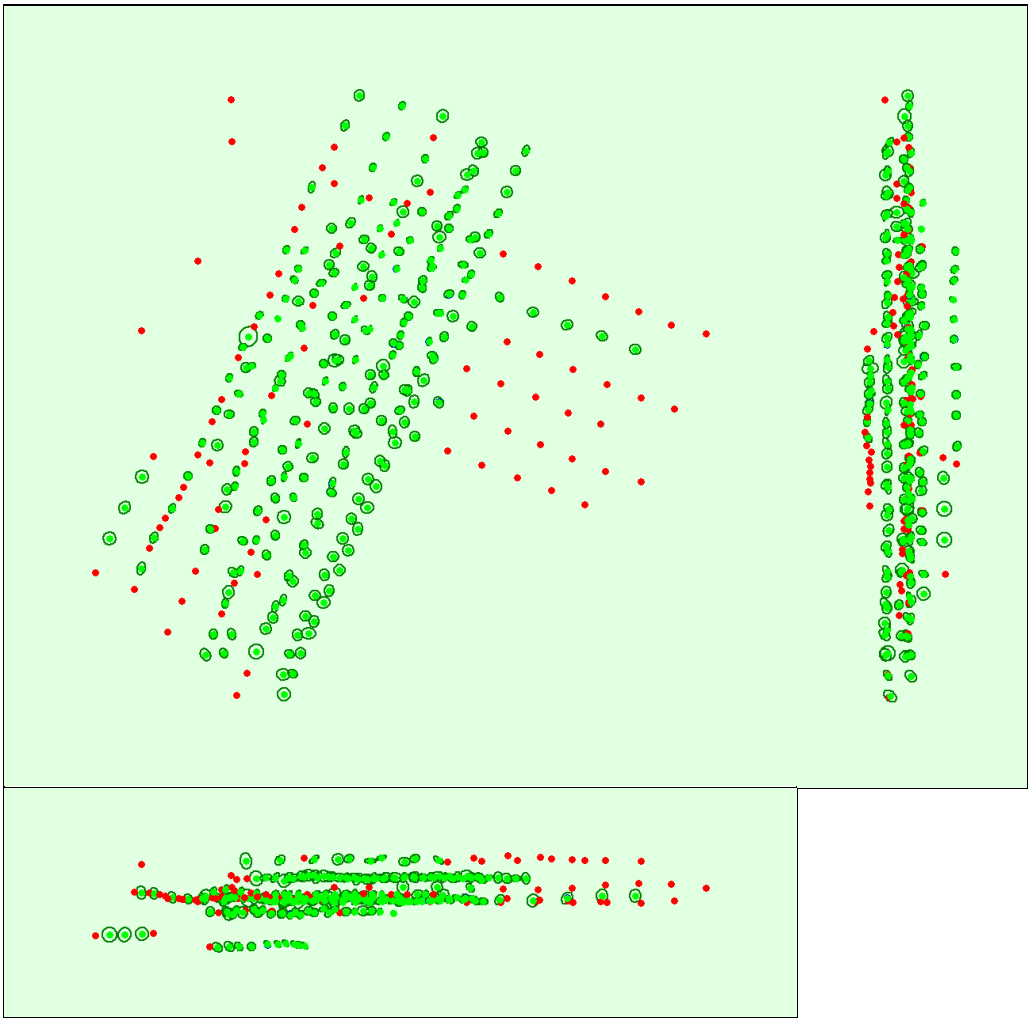


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

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	0.005	0.006	0.005	0.003	0.003	0.003
Sigma	0.001	0.001	0.001	0.001	0.001	0.002

Overlap

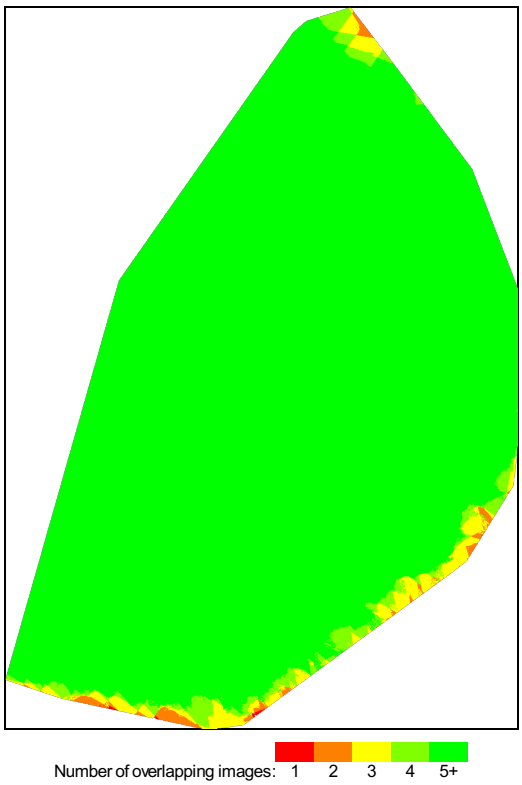


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.
Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

