

Report Drone Cappella 10

Processing Report

01 October 2024



Survey Data

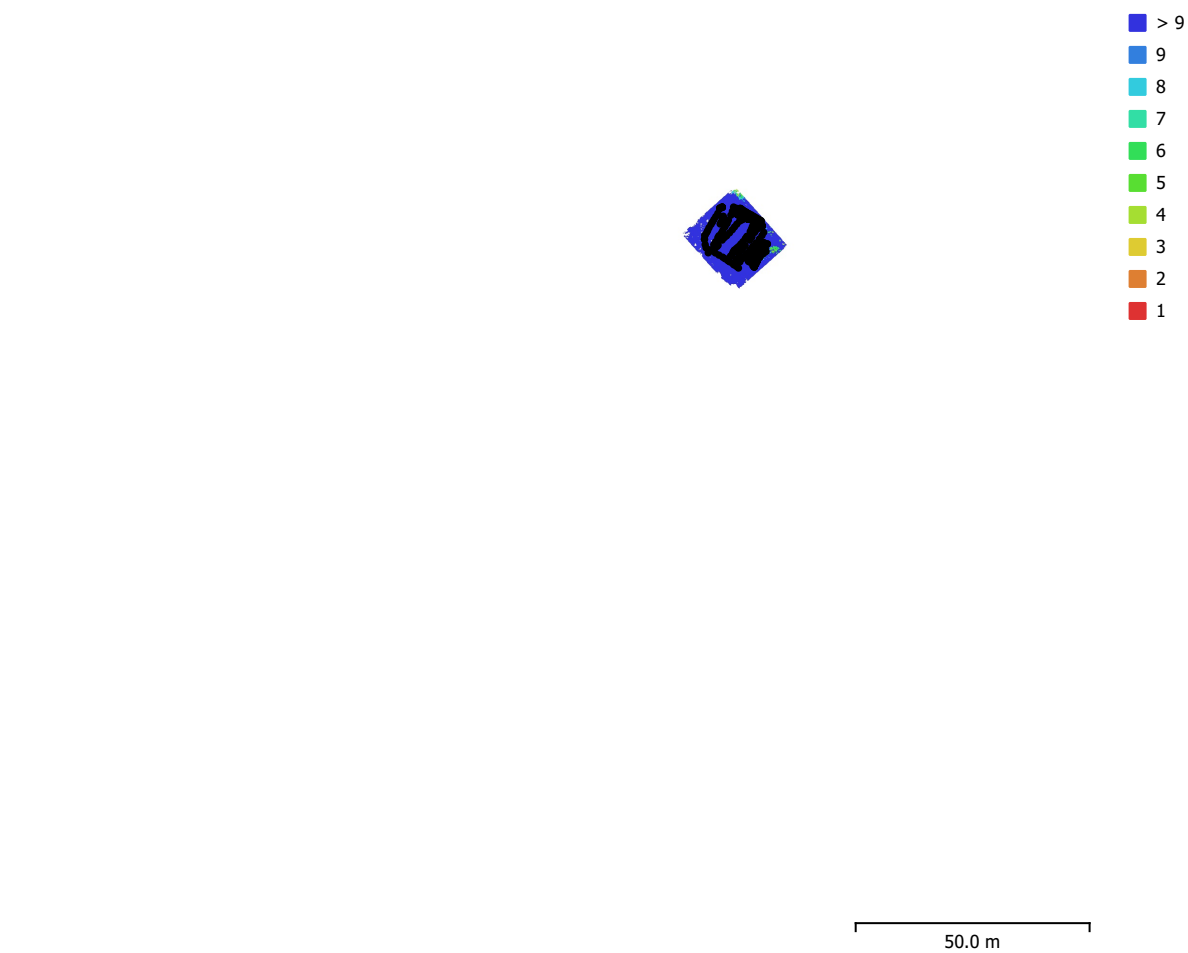


Fig. 1. Camera locations and image overlap.

Number of images:	347	Camera stations:	347
Flying altitude:	3.58 m	Tie points:	226,833
Ground resolution:	1.61 mm/pix	Projections:	1,239,662
Coverage area:	248 m ²	Reprojection error:	1.05 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
FC3582 (6.72mm)	4032 x 3024	6.72 mm	2.4 x 2.4 μm	No

Table 1. Cameras.

