Using UAVs to Map Surging Glaciers in Svalbard
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Supervisor: Dr. Richard Hann
Date of submission: 30/06/2025

Overview

As part of a research stay at NTNU, I conducted UAV-based mapping of glaciers in Svalbard in collaboration with Dr. Richard Hann. This project aimed to generate high-resolution digital elevation models (DEMs) and orthomosaics to study glacial morphology and support long-term monitoring of glacier dynamics. The data collected in this work is intended to develop new monitoring techniques for glaciers to support glaciological studies in the future. The work was supported by the SeaBee infrastructure through the Research Council of Norway (project ID #296478), which is gratefully acknowledged.

Methods

The DJI Mavic 3E multirotor drone was used to conduct aerial surveys over the following glacier systems: **Vallåkrabreen**, **Fridtjovbreen**, and the **Paulabreen–Scheelebreen system**. Flights were planned using autonomous grid patterns in DJIFlightPlanner to ensure high image overlap (70% side and front overlap) and consistent ground sampling distance (GSD) across the glacier surface and its terminus. In the days preceding the field-work, Sentinel-2 images were used to assist flight-planning which was essential due to the surging behaviour of the glaciers. All images were processed using Agisoft Metashape Professional (v2.1.1 build 17748).

Below is a summary of the survey parameters for each site:

Glacier	Flight Altitude	Ground Resolution	Area Mapped	No. of Images
Vallåkrabreen	251 m	8.29 cm/pixel	4.87 km²	625
Fridtjovbreen	157 m	4.00 cm/pixel	1.78 km²	555
Paulabreen–Scheelebreen	337 m	11.5 cm/pixel	17.4 km²	1,626

The M3E 12.29mm camera was pre-calibrated at resolution 5280 x 3956 but was calibrated in the field for its 3840 x 2160 resolution.

Results

The surveys yielded high-quality orthomosaics and dense point clouds suitable for DEM generation. Key outputs include:

- **Vallåkrabreen:**
  - Point cloud density: 36.4 points/m²
  - DEM resolution: 16.6 cm/pixel
  - Average total camera location error: 7.97 m
- **Fridtjovbreen:**
  - Point cloud density: 156 points/m²
  - DEM resolution: 8 cm/pixel
  - Average total camera location error: 5.32 m
- **Paulabreen–Scheelebreen:**
  - Point cloud density: 4.74 points/m²
  - DEM resolution: 45.9 cm/pixel
  - Average total camera location error: 6.39 m

These results provide a strong foundation for tracking glacier dynamics and contribute to the long-term glaciological record in Svalbard.

Planned Publication

Building on the high-resolution UAV datasets collected this year—and combined with archive data from previous seasons—we plan to investigate how crevasse morphology influences glacier–atmosphere heat and mass exchange. Crevassed surfaces increase surface roughness and channel airflow, significantly enhancing heat transfer compared to smoother glacier areas.

Objectives:

1. Classify glacial crevasse characteristics (e.g. density, depth, orientation) across several Svalbard glaciers.
2. Develop a “crevasse index” based on UAV-measured features to classify glaciers.
3. Scale the crevasse index to satellite platforms, creating a multi-tier pyramid of observation (drone → high-resolution satellite).
4. Compare crevasse indices between glacier sites to understand their implications for mass balance, melt rates, and glacier dynamics.

Proposed Workflow:

- UAV-derived crevasse detection (e.g. benchmark and develop semantic segmentation models)
- Local scaling to satellite resolution (e.g. Sentinel-2) applying transfer functions
- Evaluate spatial patterns across Svalbard glaciers to analyse:
  - Relationship between crevasse index and surface melt rate
  - Variation linked to glacier typology or dynamic regime

References to build upon:

The Segment Anything Model has been used in multiple publications for segmenting crevasses with reasonable success but there is a lot of room for improvement. For example, the following publications used it for different satellites and high-resolution UAV data, respectively. However,

neither study conducted thorough fine-tuning nor experimented with other models which would be significant contributions.

Wallace, Steven, et al. "Exploring Segment Anything Foundation Models for Out of Domain Crevasse Drone Image Segmentation." 6th Northern Lights Deep Learning Conference. MLR Press, 2025.

Shankar, Siddharth, Leigh A. Stearns, and C. J. van der Veen. "Semantic segmentation of glaciological features across multiple remote sensing platforms with the Segment Anything Model (SAM)." Journal of Glaciology 70 (2024): e4.

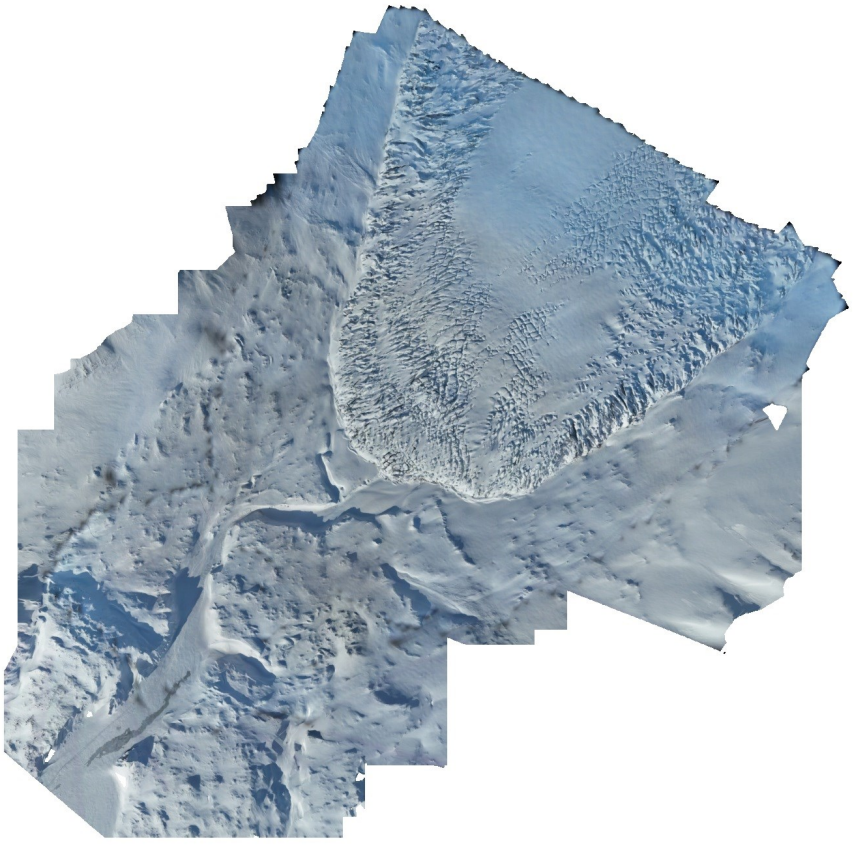
Published Dataset

Hann, Richard; Lockhart, Kaelan, 2025, "Drone-based glacier mapping of Fridtjovbreen, Vallakrabreen, Paulabreen, and Scheelebreen", https://doi.org/10.18710/GA1FTV , DataverseNO, V1

