

ARCHIVO DE EJEMPLO DE VALIDACIÓN DE RESULTADOS
TECNOLOGÍA RPAS CON MÓDULO GNSS ATYGES PPK/RTK V2.0



PROCESADO MEDIANTE EL SISTEMA ATYGES TOPODRON




[Pulse en este enlace para ver la ortofoto \(modelo 2D\), el modelo 3D y la nube de puntos realizada](#)


Si desea más información, ejemplos o set de imágenes póngase en contacto con nosotros a través de uav@atyges.es


Quality Report



Generated with Pix4Denterprise version 4.2.25

 **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	Ejemplo ATyges RTK/PPK v2
Processed	2018-05-09 21:50:21
Camera Model Name(s)	ATyges CAM_6000x4000 (RGB)
Average Ground Sampling Distance (GSD)	2.34 cm / 0.92 in
Area Covered	0.231 km ² / 23.1437 ha / 0.09 sq. mi. / 57.2189 acres
Time for Initial Processing (without report)	38m:00s

Quality Check



 Images	median of 77287 keypoints per image	
 Dataset	214 out of 214 images calibrated (100%), all images enabled	
 Camera Optimization	1.11% relative difference between initial and optimized internal camera parameters	
 Matching	median of 43350.4 matches per calibrated image	
 Georeferencing	yes, no 3D GCP	

Preview



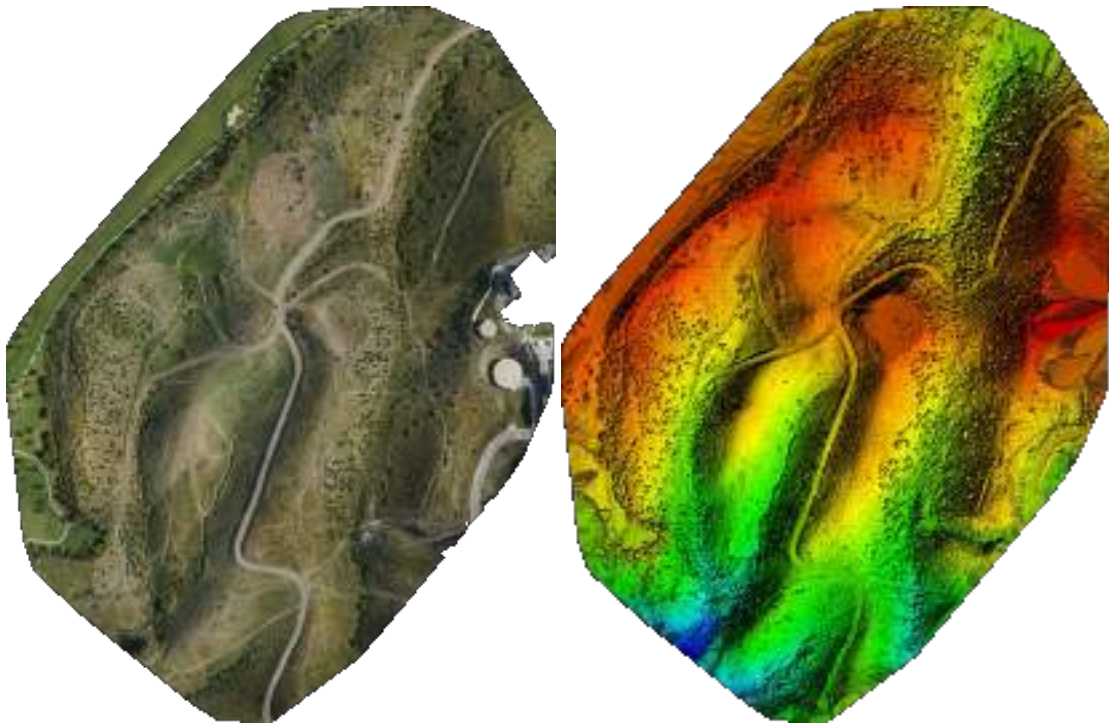


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details

Number of Calibrated Images	214 out of 214
Number of Geolocated Images	214 out of 214