Bundle Block Adjustment Details

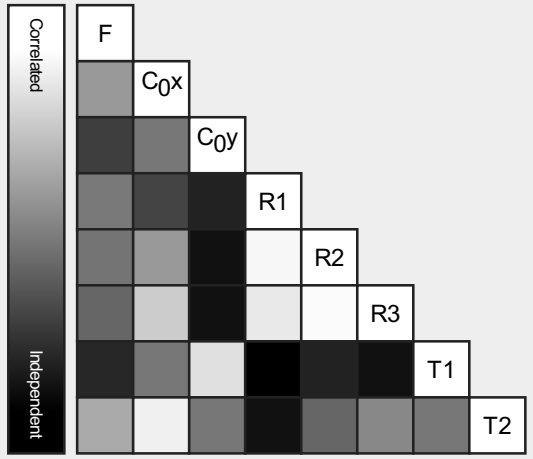
Number of 2D Keypoint Observations for Bundle Block Adjustment	3020413
Number of 3D Points for Bundle Block Adjustment	1166830
Mean Reprojection Error [pixels]	0.165

Internal Camera Parameters

S.O.D.A._10.6_5472x3648 (RGB). Sensor Dimensions: 13.133 [mm] x 8.755 [mm]

EXIF ID: S.O.D.A._10.6_5472x3648

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	4430.420 [pixel] 10.633 [mm]	2725.000 [pixel] 6.540 [mm]	1811.670 [pixel] 4.348 [mm]	0.033	-0.209	0.315	0.000	0.000
Optimized Values	4411.734 [pixel] 10.588 [mm]	2783.349 [pixel] 6.680 [mm]	1820.196 [pixel] 4.368 [mm]	0.037	-0.212	0.310	0.001	0.004
Uncertainties (Sigma)	0.075 [pixel] 0.000 [mm]	0.095 [pixel] 0.000 [mm]	0.082 [pixel] 0.000 [mm]	0.000	0.001	0.001	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	52895	12971
Min	16325	325
Max	83247	32611
Mean	51713	13075

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	843440
In 3 Images	180600
In 4 Images	66386
In 5 Images	30902
In 6 Images	16530
In 7 Images	9729
In 8 Images	5997
In 9 Images	3761
In 10 Images	2643
In 11 Images	1742
In 12 Images	1332
In 13 Images	923
In 14 Images	675
In 15 Images	508
In 16 Images	368
In 17 Images	311
In 18 Images	223
In 19 Images	182
In 20 Images	118
In 21 Images	98
In 22 Images	105
In 23 Images	64
In 24 Images	54
In 25 Images	41
In 26 Images	29
In 27 Images	23
In 28 Images	12
In 29 Images	11
In 30 Images	8
In 31 Images	6
In 32 Images	5
In 33 Images	1
In 34 Images	1
In 37 Images	1
In 38 Images	1