Camera Calibration

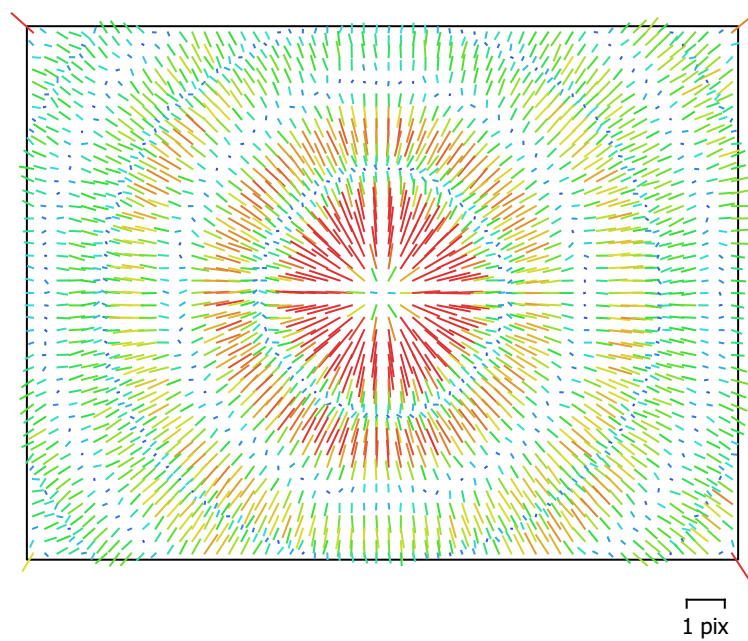


Fig. 2. Image residuals for FC3582 (6.72mm).

FC3582 (6.72mm)

347 images

Type	Resolution	Focal Length	Pixel Size
Frame	4032 x 3024	6.72 mm	2.4 x 2.4 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	2828.79	0.04	1.00	0.10	-0.22	-0.09	0.13	-0.09	0.09	-0.24
Cx	-4.20418	0.066		1.00	0.03	0.04	-0.04	0.05	0.92	0.02
Cy	-6.57181	0.055			1.00	-0.02	0.01	-0.01	0.03	0.84
K1	0.0907087	4.4e-05				1.00	-0.96	0.91	0.03	-0.03
K2	-0.177511	0.00014					1.00	-0.98	-0.04	0.02
K3	0.133119	0.00013						1.00	0.04	-0.02
P1	0.000267745	6.4e-06							1.00	0.02
P2	-0.000300039	5.2e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

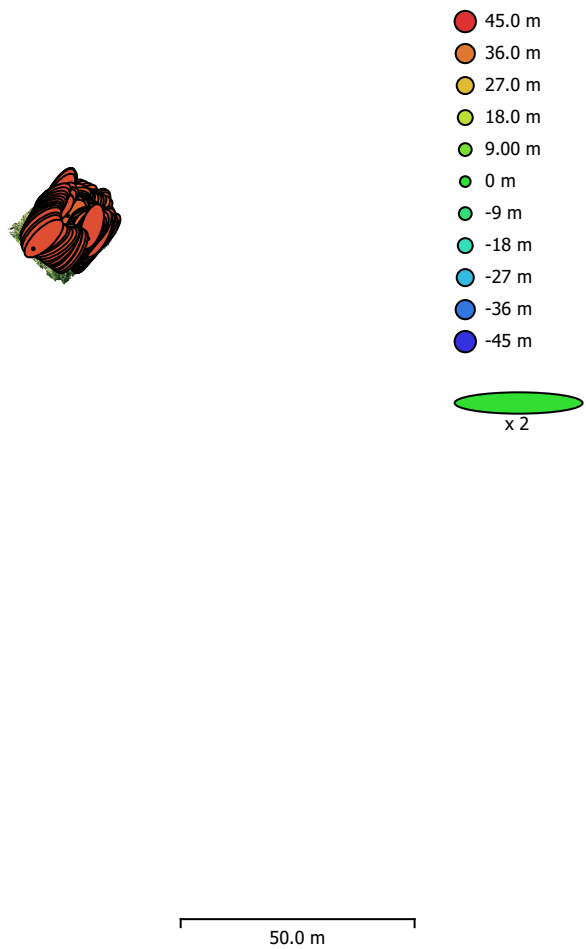


Fig. 3. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	Z error (m)	XY error (m)	Total error (m)
1.53872	1.72246	39.5008	2.30966	39.5682