Initial Image Positions

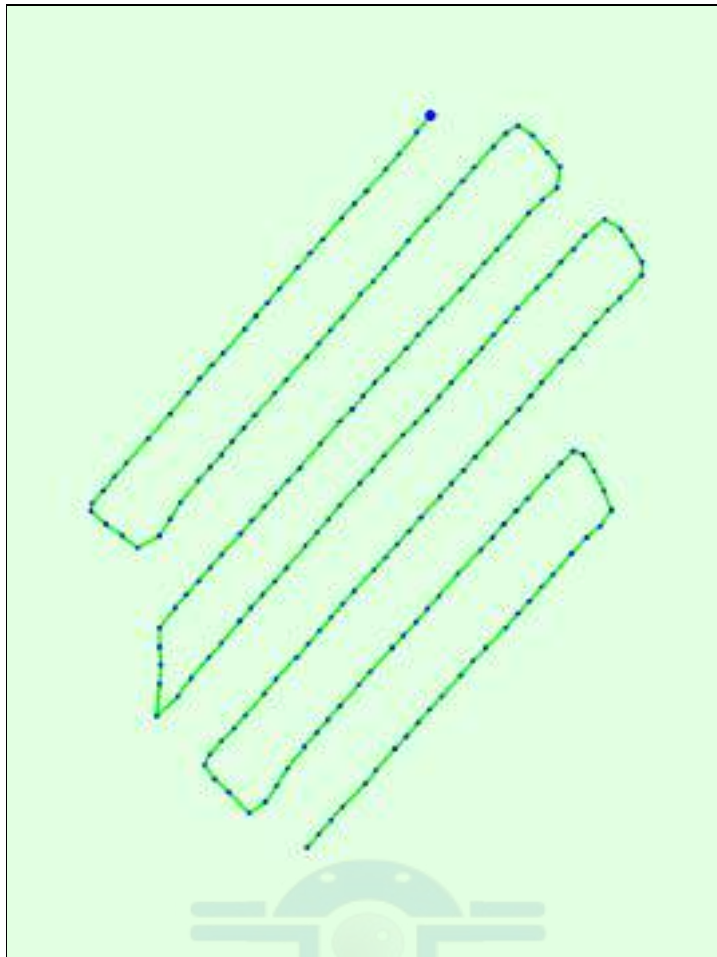
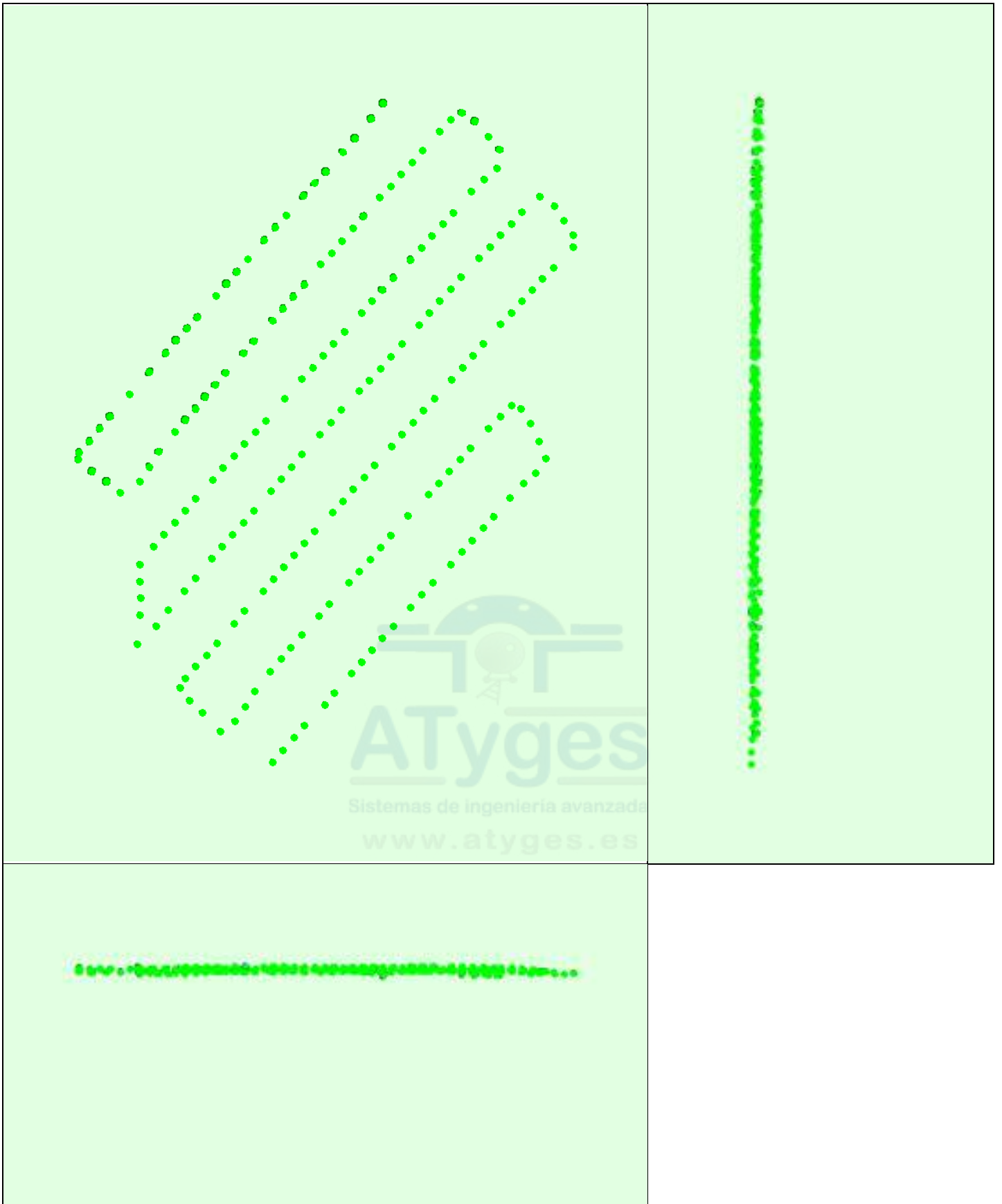


