

# Agisoft PhotoScan

Processing Report

16 April 2018



# Survey Data

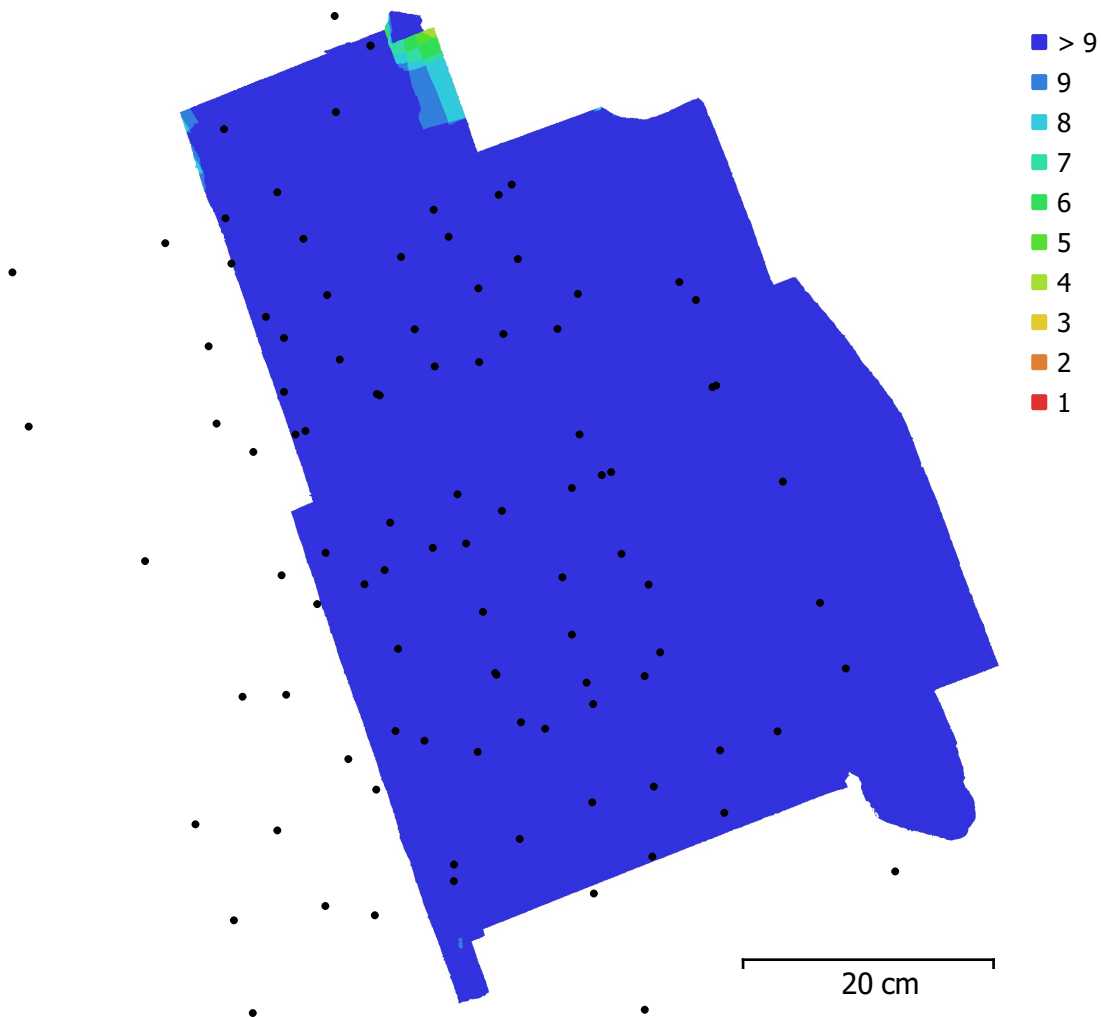


Fig. 1. Camera locations and image overlap.

