

- !** **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 **i**

Project	Assignment
Processed	2020-12-19 12:53:57
Camera Model Name(s)	FC6310_8.8_5472x3648 (RGB)
Average Ground Sampling Distance (GSD)	2.73 cm / 1.07 in
Area Covered	0.053 km ² / 5.2678 ha / 0.02 sq. mi. / 13.0237 acres

Quality Check **i**

? Images	median of 53186 keypoints per image	✓
? Dataset	48 out of 48 images calibrated (100%), all images enabled	✓
? Camera Optimization	2.38% relative difference between initial and optimized internal camera parameters	✓
? Matching	median of 13274.5 matches per calibrated image	✓
? Georeferencing	yes, 3 GCPs (3 3D), mean RMS error = 0 m	✓

? Preview **i**

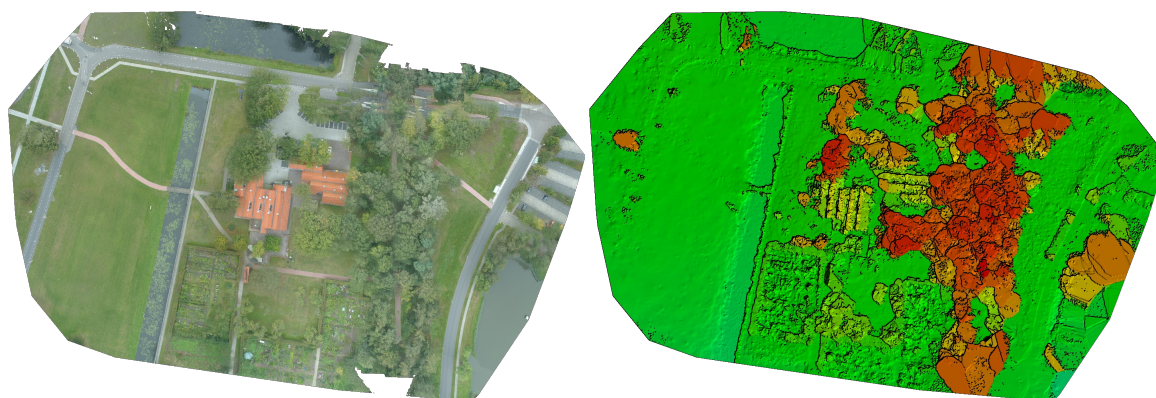


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details **i**

Number of Calibrated Images	48 out of 48
Number of Geolocated Images	48 out of 48

