Grp-6-Flight1+2-Report

Processing Report

03 June 2021

Survey Data

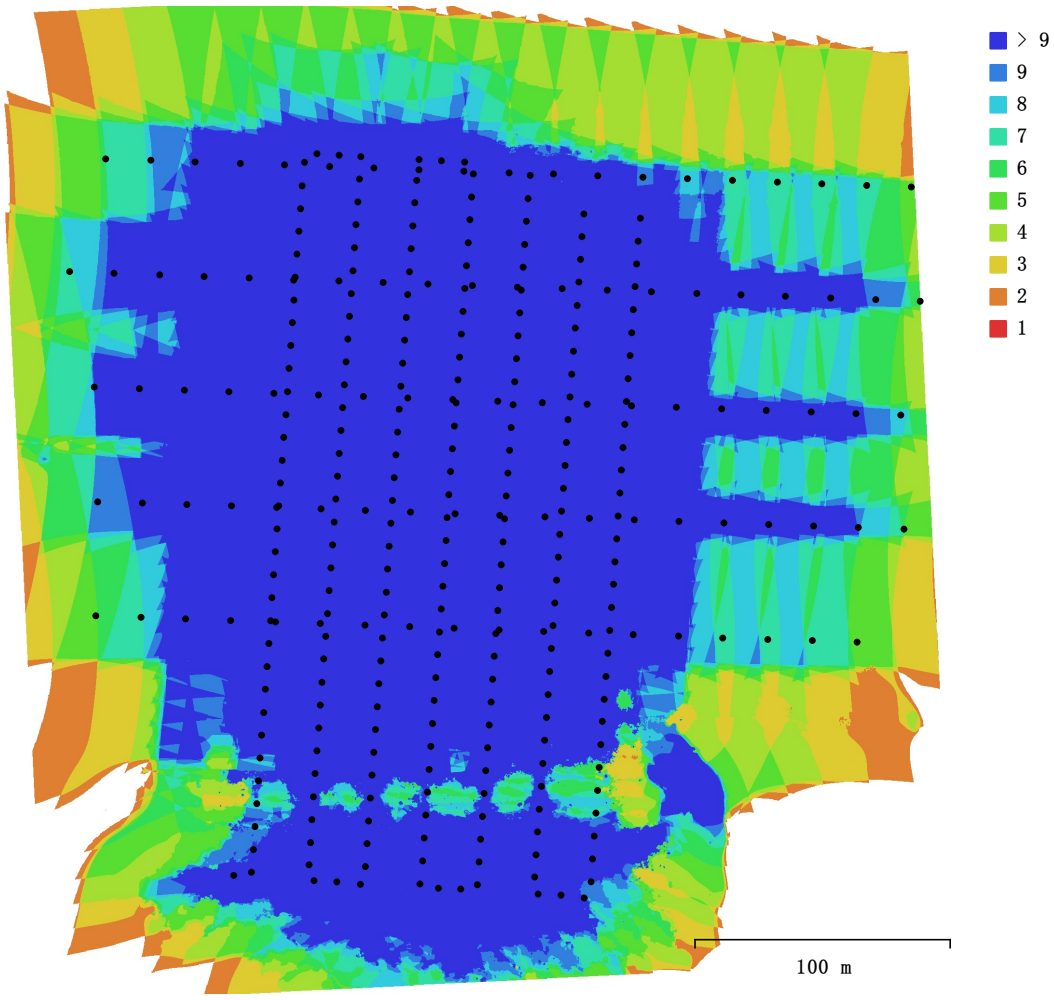

Fig. 1. Camera locations and image overlap.

Number of images:	335	Camera stations:	328
Flying altitude:	52.9 m	Tie points:	282,707
Ground resolution:	1.27 cm/pix	Projections:	835,914
Coverage area:	0.124 km²	Reprojection error:	0.289 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
FC6310R (8.8mm)	5472 x 3648	8.8 mm	2.41 x 2.41 µm	Yes

Table 1. Cameras.