Number of images:	100	Camera stations:	98
Flying altitude:	29 cm	Tie points:	12,588
Ground resolution:	0.0566 mm/pix	Projections:	89,876
Coverage area:	2.91e+03 cm <sup>2</sup>	Reprojection error:	1.44 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
NIKON D600 (28 mm)	6034 x 4028	28 mm	5.96 x 5.96 $\mu$ m	No
NIKON D600 (34 mm)	6034 x 4028	34 mm	5.96 x 5.96 $\mu$ m	No
NIKON D600 (28 mm)	4028 x 6034	28 mm	5.96 x 5.96 $\mu$ m	No
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<b>Camera Model</b>	<b>Resolution</b>	<b>Focal Length</b>	<b>Pixel Size</b>	<b>Precalibrated</b>
NIKON D600 (34 mm)	6034 x 4028	34 mm	5.96 x 5.96 $\mu\text{m}$	No

Table 1. Cameras.

# Camera Calibration

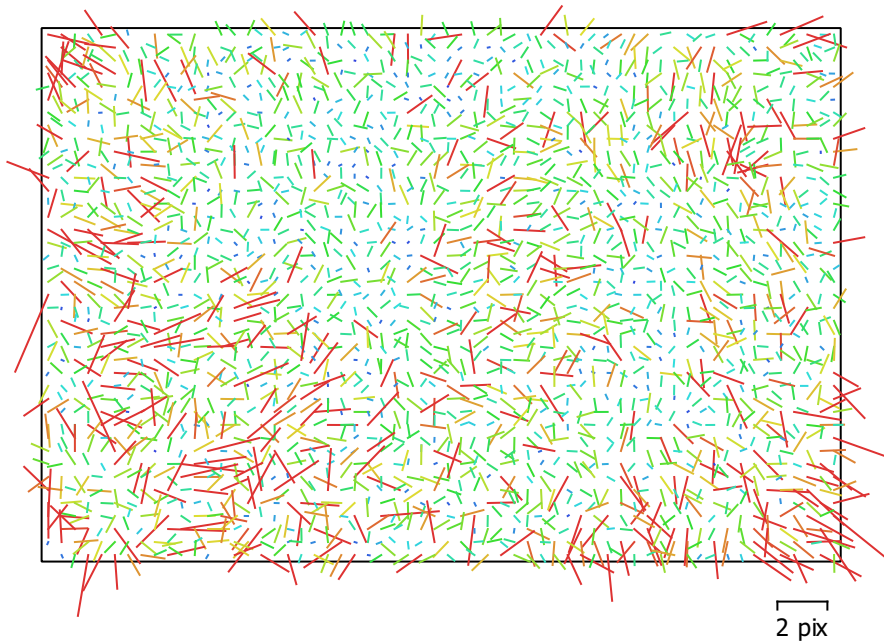


Fig. 2. Image residuals for NIKON D600 (28 mm).

## NIKON D600 (28 mm)

24 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>6034 x 4028</b>	<b>28 mm</b>	<b>5.96 x 5.96 <math>\mu</math>m</b>
F:	4808.6		
Cx:	9.98106	B1:	-4.93932
Cy:	10.6053	B2:	1.66235
K1:	-0.128992	P1:	-0.00014441
K2:	0.0853698	P2:	0.000307945
K3:	-0.06023	P3:	0
K4:	0	P4:	0

# Camera Calibration

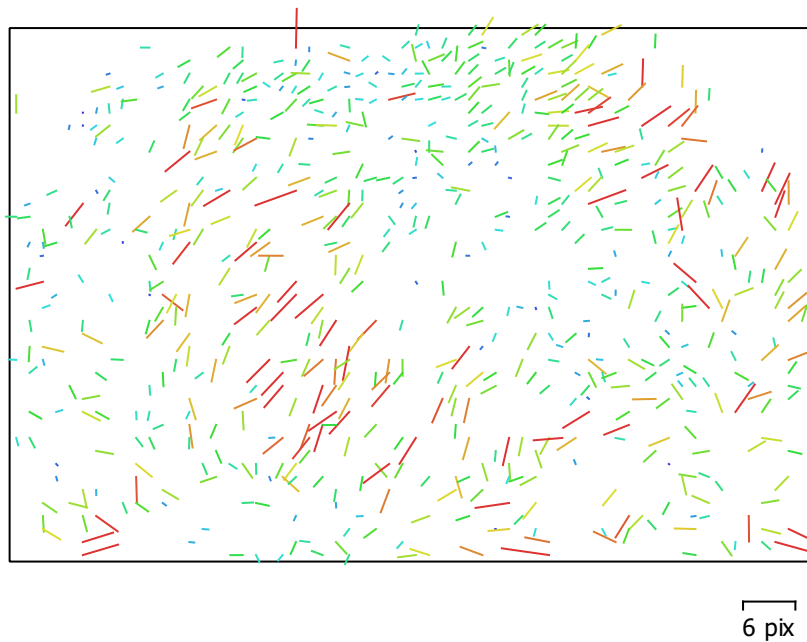


Fig. 3. Image residuals for NIKON D600 (34 mm).