Agisoft Metashape

Processing Report

23 April 2025



Survey Data

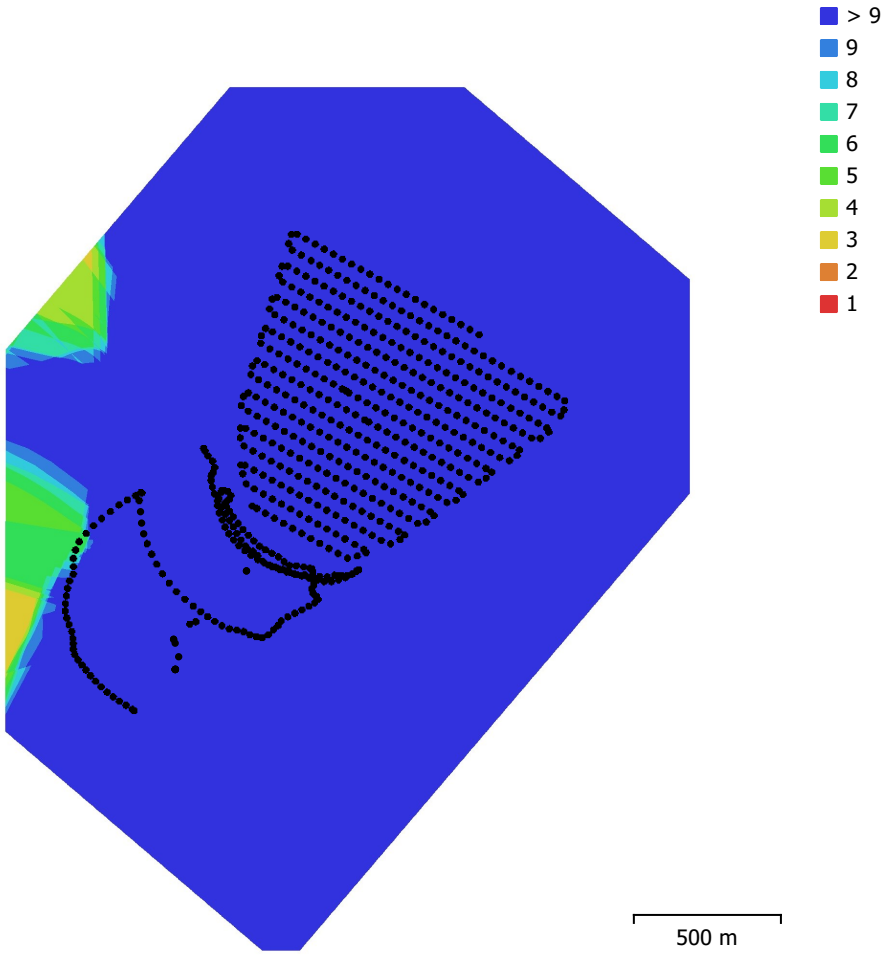


Fig. 1. Camera locations and image overlap.

Number of images:	625	Camera stations:	625
Flying altitude:	251 m	Tie points:	154,995
Ground resolution:	8.29 cm/pix	Projections:	1,949,316
Coverage area:	4.87 km²	Reprojection error:	1.25 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
M3E (12.29mm)	5280 x 3956	12.29 mm	3.36 x 3.36 µm	Yes
M3E (12.29mm)	3840 x 2160	12.29 mm	5.03 x 5.03 µm	No

Table 1. Cameras.

Camera Calibration

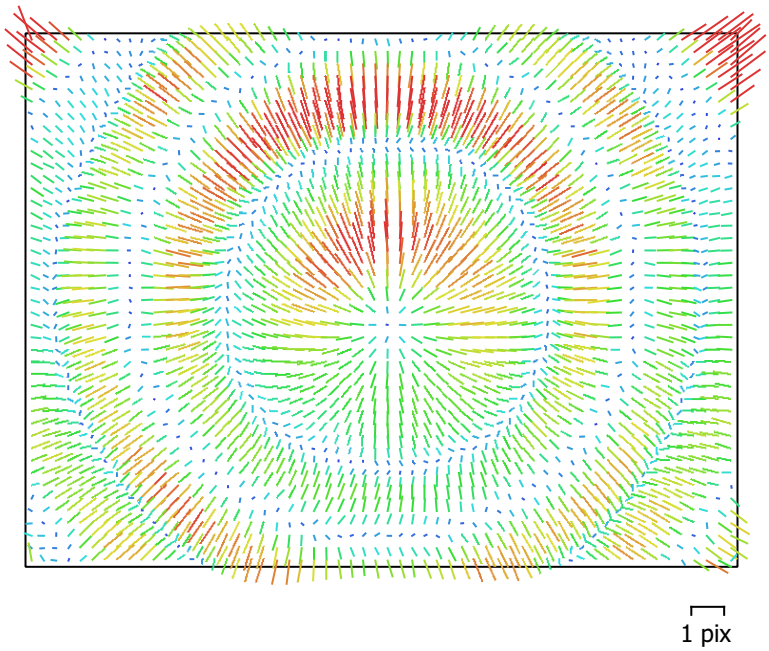


Fig. 2. Image residuals for M3E (12.29mm).

M3E (12.29mm)

623 images, precalibrated

Type	Resolution	Focal Length	Pixel Size
Frame	**5280 x 3956**	**12.29 mm**	**3.36 x 3.36 µm**

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	**3710.21**	0.023	1.00	-0.05	-0.25	-0.19	0.19	-0.22	0.03	0.21
Cx	**5.84649**	0.015		1.00	0.02	0.01	-0.03	0.04	0.20	-0.02
Cy	**-24.8954**	0.016			1.00	-0.02	0.03	-0.03	-0.02	-0.29
K1	**-0.107693**	1.4e-05				1.00	-0.95	0.88	0.01	-0.02
K2	**0.00498989**	3.5e-05					1.00	-0.98	-0.02	0.02
K3	**-0.0211923**	2.7e-05						1.00	0.03	-0.03
P1	**-6.54025e-05**	6.2e-07							1.00	0.01
P2	**-2.95236e-05**	6.9e-07								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

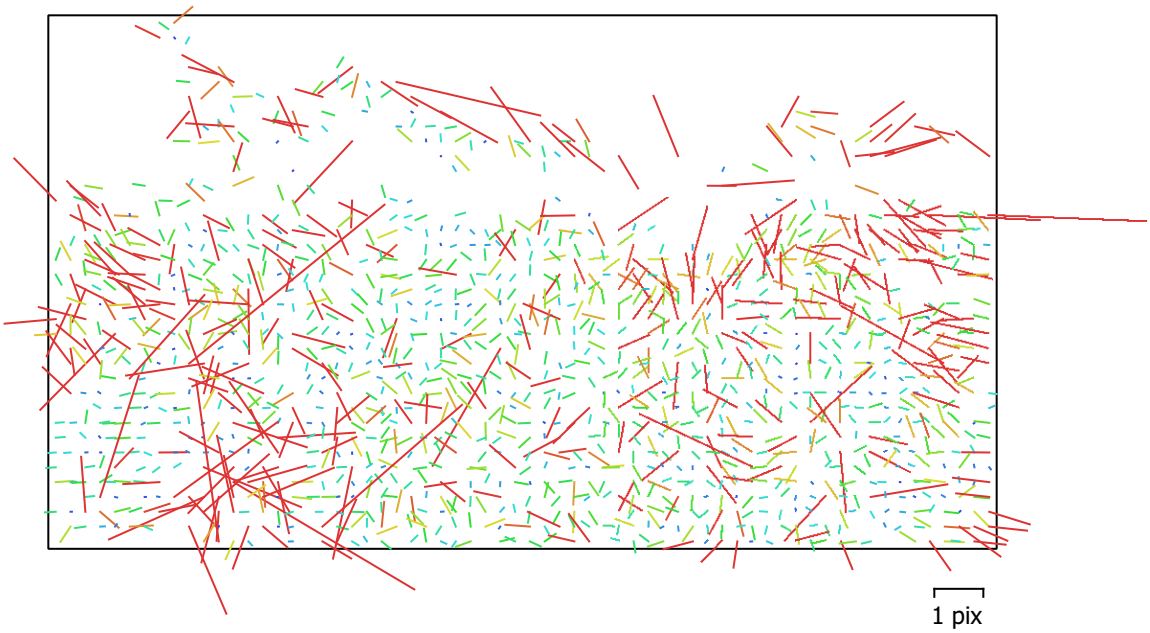


Fig. 3. Image residuals for M3E (12.29mm).

M3E (12.29mm)

2 images

Type	Resolution	Focal Length	Pixel Size
Frame	**3840 x 2160**	**12.29 mm**	**5.03 x 5.03 µm**

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	**2701.18**	0.23	1.00	-0.25	-0.84	-0.40	0.41	-0.38	-0.24	-0.17
Cx	**5.88961**	0.38		1.00	0.29	0.01	-0.04	0.06	0.98	0.28
Cy	**-22.7744**	0.75			1.00	0.01	-0.09	0.11	0.28	0.47
K1	**0.0169715**	0.00054				1.00	-0.96	0.91	0.03	-0.13
K2	**-0.0516671**	0.0021					1.00	-0.98	-0.06	0.05
K3	**0.0783173**	0.0024						1.00	0.07	-0.02
P1	**0.000280655**	5.1e-05							1.00	0.28
P2	**-0.00120276**	2.7e-05								1.00

Table 3. Calibration coefficients and correlation matrix.

