Sander_2023-09-26_Mavic2EA_Wide

Processing Report

01 July 2024

Survey Data

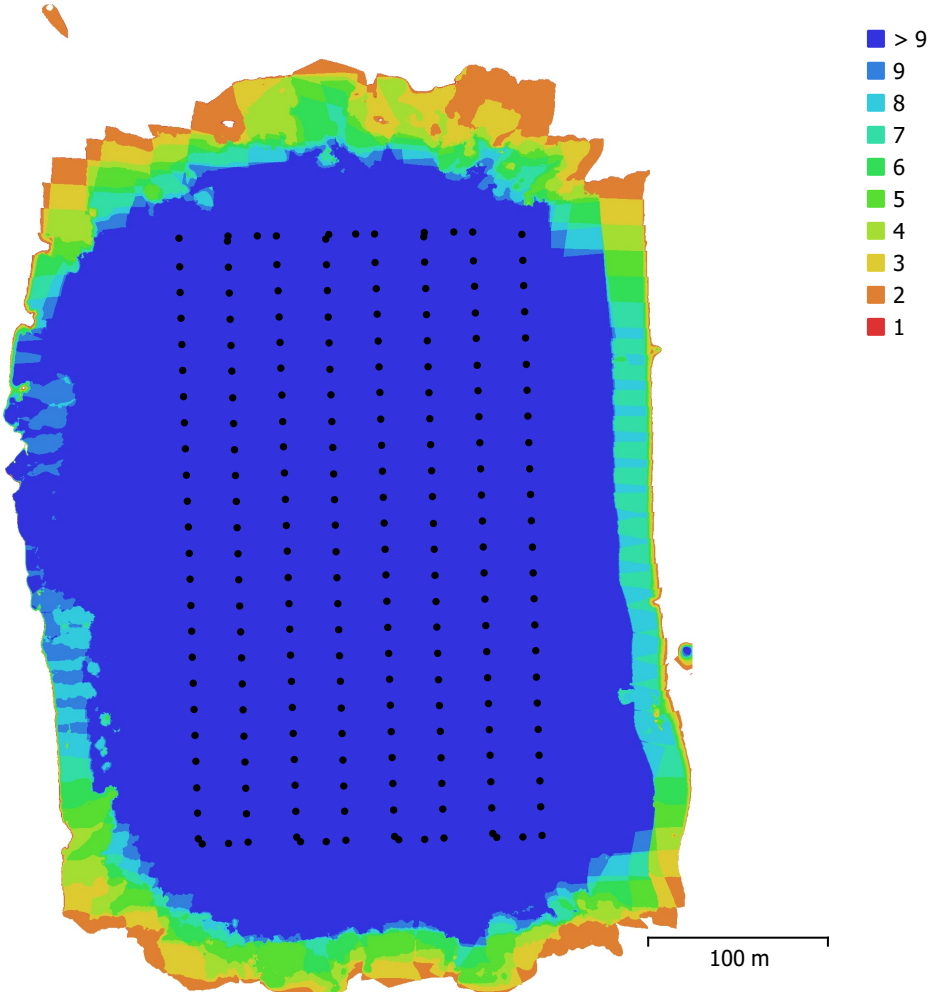

Fig. 1. Camera locations and image overlap.

Number of images:	206	Camera stations:	206
Flying altitude:	111 m	Tie points:	131,315
Ground resolution:	1.94 cm/pix	Projections:	644,786
Coverage area:	0.166 km²	Reprojection error:	1.93 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
MAVIC2-ENTERPRISE-...	8000 x 6000	4.5 mm	0.811 x 0.811 µm	No

Table 1. Cameras.

