

# Midterhuken

Processing Report  
07 February 2022



# Survey Data

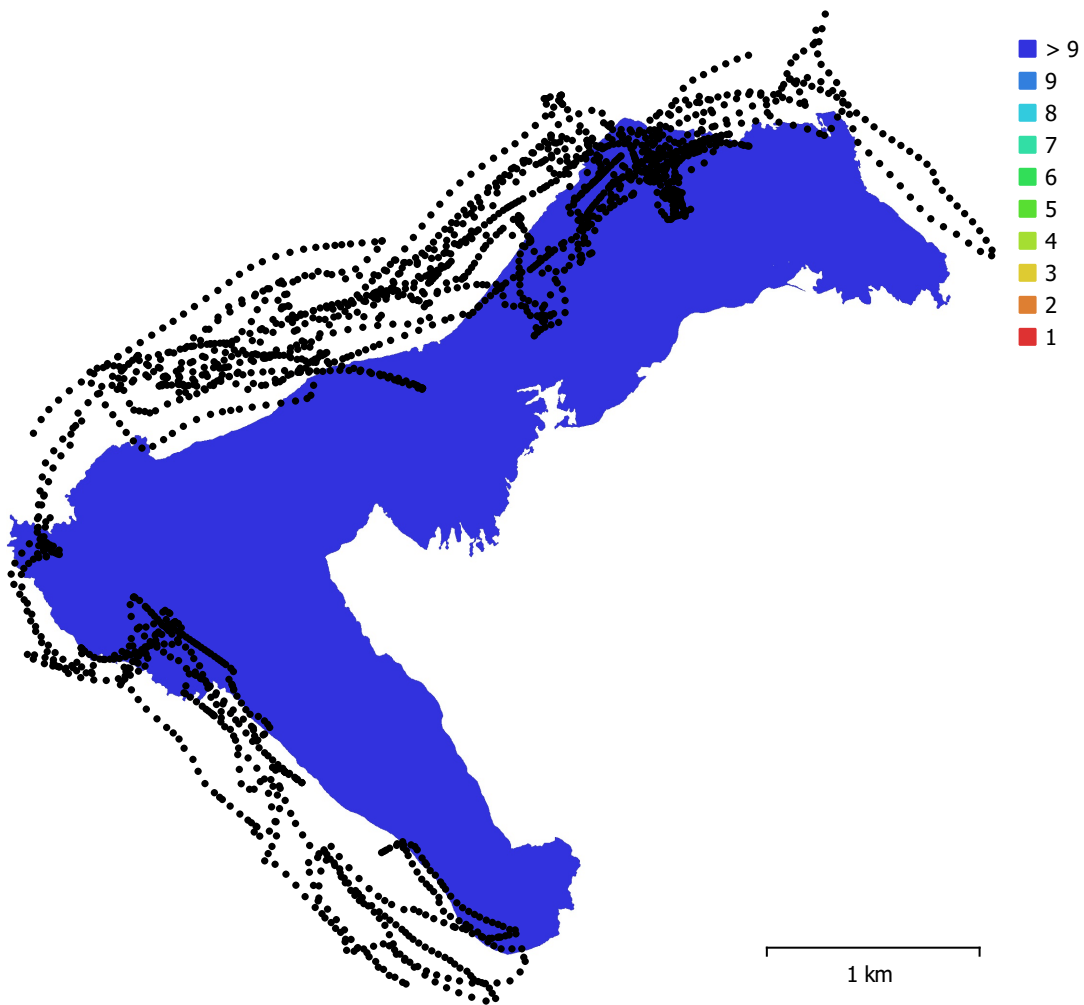


Fig. 1. Camera locations and image overlap.

Number of images:	2,000	Camera stations:	1,997
Flying altitude:	427 m	Tie points:	1,429,825
Ground resolution:	10.1 cm/pix	Projections:	3,650,166
Coverage area:	4.94 km <sup>2</sup>	Reprojection error:	0.214 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
L1D-20c (10.26mm)	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu$ m	No

Table 1. Cameras.