? Initial Image Positions **i**

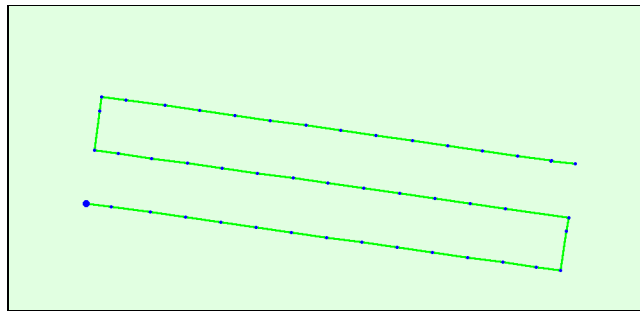
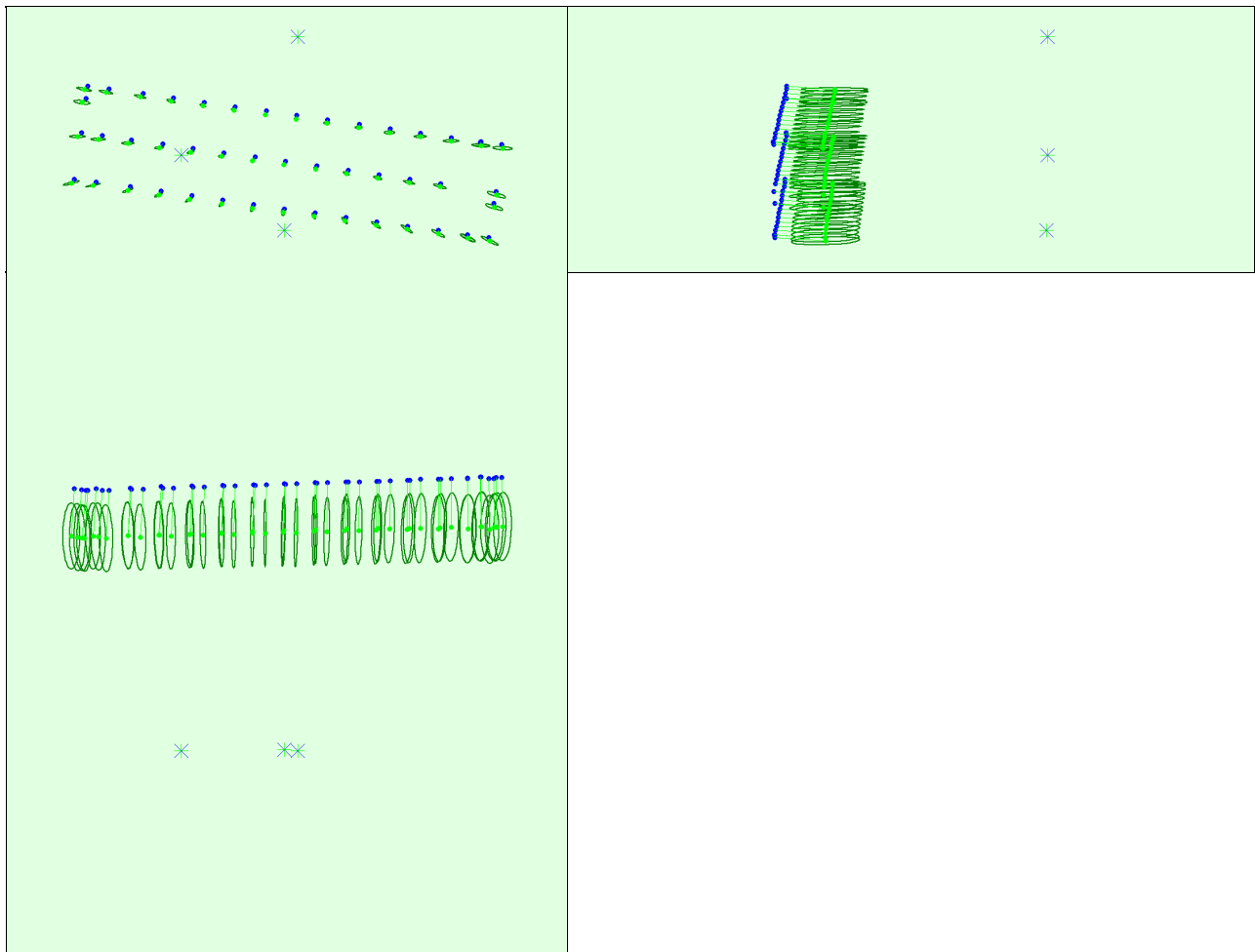


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions



Uncertainty ellipses 100x 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	0.024	0.010	0.158	0.005	0.013	0.001
Sigma	0.012	0.005	0.002	0.003	0.007	0.000

Overlap



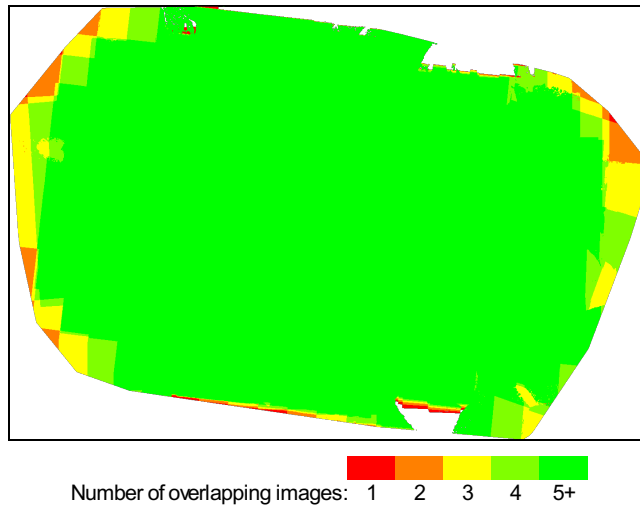


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic. Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint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