Camera Calibration

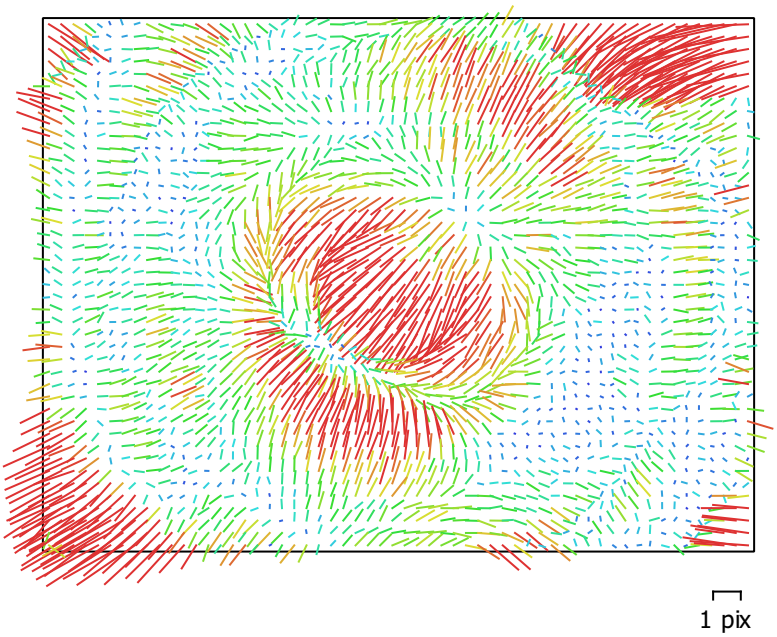

Fig. 2. Image residuals for MAVIC2-ENTERPRISE-ADVANCED (4.5mm).

MAVIC2-ENTERPRISE-ADVANCED (4.5mm)

206 images

Type	Resolution	Focal Length	Pixel Size
Frame	**8000 x 6000**	**4.5 mm**	**0.811 x 0.811 µm**

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	P1	P2
F	**5741.07**	2.9	1.00	-0.38	0.90	-0.09	0.01	-0.01	-0.26	0.05	0.08	0.13
Cx	**74.9679**	0.066		1.00	-0.32	0.04	-0.06	-0.02	0.11	-0.02	0.58	0.02
Cy	**-30.7434**	0.12			1.00	-0.05	0.02	-0.02	-0.24	0.06	0.11	0.36
B1	**-4.73085**	0.021				1.00	-0.00	0.02	-0.01	0.03	0.05	-0.01
B2	**-0.106773**	0.021					1.00	0.00	-0.00	-0.00	0.01	0.03
K1	**0.00752529**	7.8e-05						1.00	-0.58	0.54	-0.11	0.33
K2	**-0.0206384**	0.00016							1.00	-0.96	0.01	-0.04
K3	**0.00280511**	0.00014								1.00	-0.01	0.01
P1	**0.000536133**	3.1e-06									1.00	0.05
P2	**0.00119558**	3e-06										1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

