

# Čataj

Processing Report  
date - 24.4.2018  
Mapovanie 14.3.2018  
24 April 2018



# Survey Data

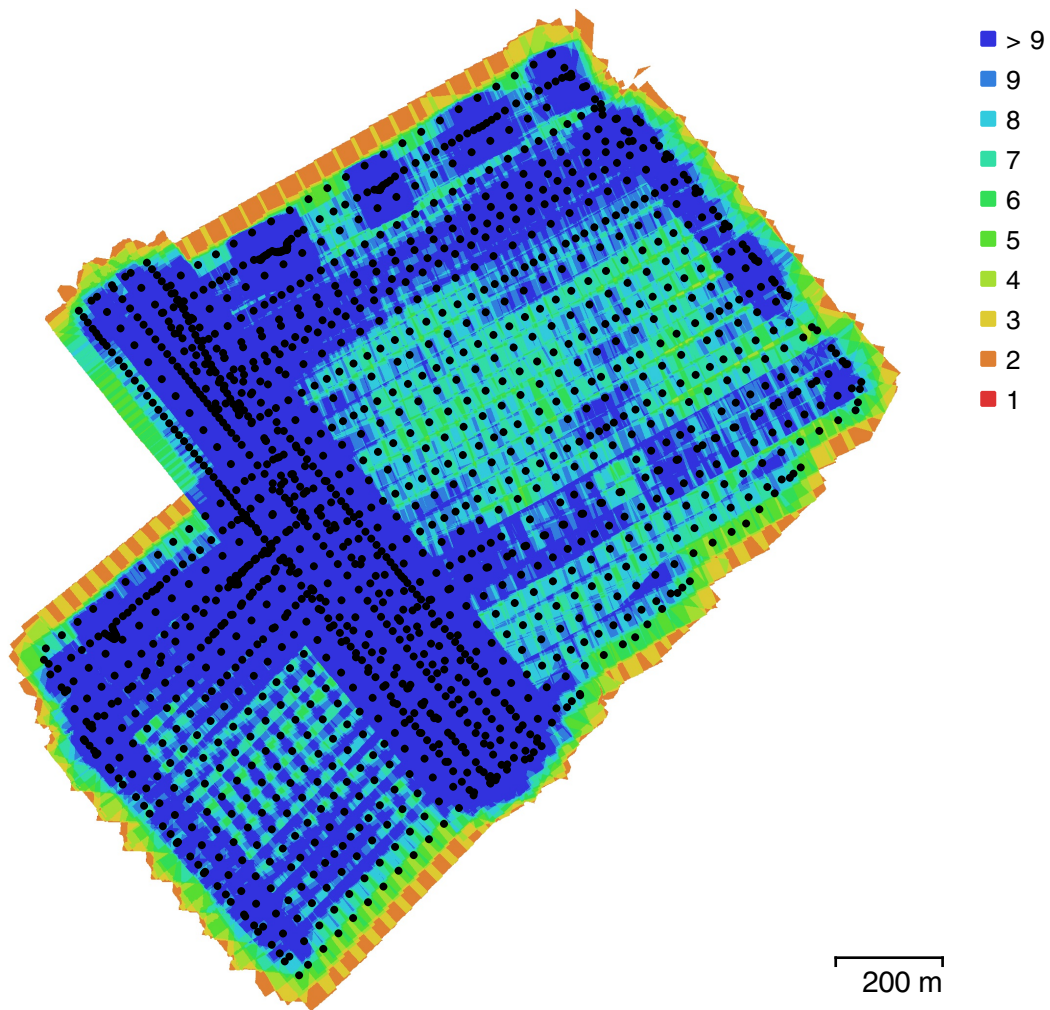


Fig. 1. Camera locations and image overlap.

Number of images:	1,602	Camera stations:	1,602
Flying altitude:	84.8 m	Tie points:	1,104,591
Ground resolution:	3.14 cm/pix	Projections:	4,909,875
Coverage area:	1.73 km <sup>2</sup>	Reprojection error:	0.939 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
FC330 (3.61mm)	4000 x 3000	3.61 mm	1.56 x 1.56 $\mu$ m	No

Table 1. Cameras.

