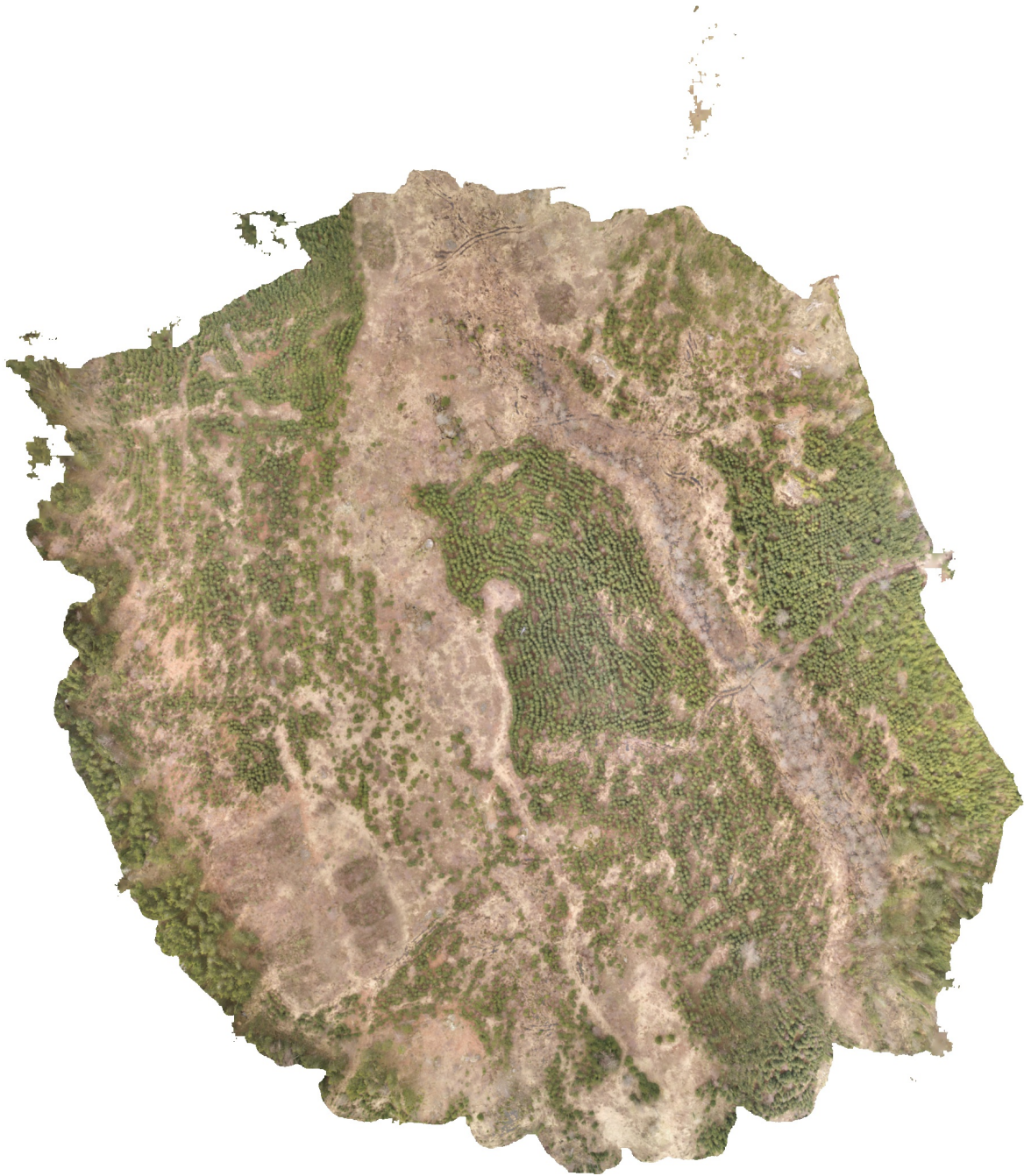


# Agisoft Metashape

Processing Report

08 March 2021



# Survey Data

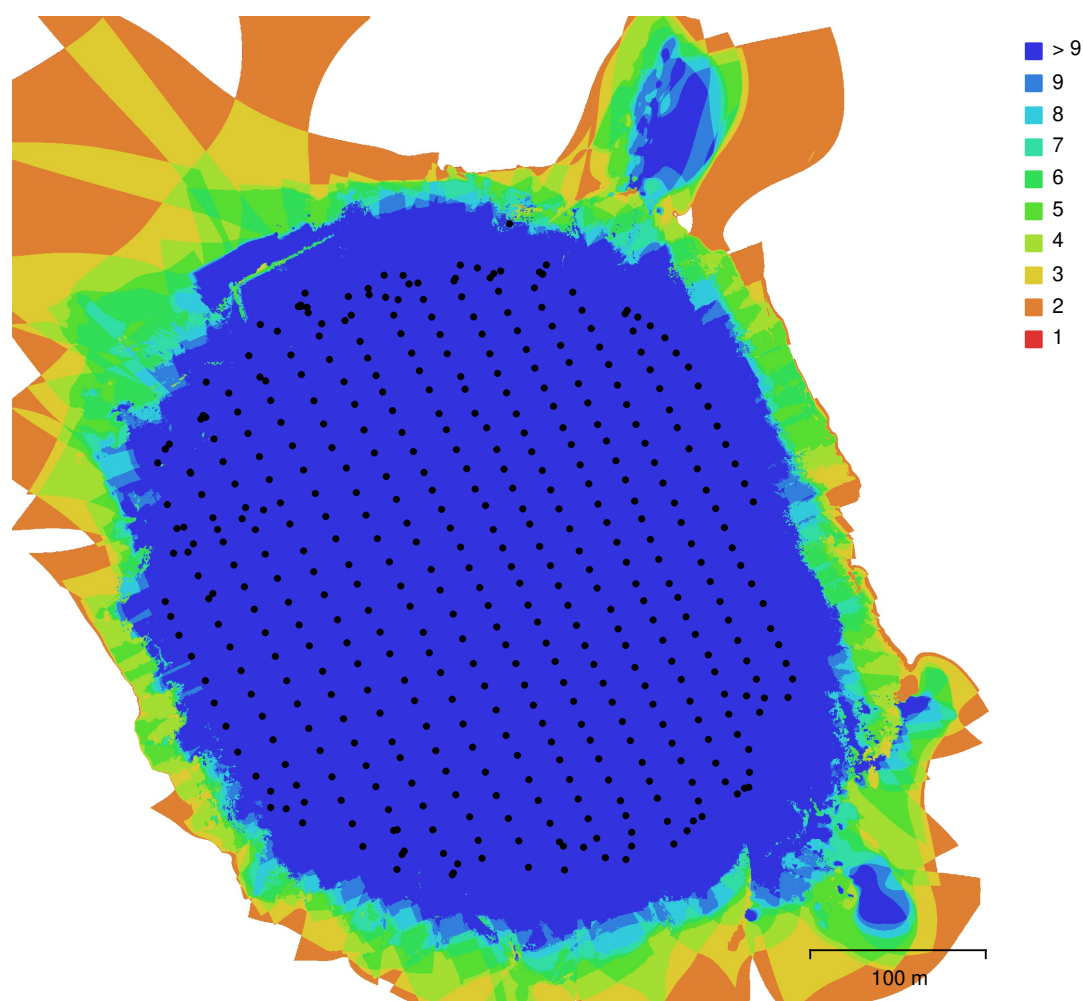


Fig. 1. Camera locations and image overlap.

Number of images:	443	Camera stations:	443
Flying altitude:	93.6 m	Tie points:	365,677
Ground resolution:	2.23 cm/pix	Projections:	1,261,190
Coverage area:	0.232 km <sup>2</sup>	Reprojection error:	6.13 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Sequoia (4.88mm)	4608 x 3456	4.88 mm	1.34 x 1.34 μm	Yes

Table 1. Cameras.