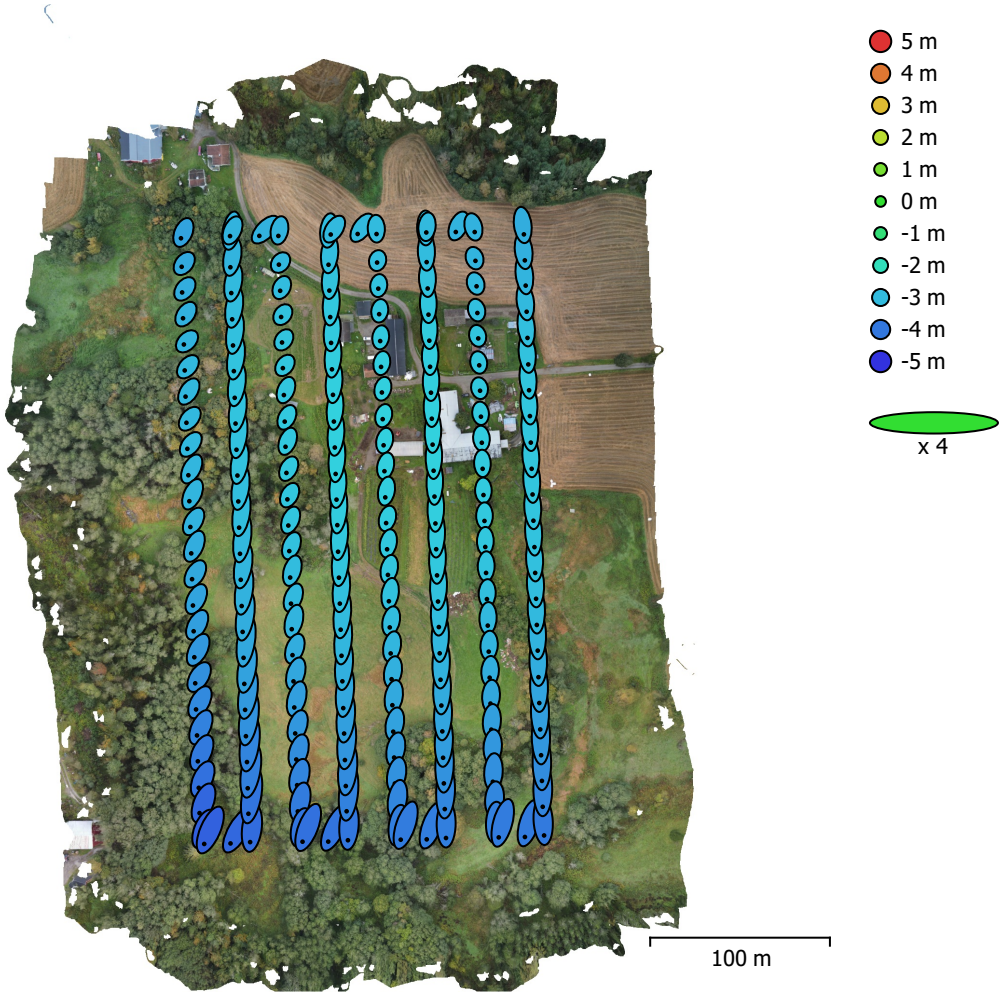

Fig. 3. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	Z error (m)	XY error (m)	Total error (m)
0.608306	3.07803	3.20164	3.13757	4.48273