# Camera Calibration

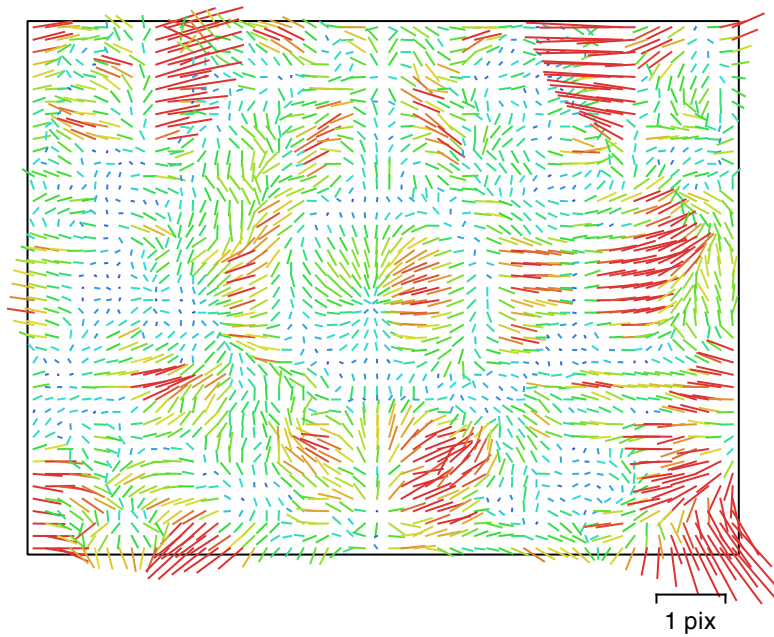


Fig. 2. Image residuals for FC330 (3.61mm).

## FC330 (3.61mm)

1602 images

Type	Resolution	Focal Length	Pixel Size
Frame	<b>4000 x 3000</b>	<b>3.61 mm</b>	<b>1.56 x 1.56 <math>\mu\text{m}</math></b>

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
<b>F</b>	<b>2333.29</b>	0.36	1.00	0.13	-0.04	-0.32	-0.00	-0.03	-0.06	0.08	-0.10	0.08	-0.02
<b>Cx</b>	<b>34.2175</b>	0.071		1.00	-0.05	-0.16	0.42	-0.01	-0.00	0.00	-0.01	-0.04	0.00
<b>Cy</b>	<b>-10.973</b>	0.062			1.00	-0.33	-0.15	-0.00	0.00	-0.00	0.00	0.00	-0.07
<b>B1</b>	<b>-6.15895</b>	0.0035				1.00	-0.01	0.03	-0.00	-0.01	0.02	-0.01	0.06
<b>B2</b>	<b>-0.509126</b>	0.0034					1.00	-0.00	0.00	-0.00	0.00	-0.05	0.04
<b>K1</b>	<b>-0.00131024</b>	2.5e-05						1.00	-0.97	0.93	-0.88	-0.00	-0.00
<b>K2</b>	<b>-0.00922187</b>	8.4e-05							1.00	-0.99	0.96	-0.00	0.00
<b>K3</b>	<b>0.0109787</b>	0.00011								1.00	-0.99	-0.00	-0.00
<b>K4</b>	<b>-0.00430607</b>	4.9e-05									1.00	0.00	0.00
<b>P1</b>	<b>0.000595611</b>	8.9e-07										1.00	-0.01
<b>P2</b>	<b>-0.000143395</b>	7.4e-07											1.00

Table 2. Calibration coefficients and correlation matrix.

