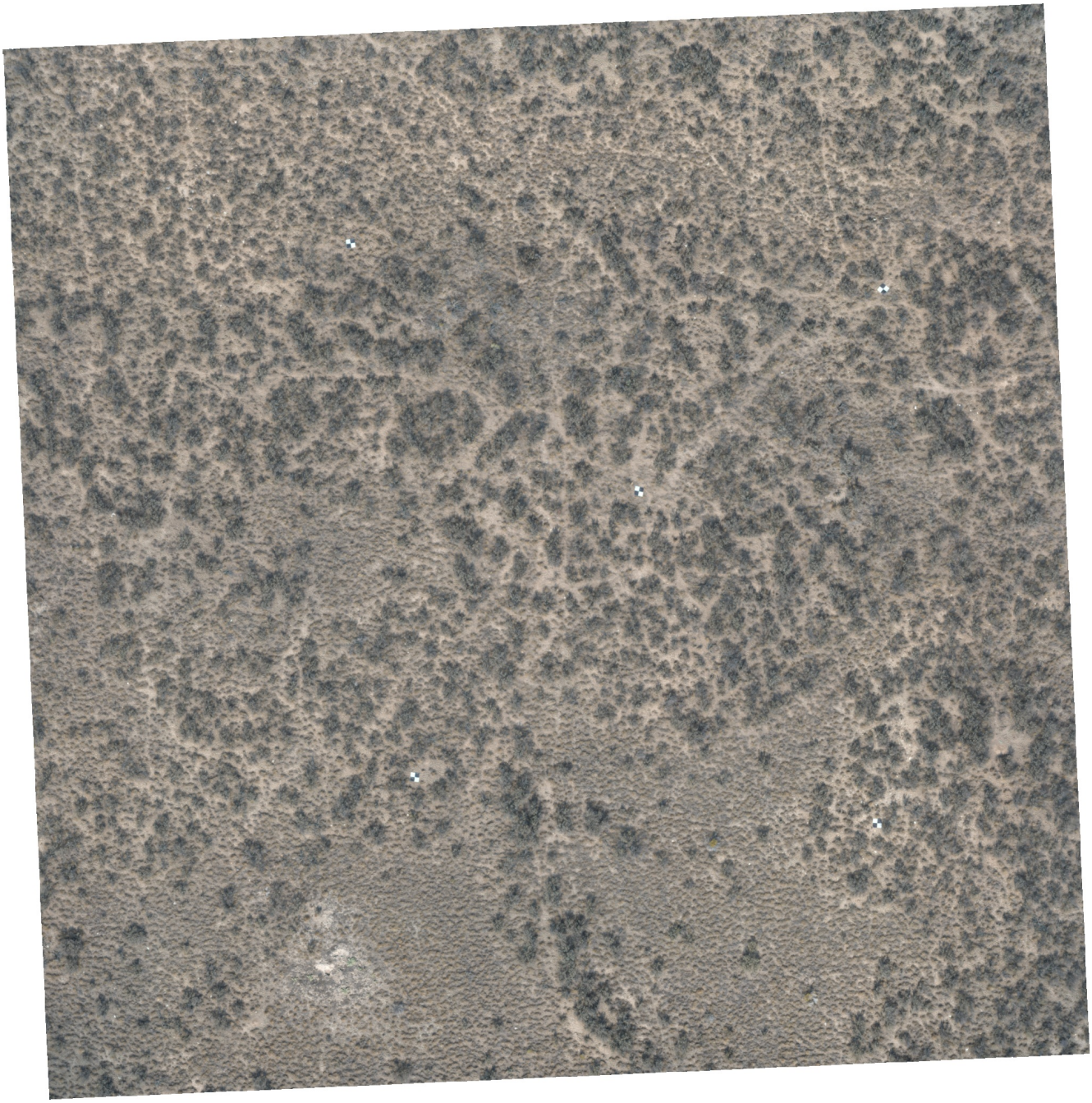
Castle Rocks Site 4 Sept 2021

Processing Report
avr
05 May 2022



Survey Data

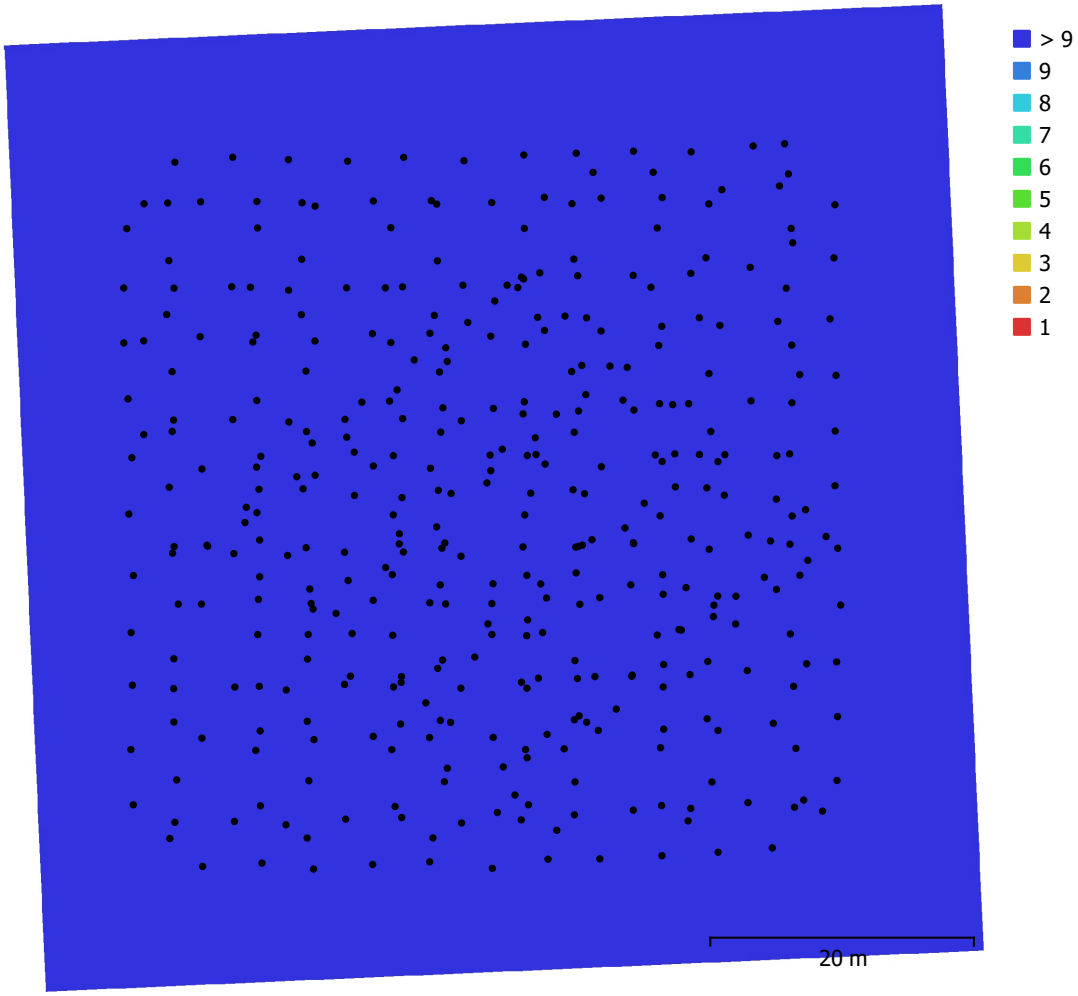


Fig. 1. Camera locations and image overlap.

Number of images:	384	Camera stations:	384
Flying altitude:	35.1 m	Tie points:	4,844,226
Ground resolution:	8.23 mm/pix	Projections:	19,197,831
Coverage area:	5.11e+03 m²	Reprojection error:	0.868 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
Test_Pro (10.26mm)	5464 x 3640	10.26 mm	2.41 x 2.41 µm	No

Table 1. Cameras.