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

Ground Control Points

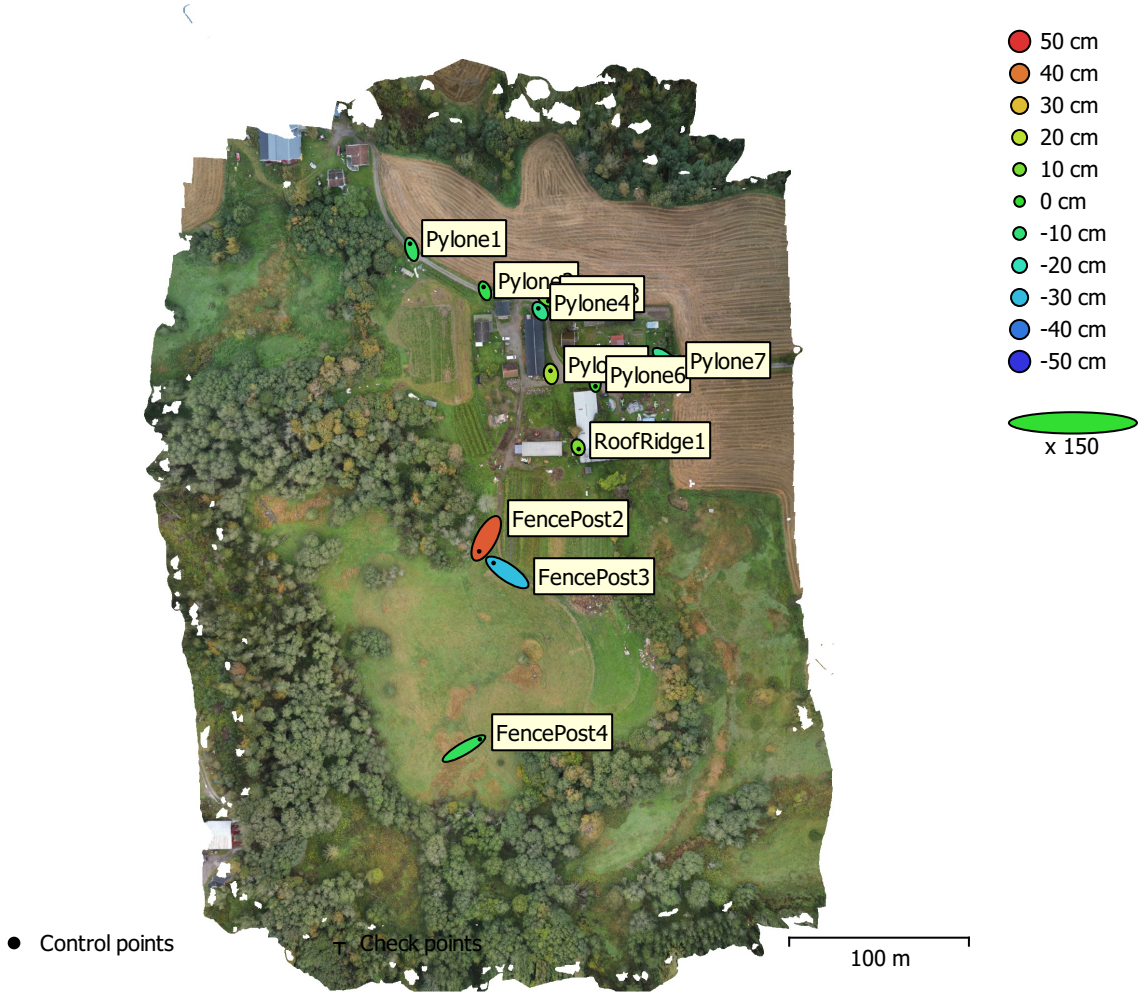

Fig. 4. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
11	5.30899	4.82532	18.4574	7.17419	19.8026

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)
Pylone1	-1.20356	4.16115	-7.28099	8.4721	1.470 (7)
Pylone2	-1.01924	2.87247	-3.73815	4.82324	0.949 (10)
Pylone3	2.14535	-2.11715	6.70533	7.35162	1.416 (10)
Pylone4	-1.37001	2.07628	-12.9505	13.1872	1.482 (12)
Pylone5	-0.310823	2.32659	16.7747	16.9381	5.834 (8)
Pylone6	0.219524	-1.91596	2.20556	2.92978	1.333 (10)
Pylone7	5.46092	-4.69411	-14.2458	15.9624	2.195 (11)
FencePost2	-5.22917	-9.62542	44.2199	45.5565	3.531 (8)
FencePost3	-10.1534	6.97879	-29.66	32.1172	1.332 (9)
FencePost4	11.8518	6.91203	-5.90694	14.9376	2.025 (7)
RoofRidge1	0.45313	-1.23044	10.419	10.5012	3.356 (10)
Total	**5.30899**	**4.82532**	**18.4574**	**19.8026**	**2.564**

Table 5. Control points.