## NIKON D600 (34 mm)

1 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>6034 x 4028</b>	<b>34 mm</b>	<b>5.96 x 5.96 <math>\mu\text{m}</math></b>
F:	5545.78		
Cx:	66.0792	B1:	8.68007
Cy:	-29.4281	B2:	-0.0994812
K1:	-0.110452	P1:	0.00201054
K2:	0.0543462	P2:	-0.000659268
K3:	0.0304622	P3:	0
K4:	0	P4:	0

# Camera Calibration

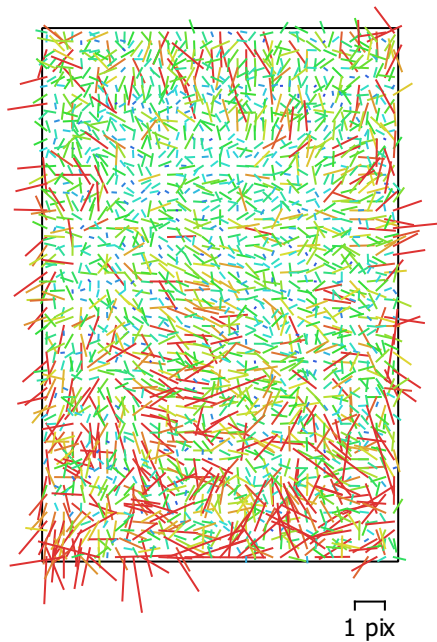


Fig. 4. Image residuals for NIKON D600 (28 mm).

## NIKON D600 (28 mm)

33 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>4028 x 6034</b>	<b>28 mm</b>	<b>5.96 x 5.96 <math>\mu\text{m}</math></b>
F:	4802.88		
Cx:	2.51666	B1:	6.1879
Cy:	11.6888	B2:	-1.52392
K1:	-0.120063	P1:	-0.000169802
K2:	0.0511467	P2:	0.000277207
K3:	-0.0240794	P3:	0
K4:	0	P4:	0

# Camera Calibration

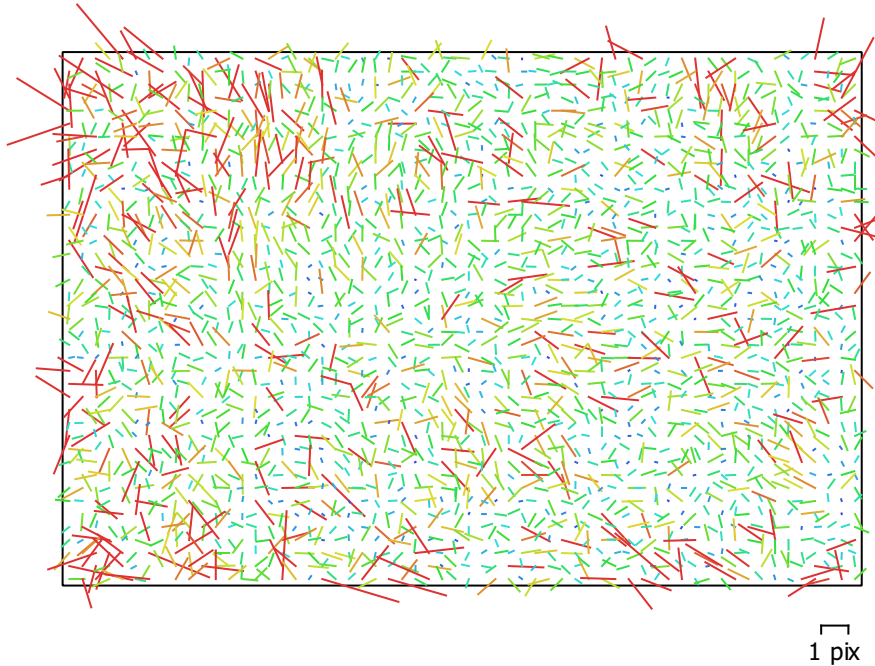


Fig. 5. Image residuals for NIKON D600 (28 mm).

