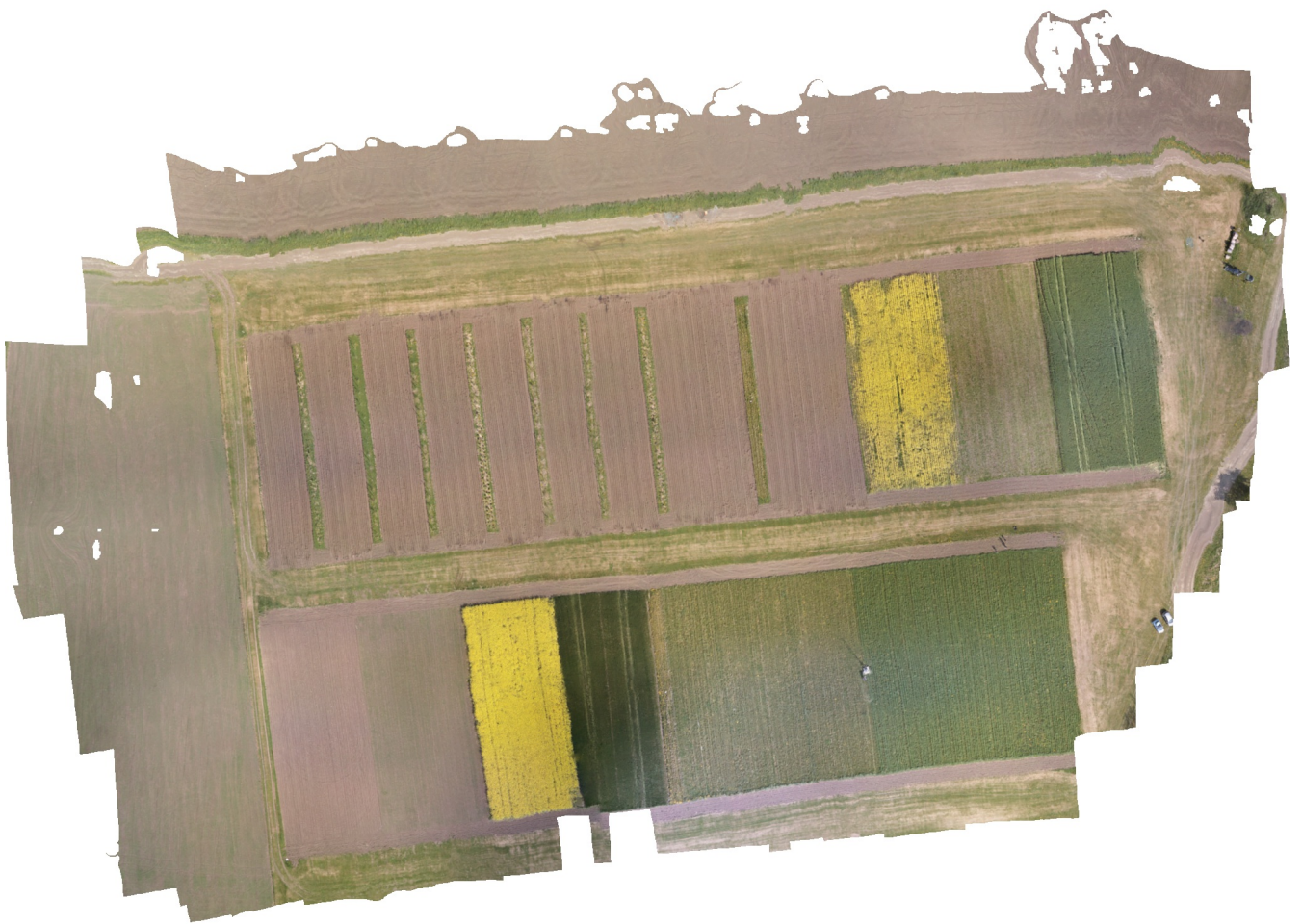


Agisoft Metashape

Processing Report
12 March 2021



