

Agisoft Metashape

Processing Report
16 November 2023



Survey Data

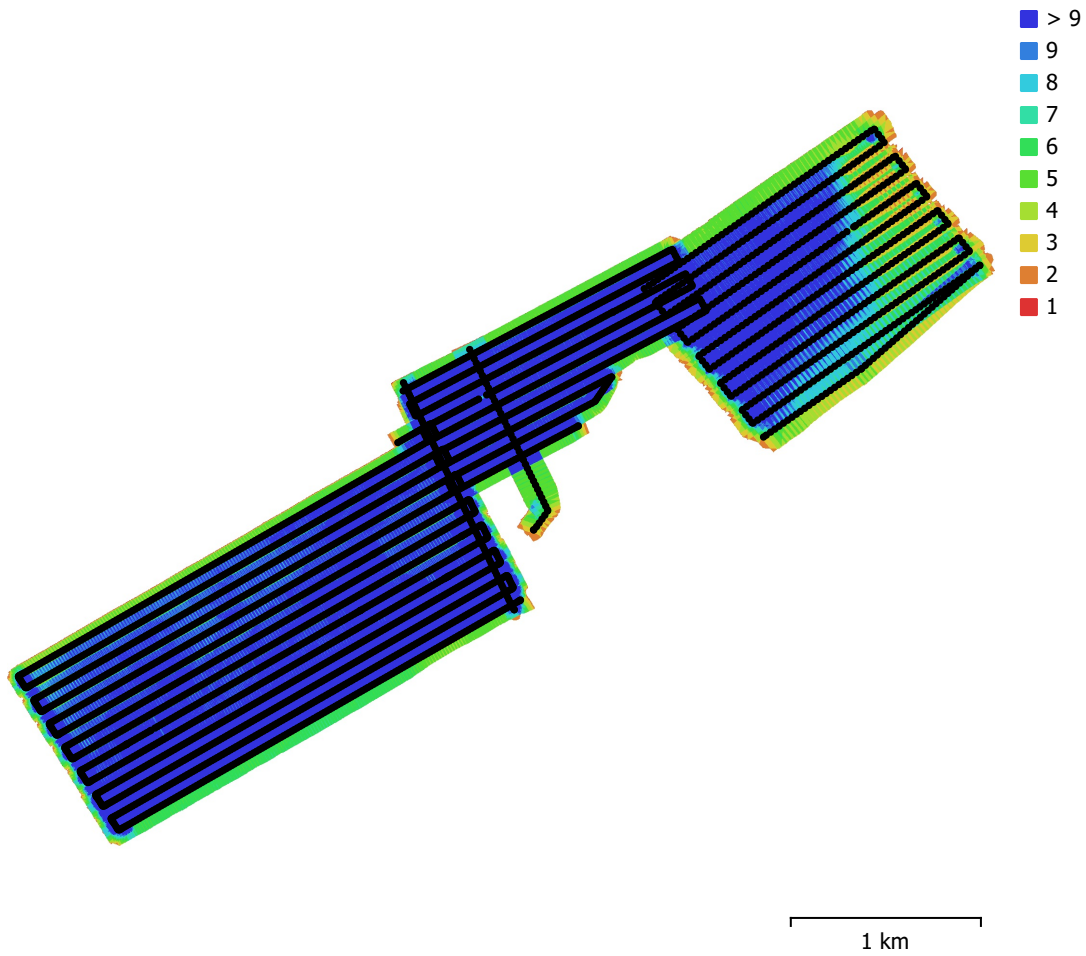


Fig. 1. Camera locations and image overlap.

Number of images:	3,959	Camera stations:	3,958
Flying altitude:	126 m	Tie points:	5,970,039
Ground resolution:	1.54 cm/pix	Projections:	29,538,624
Coverage area:	5.61 km ²	Reprojection error:	0.24 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
ZenmuseP1 (35mm)	8192 x 5460	35 mm	4.39 x 4.39 μm	No

Table 1. Cameras.