# Camera Calibration

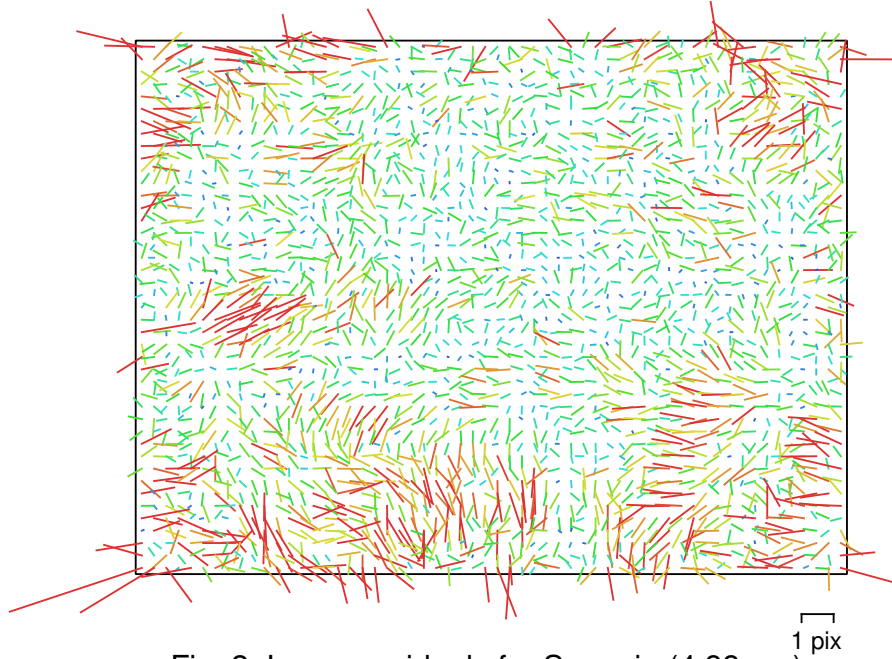


Fig. 2. Image residuals for Sequoia (4.88mm).

## Sequoia (4.88mm)

443 images, precalibrated

Type  
Frame

Resolution  
4608 x 3456

Focal Length  
4.88 mm

Pixel Size  
1.34 x 1.34  $\mu\text{m}$

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	3976.57	1.6	1.00	-0.01	-0.63	0.40	-0.38	0.38	-0.00	-0.23
Cx	-5.36945	0.36		1.00	-0.02	0.04	-0.03	0.02	0.67	-0.05
Cy	-43.6425	0.48			1.00	-0.27	0.23	-0.22	-0.02	0.64
K1	0.202814	0.00052				1.00	-0.93	0.89	0.03	-0.24
K2	-0.593669	0.0024					1.00	-0.98	-0.01	0.08
K3	0.571007	0.0034						1.00	0.01	-0.07
P1	-0.000774155	2.6e-05							1.00	-0.06
P2	-0.000337748	3.4e-05								1.00

Table 2. Calibration coefficients and correlation matrix.