## NIKON D600 (28 mm)

23 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>6034 x 4028</b>	<b>28 mm</b>	<b>5.96 x 5.96 <math>\mu\text{m}</math></b>
F:	4841.58		
Cx:	17.2413	B1:	0.0313939
Cy:	-2.68529	B2:	2.71005
K1:	-0.128023	P1:	5.7343e-05
K2:	0.0726781	P2:	0.000108194
K3:	-0.044686	P3:	0
K4:	0	P4:	0

# Camera Calibration



Fig. 6. Image residuals for NIKON D600 (28 mm).

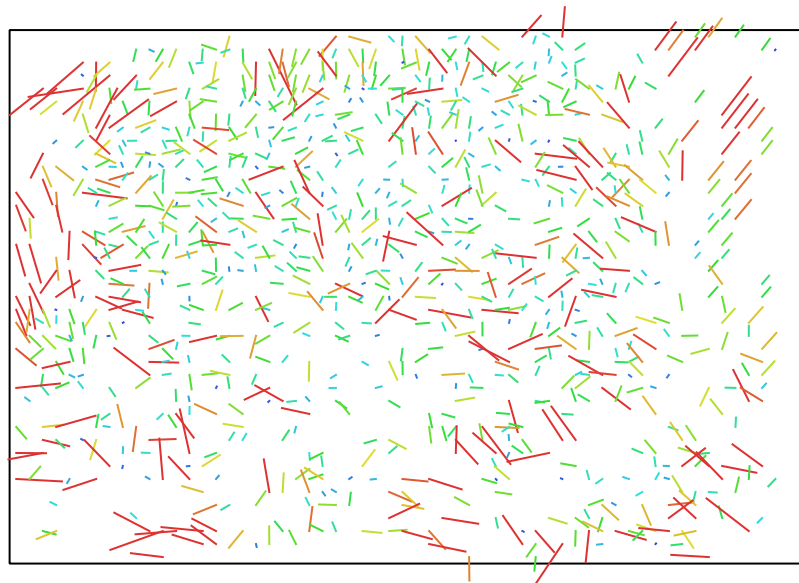
## NIKON D600 (28 mm)

18 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>4028 x 6034</b>	<b>28 mm</b>	<b>5.96 x 5.96 <math>\mu\text{m}</math></b>
F:	4809.77		
Cx:	5.62475	B1:	5.19378
Cy:	-12.5852	B2:	-3.2914
K1:	-0.132715	P1:	0.000106798
K2:	0.104353	P2:	6.21863e-05
K3:	-0.0858315	P3:	0
K4:	0	P4:	0



# Camera Calibration



3 pix

Fig. 7. Image residuals for NIKON D600 (34 mm).

## NIKON D600 (34 mm)

1 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>6034 x 4028</b>	<b>34 mm</b>	<b>5.96 x 5.96 <math>\mu\text{m}</math></b>
F:	5255.43		
Cx:	27.3214	B1:	7.74681
Cy:	-13.704	B2:	-5.17014
K1:	-0.125319	P1:	1.06291e-05
K2:	0.134541	P2:	0.000181611
K3:	-0.15387	P3:	0
K4:	0	P4:	0