Camera Calibration

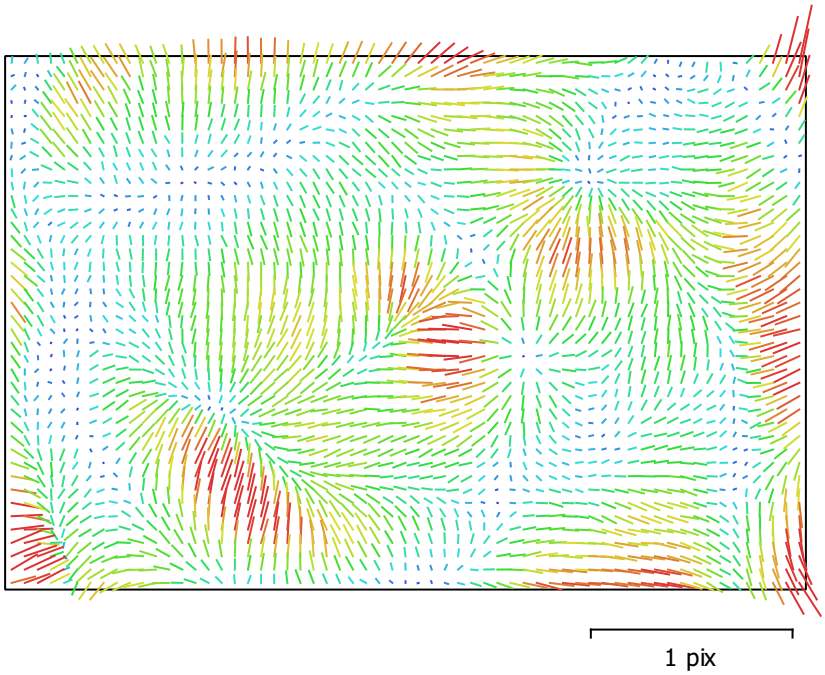


Fig. 2. Image residuals for Test_Pro (10.26mm).

Test_Pro (10.26mm)

384 images

Type	Resolution	Focal Length	Pixel Size
Frame	**5464 x 3640**	**10.26 mm**	**2.41 x 2.41 µm**

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2
F	**4276.37**	0.46	1.00	-0.57	-0.95	0.19	-0.51	-0.92	-0.06	0.06	0.23	0.63	0.92
Cx	**2.23797**	0.023		1.00	0.54	0.09	0.84	0.51	0.04	-0.03	-0.13	-0.93	-0.51
Cy	**-12.739**	0.066			1.00	-0.42	0.55	0.87	0.08	-0.07	-0.20	-0.59	-0.96
B1	**-14.6663**	0.0018				1.00	-0.15	-0.23	-0.06	0.09	-0.05	-0.03	0.48
B2	**1.40298**	0.0019					1.00	0.49	0.04	-0.05	-0.09	-0.86	-0.56
K1	**-0.182607**	3.8e-05						1.00	-0.23	0.19	-0.42	-0.61	-0.91
K2	**0.010977**	5.7e-05							1.00	-0.98	0.90	-0.04	-0.06
K3	**-0.0145163**	0.00012								1.00	-0.95	0.05	0.08
K4	**0.0401842**	8.8e-05									1.00	0.13	0.17
P1	**0.00117989**	9.3e-07										1.00	0.60
P2	**0.000607283**	2.6e-06											1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