# Camera Locations

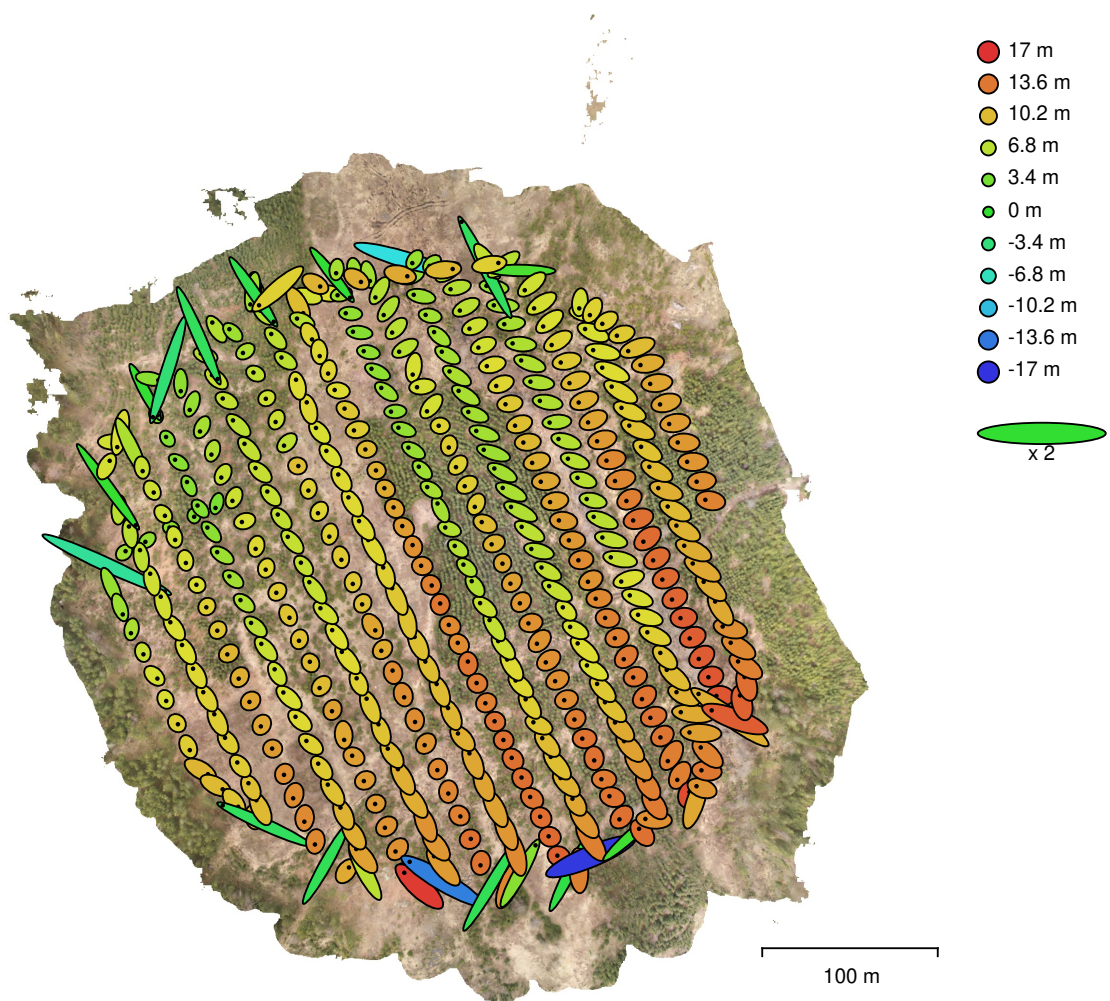


Fig. 3. Camera locations and error estimates.

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

Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	Z error (m)	XY error (m)	Total error (m)
4.40318	4.46631	9.7417	6.27184	11.5861

Table 3. Average camera location error.

X - Easting, Y - Northing, Z - Altitude.