Camera Calibration

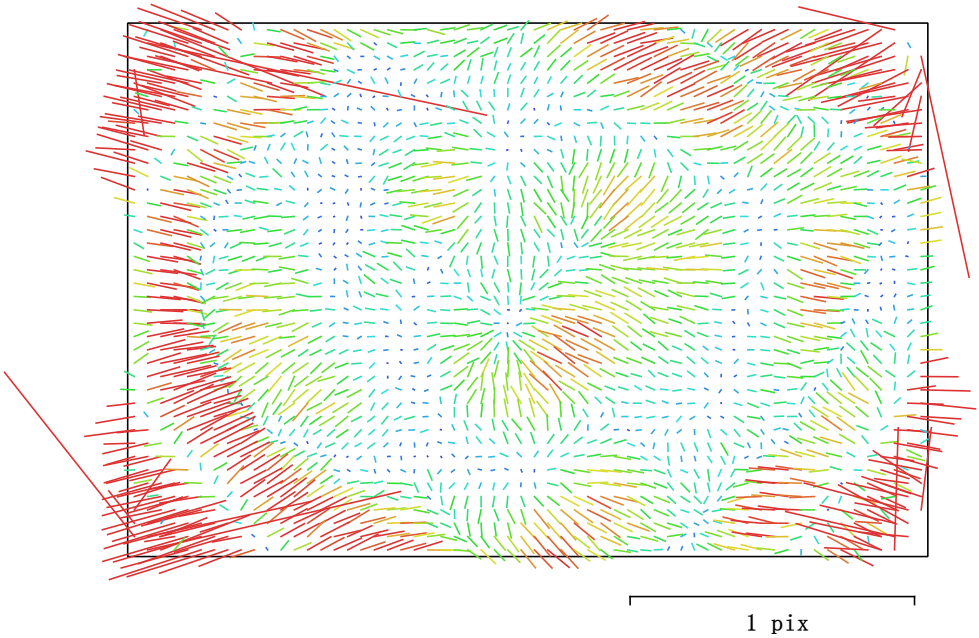

Fig. 2. Image residuals for FC6310R (8.8mm).

FC6310R (8.8mm)
335 images, precalibrated

Type	Resolution	Focal Length	Pixel Size
Frame	**5472 x 3648**	**8.8 mm**	**2.41 x 2.41 µm**

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	**3645.9**	0.054	1.00	0.04	0.03	-0.70	0.38	-0.28	-0.05	-0.02
Cx	**6.0401**	0.027		1.00	-0.01	-0.05	0.04	-0.03	-0.82	-0.02
Cy	**8.77447**	0.026			1.00	0.00	-0.02	0.02	0.00	-0.69
K1	**-0.267434**	1.1e-05				1.00	-0.89	0.80	0.07	-0.01
K2	**0.108337**	1.9e-05					1.00	-0.98	-0.07	0.03
K3	**-0.0295986**	1.2e-05						1.00	0.06	-0.04
P1	**-0.00117473**	1.1e-06							1.00	0.02
P2	**-2.03656e-05**	1.1e-06								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