# Ground Control Points

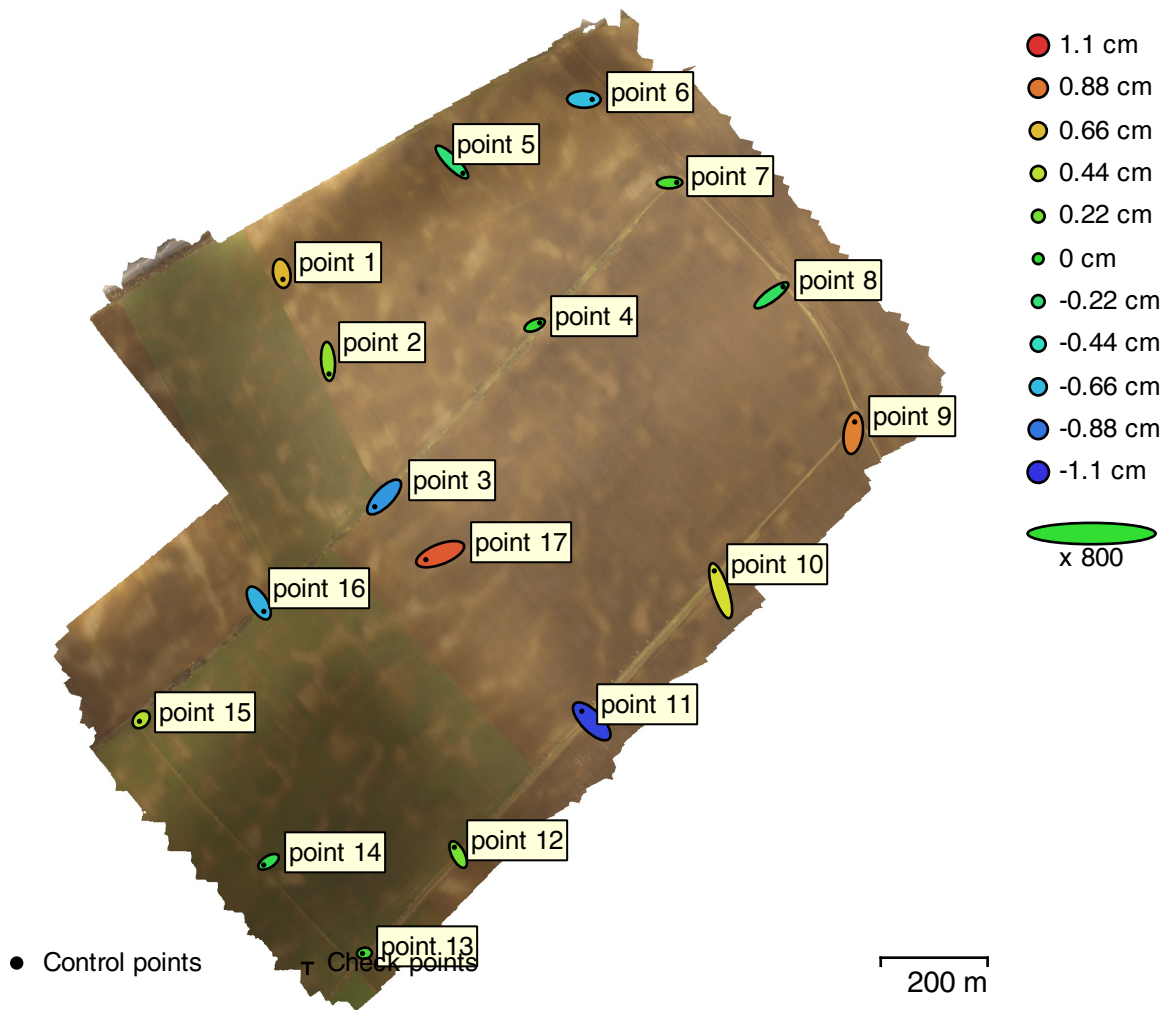


Fig. 3. GCP locations and error estimates.

Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.

Estimated GCP locations are marked with a dot or crossing.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
17	3.42552	4.06559	0.565279	5.31632	5.34629

Table 3. Control points RMSE.

<b>Label</b>	<b>X error (cm)</b>	<b>Y error (cm)</b>	<b>Z error (cm)</b>	<b>Total (cm)</b>	<b>Image (pix)</b>
point 1	0.531696	-2.76534	0.679664	2.89685	0.416 (9)
point 2	0.442369	-5.89018	0.314571	5.91514	0.544 (16)
point 3	-4.38744	-4.53297	-0.777171	6.35621	0.325 (24)
point 4	2.35916	1.06007	0.00543729	2.58639	0.401 (7)
point 5	5.19349	-5.25398	-0.218024	7.39082	0.476 (9)
point 6	3.87511	-0.0368818	-0.651922	3.92973	0.218 (8)
point 7	3.32803	0.102412	0.0744004	3.33044	0.374 (11)
point 8	5.45721	3.98921	-0.141172	6.76128	0.310 (13)
point 9	0.691918	5.29704	0.853896	5.40985	0.253 (9)
point 10	-2.95931	9.29562	0.527596	9.76957	0.268 (9)
point 11	-4.66338	4.72296	-1.04665	6.7193	0.340 (7)
point 12	-1.76145	3.42461	0.218905	3.85728	0.186 (8)
point 13	-0.907343	-0.0934861	0.0502949	0.913532	0.091 (5)
point 14	-2.30508	-1.45258	-0.0904667	2.72609	0.342 (13)
point 15	-0.802042	-0.834698	0.418334	1.23085	0.352 (18)
point 16	2.34869	-3.92452	-0.69367	4.62595	0.337 (18)
point 17	-6.70521	-2.59458	0.975434	7.25556	0.395 (10)
<b>Total</b>	<b>3.42552</b>	<b>4.06559</b>	<b>0.565279</b>	<b>5.34629</b>	<b>0.358</b>

Table 4. Control points.

