Quality Report

Generated with PIX4Dmapper version 4.8.4

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	Charnay_MT
Processed	2024-02-15 09:53:54
Camera Model Name(s)	FC6310R_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	1.14 cm / 0.45 in
Time for Initial Processing (without report)	44m:28s

Quality Check

Images	median of 56225 keypoints per image	✓
Dataset	363 out of 363 images calibrated (100%), all images enabled	✓
Camera Optimization	0.87% relative difference between initial and optimized internal camera parameters	✓
Matching	median of 30337.9 matches per calibrated image	✓
Georeferencing	yes, 5 GCPs (5 3D), mean RMS error = 0.059 m	⚠

Calibration Details

Number of Calibrated Images	363 out of 363
Number of Geolocated Images	363 out of 363

Initial Image Positions

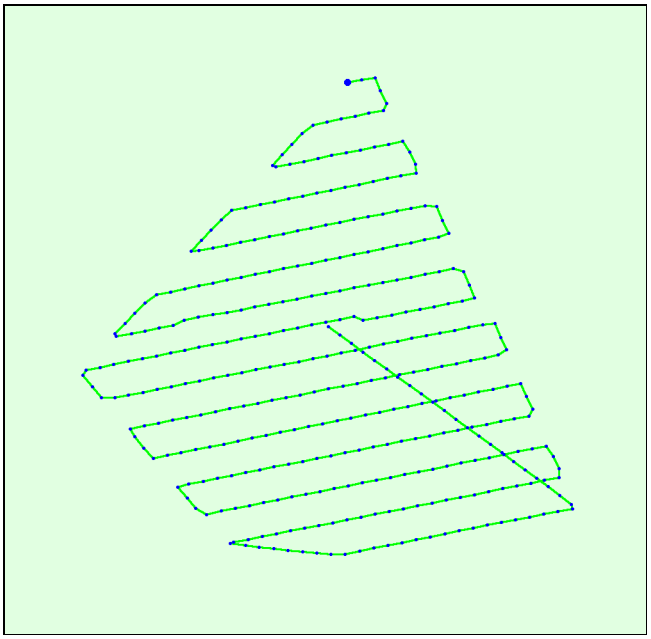
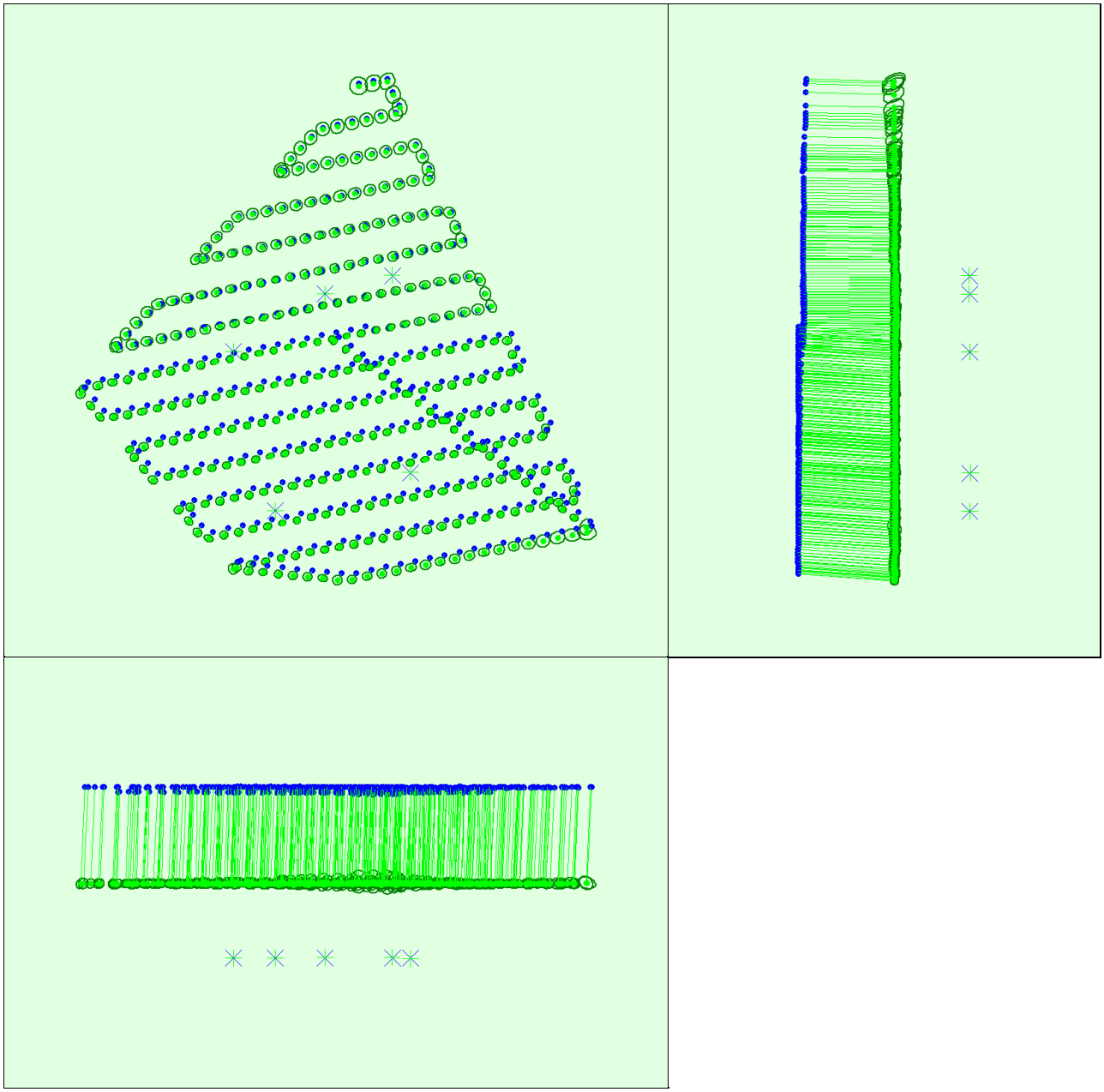