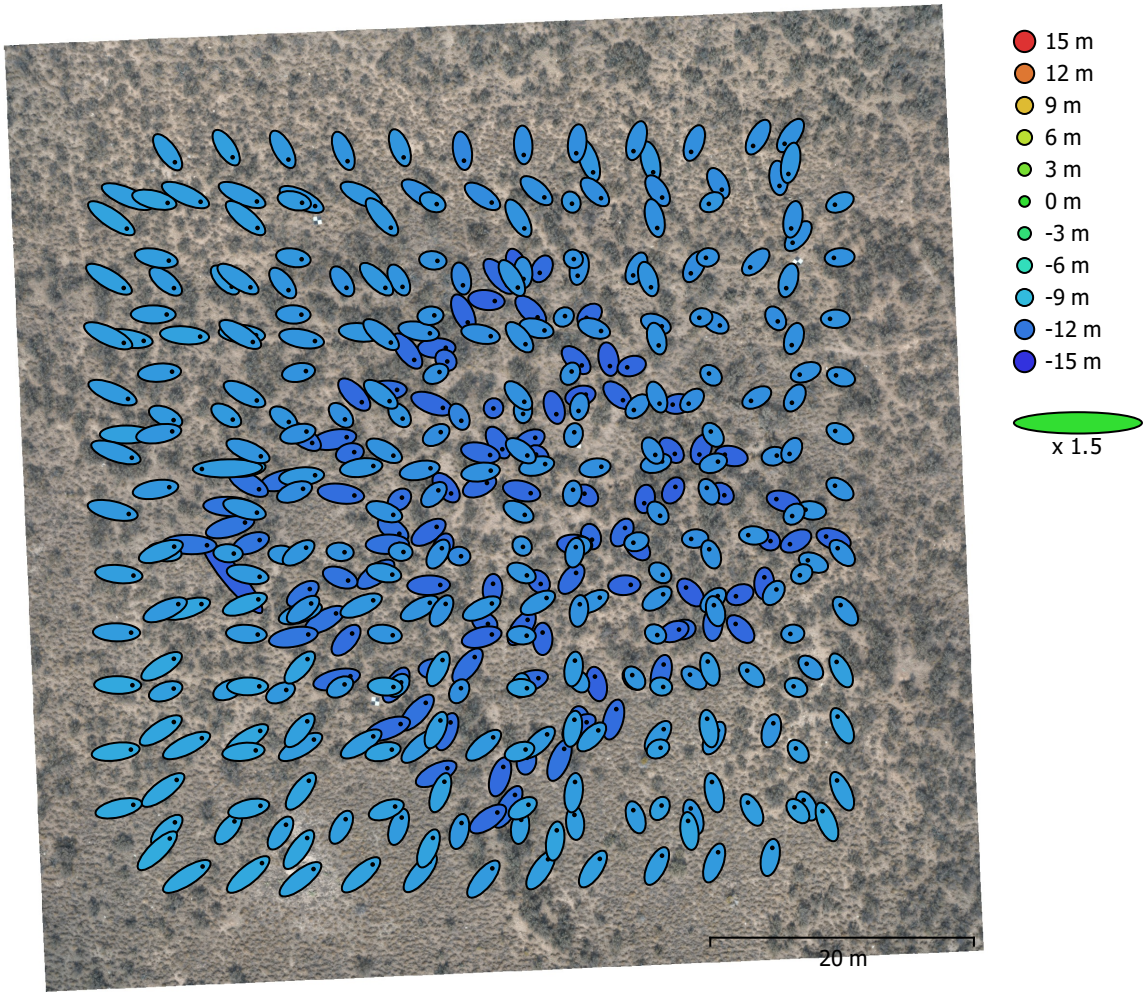


Fig. 3. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

X error (m)	Y error (m)	Z error (m)	XY error (m)	Total error (m)
0.804866	0.614231	11.1337	1.01247	11.1796