# Camera Calibration

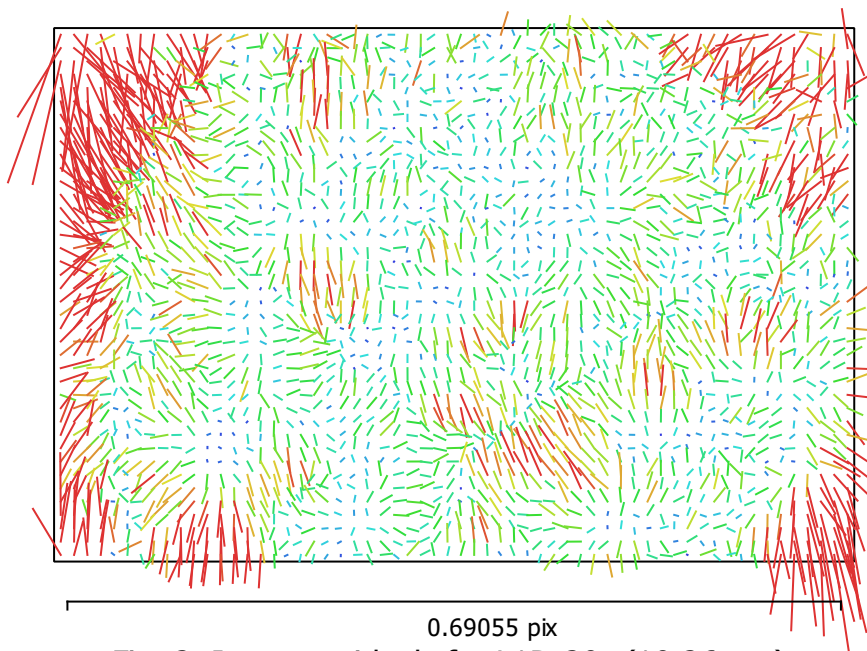


Fig. 2. Image residuals for L1D-20c (10.26mm).

## L1D-20c (10.26mm)

2000 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>5472 x 3648</b>	<b>10.26 mm</b>	<b>2.41 x 2.41 <math>\mu\text{m}</math></b>

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
<b>F</b>	<b>4375.73</b>	0.03	1.00	0.05	-0.57	0.04	0.10	-0.10	0.03	-0.28
<b>Cx</b>	<b>4.33172</b>	0.052		1.00	-0.06	0.00	0.01	-0.01	0.95	-0.05
<b>Cy</b>	<b>-43.5021</b>	0.05			1.00	-0.12	0.03	-0.03	-0.06	0.77
<b>K1</b>	<b>0.00755012</b>	1.5e-05				1.00	-0.93	0.86	-0.00	-0.17
<b>K2</b>	<b>0.046515</b>	6.6e-05					1.00	-0.98	0.01	0.04
<b>K3</b>	<b>-0.0489213</b>	8.7e-05						1.00	-0.01	-0.03
<b>P1</b>	<b>0.000398469</b>	3.7e-06							1.00	-0.05
<b>P2</b>	<b>-0.00298746</b>	2.6e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