# Ground Control Points

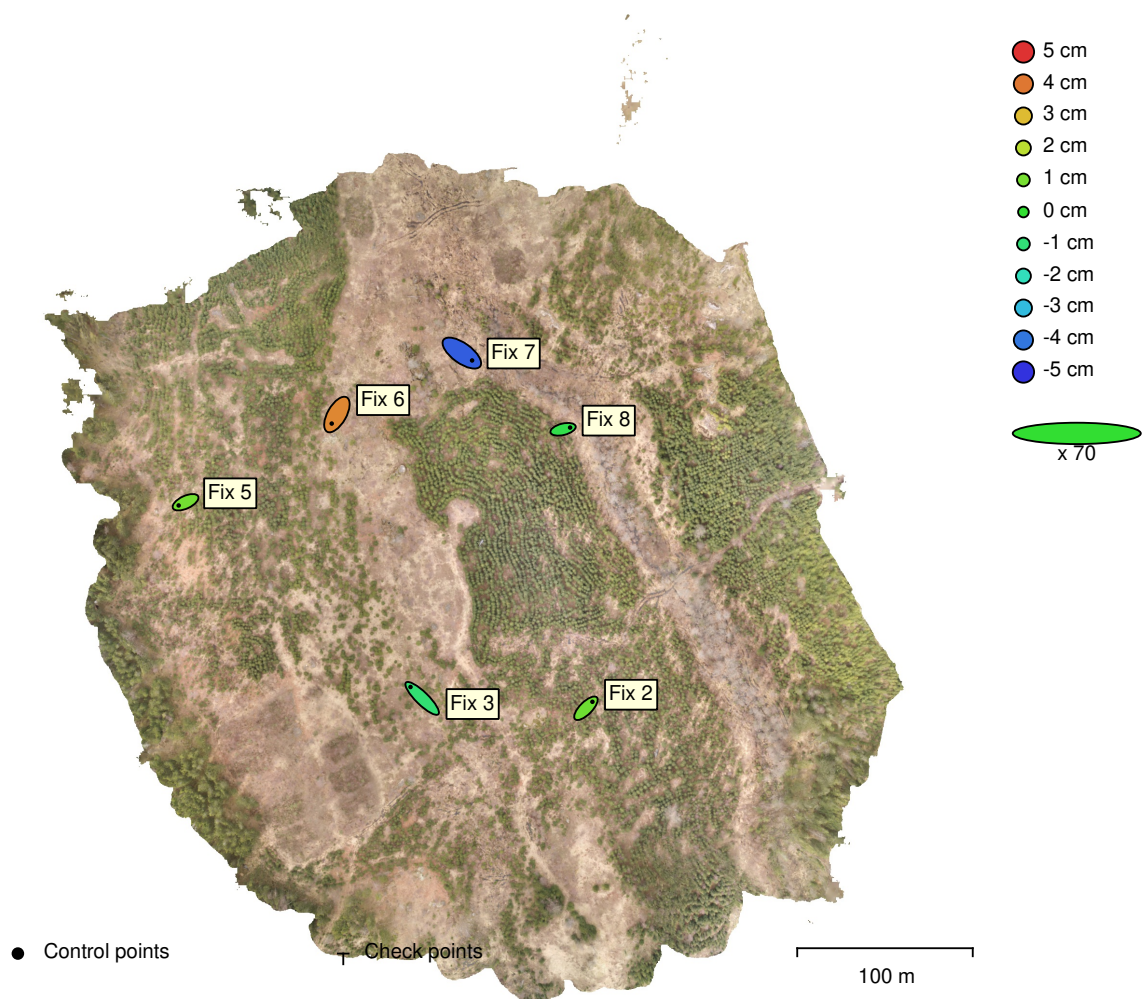


Fig. 4. GCP locations and error estimates.

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	13.4086	11.9123	2.44529	17.9358	18.1018

Table 4. Control points RMSE.

X - Easting, Y - Northing, Z - Altitude.

<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>
Fix 2	10.534	10.543	0.866017	14.9288	7.273 (10)
Fix 3	-18.9838	18.5627	-0.934174	26.5675	12.363 (6)
Fix 5	-11.2334	-5.21148	0.939125	12.419	7.669 (11)
Fix 6	-8.44237	-14.7357	3.75925	17.3939	7.095 (11)
Fix 7	16.6962	-11.9778	-4.37157	21.0081	6.305 (10)
Fix 8	11.4529	2.8146	-0.359802	11.7992	5.599 (9)
<b>Total</b>	<b>13.4086</b>	<b>11.9123</b>	<b>2.44529</b>	<b>18.1018</b>	<b>7.639</b>

Table 5. Control points.  
X - Easting, Y - Northing, Z - Altitude.