# Ground Control Points

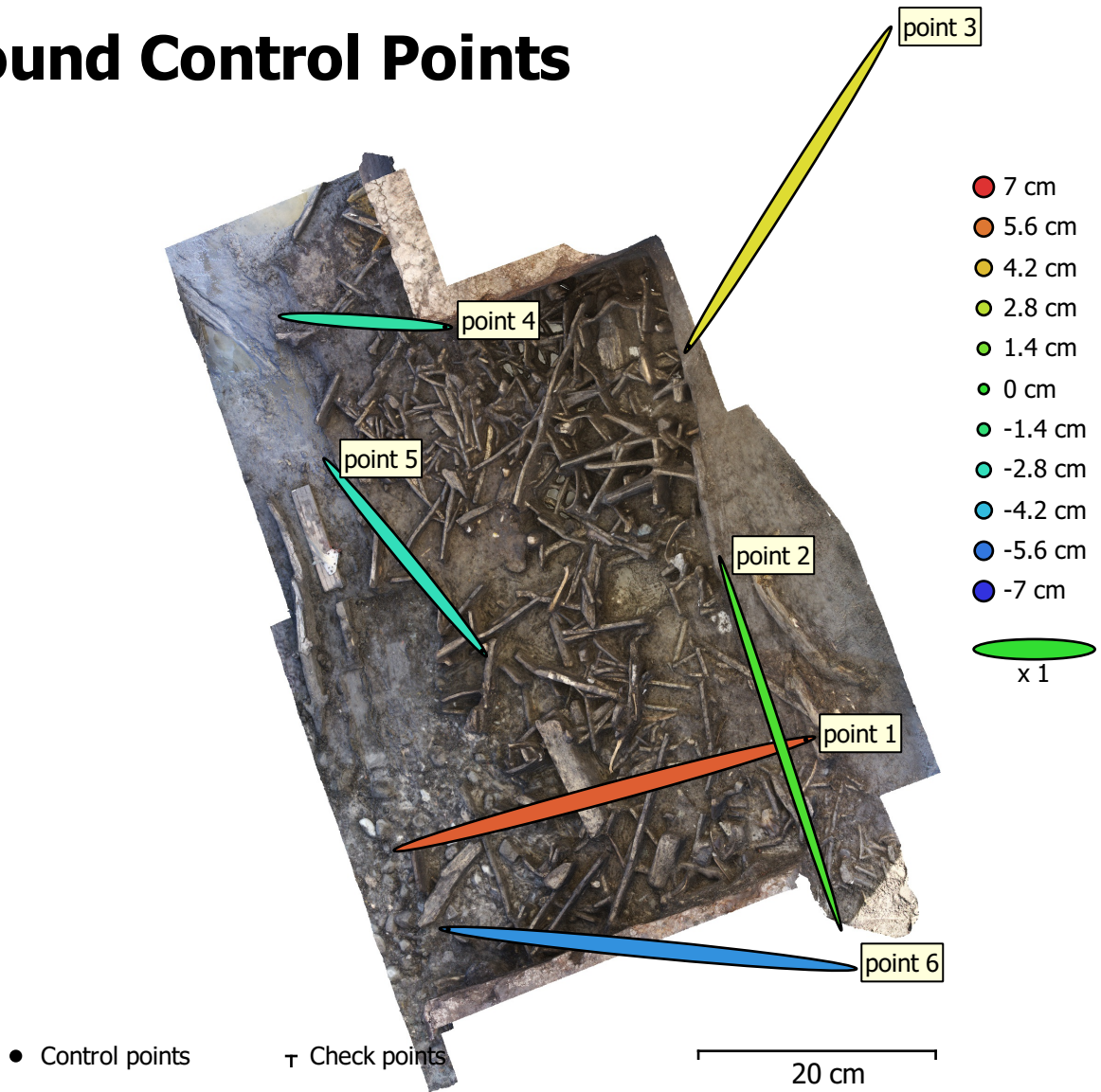


Fig. 8. GCP locations and error estimates.

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)
6	22.4173	18.1757	3.84989	28.8599	29.1155

Table 2. 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	33.9497	9.14803	6.10792	35.6871	0.433 (14)
point 2	-9.99631	30.669	0.546225	32.2616	0.502 (28)
point 3	-16.6986	-26.4074	3.5297	31.4429	0.161 (14)
point 4	13.4526	-0.870967	-2.34672	13.6835	0.342 (25)
point 5	12.9754	-15.7863	-2.76773	20.6211	0.414 (36)
point 6	-33.6828	3.24769	-5.06939	34.2166	0.336 (15)
<b>Total</b>	<b>22.4173</b>	<b>18.1757</b>	<b>3.84989</b>	<b>29.1155</b>	<b>0.397</b>

Table 3. Control points.