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

🔍 **Computed Image/GCPs/Manual Tie Points Positions**



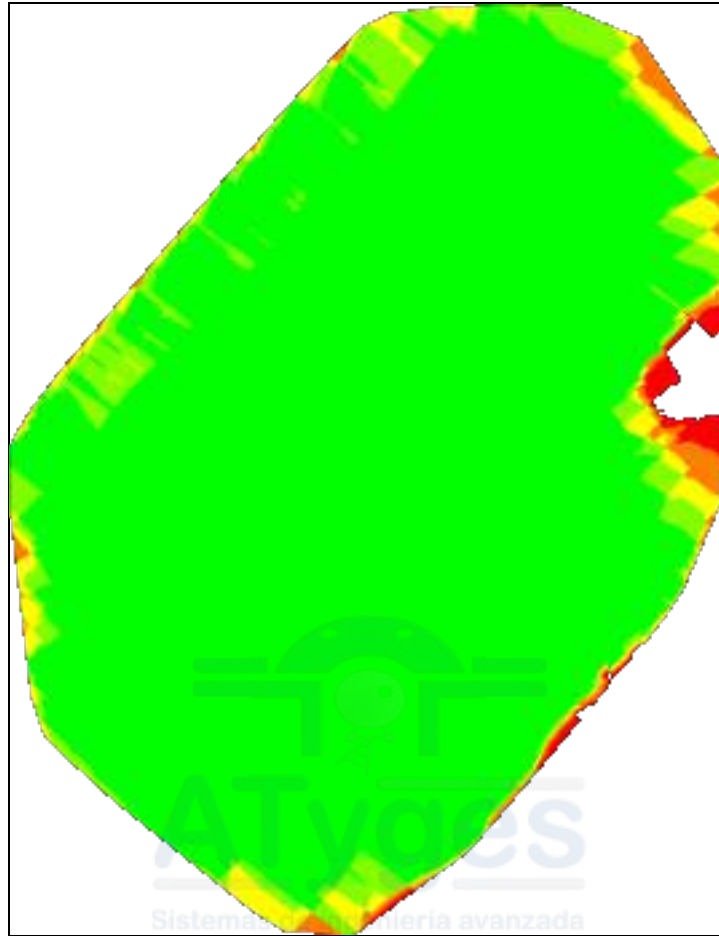


Uncertainty ellipses 1000x magnified

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). Dark green ellipses indicate the absolute position uncertainty of the bundle block adjustment result.