Camera Locations

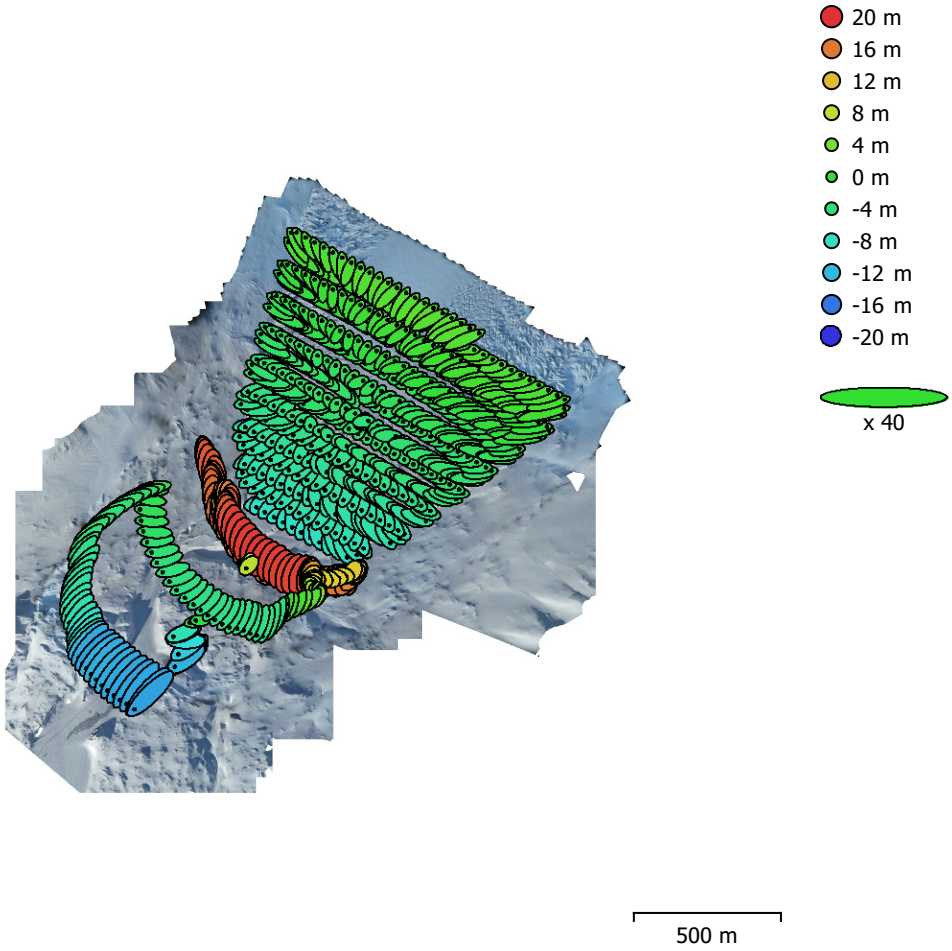


Fig. 4. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	Z error (m)	XY error (m)	Total error (m)
1.30532	1.02814	7.79047	1.6616	7.9657

Table 4. Average camera location error.
X - Longitude, Y - Latitude, Z - Altitude.

Digital Elevation Model

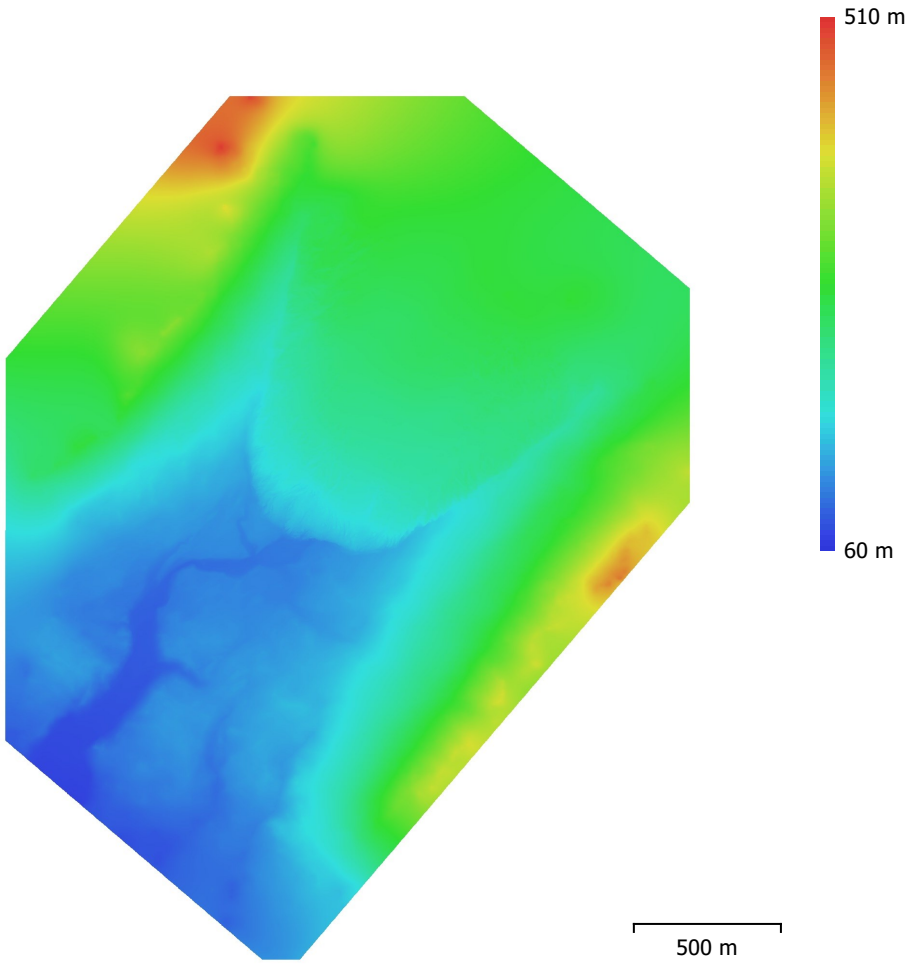


Fig. 5. Reconstructed digital elevation model.

Resolution:	16.6 cm/pix
Point density:	36.4 points/m²

Processing Parameters

General	
Cameras	625
Aligned cameras	625
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll
Tie Points	
Points	154,995 of 214,246
RMS reprojection error	0.259573 (1.24693 pix)
Max reprojection error	0.977636 (48.5671 pix)
Mean key point size	5.03887 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	13.4169
Alignment parameters	
Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Key point limit per Mpx	1,000
Tie point limit	4,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	9 minutes 34 seconds
Matching memory usage	943.07 MB
Alignment time	8 minutes 11 seconds
Alignment memory usage	685.55 MB
Optimization parameters	
Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	12 seconds
Date created	2025:04:10 10:48:43
Software version	2.1.1.17748
File size	48.10 MB
Depth Maps	
Count	625
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	57 minutes 40 seconds
Memory usage	6.78 GB
Date created	2025:04:21 21:43:47
Software version	2.1.1.17748
File size	4.34 GB
Point Cloud	
Points	72,463,188
Point attributes	
Color	3 bands, uint8
Normal	