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 500x 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). 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	0.005	0.005	0.005	0.006	0.002
Sigma	0.001	0.001	0.001	0.002	0.002	0.001

Bundle Block Adjustment Details

Number of 2D Keypoint Observations for Bundle Block Adjustment	11348494

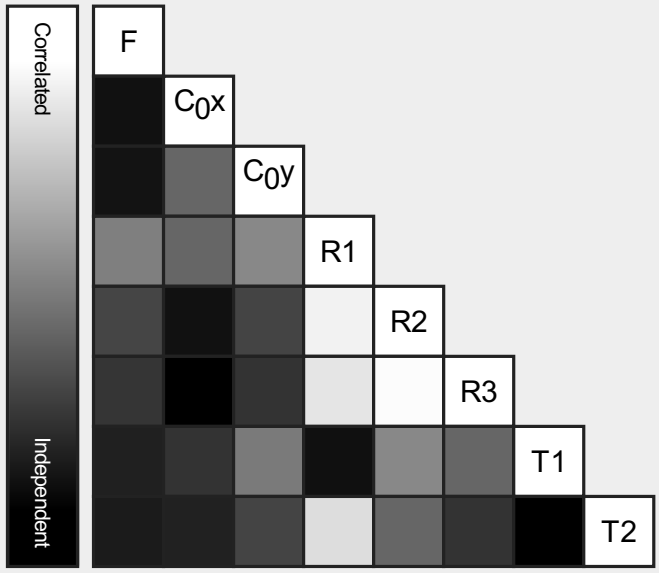
Number of 3D Points for Bundle Block Adjustment	3537527
Mean Reprojection Error [pixels]	0.130

Internal Camera Parameters

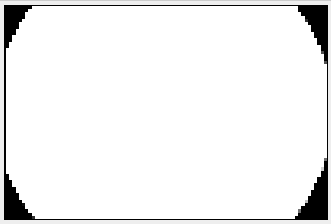
FC6310R_8.8_5472x3648 (RGB). Sensor Dimensions: 12.833 [mm] x 8.556 [mm]

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	3690.328 [pixel] 8.655 [mm]	2697.041 [pixel] 6.325 [mm]	1799.535 [pixel] 4.220 [mm]	-0.285	0.128	-0.037	0.000	-0.000
Uncertainties (Sigma)	0.228 [pixel] 0.001 [mm]	0.080 [pixel] 0.000 [mm]	0.063 [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