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

Ground Control Points

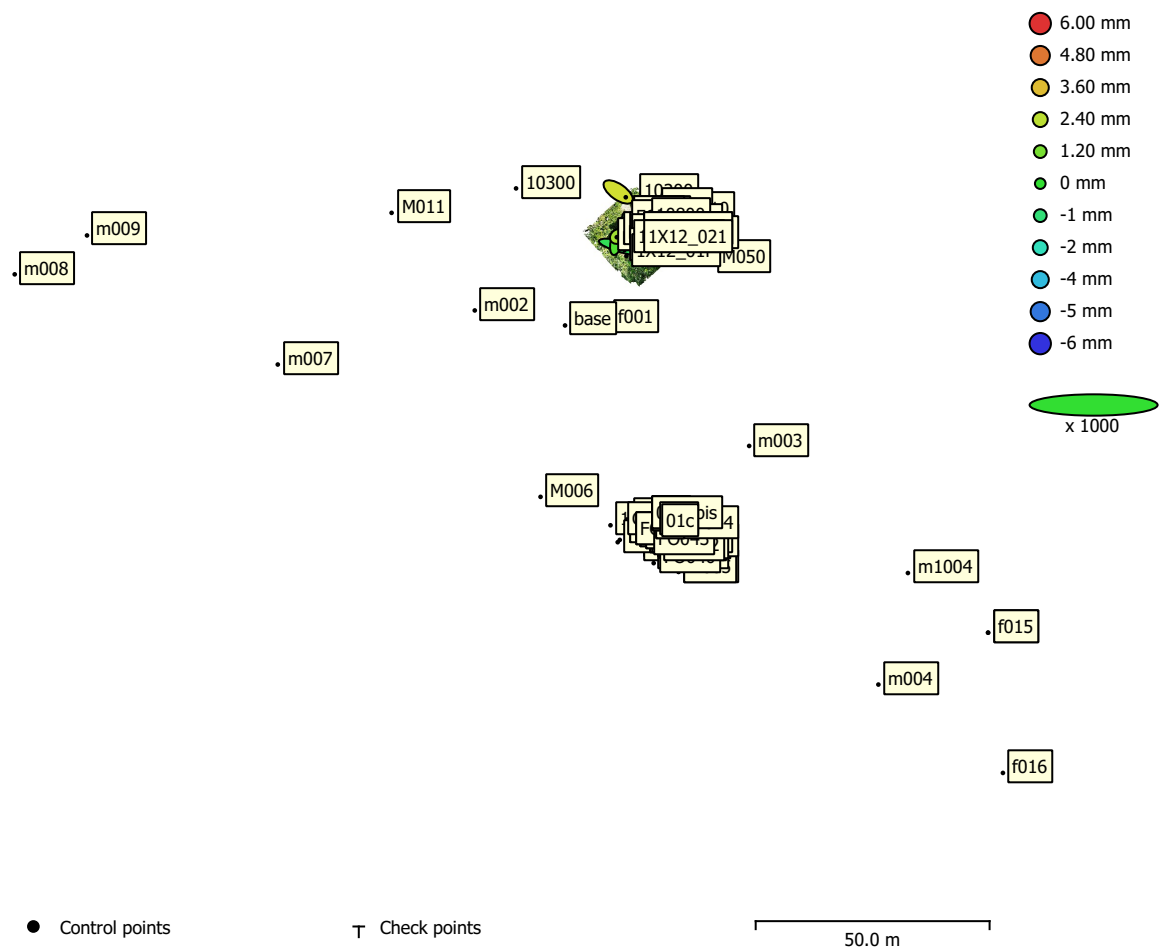


Fig. 4. GCP locations and error estimates.

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 (mm)	Y error (mm)	Z error (mm)	XY error (mm)	Total (mm)
12	3.15176	2.42071	2.69616	3.97409	4.80237

Table 4. Control points RMSE.

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

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
M010	-1.97568	-1.81684	4.7736	5.47644	0.422 (8)
M011					
m009					
m008					
m007					
M006					
m013					
M005					
m004					
f014					
f015					
m1004					
m003					
f001					
base					
m002					
f016					
M050					
1601					
1602					
CB1610					
CB1611					
CB1612					
CB1613					
CB1614					
FO1615					
FO1616					
FO1617					
FO1618					
FO1619					
FO1620					
FO1621					

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
FO1622					
FO1623					
CG1640					
CB030					
CG031					
CB032					
CB033					
FO034					
FO035					
FO036					
FO037					
FO038					
FO039					
FO040					
FO041					
FO042					
FO043					
FO044					
15					
16					
11					
12					
13					
14					
01b					
01a					
01a_bis					
01e					
01c					
10100					
10200	3.23665	-2.26964	2.78243	4.83416	1.056 (4)
CB60	8.54566	-2.11276	-0.646402	8.82666	0.682 (18)
CB61	-0.574644	2.09115	-1.36695	2.56353	1.205 (16)

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
CB62	1.72814	-0.526397	-3.56886	4.00004	0.772 (8)
FO64					
FO65					
FO66					
FO67					
FO68					
CB69	-2.22122	-0.18413	-0.00332456	2.22884	0.549 (7)
FO70					
FO71					
FO72					
FO73					
FO74					
FO75	-1.69694	-3.76643	-5.46921	6.85404	2.050 (5)
10300					
CB80	-3.40976	-0.884392	1.04479	3.67426	1.020 (11)
CB81	-2.67154	5.00408	-2.37018	6.14782	1.049 (11)
CB82	0.734696	2.98317	0.532952	3.11819	0.662 (8)
FO83	-1.0438	1.9248	-1.04968	2.42821	1.958 (5)
FO84					
FO85					
FO86					
FO87					
FO88	-0.522101	-0.323992	1.91619	2.0123	0.689 (4)
10800					
1X12_017					
1X12_018					
1X12_019					
1X12_01F					
1X12_01D					
1X12_021					
Total	3.15176	2.42071	2.69616	4.80237	1.040