Confidence	6 - 179
Point classes	
Created (never classified)	72,463,188
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	57 minutes 40 seconds
Memory usage	6.78 GB
Point cloud generation parameters	
Processing time	2 hours 24 minutes
Memory usage	22.81 GB
Date created	2025:04:22 00:07:49
Software version	2.1.1.17748
File size	2.26 GB
Model	
Faces	522,327
Vertices	261,576
Vertex colors	3 bands, uint8
Texture	8,192 x 8,192, 4 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	57 minutes 40 seconds
Memory usage	6.78 GB
Reconstruction parameters	
Surface type	Arbitrary
Source data	Depth maps
Interpolation	Enabled
Strict volumetric masks	No
Processing time	52 minutes 27 seconds
Memory usage	7.51 GB
Texturing parameters	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	8,192
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	16 minutes 40 seconds
UV mapping memory usage	331.50 MB
Blending time	8 minutes 30 seconds
Blending memory usage	18.67 GB
Date created	2025:04:22 15:57:37
Software version	2.1.1.17748
File size	95.24 MB
DEM	
Size	14,012 x 17,692
Coordinate system	WGS 84 (EPSG::4326)
Reconstruction parameters	
Source data	Point cloud
Interpolation	Enabled
Processing time	1 minutes 16 seconds
Memory usage	320.20 MB
Date created	2025:04:22 11:37:41
Software version	2.1.1.17748

File size	789.96 MB
Orthomosaic	
Size	35,966 x 40,475
Coordinate system	WGS 84 (EPSG::4326)
Colors	3 bands, uint8
Reconstruction parameters	
Blending mode	Mosaic
Surface	Model
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	15 minutes 25 seconds
Memory usage	2.32 GB
Date created	2025:04:23 00:21:28
Software version	2.1.1.17748
File size	10.40 GB
System	
Software name	Agisoft Metashape Professional
Software version	2.1.1 build 17748
OS	Windows 64 bit
RAM	31.45 GB
CPU	Intel(R) Core(TM) Ultra 7 165H
GPU(s)	NVIDIA RTX 2000 Ada Generation Laptop GPU

Agisoft Metashape

Processing Report

23 April 2025

Survey Data

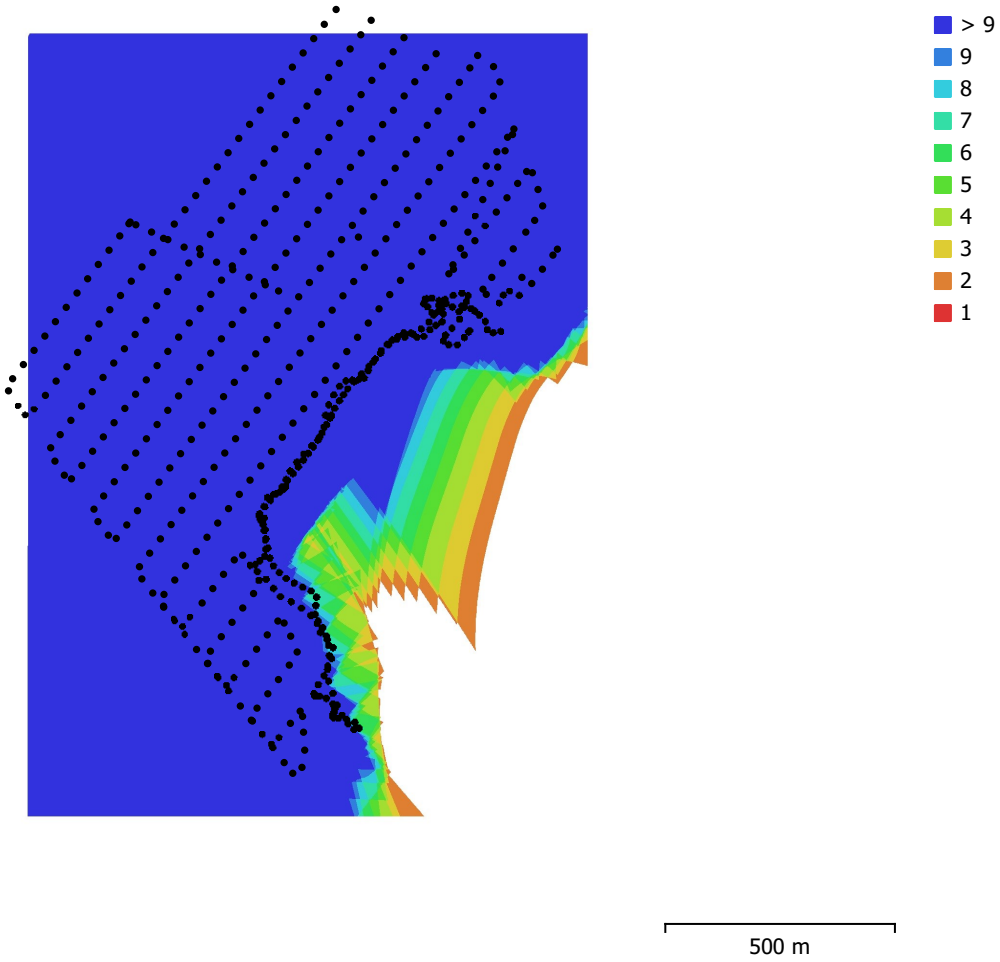


Fig. 1. Camera locations and image overlap.

Number of images:	555	Camera stations:	533
Flying altitude:	157 m	Tie points:	309,899
Ground resolution:	4 cm/pix	Projections:	1,838,941
Coverage area:	1.78 km²	Reprojection error:	1.04 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
M3E (12.29mm)	5280 x 3956	12.29 mm	3.36 x 3.36 µm	Yes
M3E (12.29mm)	3840 x 2160	12.29 mm	5.03 x 5.03 µm	No

Table 1. Cameras.

Camera Calibration

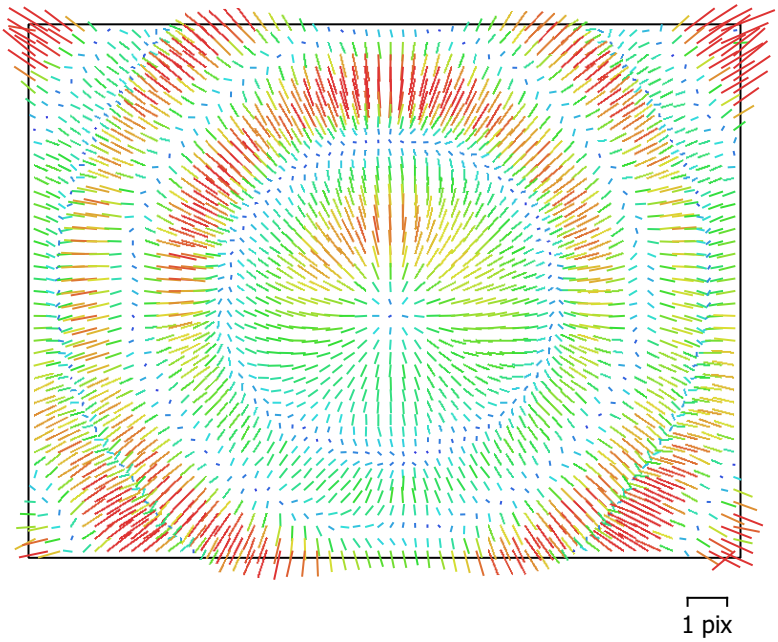


Fig. 2. Image residuals for M3E (12.29mm).