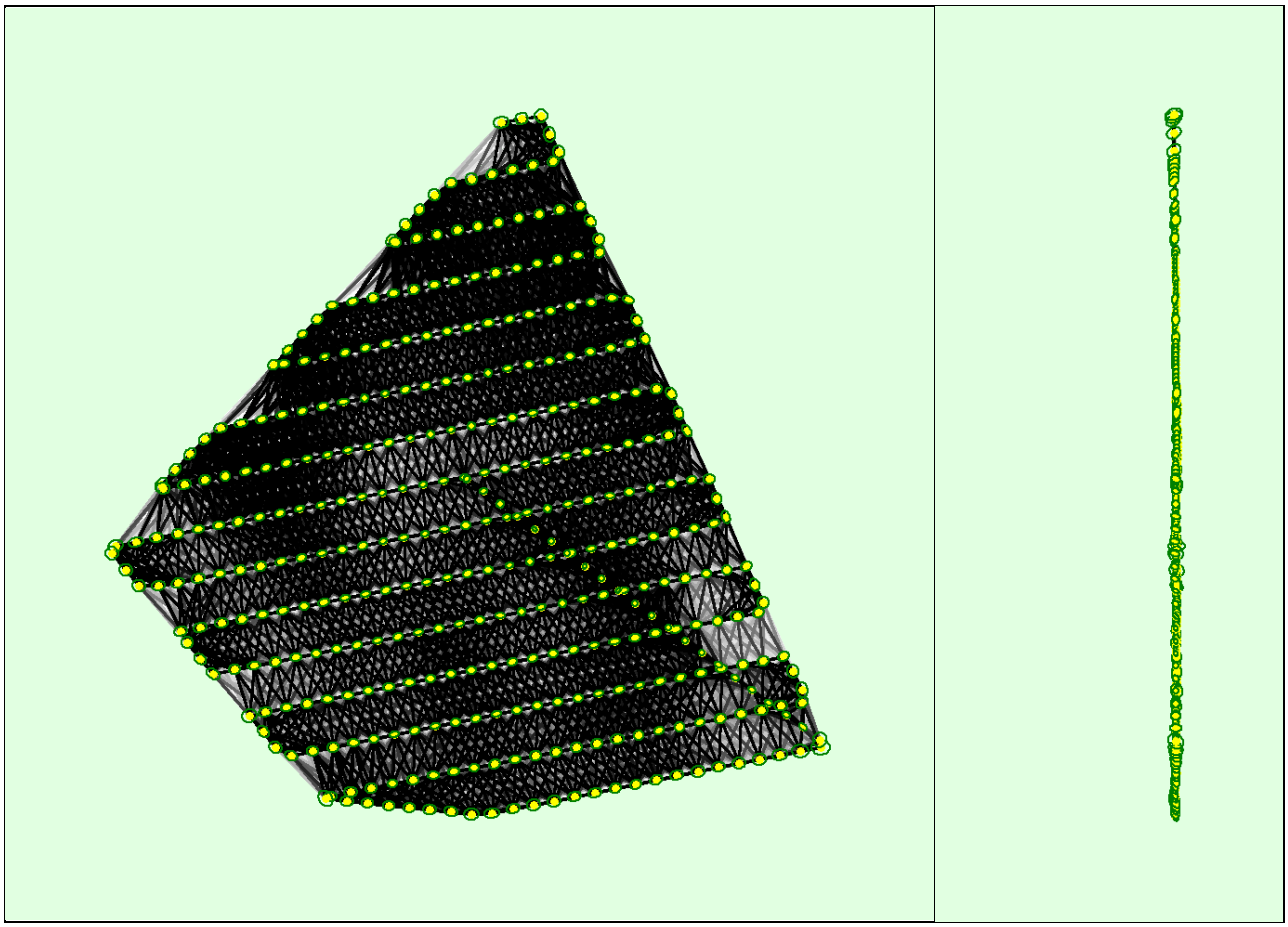
	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	56225	30338
Min	36151	10163
Max	74979	52050
Mean	55231	31263

3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	1996282
In 3 Images	664257
In 4 Images	318407
In 5 Images	182171
In 6 Images	110865
In 7 Images	74499

In 8 Images	52985
In 9 Images	38853
In 10 Images	28674
In 11 Images	20521
In 12 Images	14747
In 13 Images	10668
In 14 Images	7764
In 15 Images	5696
In 16 Images	3991
In 17 Images	2679
In 18 Images	1709
In 19 Images	1114
In 20 Images	718
In 21 Images	417
In 22 Images	244
In 23 Images	130
In 24 Images	64
In 25 Images	45
In 26 Images	18
In 27 Images	4
In 28 Images	3
In 29 Images	2