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

Ground Control Points

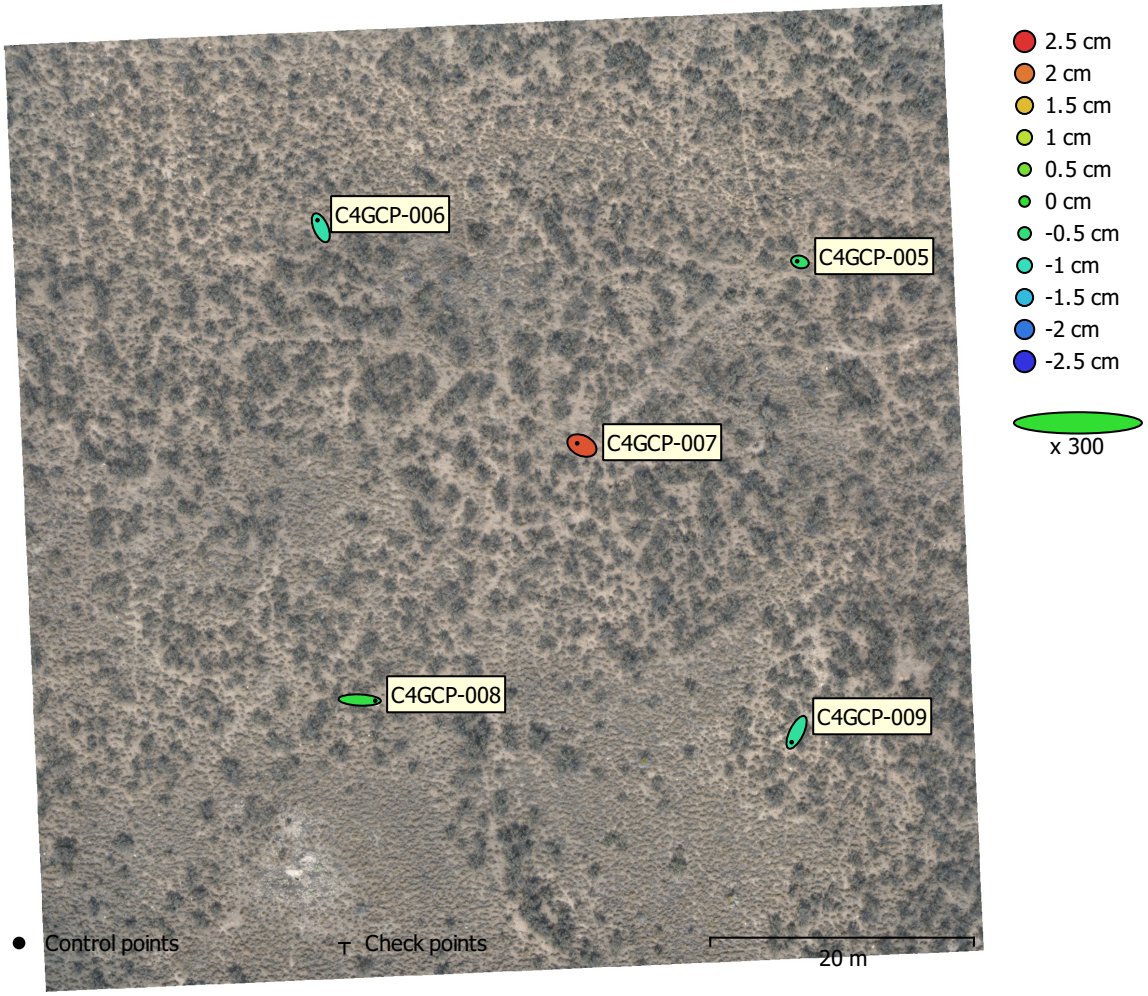


Fig. 4. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

Count	X error (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total (cm)
5	0.396626	0.286653	1.14693	0.489369	1.24697

Table 4. Control points RMSE.
X - Longitude, Y - Latitude, Z - Altitude.

Label	X error (cm)	Y error (cm)	Z error (cm)	Total (cm)	Image (pix)
C4GCP-005	-0.138924	0.0358978	-0.391013	0.416509	0.627 (96)
C4GCP-006	-0.16704	0.383966	-0.863198	0.959397	0.715 (118)
C4GCP-007	-0.239272	0.112112	2.25345	2.26889	0.617 (208)
C4GCP-008	0.787987	-0.0342586	-0.12797	0.799045	1.544 (174)
C4GCP-009	-0.247354	-0.498386	-0.764726	0.945716	0.644 (108)
Total	**0.396626**	**0.286653**	**1.14693**	**1.24697**	**0.951**

Table 5. Control points.

X - Longitude, Y - Latitude, Z - Altitude.