M3E (12.29mm)

554 images, precalibrated

Type	Resolution	Focal Length	Pixel Size
Frame	**5280 x 3956**	**12.29 mm**	**3.36 x 3.36 µm**

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	**3719.8**	0.019	1.00	0.03	-0.24	-0.31	0.25	-0.25	-0.05	0.19
Cx	**5.69079**	0.016		1.00	0.00	-0.00	-0.00	0.01	0.27	0.04
Cy	**-25.2243**	0.017			1.00	-0.03	0.04	-0.03	0.01	-0.01
K1	**-0.106613**	1.4e-05				1.00	-0.97	0.91	0.00	-0.06
K2	**0.000586775**	3.8e-05					1.00	-0.98	-0.01	0.05
K3	**-0.0184451**	2.9e-05						1.00	0.02	-0.06
P1	**-7.78203e-05**	6.8e-07							1.00	-0.02
P2	**-6.44952e-05**	7.3e-07								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Calibration

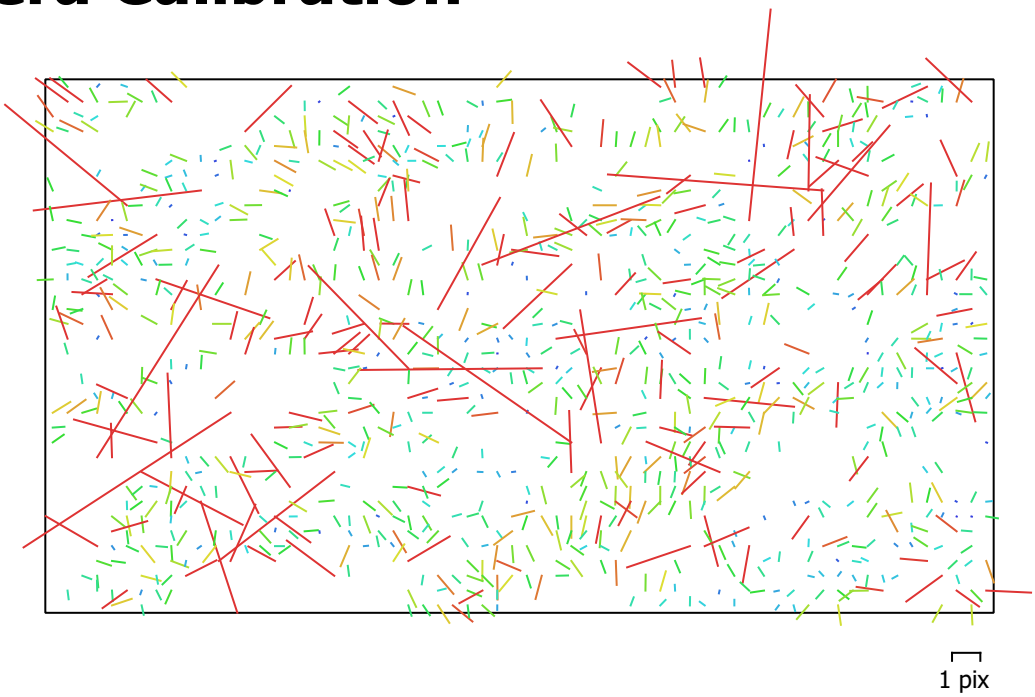


Fig. 3. Image residuals for M3E (12.29mm).

M3E (12.29mm)

1 images

Type	Resolution	Focal Length	Pixel Size
Frame	**3840 x 2160**	**12.29 mm**	**5.03 x 5.03 µm**

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	**2718.56**	1.4	1.00	-0.29	0.36	-0.08	0.02	0.02	0.01	-0.07
Cx	**-1.56306**	0.57		1.00	0.05	-0.09	0.09	-0.09	0.66	0.02
Cy	**-30.0172**	0.42			1.00	-0.04	0.03	-0.01	0.13	0.20
K1	**0.0165925**	0.0011				1.00	-0.98	0.94	-0.04	-0.03
K2	**-0.0393286**	0.0038					1.00	-0.99	0.04	0.03
K3	**0.0577601**	0.004						1.00	-0.04	-0.03
P1	**-0.00037066**	6.5e-05							1.00	0.01
P2	**-0.000879256**	3.6e-05								1.00

Table 3. Calibration coefficients and correlation matrix.

Camera Locations

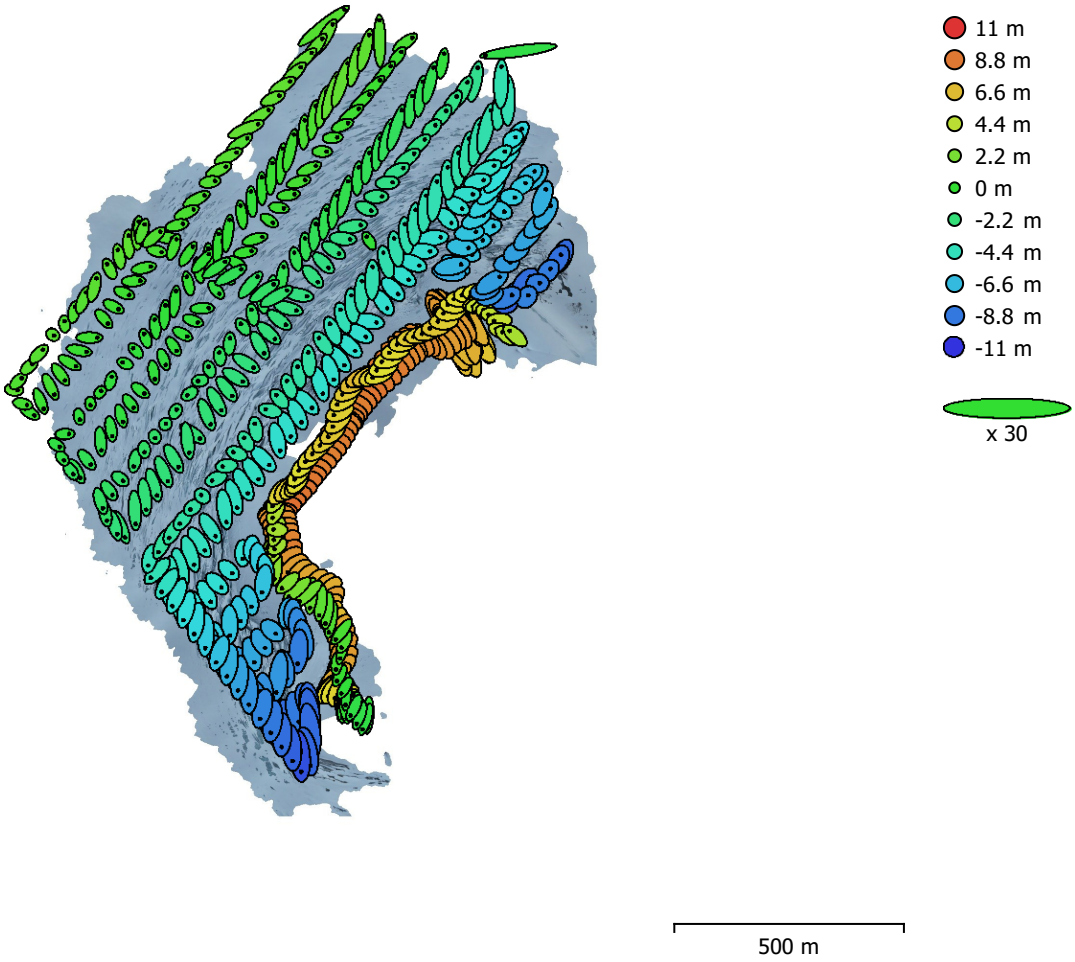


Fig. 4. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	Z error (m)	XY error (m)	Total error (m)
0.778808	1.16847	5.12795	1.40423	5.31674

Table 4. Average camera location error.
X - Longitude, Y - Latitude, Z - Altitude.