Survey Data

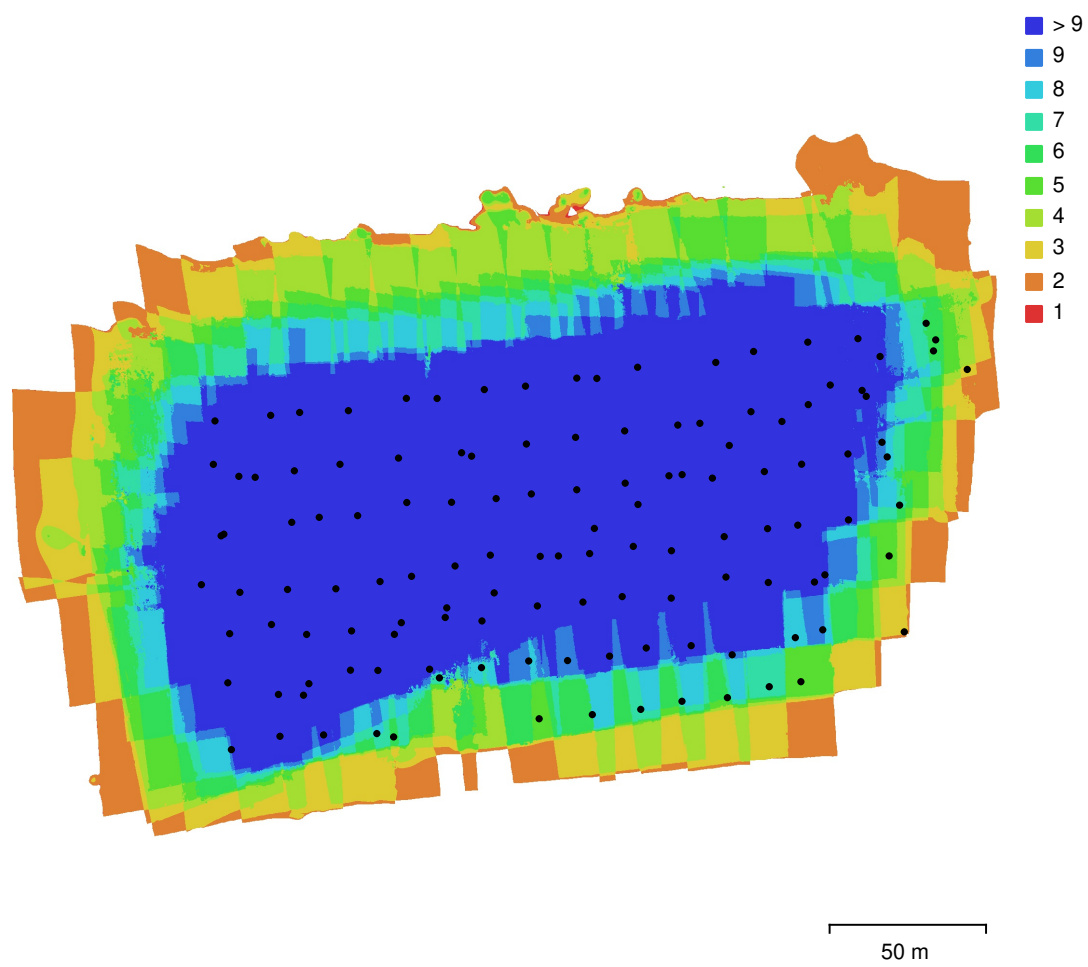


Fig. 1. Camera locations and image overlap.

