

Castle Rocks Site 3 Sept 2021

Processing Report
avr

28 January 2022



Survey Data

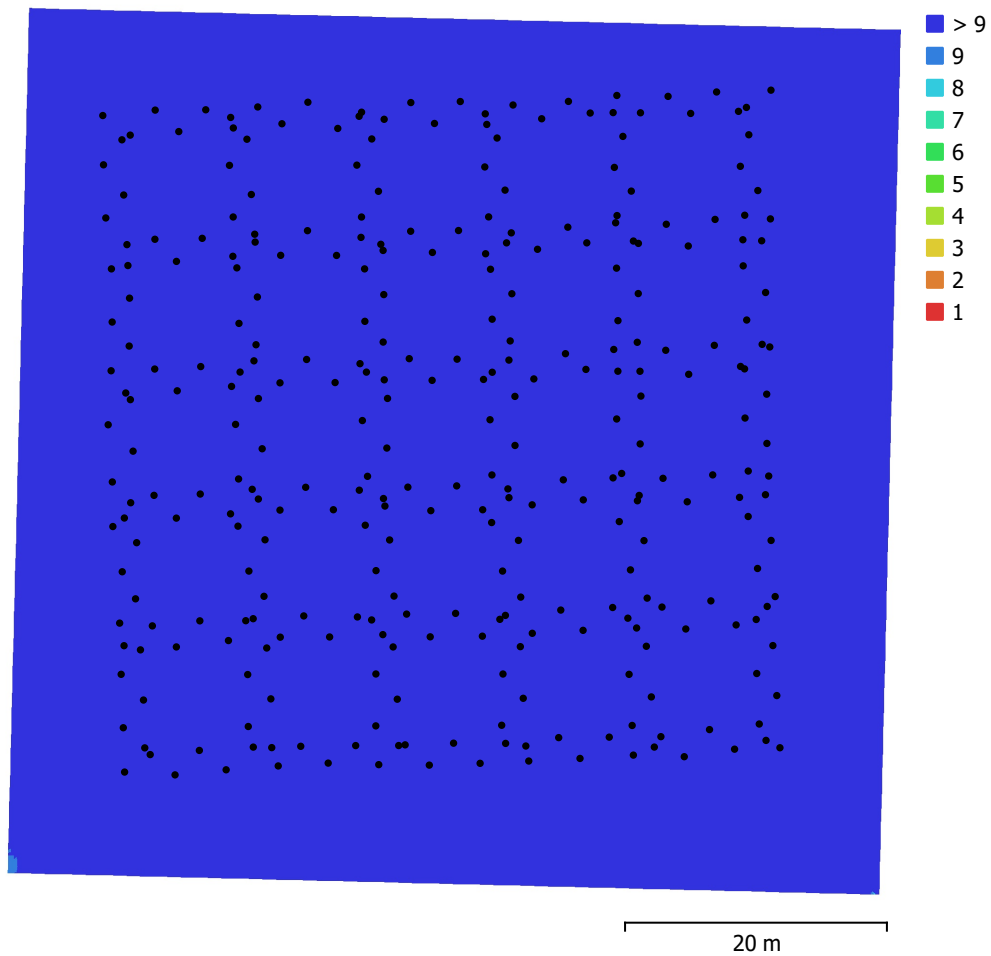


Fig. 1. Camera locations and image overlap.