Camera Calibration

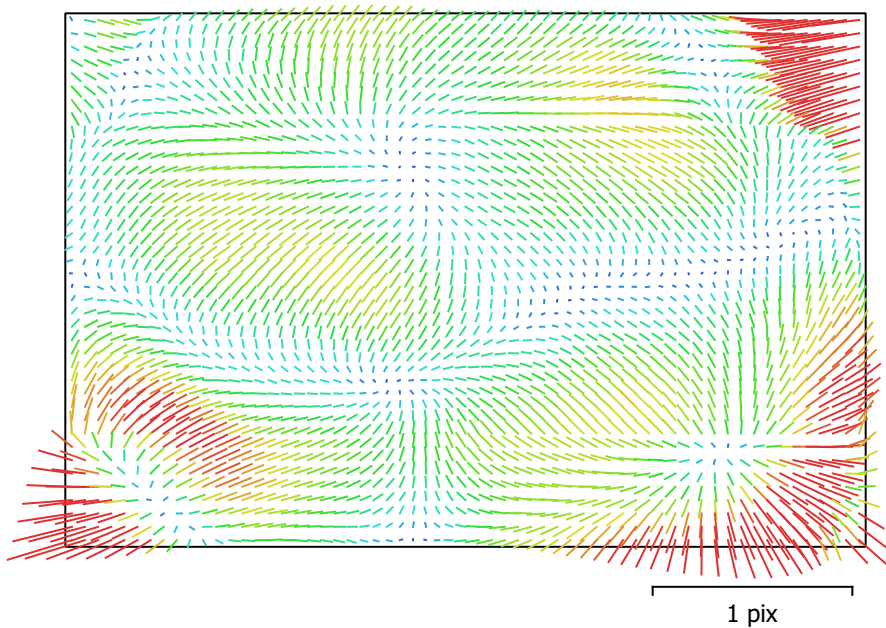


Fig. 2. Image residuals for ZenmuseP1 (35mm).

ZenmuseP1 (35mm)

3959 images

Type	Resolution	Focal Length	Pixel Size
Frame	8192 x 5460	35 mm	4.39 x 4.39 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	K4	P1	P2
F	8191.24	0.025	1.00	-0.17	0.19	-0.11	0.05	-0.05	0.04	0.03	-0.00
Cx	-18.783	0.0039		1.00	0.01	0.02	-0.02	0.02	-0.02	0.51	-0.02
Cy	3.9072	0.0036			1.00	-0.01	0.00	-0.00	0.00	-0.04	0.81
K1	-0.0501516	5.2e-06				1.00	-0.97	0.91	-0.86	0.00	0.00
K2	0.0478616	5.4e-05					1.00	-0.99	0.96	-0.01	-0.00
K3	-0.18144	0.00022						1.00	-0.99	0.01	-0.00
K4	0.0996264	0.00031							1.00	-0.01	0.00
P1	-0.000432273	1.2e-07								1.00	-0.02
P2	0.00110179	1.5e-07									1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