2D Keypoint Matches



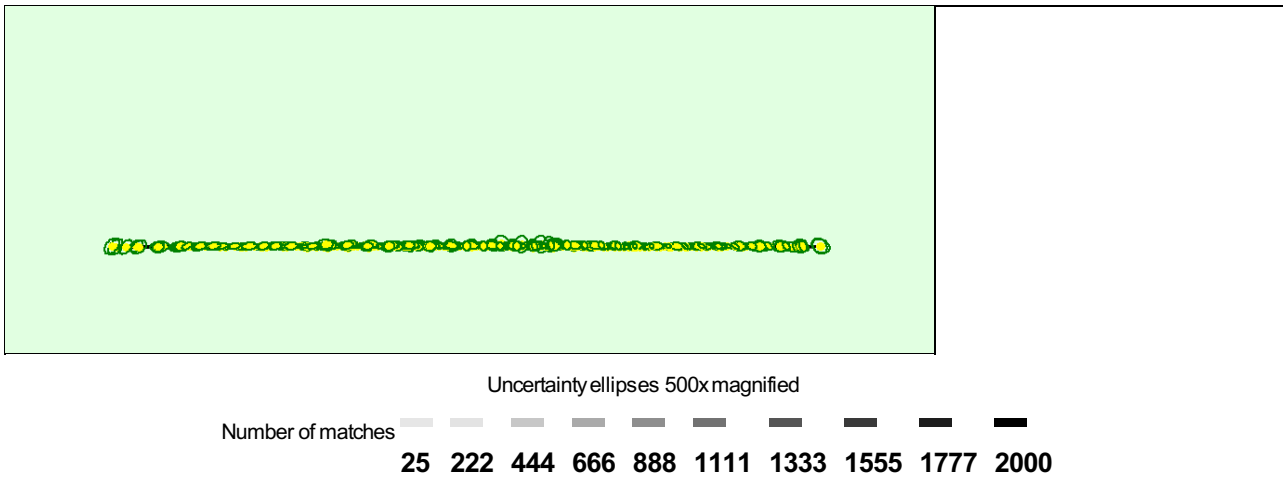


Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty 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	0.004	0.003	0.002	0.005	0.006	0.002
Sigma	0.001	0.001	0.001	0.001	0.001	0.001

Geolocation Details

Ground Control Points

GCP Name	Accuracy XY/Z [m]	Error X [m]	Error Y [m]	Error Z [m]	Projection Error [pixel]	Verified/Marked
rone2 (3D)	0.020/ 0.020	-0.033	-0.067	0.141	0.586	3 / 3
rone33 (3D)	0.020/ 0.020	0.044	-0.012	-0.134	0.280	3 / 3
rone4 (3D)	0.020/ 0.020	0.037	0.027	-0.109	0.396	3 / 3
rone5 (3D)	0.020/ 0.020	0.011	0.012	-0.036	0.103	3 / 3
rone1 (3D)	0.020/ 0.020	-0.057	0.001	0.087	0.296	3 / 3
Mean [m]		0.000341	-0.007896	-0.010124		
Sigma [m]		0.039480	0.032067	0.107751		
RMS Error [m]		0.039482	0.033025	0.108226		

Localisation accuracy per GCP and mean errors in the three coordinate directions. The last column counts the number of calibrated images where the GCP has been automatically verified vs. manually marked.

Absolute Geolocation Variance

Min Error [m]	Max Error [m]	Geolocation Error X [%]	Geolocation Error Y [%]	Geolocation Error Z [%]
-	-8.19	0.00	0.00	0.00
-8.19	-6.55	0.00	0.00	0.00
-6.55	-4.91	0.00	0.00	0.00
-4.91	-3.27	0.00	17.08	3.58
-3.27	-1.64	20.11	17.63	31.13
-1.64	0.00	40.77	33.88	27.55
0.00	1.64	39.12	31.40	37.74
1.64	3.27	0.00	0.00	0.00

3.27	4.91	0.00	0.00	0.00
4.91	6.55	0.00	0.00	0.00
6.55	8.19	0.00	0.00	0.00
8.19	-	0.00	0.00	0.00
Mean [m]		1.503051	2.416823	49.229288
Sigma [m]		0.933642	1.528898	1.355199
RMS Error [m]		1.769421	2.859818	49.247937

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.

Geolocation Bias	X	Y	Z
Translation [m]	2.108081	3.580807	50.245695

Bias between image initial and computed geolocation given in output coordinate system.

Relative Geolocation Variance

Relative Geolocation Error	Images X [%]	Images Y [%]	Images Z [%]
[-1.00, 1.00]	32.51	21.49	19.28
[-2.00, 2.00]	58.40	43.25	39.39
[-3.00, 3.00]	67.77	58.95	54.82
Mean of Geolocation Accuracy [m]	0.190903	0.190903	0.252405
Sigma of Geolocation Accuracy [m]	0.319765	0.319765	0.524382

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

Geolocation Orientational Variance	RMS [degree]
Omega	0.858
Phi	0.725
Kappa	1.259

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: 13th Gen Intel(R) Core(TM) i7-13800H RAM: 64GB GPU: Intel(R) Iris(R) Xe Graphics (Driver: 31.0.101.4887)
Operating System	Windows 11, 64-bit

Coordinate Systems

Image Coordinate System	WGS 84
Ground Control Point (GCP) Coordinate System	RGF93 v1 / CC47
Output Coordinate System	RGF93 v1 / CC47

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