Number of images:	128	Camera stations:	128
Flying altitude:	81.2 m	Tie points:	97,903
Ground resolution:	1.56 cm/pix	Projections:	353,696
Coverage area:	0.0516 km ²	Reprojection error:	10.6 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

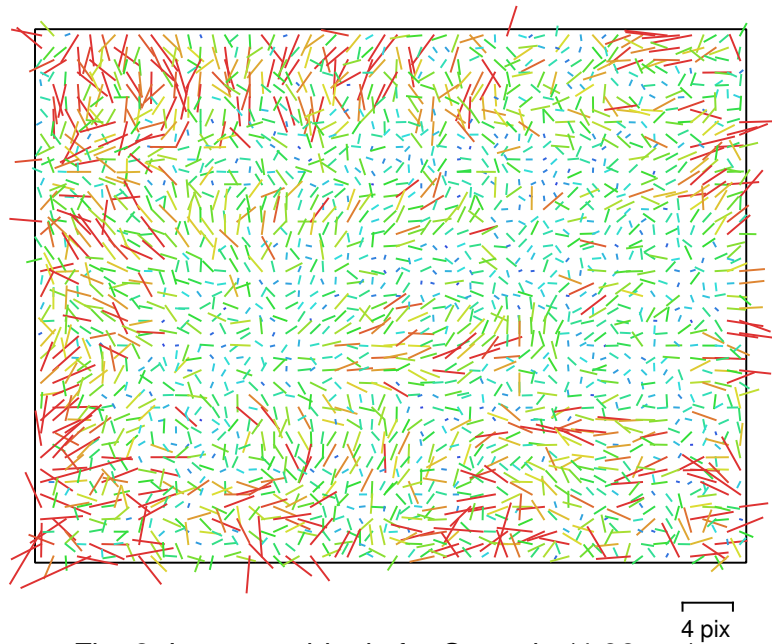


Fig. 2. Image residuals for Sequoia (4.88mm).

Sequoia (4.88mm)

128 images, precalibrated

Type
Frame

Resolution
4608 x 3456

Focal Length
4.88 mm

Pixel Size
1.34 x 1.34 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	5071.85	3.7	1.00	0.10	-0.07	0.21	-0.25	0.27	0.07	0.00
Cx	165.856	1.2		1.00	0.02	-0.01	0.03	-0.04	0.80	0.06
Cy	1.99144	1.1			1.00	-0.05	0.06	-0.06	0.01	0.76
K1	0.363961	0.0021				1.00	-0.96	0.91	-0.00	-0.03
K2	-1.79022	0.016					1.00	-0.98	0.04	0.04
K3	2.82172	0.035						1.00	-0.03	-0.03
P1	0.00479235	9.6e-05							1.00	0.05
P2	-0.00192938	8.6e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