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

Digital Elevation Model

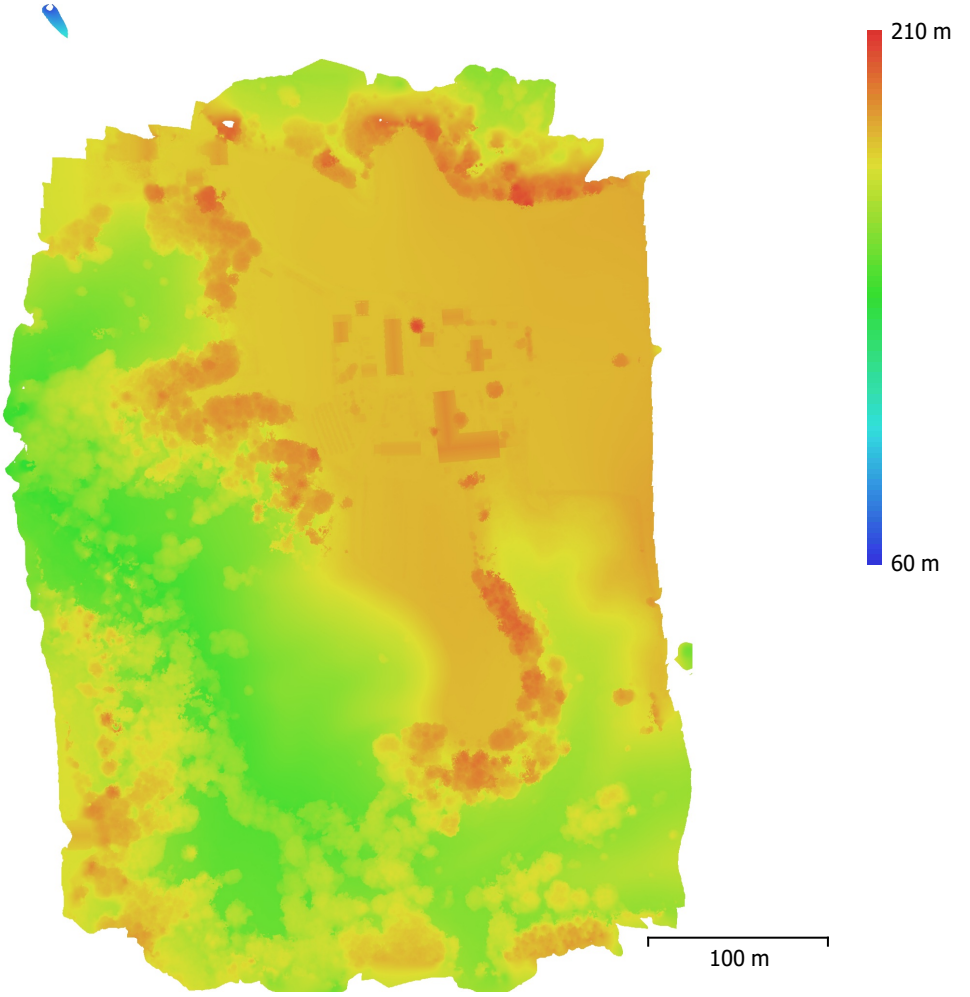

Fig. 5. Reconstructed digital elevation model.

Resolution:	5 cm/pix
Point density:	400 points/m²

Processing Parameters

General	
Cameras	206
Aligned cameras	206
Markers	11
Coordinate system	ETRS89 / UTM zone 32N + NN2000 height (EPSG::5972)
Rotation angles	Yaw, Pitch, Roll
Tie Points	
Points	131,315 of 150,980
RMS reprojection error	0.368004 (1.93399 pix)
Max reprojection error	1.71691 (88.9005 pix)
Mean key point size	5.28803 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	5.91747
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	Yes
Matching time	1 minutes 16 seconds
Matching memory usage	514.76 MB
Alignment time	50 seconds
Alignment memory usage	810.79 MB
Optimization parameters	
Parameters	f, cx, cy, k1, k2, p1, p2
Adaptive camera model fitting	Yes
Optimization time	3 seconds
Date created	2024:07:01 10:47:14
Software version	2.1.0.17532
File size	44.33 MB
Depth Maps	
Count	206
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	18 minutes 7 seconds
Memory usage	10.31 GB
Date created	2024:07:01 11:16:17
Software version	2.1.0.17532
File size	3.46 GB
DEM	
Size	7,659 x 10,994
Coordinate system	ETRS89 / UTM zone 32N + NN2000 height (EPSG::5972)
Depth maps generation parameters	

Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	18 minutes 7 seconds
Memory usage	10.31 GB
Reconstruction parameters	
Source data	Depth maps
Interpolation	Enabled
Processing time	9 minutes 38 seconds
Memory usage	22.58 GB
Date created	2024:07:01 11:25:56
Software version	2.1.0.17532
File size	289.99 MB
Orthomosaic	
Size	15,320 x 21,960
Coordinate system	ETRS89 / UTM zone 32N + NN2000 height (EPSG::5972)
Colors	3 bands, uint8
Reconstruction parameters	
Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	4 minutes 16 seconds
Memory usage	2.72 GB
Date created	2024:07:01 12:31:09
Software version	2.1.0.17532
File size	4.57 GB
System	
Software name	Agisoft Metashape Professional
Software version	2.1.0 build 17532
OS	Windows 64 bit
RAM	127.15 GB
CPU	AMD Ryzen 9 7950X 16-Core Processor
GPU(s)	NVIDIA GeForce RTX 4080 SUPER