# Digital Elevation Model

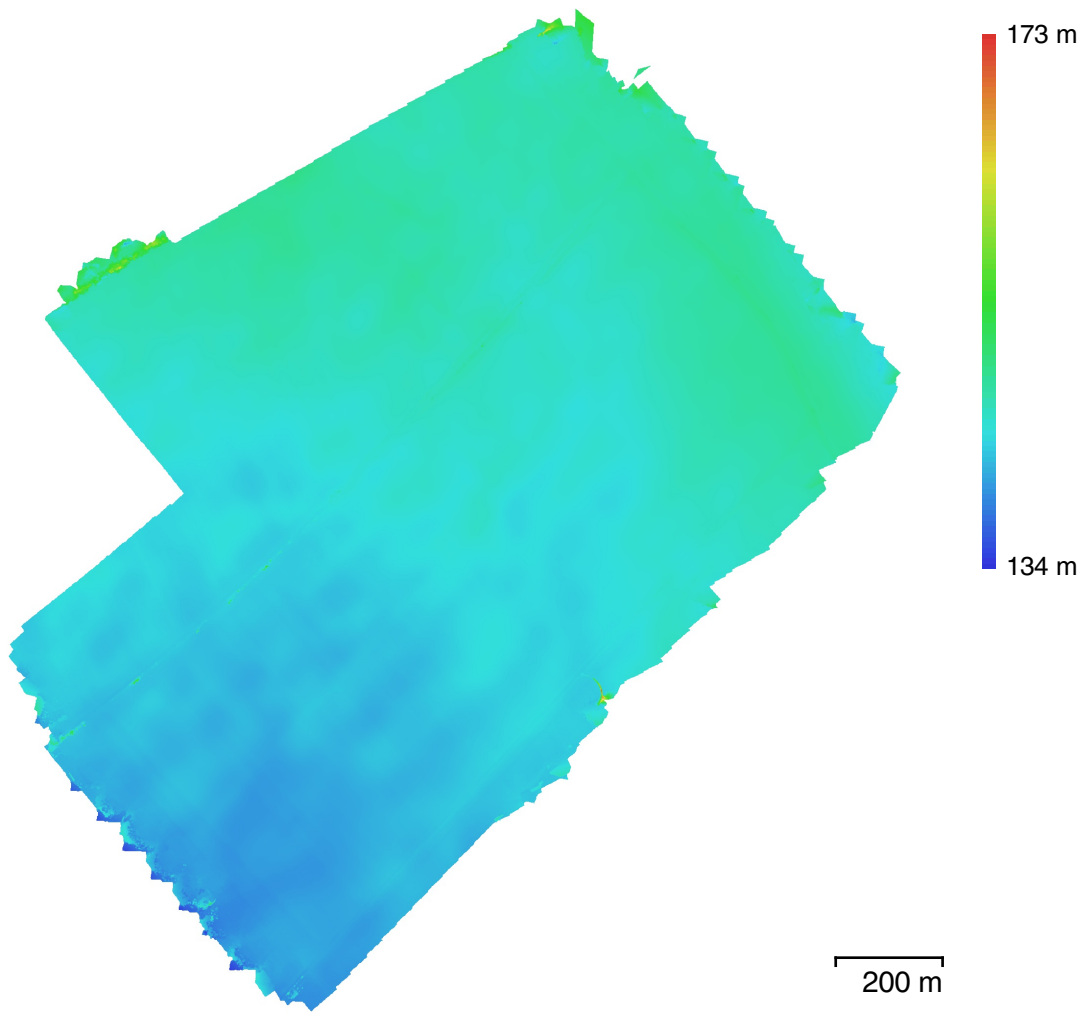


Fig. 4. Reconstructed digital elevation model.

Resolution: 12.6 cm/pix  
Point density: 63.4 points/m<sup>2</sup>

# Processing Parameters

## General

Cameras	1602
Aligned cameras	1602
Markers	17
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	1,104,591 of 1,371,330
Point colors	3 bands, uint8
RMS reprojection error	0.260787 (0.938638 pix)
Max reprojection error	4.54705 (36.8637 pix)
Mean key point size	3.32537 pix
Effective overlap	4.93544

## Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Yes
Key point limit	40,000
Tie point limit	4,000
Adaptive camera model fitting	Yes
Matching time	2 hours 42 minutes
Alignment time	49 minutes 19 seconds

## Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k4, p1, p2
Adaptive camera model fitting	No
Optimization time	40 seconds

## Dense Point Cloud

Points	118,588,407
Point colors	3 bands, uint8

## Reconstruction parameters

Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	12 hours 13 minutes
Dense cloud generation time	51 minutes 50 seconds

## DEM

Size	18,490 x 20,666
Coordinate system	Local Coordinates (m)

## Reconstruction parameters

Source data	Dense cloud
Interpolation	Enabled
Processing time	4 minutes 17 seconds

## Orthomosaic

Size	55,728 x 62,568
Coordinate system	Local Coordinates (m)
Colors	3 bands, uint8

## Reconstruction parameters

Blending mode	Mosaic
Surface	DEM
Enable color correction	Yes
Enable hole filling	Yes
Processing time	1 hours 31 minutes

## Software

Version	1.4.1 build 5925
Platform	Windows 64