Bundle Block Adjustment Details

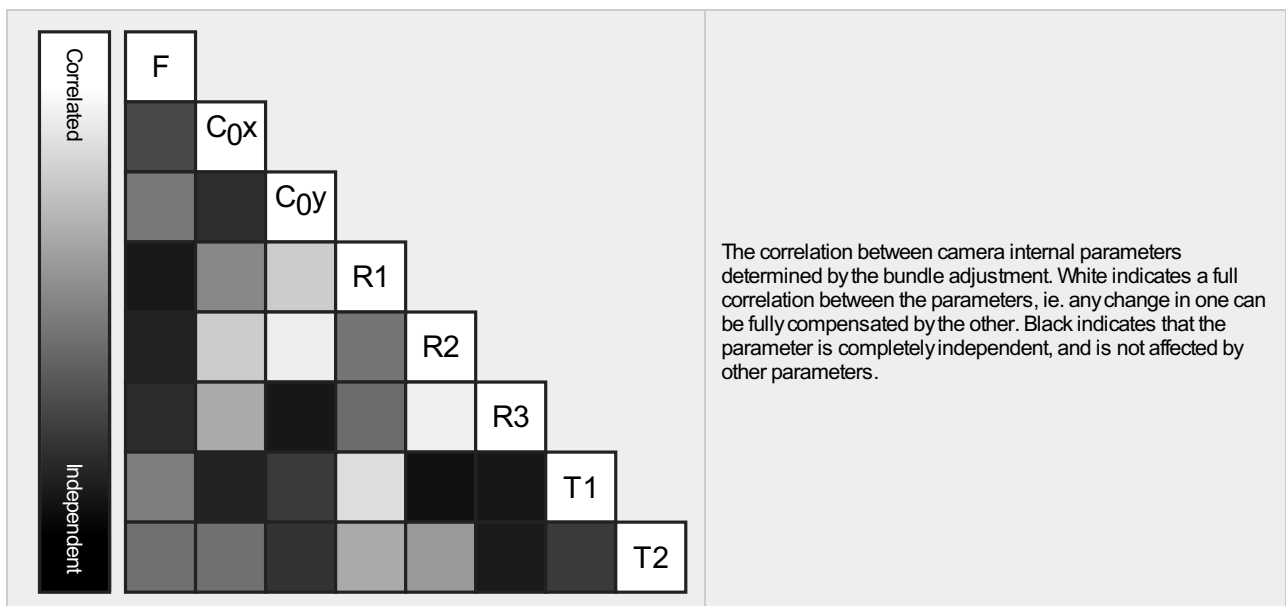
Number of 2D Keypoint Observations for Bundle Block Adjustment	685590
Number of 3D Points for Bundle Block Adjustment	233101
Mean Reprojection Error [pixels]	0.164

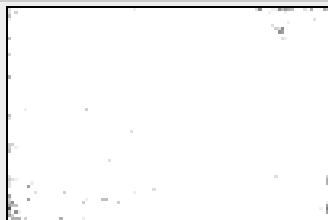
Internal Camera Parameters

FC6310_8.8_5472x3648 (RGB). Sensor Dimensions: 12.833 [mm] x 8.556 [mm]

EXIF ID: FC6310S_8.8_5472x3648

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	3668.760 [pixel] 8.604 [mm]	2736.000 [pixel] 6.417 [mm]	1824.000 [pixel] 4.278 [mm]	0.003	-0.008	0.008	-0.000	0.000
Optimized Values	3756.235 [pixel] 8.809 [mm]	2720.352 [pixel] 6.380 [mm]	1805.833 [pixel] 4.235 [mm]	-0.013	0.007	0.004	-0.002	-0.002
Uncertainties (Sigma)	5.830 [pixel] 0.014 [mm]	0.087 [pixel] 0.000 [mm]	0.064 [pixel] 0.000 [mm]	0.000	0.000	0.000	0.000	0.000





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 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



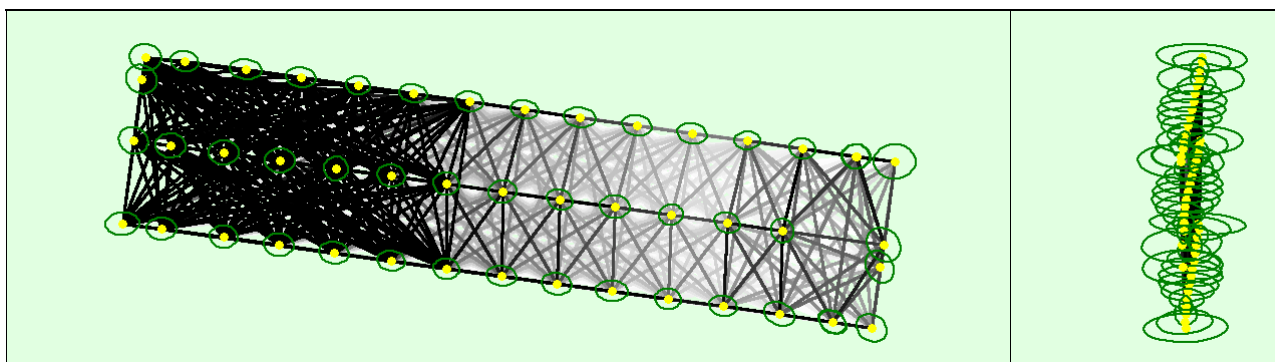
	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	53186	13275
Mn	20896	5208
Max	73712	31197
Mean	49808	14283