# Camera Locations

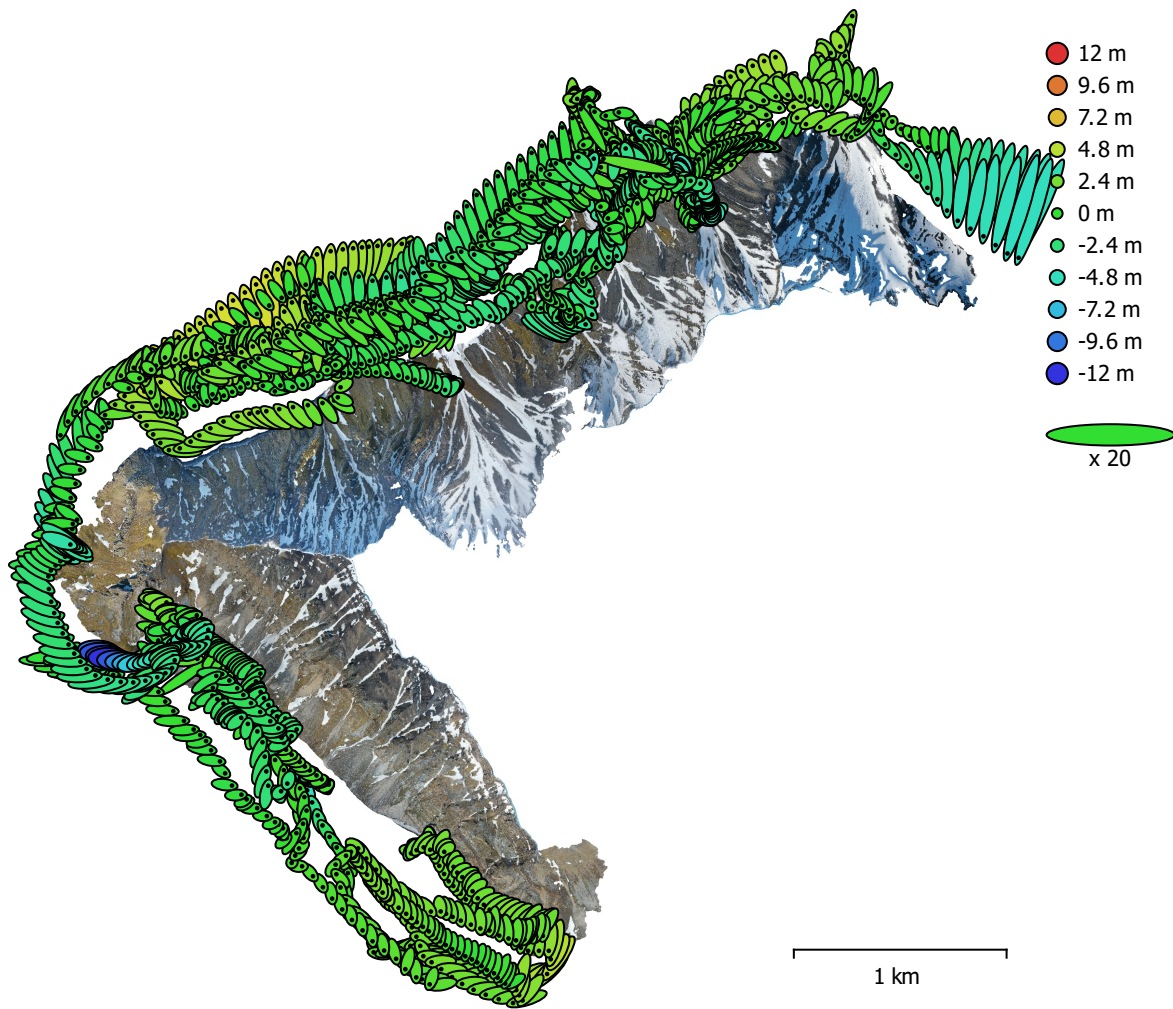


Fig. 3. Camera locations and error estimates.

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)
2.8715	3.47556	2.09734	4.50832	4.97231

Table 3. Average camera location error.

X - Longitude, Y - Latitude, Z - Altitude.