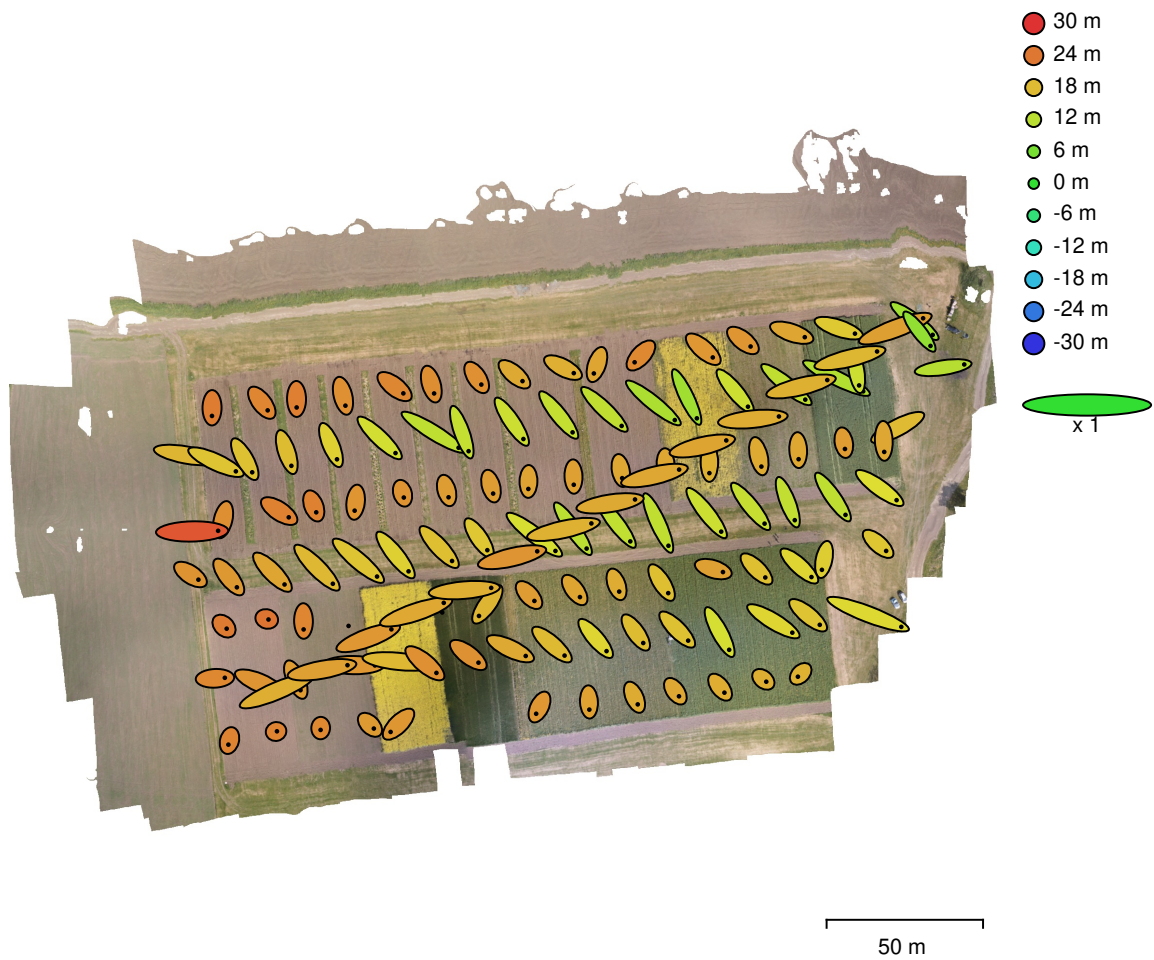


Fig. 3. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	Z error (m)	XY error (m)	Total error (m)
9.05874	6.79475	18.8068	11.3238	21.9528

Table 3. Average camera location error.
X - Easting, Y - Northing, Z - Altitude.