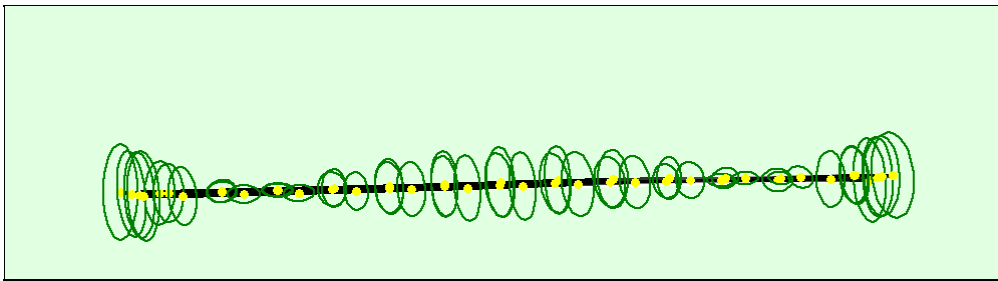
3D Points from 2D Keypoint Matches



	Number of 3D Points Observed
In 2 Images	173896
In 3 Images	23581
In 4 Images	10362
In 5 Images	6087
In 6 Images	4210
In 7 Images	2906
In 8 Images	2031
In 9 Images	1676
In 10 Images	1409
In 11 Images	1245
In 12 Images	964
In 13 Images	821
In 14 Images	625
In 15 Images	532
In 16 Images	514
In 17 Images	442
In 18 Images	425
In 19 Images	380
In 20 Images	342
In 21 Images	357
In 22 Images	274
In 23 Images	19
In 24 Images	3

2D Keypoint Matches





Uncertainty ellipses 1000x magnified



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	0.007	0.005	0.014	0.001
Sigma	0.000	0.000	0.003	0.003	0.007	0.000

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
GPS0008 (3D)	0.005/ 0.005	-0.001	-0.000	0.000	0.051	12 / 12
GPS0004 (3D)	0.005/ 0.005	0.000	0.000	0.000	0.026	22 / 22
GPS0002 (3D)	0.005/ 0.005	0.000	-0.001	-0.002	0.023	18 / 18
Mean [m]		-0.000079	-0.000213	-0.000450		
Sigma [m]		0.000470	0.000657	0.000843		
RMS Error [m]		0.000476	0.000691	0.000955		

0 out of 2 check points have been labeled as inaccurate.

Check Point Name	Accuracy XY/Z [m]	Error X[m]	Error Y[m]	Error Z[m]	Projection Error [pixel]	Verified/Marked
GPS0006		0.0004	0.0007	-0.0236	0.0390	22 / 22
GPS0012		-0.0008	0.0009	0.1007	0.0494	20 / 20
Mean [m]		-0.000219	0.000808	0.038553		
Sigma [m]		0.000615	0.000131	0.062195		
RMS Error [m]		0.000653	0.000819	0.073175		

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

Mn Error [m]	Max Error [m]	Geolocation Error X[%]	Geolocation Error Y[%]	Geolocation Error Z[%]
-	-15.00	0.00	0.00	0.00
-15.00	-12.00	0.00	0.00	0.00
-12.00	-9.00	0.00	0.00	0.00
-9.00	-6.00	0.00	0.00	0.00
-6.00	-3.00	0.00	0.00	0.00
-3.00	0.00	54.17	50.00	43.75

0.00	3.00	45.83	50.00	56.25
3.00	6.00	0.00	0.00	0.00
6.00	9.00	0.00	0.00	0.00
9.00	12.00	0.00	0.00	0.00
12.00	15.00	0.00	0.00	0.00
15.00	-	0.00	0.00	0.00
Mean [m]		0.609284	1.623670	22.561186
Sigma [m]		0.629383	0.087945	0.500762
RMS Error [m]		0.875985	1.626050	22.566743

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]	0.609284	1.623670	22.561186

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]	100.00	100.00	100.00
[-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]	5.000000	5.000000	10.000000
Sigma of Geolocation Accuracy [m]	0.000000	0.000000	0.000000

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

Geolocation Orientational Variance	RMS [degree]
Omega	0.519
Phi	0.356
Kappa	2.448

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) i7-4702MQ CPU @ 2.20GHz RAM: 16GB GPU: Intel(R) HD Graphics 4600 (Driver: 10.18.15.4248)
Operating System	Windows 10 Pro, 64-bit

Coordinate Systems

Image Coordinate System	WGS 84 (EGM96 Geoid)
Ground Control Point (GCP) Coordinate System	Amersfoort / RD New (EGM96 Geoid)
Output Coordinate System	Amersfoort / RD New (EGM96 Geoid)

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