# Digital Elevation Model

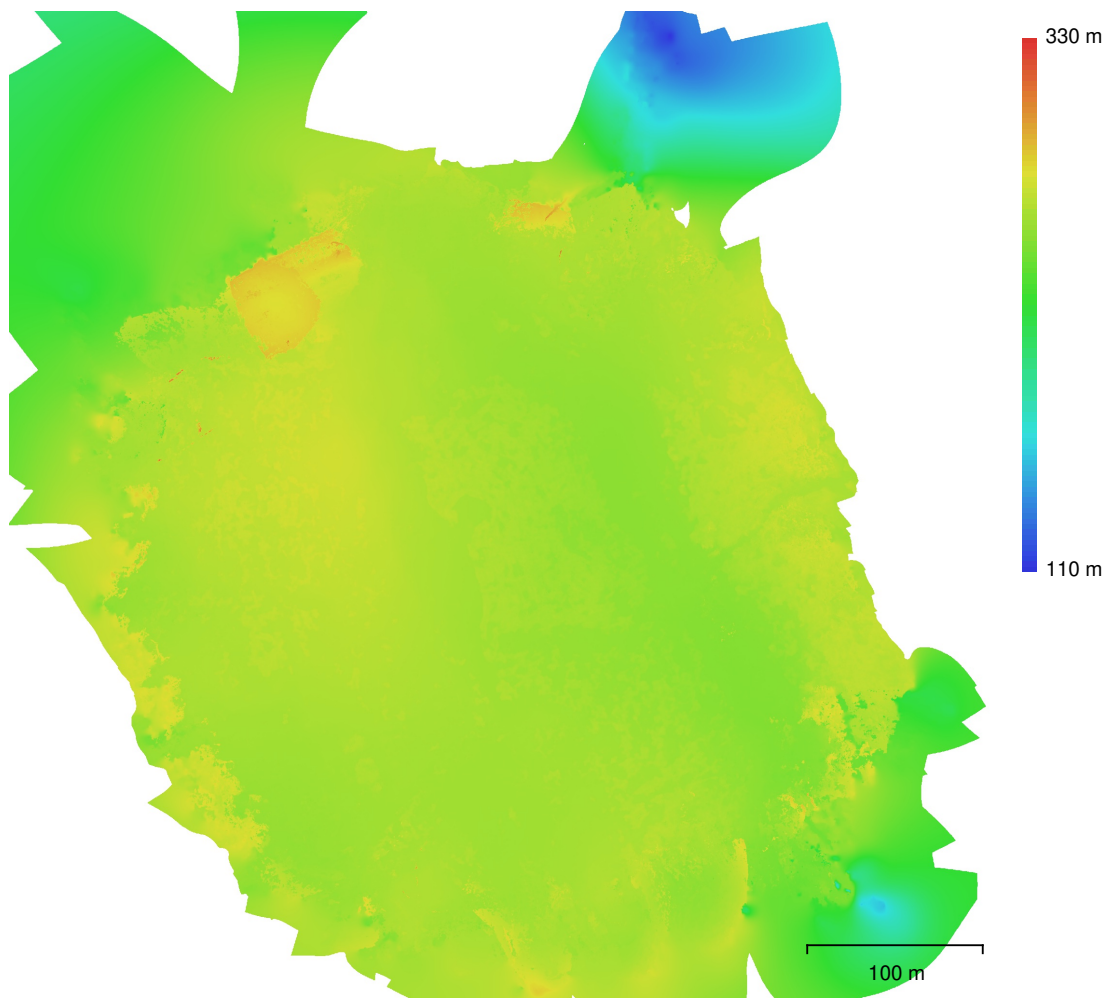


Fig. 5. Reconstructed digital elevation model.

Resolution: 4.47 cm/pix  
Point density: 501 points/m<sup>2</sup>

# Processing Parameters

## General

Cameras	443
Aligned cameras	443
Markers	6
Coordinate system	SWEREF99 TM (EPSG::3006)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	365,677 of 433,571
RMS reprojection error	0.874955 (6.13422 pix)
Max reprojection error	5.67182 (156.555 pix)
Mean key point size	8.58375 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.11418

### Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Tie point limit	4,000
Guided image matching	No
Adaptive camera model fitting	No
Matching time	3 minutes 51 seconds
Matching memory usage	1.19 GB
Alignment time	41 minutes 38 seconds
Alignment memory usage	667.91 MB

### Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	1 minutes 22 seconds
Software version	1.6.2.10247

## Depth Maps

Count	443
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### Depth maps generation parameters

Quality	High
Filtering mode	Aggressive
Processing time	1 hours 5 minutes
Software version	1.6.2.10247

## Dense Point Cloud

Points	229,834,239
Point colors	3 bands, uint8

### Depth maps generation parameters

Quality	High
Filtering mode	Aggressive
Processing time	1 hours 5 minutes

### Dense cloud generation parameters

Processing time	1 hours 18 minutes
Software version	1.6.2.10247

## Model

Faces	46,038,070
Vertices	23,115,951



Vertex colors	3 bands, uint8
Texture	4,096 x 4,096, 4 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	High
Filtering mode	Aggressive
Processing time	1 hours 5 minutes
<b>Reconstruction parameters</b>	
Surface type	Arbitrary
Source data	Dense cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	1 hours 48 minutes
<b>Texturing parameters</b>	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	4,096
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	2 hours 20 minutes
Blending time	7 minutes 51 seconds
Software version	1.6.2.10247
<b>DEM</b>	
Size	86,126 x 81,012
Coordinate system	SWEREF99 TM (EPSG::3006)
<b>Reconstruction parameters</b>	
Source data	Dense cloud
Interpolation	Enabled
Processing time	4 minutes 32 seconds
Software version	1.6.2.10247
<b>Orthomosaic</b>	
Size	9,741 x 10,705
Coordinate system	SWEREF99 TM (EPSG::3006)
Colors	3 bands, uint8
<b>Reconstruction parameters</b>	
Blending mode	Mosaic
Surface	Mesh
Enable hole filling	Yes
Processing time	17 minutes 45 seconds
Software version	1.6.2.10247
<b>System</b>	
Software name	Agisoft Metashape Professional
Software version	1.6.2 build 10247
OS	Linux 64 bit
RAM	62.65 GB
CPU	Intel(R) Xeon(R) CPU E5-2650 v3 @ 2.30GHz
GPU(s)	Tesla K80
	Tesla K80
	Tesla K80
	Tesla K80