Number of images:	312	Camera stations:	312
Flying altitude:	29.9 m	Tie points:	4,098,985
Ground resolution:	6.45 mm/pix	Projections:	14,230,590
Coverage area:	4.39e+03 m ²	Reprojection error:	1.15 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

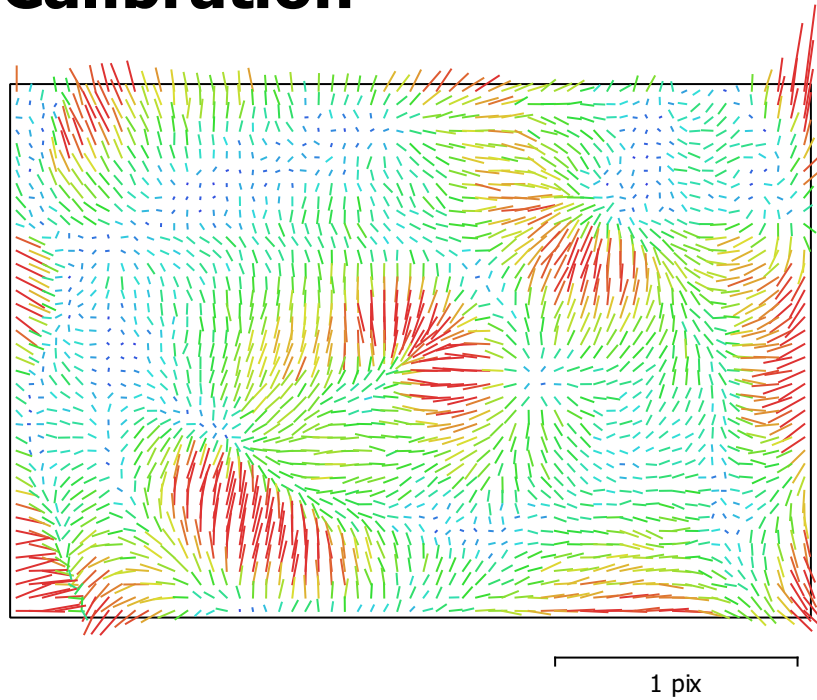


Fig. 2. Image residuals for Test_Pro (10.26mm).

Test_Pro (10.26mm)

312 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	4274.27	0.58	1.00	-0.81	-0.99	0.05	-0.66	-0.93	-0.11	0.13	0.12	0.86	0.97
Cx	-0.411627	0.025		1.00	0.80	0.05	0.73	0.75	0.10	-0.12	-0.08	-0.91	-0.78
Cy	-10.0905	0.084			1.00	-0.12	0.67	0.92	0.12	-0.14	-0.11	-0.85	-0.98
B1	-18.3573	0.002				1.00	-0.03	-0.09	-0.06	0.08	-0.07	0.00	0.17
B2	1.33315	0.0025					1.00	0.63	0.08	-0.10	-0.06	-0.75	-0.67
K1	-0.180271	4.9e-05						1.00	-0.19	0.13	-0.35	-0.83	-0.94
K2	0.00573019	7.9e-05							1.00	-0.98	0.92	-0.10	-0.11
K3	-0.00534558	0.00016								1.00	-0.96	0.14	0.15
K4	0.0343243	0.00012									1.00	0.08	0.09
P1	0.00141094	1.1e-06										1.00	0.86
P2	0.000469612	3.4e-06											1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