Ground Control Points

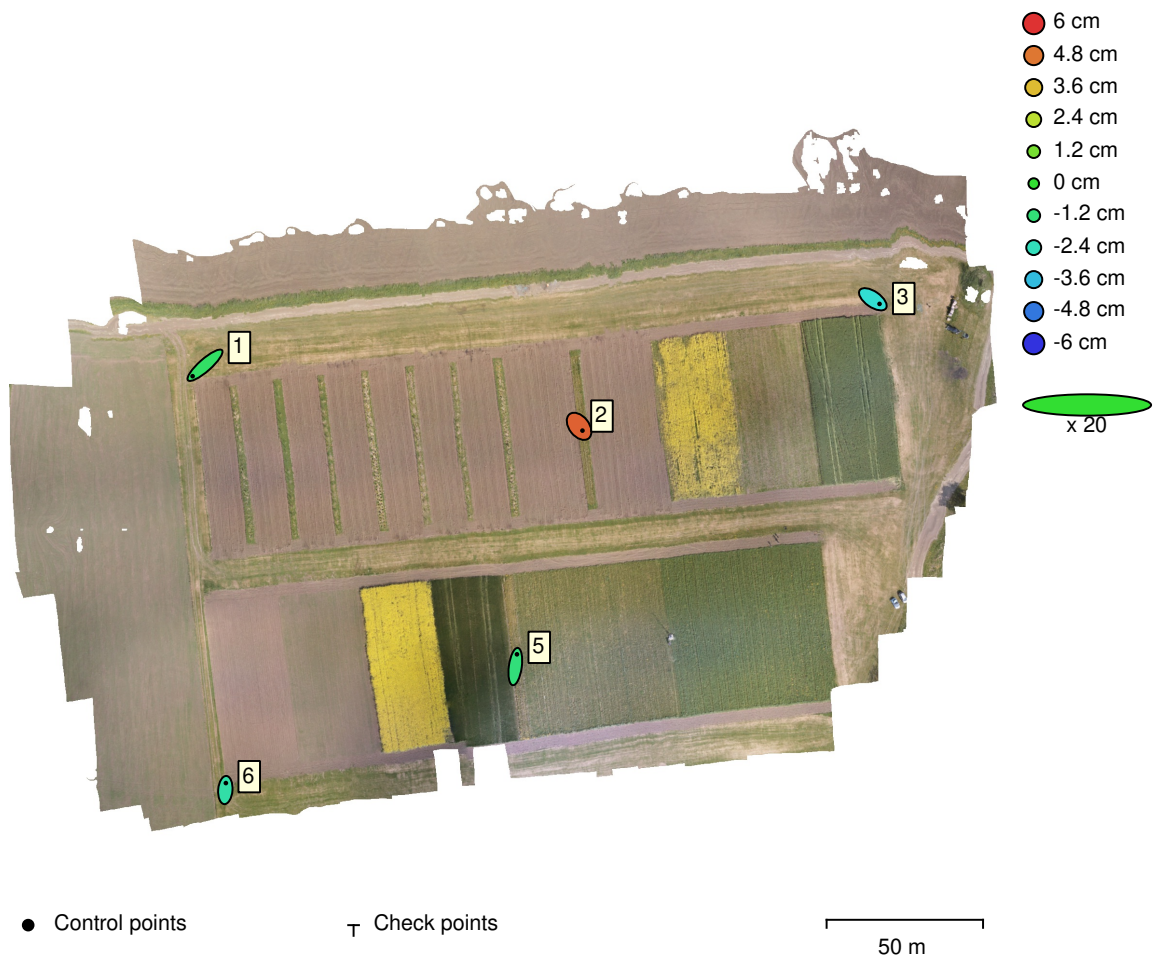


Fig. 4. GCP locations and error estimates.

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)
5	20.8913	27.0633	2.87131	34.1887	34.3091

Table 4. Control points RMSE.

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

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
1	-39.7322	-35.0247	-0.890526	52.9733	18.899 (5)
2	10.7781	-13.7296	5.1838	18.2083	8.497 (10)
3	21.365	-14.7865	-2.79541	26.1328	35.594 (6)
5	5.28958	39.1661	-1.25434	39.5416	14.162 (6)
6	1.72719	22.2315	-2.04198	22.3918	13.244 (4)
Total	20.8913	27.0633	2.87131	34.3091	19.687