Digital Elevation Model

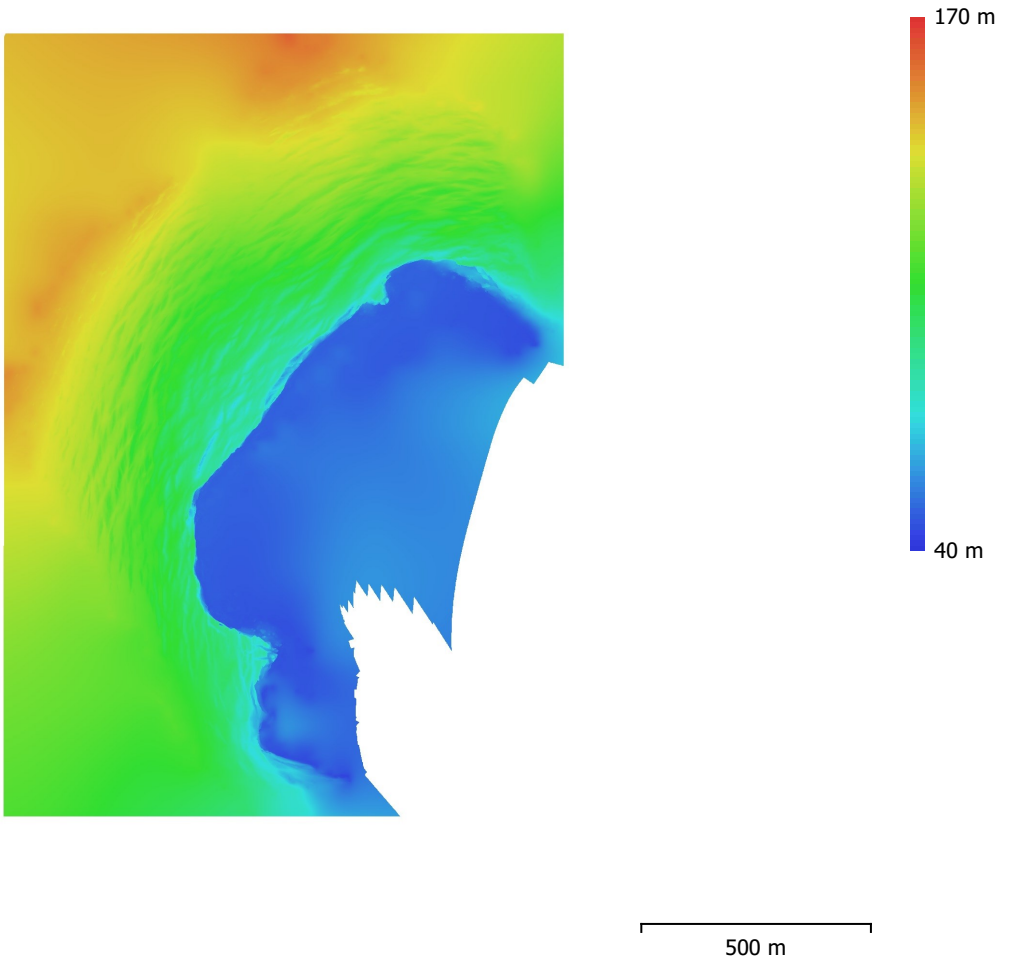


Fig. 5. Reconstructed digital elevation model.

Resolution:	8 cm/pix
Point density:	156 points/m²

Processing Parameters

General	
Cameras	555
Aligned cameras	533
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll
Tie Points	
Points	309,899 of 360,594
RMS reprojection error	0.242654 (1.04001 pix)
Max reprojection error	0.89798 (43.336 pix)
Mean key point size	3.94973 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	5.91339
Alignment parameters	
Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Key point limit per Mpx	1,000
Tie point limit	4,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	9 minutes 40 seconds
Matching memory usage	703.93 MB
Alignment time	3 minutes 29 seconds
Alignment memory usage	278.48 MB
Optimization parameters	
Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	7 seconds
Date created	2025:04:10 09:52:48
Software version	2.1.1.17748
File size	40.73 MB
Depth Maps	
Count	528
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	1 hours 4 minutes
Memory usage	4.70 GB
Date created	2025:04:10 12:03:00
Software version	2.1.1.17748
File size	2.11 GB
Point Cloud	
Points	79,609,496
Point attributes	
Color	3 bands, uint8
Normal	

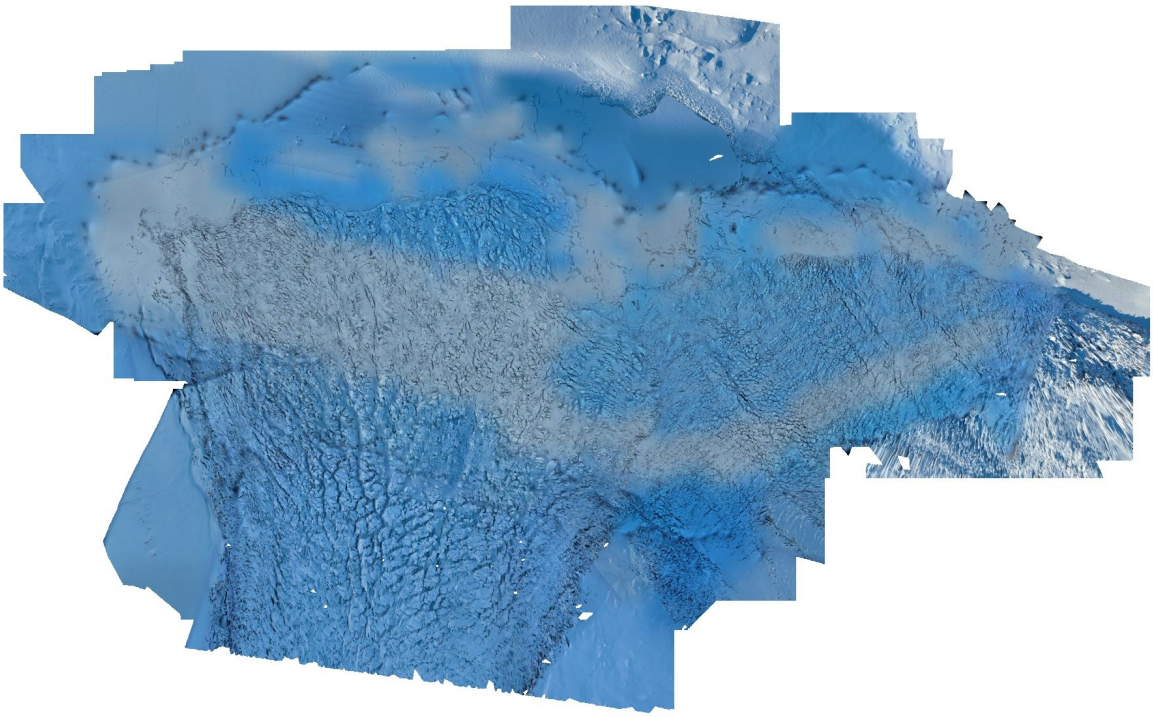
Confidence	6 - 59
Point classes	
Created (never classified)	79,609,496
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	1 hours 4 minutes
Memory usage	4.70 GB
Point cloud generation parameters	
Processing time	48 minutes 53 seconds
Memory usage	12.99 GB
Date created	2025:04:10 12:51:55
Software version	2.1.1.17748
File size	2.34 GB
Model	
Faces	441,500
Vertices	221,012
Vertex colors	3 bands, uint8
Texture	8,192 x 8,192, 4 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	1 hours 4 minutes
Memory usage	4.70 GB
Reconstruction parameters	
Surface type	Arbitrary
Source data	Depth maps
Interpolation	Enabled
Strict volumetric masks	No
Processing time	52 minutes 39 seconds
Memory usage	9.61 GB
Texturing parameters	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	8,192
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	17 minutes 49 seconds
UV mapping memory usage	468.41 MB
Blending time	8 minutes 5 seconds
Blending memory usage	12.92 GB
Date created	2025:04:19 19:13:06
Software version	2.1.1.17748
File size	82.79 MB
DEM	
Size	15,226 x 21,302
Coordinate system	WGS 84 (EPSG::4326)
Reconstruction parameters	
Source data	Point cloud
Interpolation	Enabled
Processing time	1 minutes 30 seconds
Memory usage	325.66 MB
Date created	2025:04:19 17:21:49
Software version	2.1.1.17748

File size	1.15 GB
Orthomosaic	
Size	43,541 x 53,748
Coordinate system	WGS 84 (EPSG::4326)
Colors	3 bands, uint8
Reconstruction parameters	
Blending mode	Mosaic
Surface	Model
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	24 minutes 49 seconds
Memory usage	2.95 GB
Date created	2025:04:22 23:26:19
Software version	2.1.1.17748
File size	8.04 GB
System	
Software name	Agisoft Metashape Professional
Software version	2.1.1 build 17748
OS	Windows 64 bit
RAM	31.45 GB
CPU	Intel(R) Core(TM) Ultra 7 165H
GPU(s)	NVIDIA RTX 2000 Ada Generation Laptop GPU