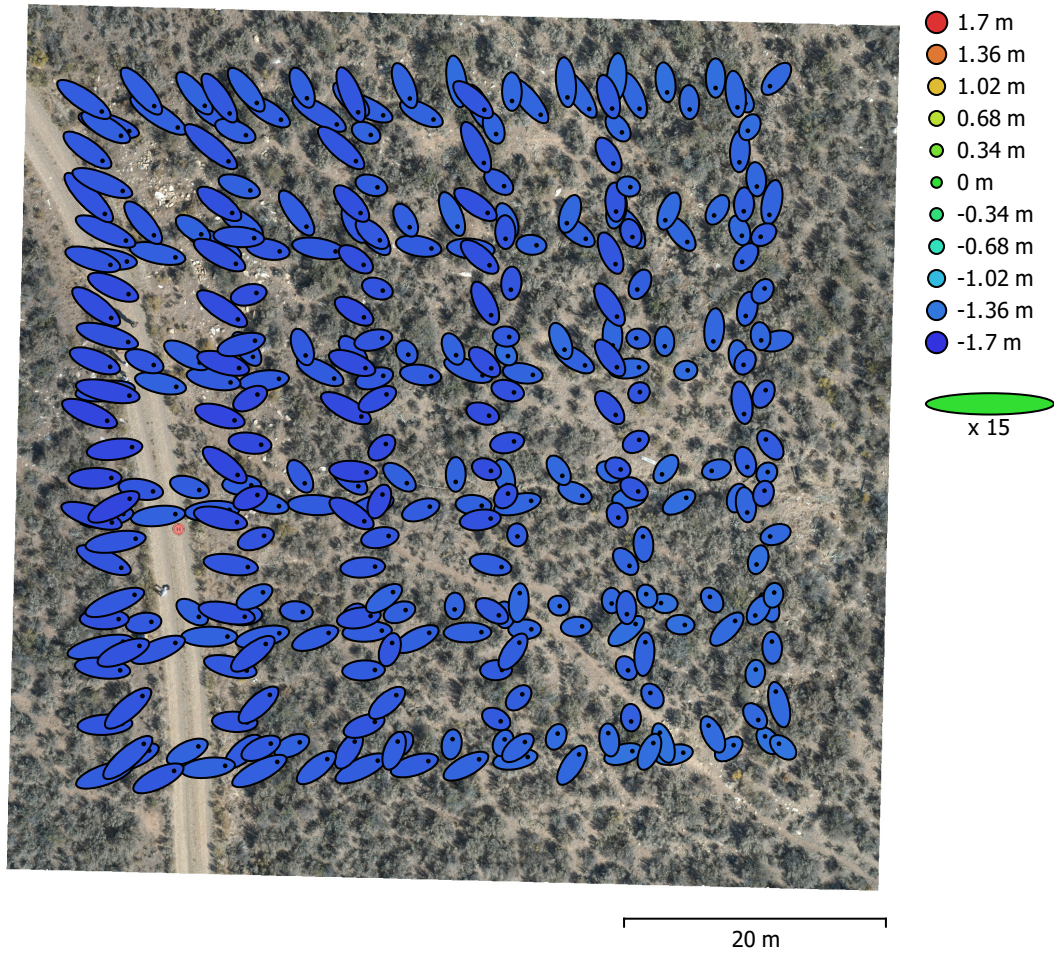


Fig. 3. Camera locations and error estimates.

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)
0.104354	0.071437	1.48364	0.126463	1.48902