Digital Elevation Model

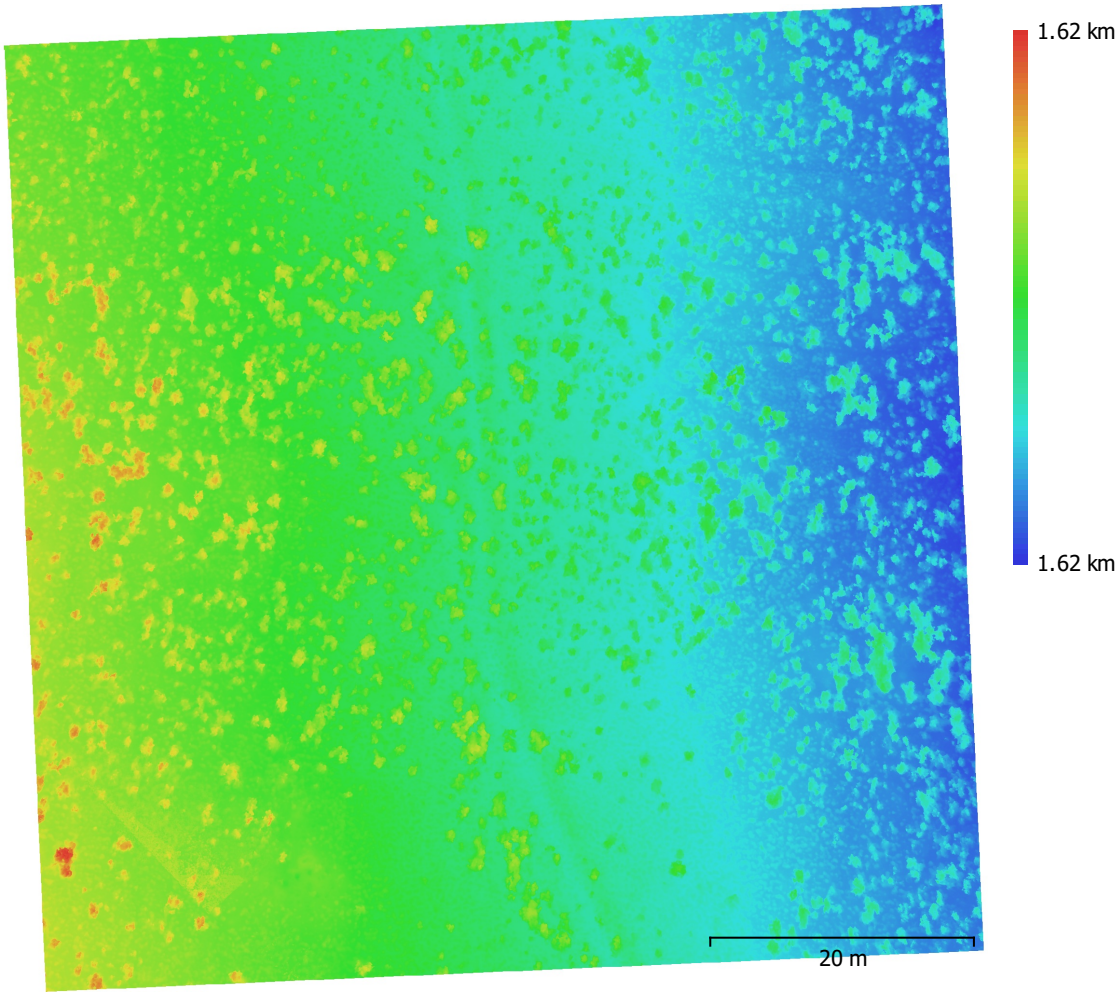


Fig. 5. Reconstructed digital elevation model.

Resolution:	8.23 mm/pix
Point density:	1.48 points/cm²

Processing Parameters

General	
Cameras	384
Aligned cameras	384
Markers	5
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll
Point Cloud	
Points	4,844,226 of 5,376,685
RMS reprojection error	0.186293 (0.867622 pix)
Max reprojection error	2.25244 (44.4164 pix)
Mean key point size	3.75162 pix
Point colors	3 bands, uint16
Key points	No
Average tie point multiplicity	6.44996
Alignment parameters	
Accuracy	High
Generic preselection	Yes
Reference preselection	Source
Key point limit	200,000
Key point limit per Mpx	1,000
Tie point limit	0
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	21 minutes 48 seconds
Matching memory usage	2.49 GB
Alignment time	2 hours 15 minutes
Alignment memory usage	3.20 GB
Optimization parameters	
Parameters	f, b1, b2, cx, cy, k1-k4, p1, p2
Adaptive camera model fitting	No
Optimization time	2 minutes 30 seconds
Date created	2022:02:02 22:30:27
Software version	1.7.5.13229
File size	670.86 MB
Depth Maps	
Count	384
Depth maps generation parameters	
Quality	Ultra High
Filtering mode	Disabled
Max neighbors	40
Processing time	8 hours 17 minutes
Memory usage	20.39 GB
Date created	2022:02:04 03:46:41
Software version	1.7.5.13229
File size	12.10 GB
Dense Point Cloud	
Points	155,248,287
Point colors	3 bands, uint16
Depth maps generation parameters	

Quality	Ultra High
Filtering mode	Disabled
Max neighbors	40
Processing time	8 hours 17 minutes
Memory usage	20.39 GB
Dense cloud generation parameters	
Processing time	14 hours 24 minutes
Memory usage	45.33 GB
Date created	2022:02:04 18:10:58
Software version	1.7.5.13229
File size	2.78 GB
DEM	
Size	9,025 x 9,112
Coordinate system	WGS 84 (EPSG::4326)
Reconstruction parameters	
Source data	Dense cloud
Interpolation	Enabled
Processing time	6 minutes 55 seconds
Memory usage	311.66 MB
Date created	2022:02:04 20:36:37
Software version	1.7.5.13229
File size	211.33 MB
Orthomosaic	
Size	9,025 x 9,102
Coordinate system	WGS 84 (EPSG::4326)
Colors	3 bands, uint16
Reconstruction parameters	
Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Enable ghosting filter	No
Processing time	1 hours 3 minutes
Memory usage	3.39 GB
Date created	2022:02:09 00:56:14
Software version	1.8.1.13915
File size	77.71 GB
System	
Software name	Agisoft Metashape Professional
Software version	1.8.1 build 13915
OS	Windows 64 bit
RAM	63.82 GB
CPU	Intel(R) Core(TM) i9-9900K CPU @ 3.60GHz
GPU(s)	GeForce RTX 2080
	GeForce RTX 2080