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

Digital Elevation Model

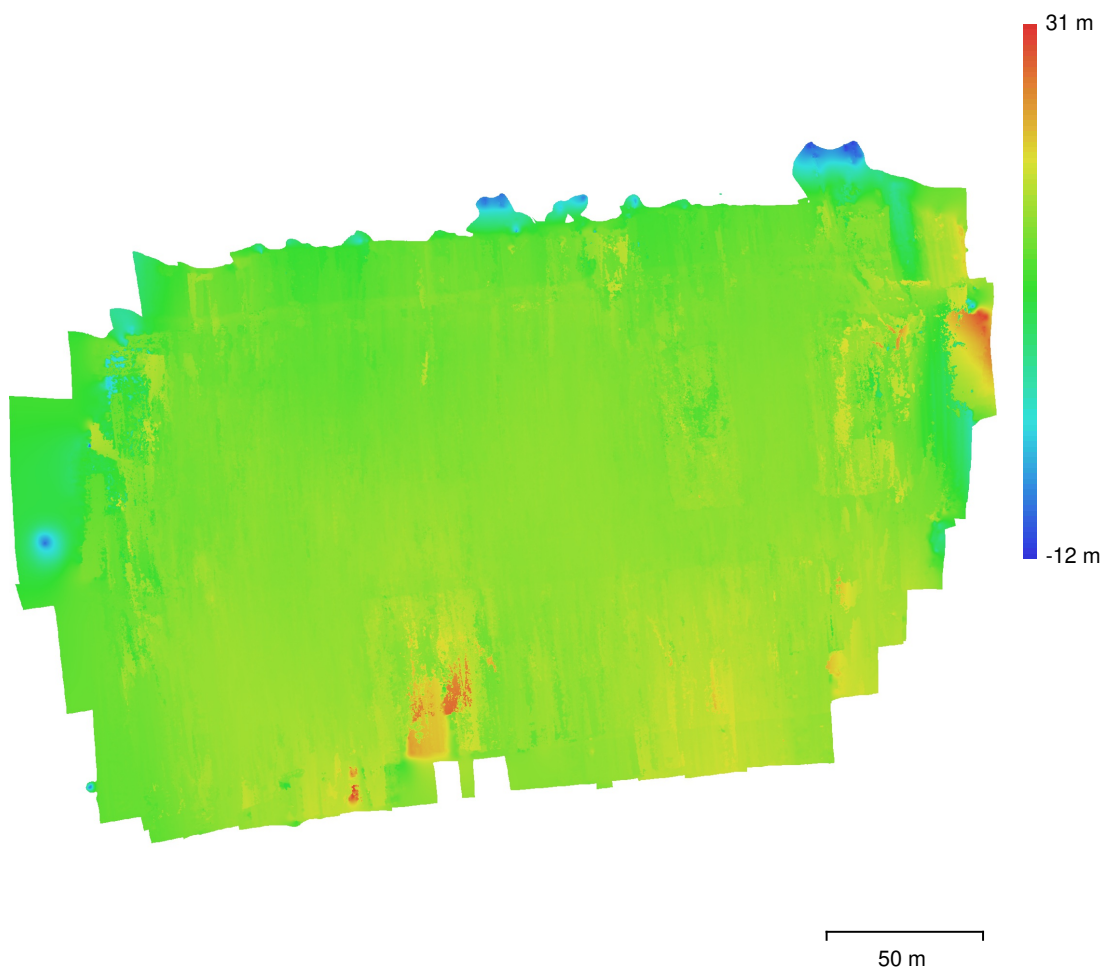


Fig. 5. Reconstructed digital elevation model.

Resolution: 3.12 cm/pix
Point density: 0.103 points/cm²

Processing Parameters

General

Cameras	128
Aligned cameras	128
Markers	5
Coordinate system	SWEREF99 TM (EPSG::3006)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	97,903 of 135,044
RMS reprojection error	2.94973 (10.6394 pix)
Max reprojection error	13.2705 (161.589 pix)
Mean key point size	3.79994 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.01198

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	2 minutes 1 seconds
Matching memory usage	624.72 MB
Alignment time	2 minutes 28 seconds
Alignment memory usage	88.69 MB

Optimization parameters

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

Depth Maps

Count	128
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Processing time	19 minutes 30 seconds
Software version	1.6.2.10247

Dense Point Cloud

Points	96,996,856
Point colors	3 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Processing time	19 minutes 30 seconds
Dense cloud generation parameters	
Processing time	15 minutes 43 seconds
Software version	1.6.2.10247

DEM

Size	13,154 x 9,876
Coordinate system	SWEREF99 TM (EPSG::3006)

Reconstruction parameters	
Source data	Dense cloud
Interpolation	Enabled
Processing time	1 minutes 52 seconds
Software version	1.6.2.10247
Orthomosaic	
Size	20,200 x 14,368
Coordinate system	SWEREF99 TM (EPSG::3006)
Colors	3 bands, uint8
Reconstruction parameters	
Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Processing time	5 minutes 15 seconds
Software version	1.6.2.10247
System	
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