# Digital Elevation Model

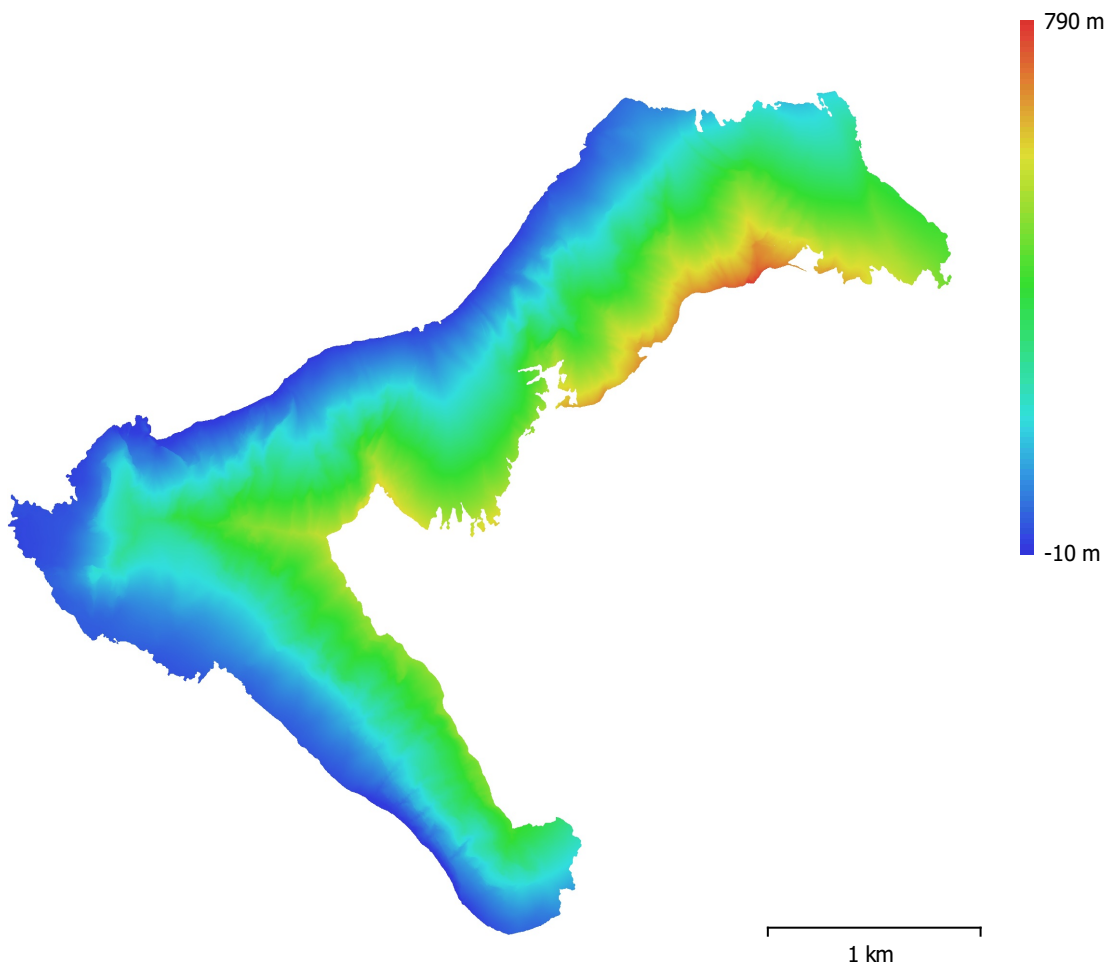


Fig. 4. Reconstructed digital elevation model.

Resolution: 20.3 cm/pix  
Point density: 24.3 points/m<sup>2</sup>

# Processing Parameters

## General

Cameras	2000
Aligned cameras	1997
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	1,429,825 of 9,529,648
RMS reprojection error	0.145703 (0.213796 pix)
Max reprojection error	0.758239 (2.24078 pix)
Mean key point size	1.40594 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	4.7211

## Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	No
Key point limit	60,000
Tie point limit	0
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	2 hours 45 minutes
Matching memory usage	3.33 GB
Alignment time	5 hours 22 minutes
Alignment memory usage	6.27 GB

## Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	37 seconds
Software version	1.7.2.12040
File size	746.75 MB

## Depth Maps

Count	1994
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## Depth maps generation parameters

Quality	High
Filtering mode	Mild
Processing time	2 hours 8 minutes
Memory usage	4.29 GB
Software version	1.7.2.12040
File size	14.27 GB

## Dense Point Cloud

Points	204,105,748
Point colors	3 bands, uint8

## Depth maps generation parameters

Quality	High
Filtering mode	Mild
Processing time	2 hours 8 minutes
Memory usage	4.29 GB

## Dense cloud generation parameters

Processing time	17 hours 31 minutes
Memory usage	33.61 GB
Software version	1.7.2.12040
File size	6.84 GB
<b>Model</b>	
Faces	40,378,523
Vertices	20,205,964
Vertex colors	3 bands, uint8
Texture	4,096 x 4,096 x 15, 4 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	High
Filtering mode	Mild
Processing time	2 hours 8 minutes
Memory usage	4.29 GB
<b>Reconstruction parameters</b>	
Surface type	Arbitrary
Source data	Dense cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	1 hours 32 minutes
Memory usage	102.86 GB
<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	4 minutes 53 seconds
UV mapping memory usage	7.33 GB
Blending time	3 hours 19 minutes
Blending memory usage	32.49 GB
Software version	1.7.2.12040
File size	2.05 GB
<b>Tiled Model</b>	
Texture	3 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	High
Filtering mode	Mild
Processing time	2 hours 8 minutes
Memory usage	4.29 GB
<b>Reconstruction parameters</b>	
Source data	Dense cloud
Tile size	256
Face count	High
Enable ghosting filter	No
Processing time	9 hours 46 minutes
Memory usage	9.84 GB
Software version	1.7.2.12040
File size	2.94 GB
<b>System</b>	
Software name	Agisoft Metashape Professional
Software version	1.7.2 build 12040
OS	Windows 64 bit
RAM	127.71 GB
CPU	Intel(R) Xeon(R) Gold 5122 CPU @ 3.60GHz
GPU(s)	Quadro P5000