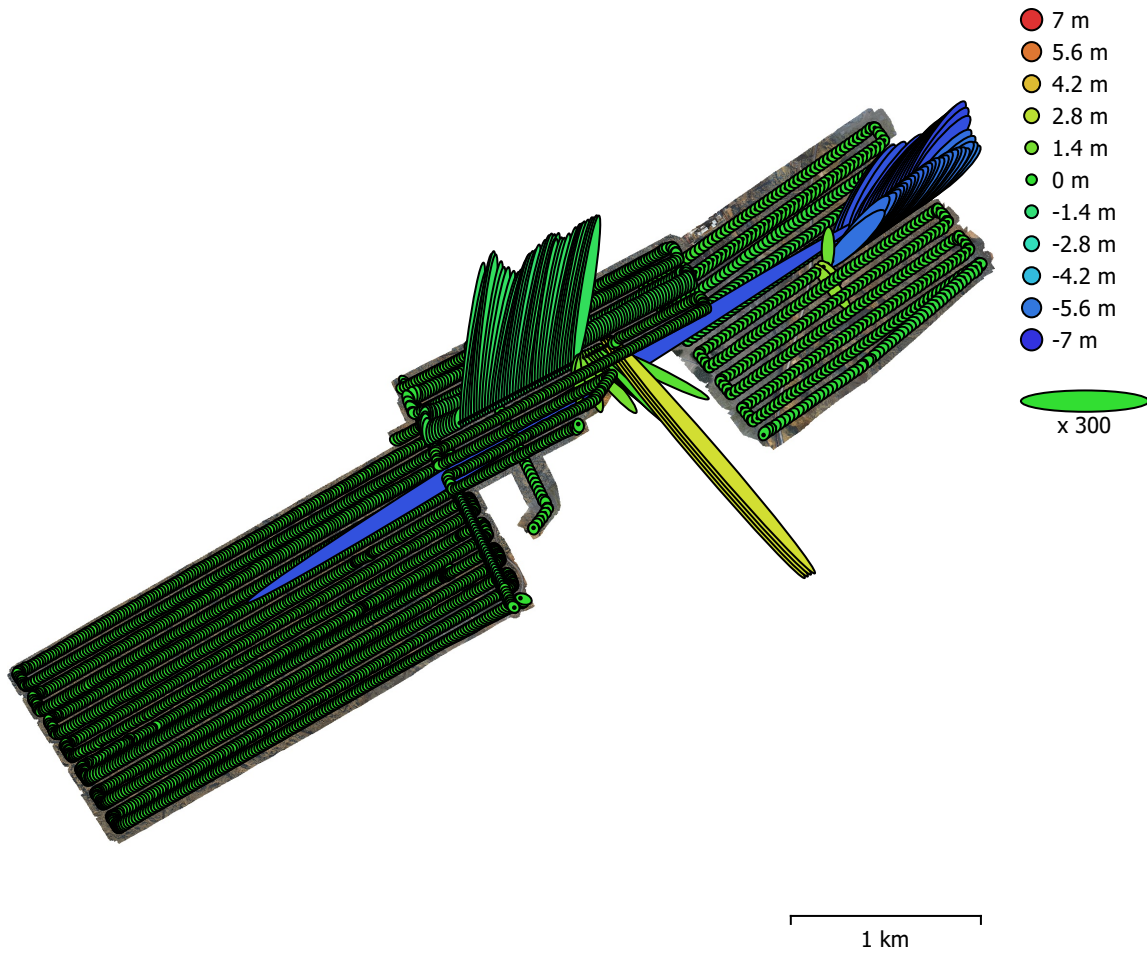


Fig. 3. Camera locations and error estimates.

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 (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total error (cm)
23.0008	33.3841	69.204	40.5405	80.2043

Table 3. Average camera location error.