Agisoft Metashape

Processing Report

23 April 2025



Survey Data

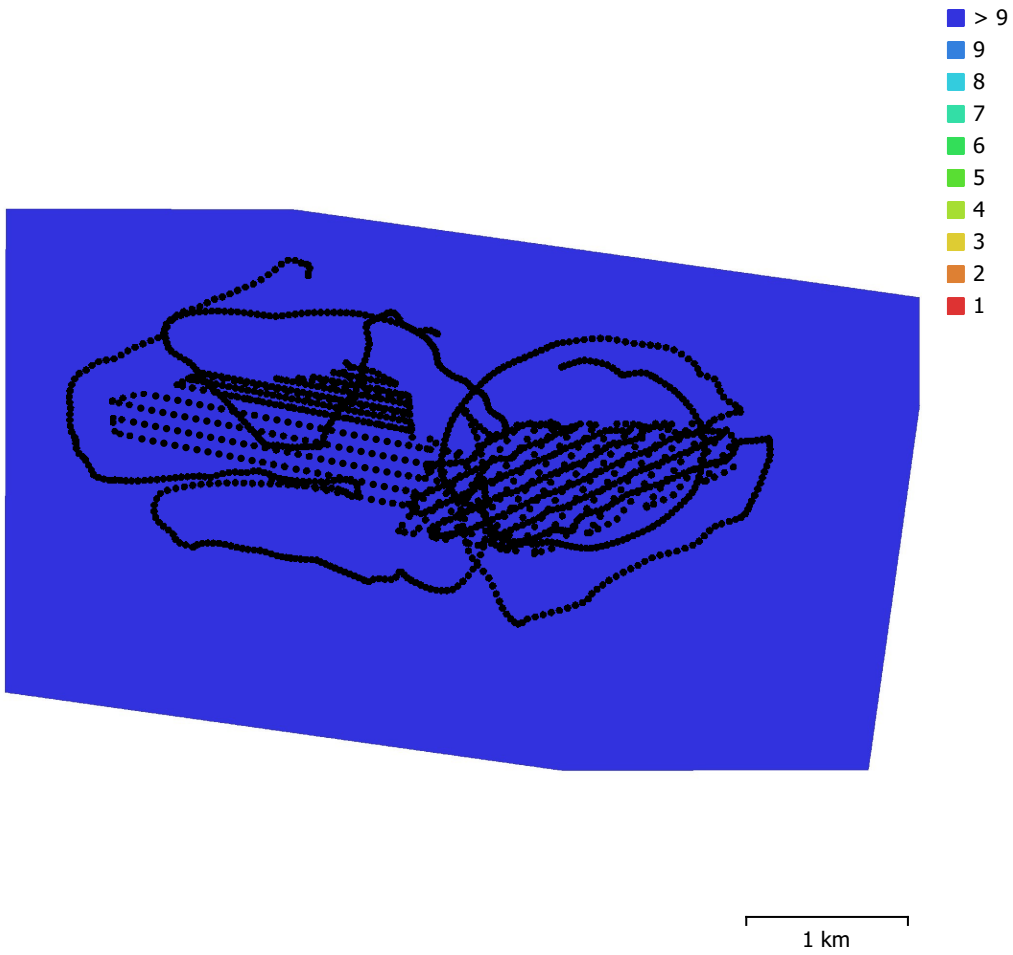


Fig. 1. Camera locations and image overlap.

Number of images:	1,626	Camera stations:	1,617
Flying altitude:	337 m	Tie points:	926,201
Ground resolution:	11.5 cm/pix	Projections:	5,150,514
Coverage area:	17.4 km²	Reprojection error:	1.35 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
M3E (12.29mm)	5280 x 3956	12.29 mm	3.36 x 3.36 µm	Yes

Table 1. Cameras.

Camera Calibration

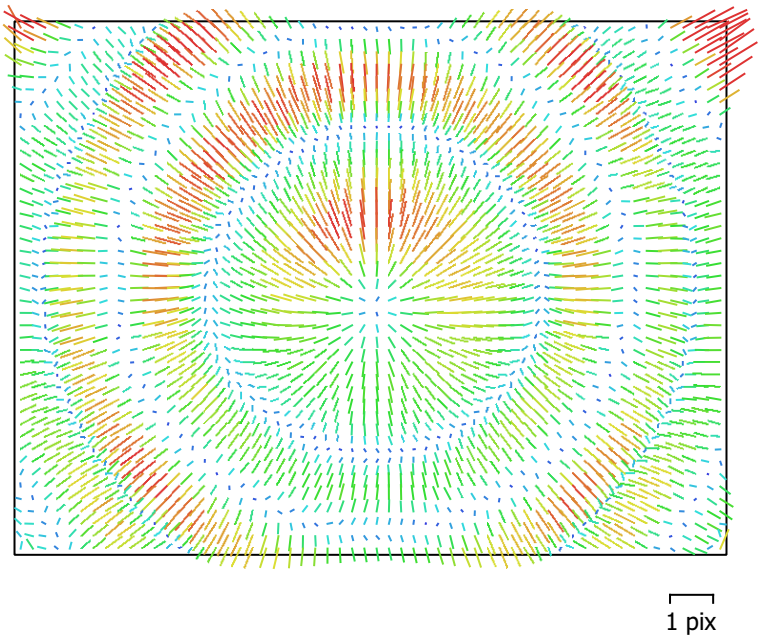


Fig. 2. Image residuals for M3E (12.29mm).

M3E (12.29mm)

1625 images, precalibrated

Type	Resolution	Focal Length	Pixel Size
Frame	**5280 x 3956**	**12.29 mm**	**3.36 x 3.36 µm**

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	**3710.93**	0.016	1.00	-0.00	-0.47	-0.28	0.23	-0.24	-0.01	0.29
Cx	**4.64106**	0.012		1.00	-0.01	0.01	-0.01	0.01	0.32	0.00
Cy	**-24.3754**	0.016			1.00	-0.01	0.03	-0.02	0.02	-0.35
K1	**-0.107576**	1.1e-05				1.00	-0.96	0.90	-0.00	-0.05
K2	**0.00514733**	2.8e-05					1.00	-0.98	0.00	0.02
K3	**-0.0219338**	2.1e-05						1.00	0.00	-0.02
P1	**-0.000102358**	5.2e-07							1.00	-0.02
P2	**-1.70074e-05**	6.7e-07								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