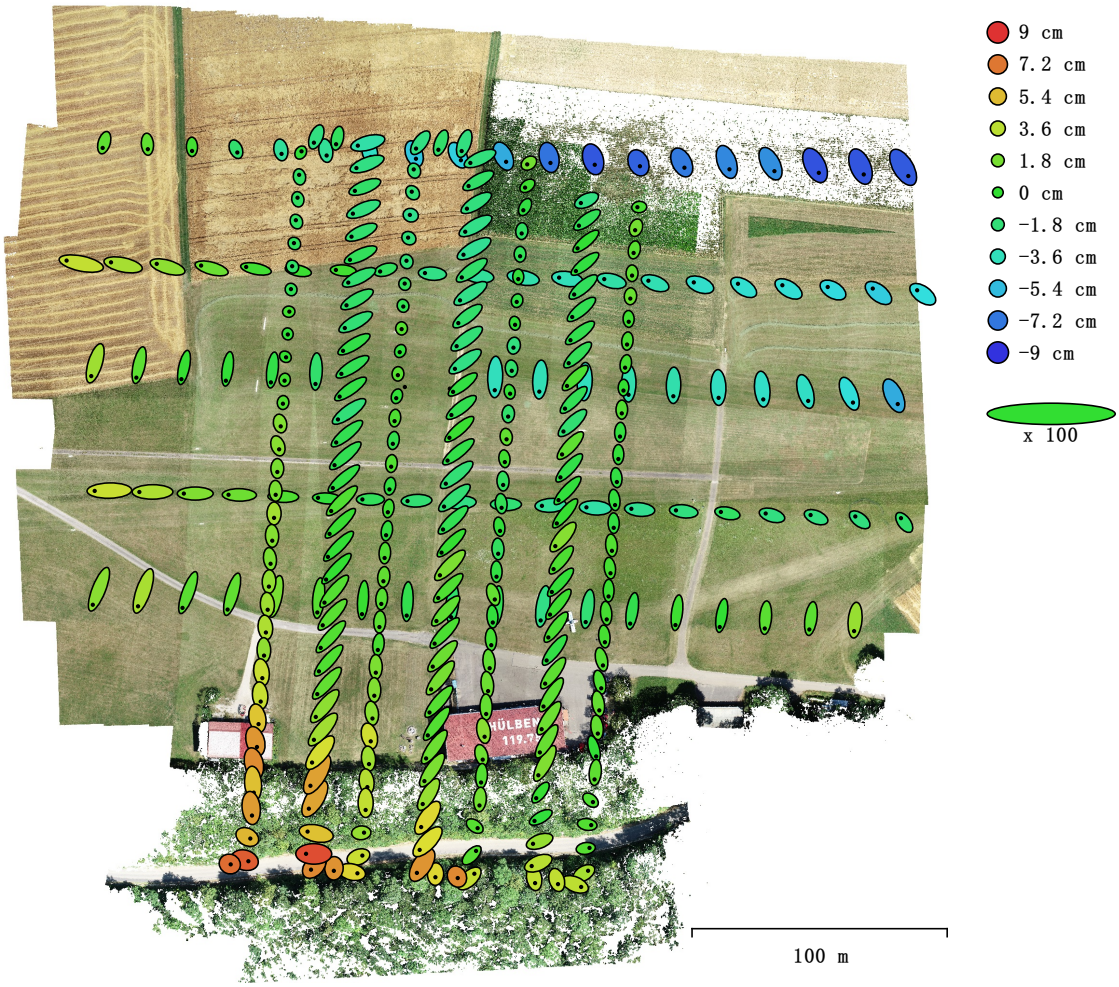

Fig. 3. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total error (cm)
4.68229	5.43778	2.74389	7.17588	7.68259

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)
8	1.89713	1.99572	0.777582	2.75354	2.86122

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)
4	2.8097	2.16351	3.33	3.54616	4.86458

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)
P5	-1.05877	0.956468	-0.377674	1.47596	0.869 (3)
P10	4.03969	-0.0593759	0.515841	4.07293	8.692 (9)
P16	2.54687	1.30097	-0.6652	2.93625	0.445 (18)
P26	1.96786	3.47461	1.76549	4.36604	0.546 (19)
P14	0.954369	1.49684	-0.0847045	1.77723	3.590 (22)
P2	0.218023	2.47603	-0.799649	2.61107	0.605 (17)
P1	0.153376	2.86651	-0.141559	2.87409	0.492 (21)
P3	0.108106	0.76885	-0.449707	0.897248	0.396 (10)
Total	**1.89713**	**1.99572**	**0.777582**	**2.86122**	**2.881**

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

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
P25	4.22386	3.0927	3.85066	6.49872	0.286 (5)
P17	2.57222	1.46552	4.6363	5.50085	2.201 (17)
P15	2.54531	1.34029	-2.36391	3.72331	1.545 (24)
P4	-0.80113	2.28346	-1.56351	2.88107	0.421 (18)
Total	**2.8097**	**2.16351**	**3.33**	**4.86458**	**1.496**