	X [m]	Y [m]	Z [m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.002	0.002	0.002	0.002	0.002	0.001
Sigma	0.000	0.000	0.000	0.000	0.000	0.000

Overlap



Number of overlapping images: 1 2 3 4 5+

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	9164301
Number of 3D Points for Bundle Block Adjustment	3073442
Mean Reprojection Error [pixels]	0.156

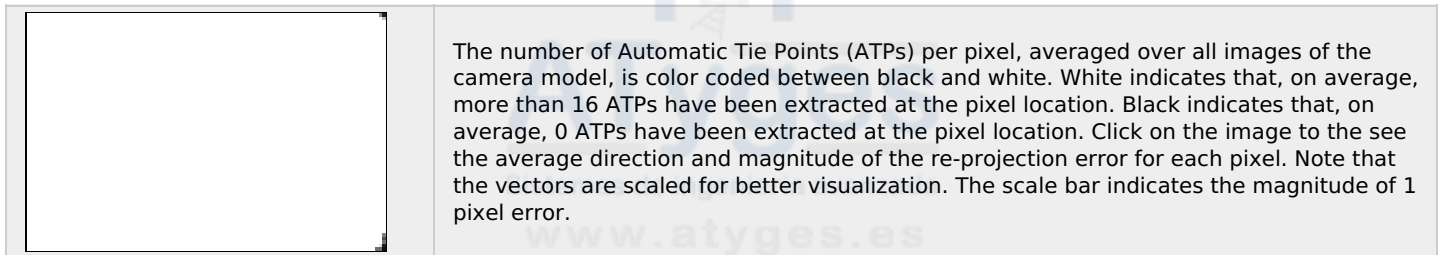
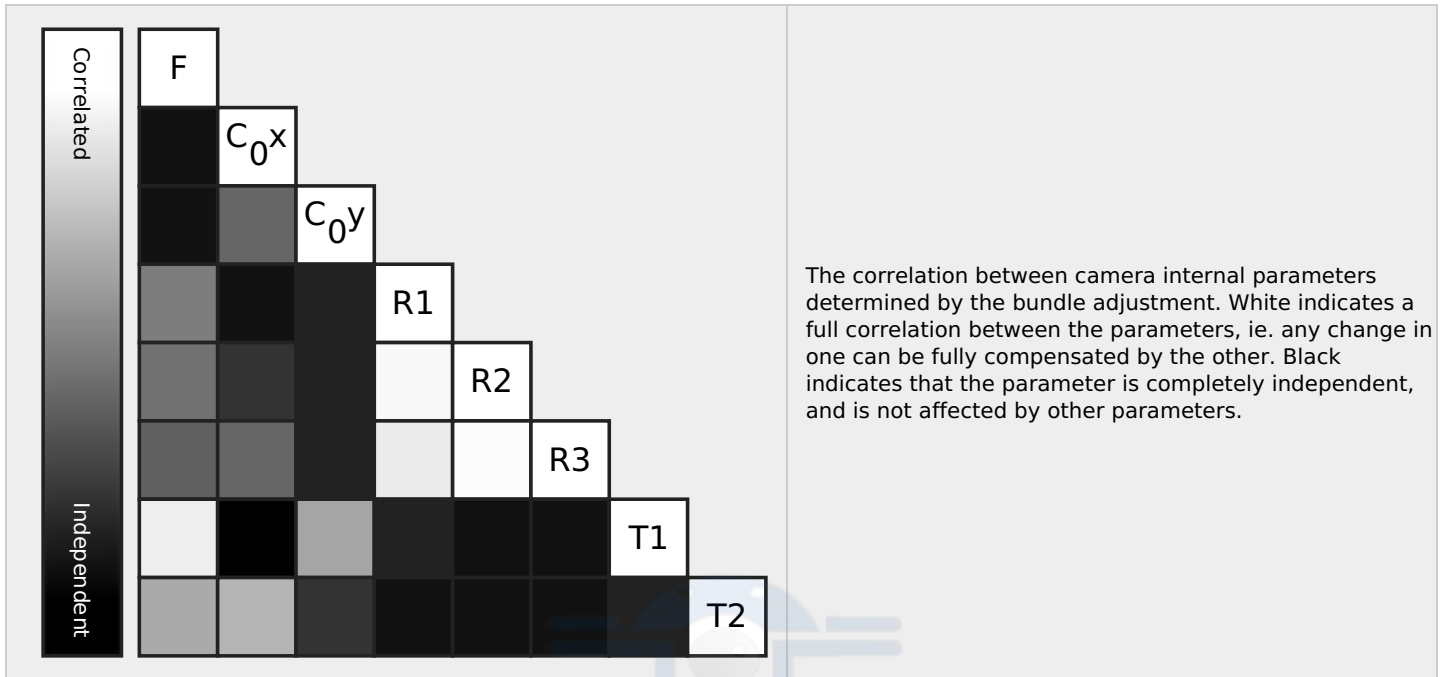
Internal Camera Parameters