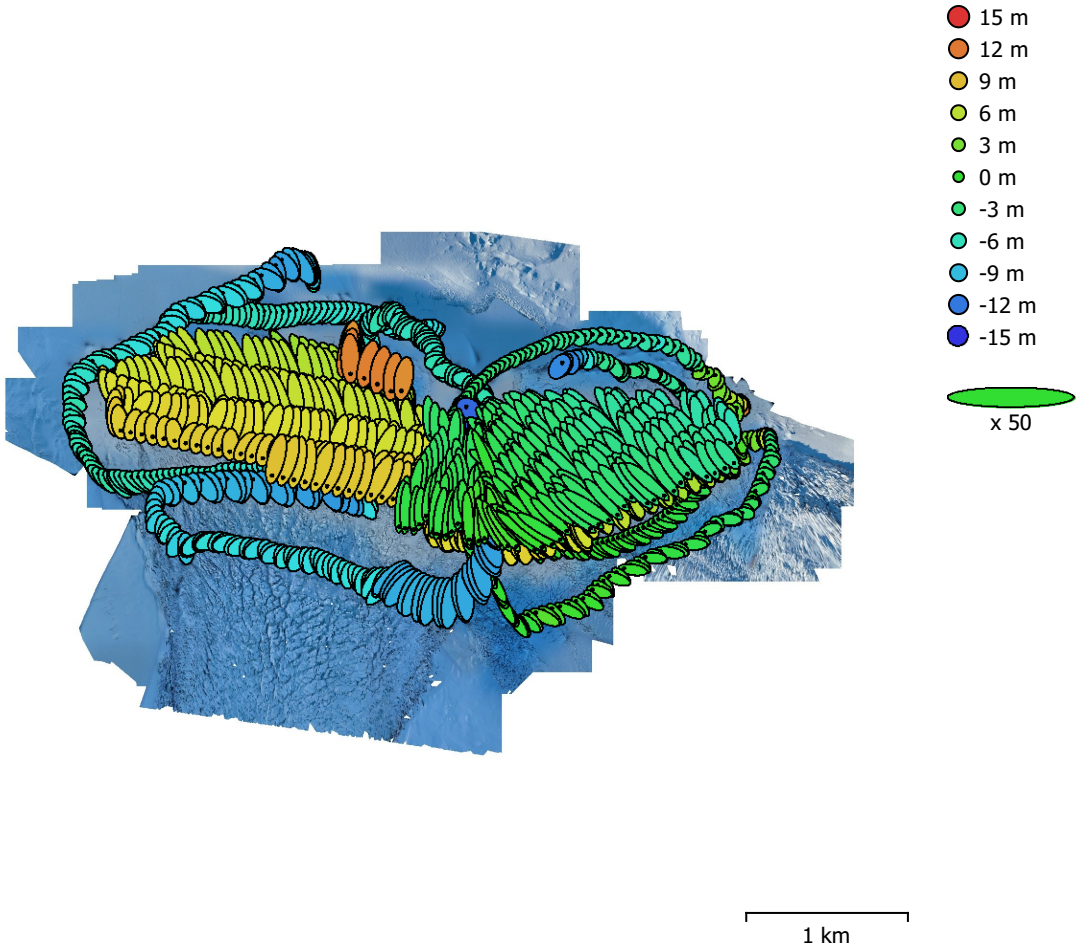


Fig. 3. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	Z error (m)	XY error (m)	Total error (m)
1.42984	2.39818	5.75061	2.79208	6.39259

Table 3. Average camera location error.
X - Longitude, Y - Latitude, Z - Altitude.

Digital Elevation Model

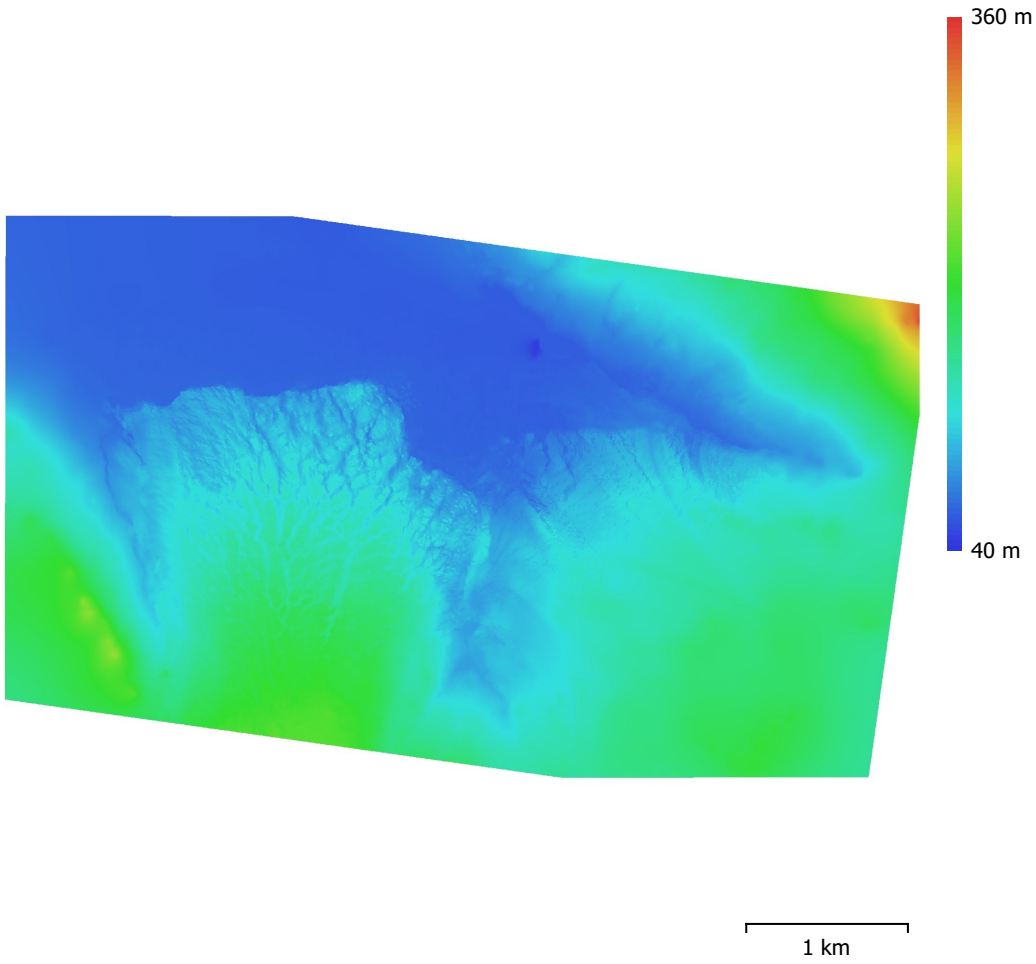


Fig. 4. Reconstructed digital elevation model.

Resolution:	45.9 cm/pix
Point density:	4.74 points/m²

Processing Parameters

General	
Cameras	1626
Aligned cameras	1617
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll
Tie Points	
Points	926,201 of 1,125,056
RMS reprojection error	0.28611 (1.35092 pix)
Max reprojection error	2.21579 (89.2961 pix)
Mean key point size	3.75759 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	6.29696
Alignment parameters	
Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Key point limit per Mpx	1,000
Tie point limit	4,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	27 minutes 50 seconds
Matching memory usage	2.76 GB
Alignment time	15 minutes 9 seconds
Alignment memory usage	2.60 GB
Optimization parameters	
Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	45 seconds
Date created	2025:04:10 10:23:04
Software version	2.1.1.17748
File size	132.73 MB
Depth Maps	
Count	1617
Depth maps generation parameters	
Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	43 minutes 4 seconds
Memory usage	1.91 GB
Date created	2025:04:22 17:29:02
Software version	2.1.1.17748
File size	3.51 GB
Point Cloud	
Points	43,663,451
Point attributes	
Color	3 bands, uint8
Normal	

Confidence	6 - 164
Point classes	
Created (never classified)	43,663,451
Depth maps generation parameters	
Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	43 minutes 4 seconds
Memory usage	1.91 GB
Point cloud generation parameters	
Processing time	3 hours 20 minutes
Memory usage	16.58 GB
Date created	2025:04:22 20:49:13
Software version	2.1.1.17748
File size	1.48 GB
Model	
Faces	412,228
Vertices	206,437
Vertex colors	3 bands, uint8
Texture	8,192 x 8,192, 4 bands, uint8
Depth maps generation parameters	
Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	43 minutes 4 seconds
Memory usage	1.91 GB
Reconstruction parameters	
Surface type	Arbitrary
Source data	Depth maps
Interpolation	Enabled
Strict volumetric masks	No
Processing time	55 minutes 5 seconds
Memory usage	8.95 GB
Texturing parameters	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	8,192
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	26 minutes 39 seconds
UV mapping memory usage	430.55 MB
Blending time	20 minutes 10 seconds
Blending memory usage	18.36 GB
Date created	2025:04:22 22:00:07
Software version	2.1.1.17748
File size	116.96 MB
DEM	
Size	12,304 x 7,552
Coordinate system	WGS 84 (EPSG::4326)
Reconstruction parameters	
Source data	Point cloud
Interpolation	Enabled
Processing time	1 minutes 24 seconds
Memory usage	319.24 MB
Date created	2025:04:22 21:05:03
Software version	2.1.1.17748

File size	380.45 MB
Orthomosaic	
Size	53,080 x 32,262
Coordinate system	WGS 84 (EPSG::4326)
Colors	3 bands, uint8
Reconstruction parameters	
Blending mode	Mosaic
Surface	Model
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	37 minutes 22 seconds
Memory usage	3.07 GB
Date created	2025:04:22 23:58:02
Software version	2.1.1.17748
File size	27.21 GB
System	
Software name	Agisoft Metashape Professional
Software version	2.1.1 build 17748
OS	Windows 64 bit
RAM	31.45 GB
CPU	Intel(R) Core(TM) Ultra 7 165H
GPU(s)	NVIDIA RTX 2000 Ada Generation Laptop GPU