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

Label	X error (mm)	Y error (mm)	Z error (mm)	Total (mm)	Image (pix)
point 1					2.003 (22)
point 2					1.633 (13)
point 3					1.938 (12)
point 4					0.897 (7)
point 5					1.695 (8)
point 6					2.730 (15)
point 7					0.721 (6)
Total					

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

Digital Elevation Model

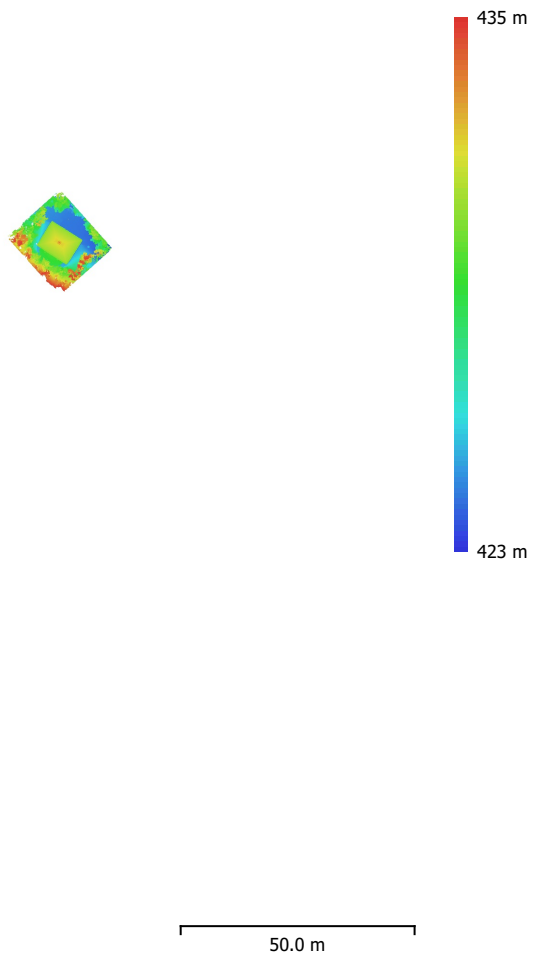


Fig. 5. Reconstructed digital elevation model.

Resolution: unknown

Point density: unknown

Processing Parameters

General

Images	347
Aligned images	347
Markers	102
Coordinate system	WGS 84 / UTM zone 32N (EPSG::32632)
Camera coordinate system	WGS 84 (EPSG::4326)
Marker coordinate system	WGS 84 / UTM zone 32N (EPSG::32632)
Rotation angles	Omega, Phi, Kappa

Shapes

Point	2
Coordinate system	WGS 84 (EPSG::4326)

Tie Points

Points	226,833 of 249,478
Point colors	3 bands, uint8
RMS reprojection error	0.297421 (1.05192 pix)
Max reprojection error	1.2905 (58.2457 pix)
Mean key point size	3.32034 pix
Key points	No
Average tie point multiplicity	6.20403

Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	40,000
Tie point limit	4,000
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	3 minutes 33 seconds
Matching memory usage	916.21 MB
Alignment time	7 minutes 31 seconds
Alignment memory usage	135.95 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	5 seconds
Date created	2024:09:06 17:14:35
Software version	1.7.0.11736
File size	29.57 MB

Depth Maps

Count	347
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Max neighbors	16
Processing time	21 minutes 13 seconds
Memory usage	4.91 GB
Date created	2024:10:01 11:47:10
Software version	2.1.3.18817
File size	1.55 GB

Point Cloud

Points	77,441,962
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Point attributes

Color	3 bands, uint8
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Normal

Point classes

Created (never classified)

77,441,962

Depth maps generation parameters

Quality

High

Filtering mode

Mild

Max neighbors

16

Processing time

21 minutes 13 seconds

Memory usage

4.91 GB

Point cloud generation parameters

Source data

Depth maps

Processing time

1 hours 21 minutes

Memory usage

14.70 GB

Date created

2024:10:01 13:08:57

Software version

2.1.3.18817

File size

1018.38 MB

System

Software name

Agisoft Metashape Professional

Software version

2.1.3 build 18817

OS

Windows 64 bit

RAM

31.77 GB

CPU

11th Gen Intel(R) Core(TM) i7-11800H @ 2.30GHz

GPU(s)

Intel(R) UHD Graphics

NVIDIA GeForce RTX 3060 Laptop GPU