2D Keypoint Matches

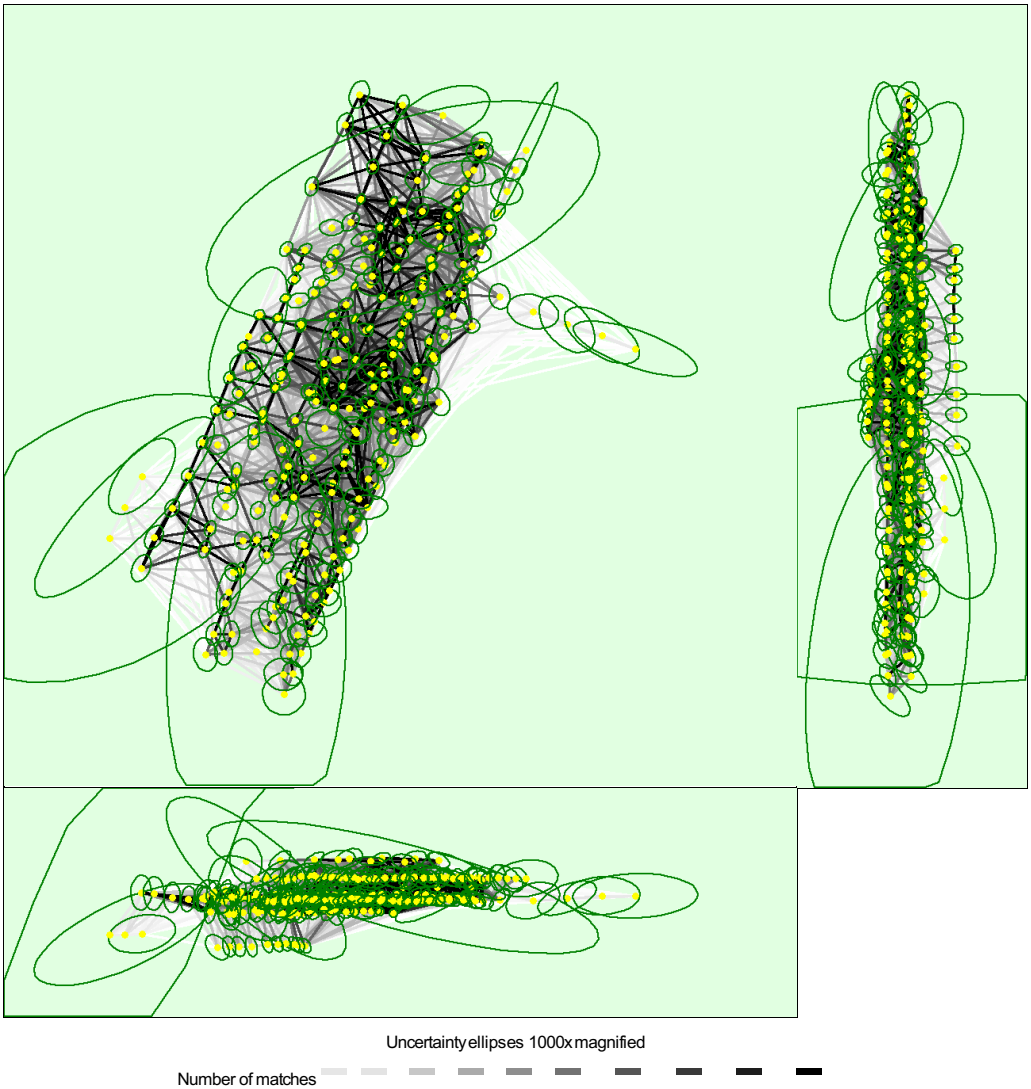


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.014	0.015	0.013	0.008	0.007	0.005
Sigma	0.022	0.023	0.031	0.010	0.011	0.007

Geolocation Details

Absolute Geolocation Variance

Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-0.06	0.00	0.00	0.00
-0.06	-0.05	0.00	0.00	0.00
-0.05	-0.04	0.43	0.00	3.46
-0.04	-0.02	3.46	3.90	5.63
-0.02	-0.01	14.29	9.96	13.85
-0.01	0.00	33.77	34.63	25.54
0.00	0.01	31.17	37.23	25.54
0.01	0.02	11.69	13.42	19.48
0.02	0.04	3.90	0.00	5.19
0.04	0.05	1.30	0.43	1.30
0.05	0.06	0.00	0.43	0.00
0.06	-	0.00	0.00	0.00
Mean [m]		-0.000262	0.000069	0.000108
Sigma [m]		0.013725	0.012168	0.016739

RMS Error [m]	0.013728	0.012168	0.016739

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]	92.64	95.24	88.74
[-2.00, 2.00]	100.00	99.57	100.00
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	0.025066	0.025066	0.026645
Sigma of Geolocation Accuracy [m]	0.002118	0.002118	0.002691

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

Geolocation Orientational Variance	RMS [degree]
Omega	35.903
Phi	49.689
Kappa	4.901

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) Core(TM) i7-7820HQ CPU @ 2.90GHz RAM: 16GB GPU: NVIDIA Quadro M2200 (Driver: 22.21.13.8205)
Operating System	Windows 10 Pro, 64-bit

Coordinate Systems

Image Coordinate System	WGS84
Output Coordinate System	WGS 84 / UTM zone 32N

Processing Options

Detected Template	No Template Available
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	no
LOD	Generated: no
Advanced: Image Groups	group1
Advanced: Use Processing Area	yes
Advanced: Use Annotations	yes
Time for Point Cloud Densification	01h:05m:52s
Time for Point Cloud Classification	06m:06s
Time for 3D Textured Mesh Generation	NA

Results

Number of Processed Clusters	2

Number of Generated Tiles	1
Number of 3D Densified Points	21022311
Average Density (per m^3)	59.92