ATyges CAM_6000x4000 (RGB). Sensor Dimensions: 23.333 [mm] x 15.556 [mm]



EXIF ID: ATyges CAM_6000x4000

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	4114.286 [pixel] 16.000 [mm]	3000.000 [pixel] 11.667 [mm]	2000.000 [pixel] 7.778 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	4068.279 [pixel] 15.821 [mm]	2969.945 [pixel] 11.550 [mm]	1966.194 [pixel] 7.646 [mm]	-0.068	0.102	0.003	-0.001	-0.001
Uncertainties (Sigma)	0.077 [pixel] 0.000 [mm]	0.075 [pixel] 0.000 [mm]	0.063 [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	77287	43350
Min	51780	6807
Max	85613	55471
Mean	76297	42824

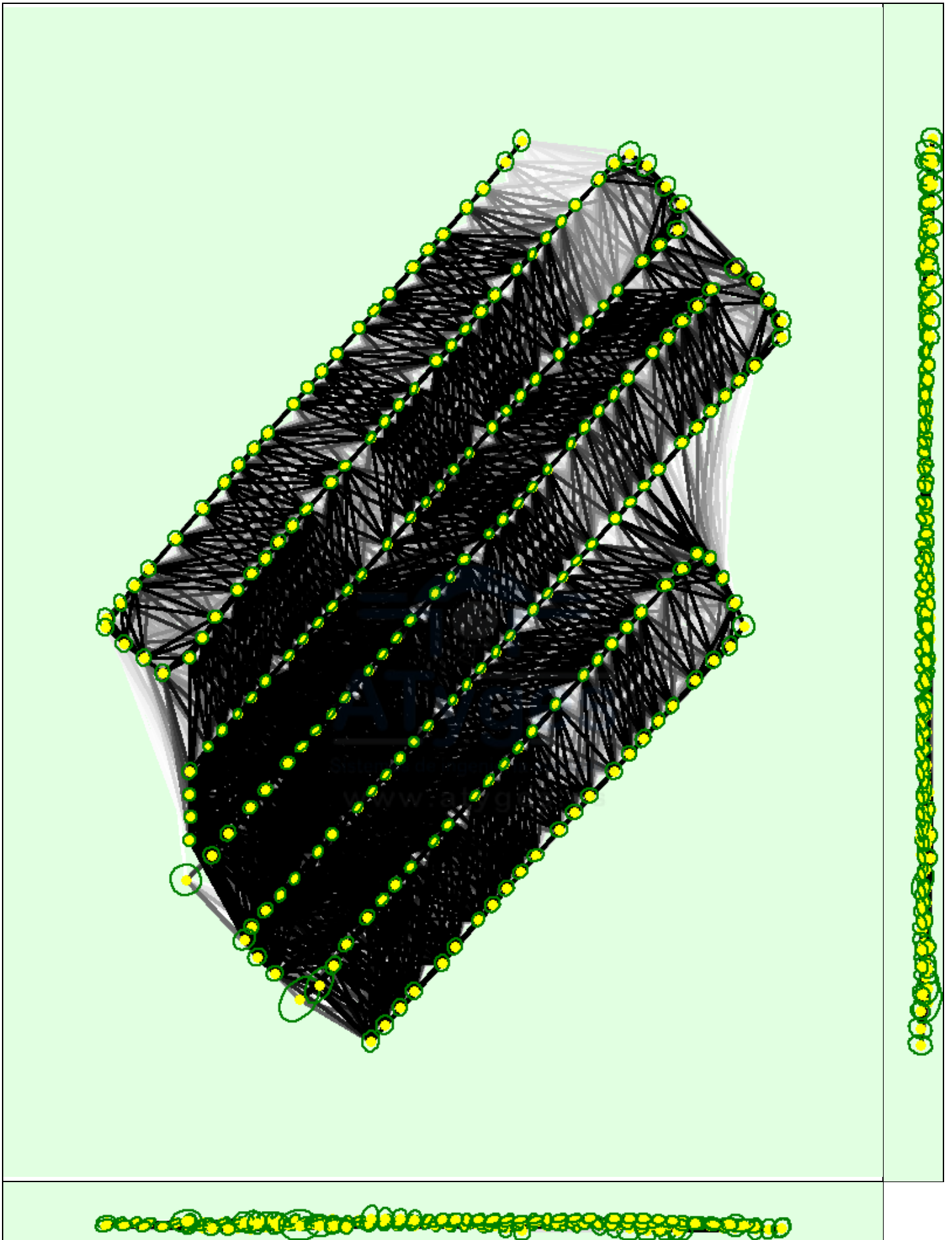
3D Points from 2D Keypoint Matches

	Number of 3D Points Observed
In 2 Images	1905601
In 3 Images	555617
In 4 Images	245274
In 5 Images	132131
In 6 Images	76723
In 7 Images	43530
In 8 Images	27260
In 9 Images	19912