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

Ground Control Points

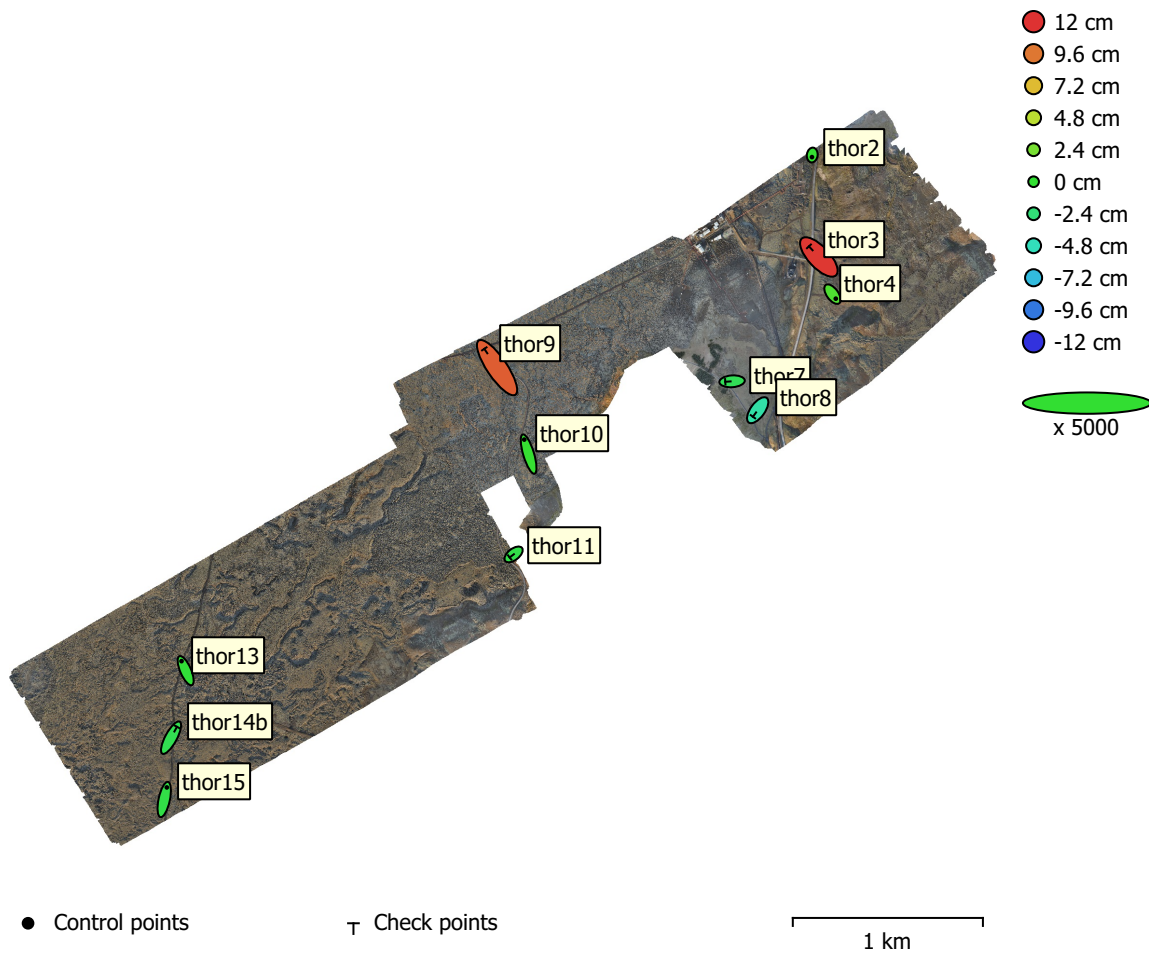


Fig. 4. GCP locations and error estimates.

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	0.691171	2.04153	0.561347	2.15536	2.22726

Table 4. Control points RMSE.

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

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
6	1.67349	2.16757	6.70092	2.73842	7.23887

Table 5. Check points RMSE.

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

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
thor10	-0.920332	3.0464	0.140931	3.18551	0.665 (10)
thor13	-0.86865	1.99637	-0.206608	2.18694	0.559 (10)
thor15	0.546212	2.54526	-0.706172	2.69729	0.795 (13)
thor2	-0.0576214	-0.434794	0.0754362	0.445036	0.800 (4)
thor4	0.696674	-0.951694	1.00431	1.5491	1.110 (10)
Total	0.691171	2.04153	0.561347	2.22726	0.807

Table 6. Control points.
X - Easting, Y - Northing, Z - Altitude.

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
thor11	-0.826857	-0.636898	-0.788362	1.30799	0.190 (6)
thor14b	1.2408	2.2913	-1.07297	2.81796	0.578 (10)
thor3	-2.08331	2.23416	11.8057	12.1945	0.520 (10)
thor7	-1.43101	-0.098431	-1.29899	1.93516	0.594 (11)
thor8	-1.00088	-1.37512	-4.0635	4.40508	0.441 (10)
thor9	-2.68152	3.95505	10.4914	11.5283	0.559 (9)
Total	1.67349	2.16757	6.70092	7.23887	0.516

Table 7. Check points.
X - Easting, Y - Northing, Z - Altitude.