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

Digital Elevation Model

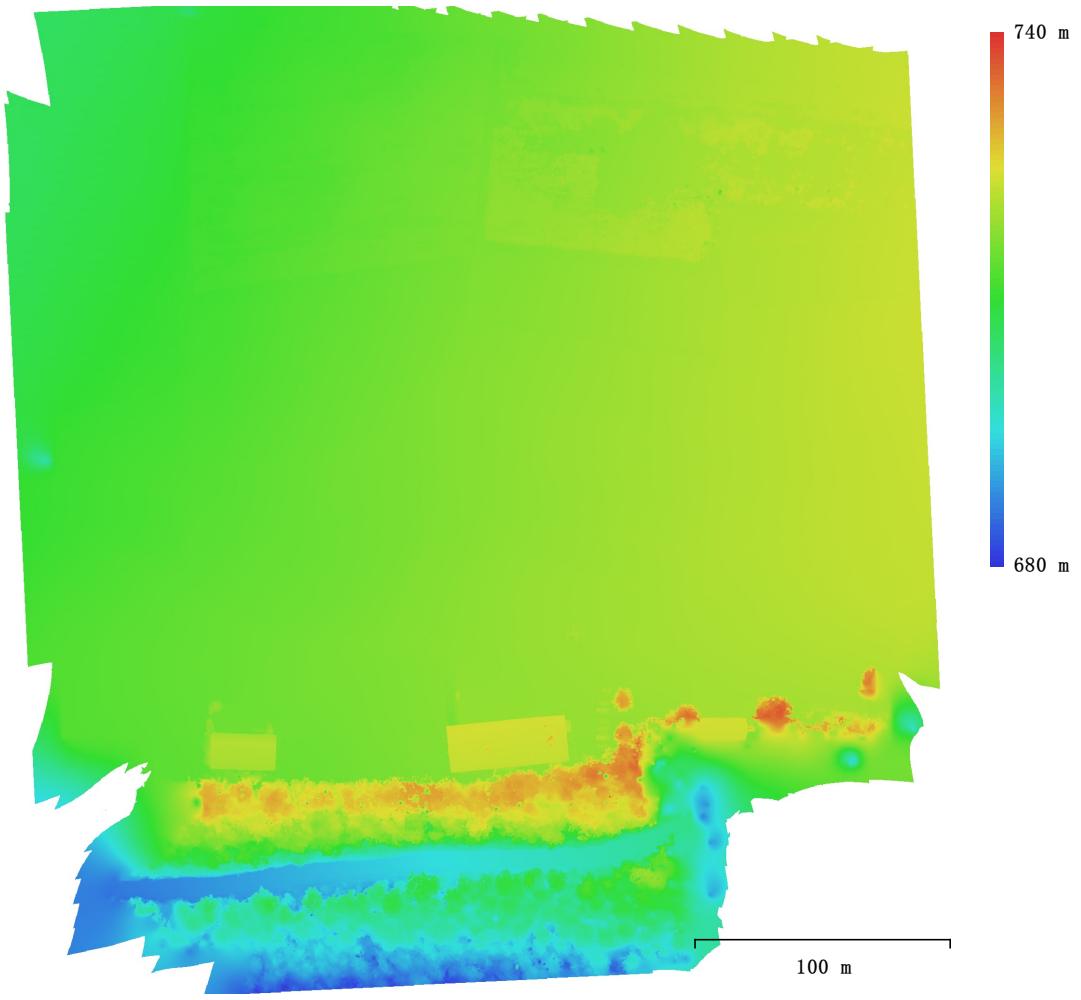

Fig. 5. Reconstructed digital elevation model.

Resolution:	2.54 cm/pix
Point density:	0.155 points/cm²

Processing Parameters

General	
Cameras	335
Aligned cameras	328
Markers	24
Coordinate system	ETRS89 / UTM zone 32N (EPSG::25832)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	282,707 of 369,650
RMS reprojection error	0.141014 (0.289098 pix)
Max reprojection error	0.911672 (14.6285 pix)
Mean key point size	1.72232 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	3.46436
Alignment parameters	
Accuracy	Highest
Generic preselection	No
Reference preselection	No
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	43 minutes 42 seconds
Matching memory usage	2.50 GB
Alignment time	2 minutes 12 seconds
Alignment memory usage	181.38 MB
Optimization parameters	
Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	2 seconds
Software version	1.7.2.12070
File size	27.11 MB
Depth Maps	
Count	328
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Processing time	21 minutes 22 seconds
Memory usage	3.86 GB
Software version	1.7.2.12070
File size	2.22 GB
Dense Point Cloud	
Points	189,297,230
Point colors	3 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Processing time	21 minutes 22 seconds
Memory usage	3.86 GB
Dense cloud generation parameters	

Processing time	24 minutes 46 seconds
Memory usage	8.61 GB
Software version	1.7.2.12070
File size	2.44 GB
DEM	
Size	14,788 x 15,980
Coordinate system	ETRS89 / UTM zone 32N (EPSG::25832)
Reconstruction parameters	
Source data	Dense cloud
Interpolation	Enabled
Processing time	2 minutes 25 seconds
Memory usage	429.62 MB
Software version	1.7.2.12070
File size	599.70 MB
System	
Software name	Agisoft Metashape Professional
Software version	1.7.2 build 12070
OS	Windows 64 bit
RAM	15.92 GB
CPU	Intel(R) Core(TM) i9-9900K CPU @ 3.60GHz
GPU(s)	GeForce RTX 2080 Ti