In 10 Images	16219
In 11 Images	12305
In 12 Images	9257
In 13 Images	6938
In 14 Images	4935
In 15 Images	4030
In 16 Images	3213
In 17 Images	2731
In 18 Images	2229
In 19 Images	1777
In 20 Images	1305
In 21 Images	825
In 22 Images	543
In 23 Images	353
In 24 Images	271
In 25 Images	195
In 26 Images	130
In 27 Images	66
In 28 Images	44
In 29 Images	25
In 30 Images	3

🔍 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	0.008	0.007	0.006	0.006	0.003
Sigma	0.002	0.002	0.003	0.002	0.002	0.001

Geolocation Details



Ground Control Points



0 out of 12 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
1		-0.028	0.015	0.062	0.484	6 / 6
2		-0.024	-0.010	0.018	0.346	4 / 4
3		-0.015	-0.003	0.016	0.443	10 / 10
4		0.013	0.074	0.032	0.614	6 / 6
5		0.015	0.032	-0.043	0.633	6 / 6
6		0.020	0.029	0.036	0.337	5 / 5
7		-0.025	0.072	-0.013	0.673	5 / 5
11		-0.007	-0.011	-0.017	0.554	8 / 8
12		0.036	-0.029	-0.033	0.524	5 / 5
13		0.022	-0.017	0.023	0.382	7 / 7
14		-0.014	0.012	0.000	0.190	5 / 5
15		-0.004	0.007	-0.008	1.105	4 / 4
Mean [m]		-0.000964	0.014472	0.006174		
Sigma [m]		0.020358	0.031332	0.029131		
RMS Error [m]		0.020381	0.034513	0.029778		

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 [%]
-	-0.04	0.00	0.00	0.93
-0.04	-0.03	0.00	0.00	2.34
-0.03	-0.03	0.00	0.00	4.67
-0.03	-0.02	2.80	0.47	7.48
-0.02	-0.01	3.27	3.74	13.08
-0.01	0.00	45.33	46.26	23.83
0.00	0.01	42.06	40.65	18.22
0.01	0.02	5.61	7.48	14.49
0.02	0.03	0.93	0.93	7.01

0.03	0.03	0.00	0.47	1.87
0.03	0.04	0.00	0.00	0.93
0.04	-	0.00	0.00	5.14
Mean [m]		-0.000227	0.000654	0.001491
Sigma [m]		0.006038	0.006186	0.021620
RMS Error [m]		0.006042	0.006221	0.021671

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]	94.39	95.33	65.42
[-2.00, 2.00]	99.53	99.53	92.06
[-3.00, 3.00]	100.00	100.00	99.07
Mean of Geolocation Accuracy [m]	0.010821	0.010821	0.016977
Sigma of Geolocation Accuracy [m]	0.002097	0.002097	0.004090

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

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 3.13.0-145-generic x86_64

Coordinate Systems

Image Coordinate System	WGS84
Output Coordinate System	ETRS89 / UTM zone 30N

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	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:24s
Time for Point Cloud Classification	02m:18s
Time for 3D Textured Mesh Generation	13m:30s

Results



Number of Generated Tiles	4
Number of 3D Densified Points	35712864
Average Density (per m ³)	225.51

DSM, Orthomosaic and Index Details



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Processing Options



DSM and Orthomosaic Resolution	1 x GSD (2.34 [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
Raster DTM	Generated: yes Merge Tiles: yes
DTM Resolution	5 x GSD (2.34 [cm/pixel])
Contour Lines Generation	Generated: yes Contour Base [m]: 0 Elevation Interval [m]: 0.1 Resolution [cm]: 50 Minimum Line Size [vertices]: 20
Time for DSM Generation	06m:19s
Time for Orthomosaic Generation	16m:18s
Time for DTM Generation	05m:41s
Time for Contour Lines Generation	16s
Time for Reflectance Map Generation	00s