Digital Elevation Model

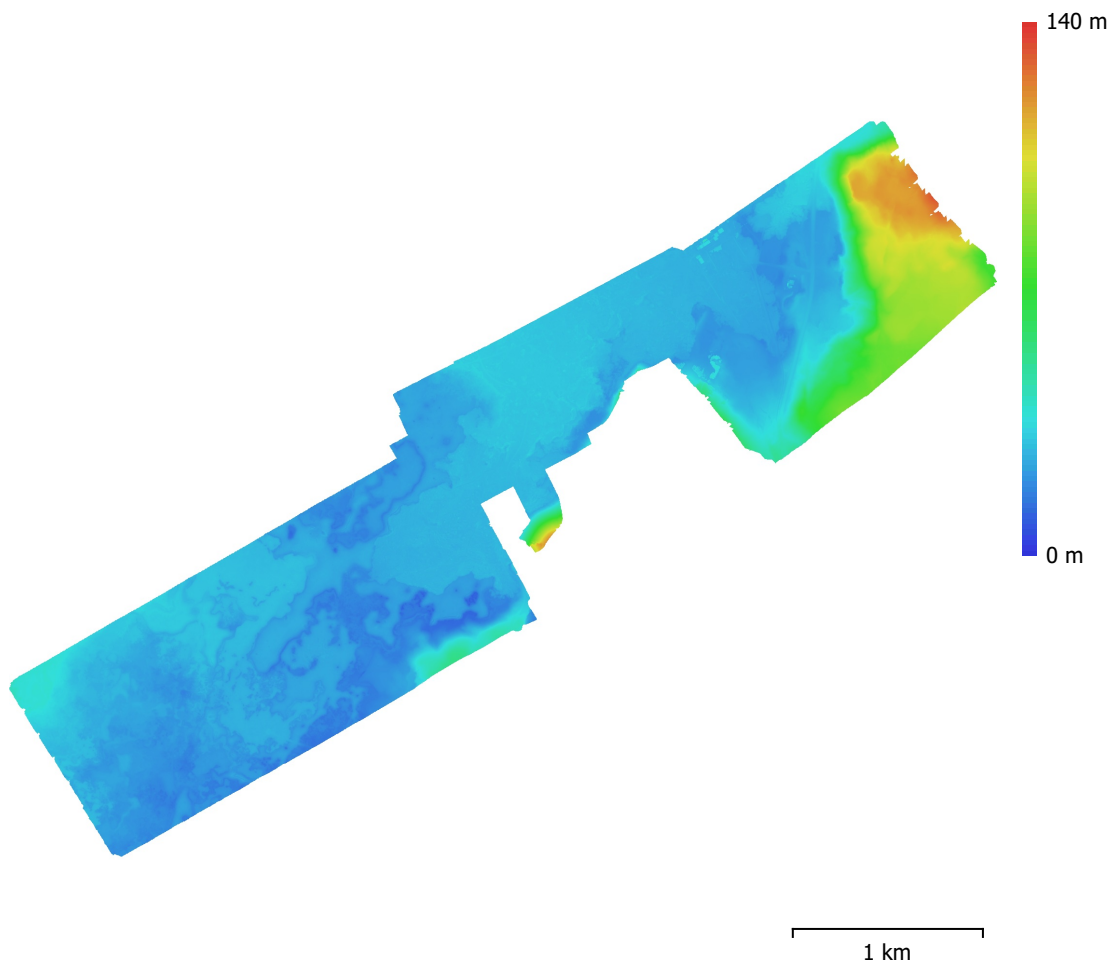


Fig. 5. Reconstructed digital elevation model.

Resolution: 18.7 cm/pix
Point density: 28.5 points/m²

Processing Parameters

General

Cameras	3959
Aligned cameras	3958
Markers	11
Coordinate system	ISN2016 + ISH2004
Rotation angles	Yaw, Pitch, Roll

Tie Points

Points	5,970,039 of 7,820,051
RMS reprojection error	0.106415 (0.239845 pix)
Max reprojection error	0.371186 (1.41578 pix)
Mean key point size	2.24664 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	5.31061

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	10,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	30 minutes 2 seconds
Matching memory usage	6.42 GB
Alignment time	32 minutes 52 seconds
Alignment memory usage	3.68 GB

Optimization parameters

Parameters	f, cx, cy, k1-k4, p1, p2
Adaptive camera model fitting	No
Optimization time	38 seconds
Date created	2023:11:16 13:28:44
Software version	2.0.3.16960
File size	1.08 GB

Depth Maps

Count	3956
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Depth maps generation parameters

Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	2 hours 0 minutes
Memory usage	3.36 GB
Date created	2023:11:16 16:48:02
Software version	2.0.3.16960
File size	14.75 GB

Model

Faces	117,745,380
Vertices	58,881,487
Vertex colors	3 bands, uint8

Depth maps generation parameters

Quality	Medium
Filtering mode	Mild
Max neighbors	16
Processing time	2 hours 0 minutes
Memory usage	3.36 GB

Reconstruction parameters

Surface type	Arbitrary
Source data	Depth maps
Interpolation	Enabled
Strict volumetric masks	No
Processing time	2 hours 3 minutes
Memory usage	16.54 GB
Date created	2023:11:16 18:47:23
Software version	2.0.3.16960
File size	2.63 GB

DEM

Size	27,690 x 20,622
Coordinate system	ISN2016 + ISH2004

Reconstruction parameters

Source data	Mesh
Interpolation	Enabled
Processing time	10 minutes 12 seconds
Memory usage	7.47 GB
Date created	2023:11:16 20:17:34
Software version	2.0.3.16960
File size	797.18 MB

System

Software name	Agisoft Metashape Professional
Software version	2.0.3 build 16960
OS	Windows 64 bit
RAM	127.76 GB
CPU	12th Gen Intel(R) Core(TM) i9-12900K
GPU(s)	NVIDIA GeForce RTX 3070 Ti