# Digital Elevation Model

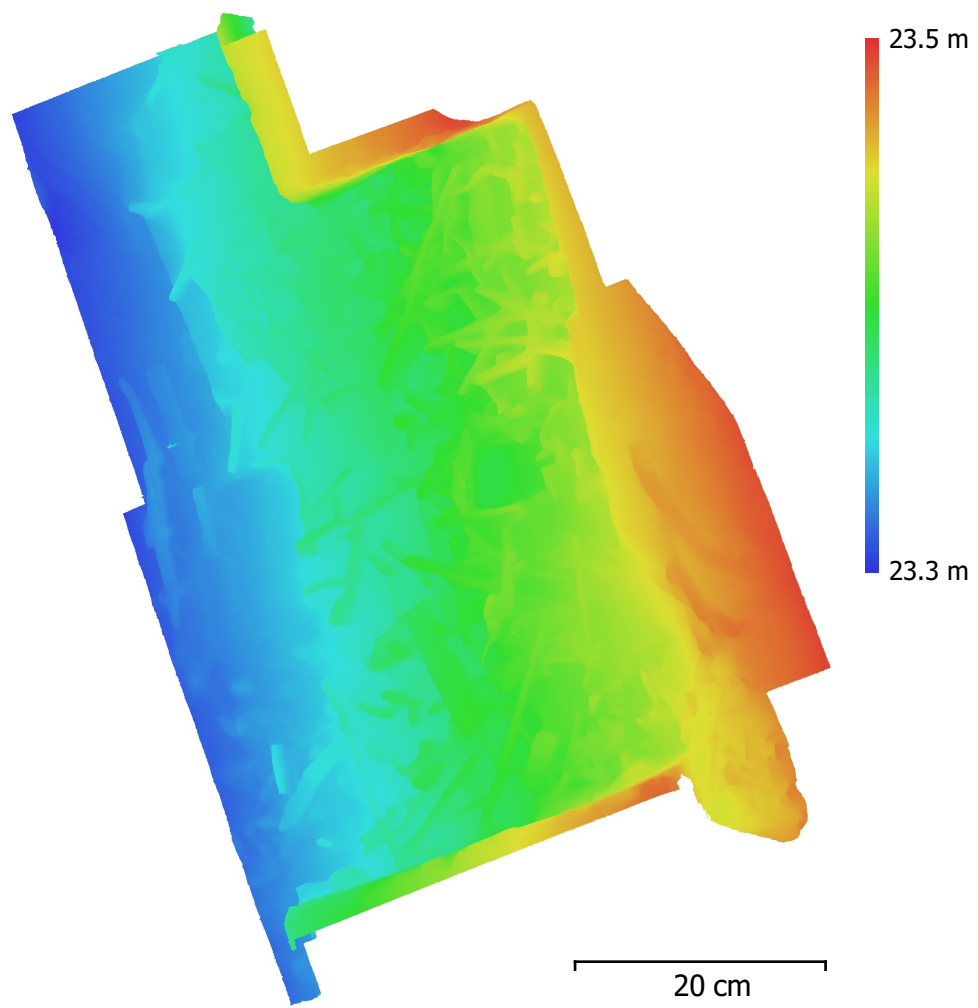


Fig. 9. Reconstructed digital elevation model.

Resolution: 0.113 mm/pix  
Point density: 7.81e+04 points/mm<sup>2</sup>

# Processing Parameters

## General

Cameras	100
Aligned cameras	98
Markers	6
Coordinate system	Local Coordinates (m)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	12,588 of 16,833
Point colors	3 bands, uint8
Reprojection error	1.43643 (8.26334 max)
Effective overlap	7.67552

### Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k3, p1, p2
Optimization time	1 seconds

## Dense Point Cloud

Points	55,235,815
Point colors	3 bands, uint8

### Reconstruction parameters

Quality	High
Depth filtering	Aggressive
Dense cloud generation time	1 hours 10 minutes

## Model

Faces	49,999
Vertices	26,335
Vertex colors	3 bands, uint8
Texture	7,000 x 7,000, 4 bands, uint8

### Reconstruction parameters

Surface type	Arbitrary
Source data	Dense
Interpolation	Enabled
Quality	High
Depth filtering	Aggressive
Face count	20,000,000
Processing time	44 minutes 31 seconds

### Texturing parameters

Blending mode	Mosaic
Texture size	7,000 x 7,000
UV mapping time	38 seconds
Blending time	1 minutes 2 seconds

## Software

Version	1.4.1 build 5925
Platform	Windows 64