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

Ground Control Points

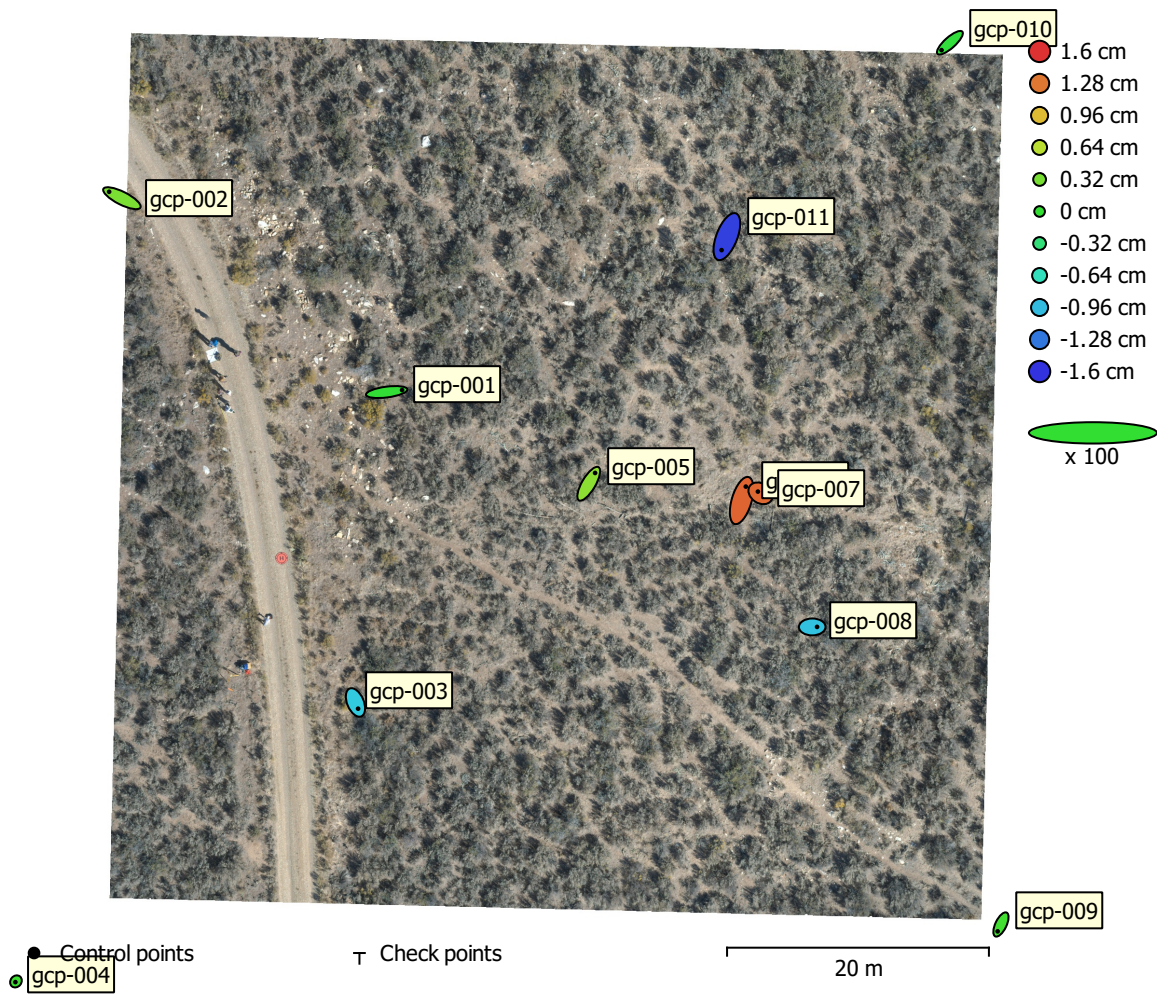


Fig. 4. GCP locations and error estimates.

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)
11	1.131	1.20407	0.854131	1.65195	1.8597

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)
gcp-001	2.34616	0.306544	-0.0172409	2.36616	0.677 (95)
gcp-002	-1.94971	0.981884	0.337978	2.209	0.417 (23)
gcp-003	0.400841	-0.951773	-0.891022	1.36399	0.693 (75)
gcp-004	-0.0877848	-0.108201	0.0429763	0.14581	0.259 (4)
gcp-005	0.97434	1.64672	0.423269	1.95964	0.780 (104)
gcp-006	0.638355	2.13408	1.36882	2.61447	0.628 (91)
gcp-007	-0.39211	0.261057	1.35102	1.43079	0.765 (88)
gcp-008	0.739995	0.00623086	-0.935456	1.19277	0.791 (65)
gcp-009	-0.504204	-1.04739	0.0746502	1.16483	0.698 (6)
gcp-010	-1.27485	-1.13519	-0.0460962	1.70764	0.559 (18)
gcp-011	-0.811707	-2.06205	-1.53421	2.69531	0.731 (73)
Total	1.131	1.20407	0.854131	1.8597	0.709

Table 5. Control points.
X - Longitude, Y - Latitude, Z - Altitude.

Scale Bars

Label	Distance (m)	Error (m)
gcp-006_gcp-007	1.00162	0.00162197
Total		0.00162197

Table 6. Control scale bars.

Digital Elevation Model

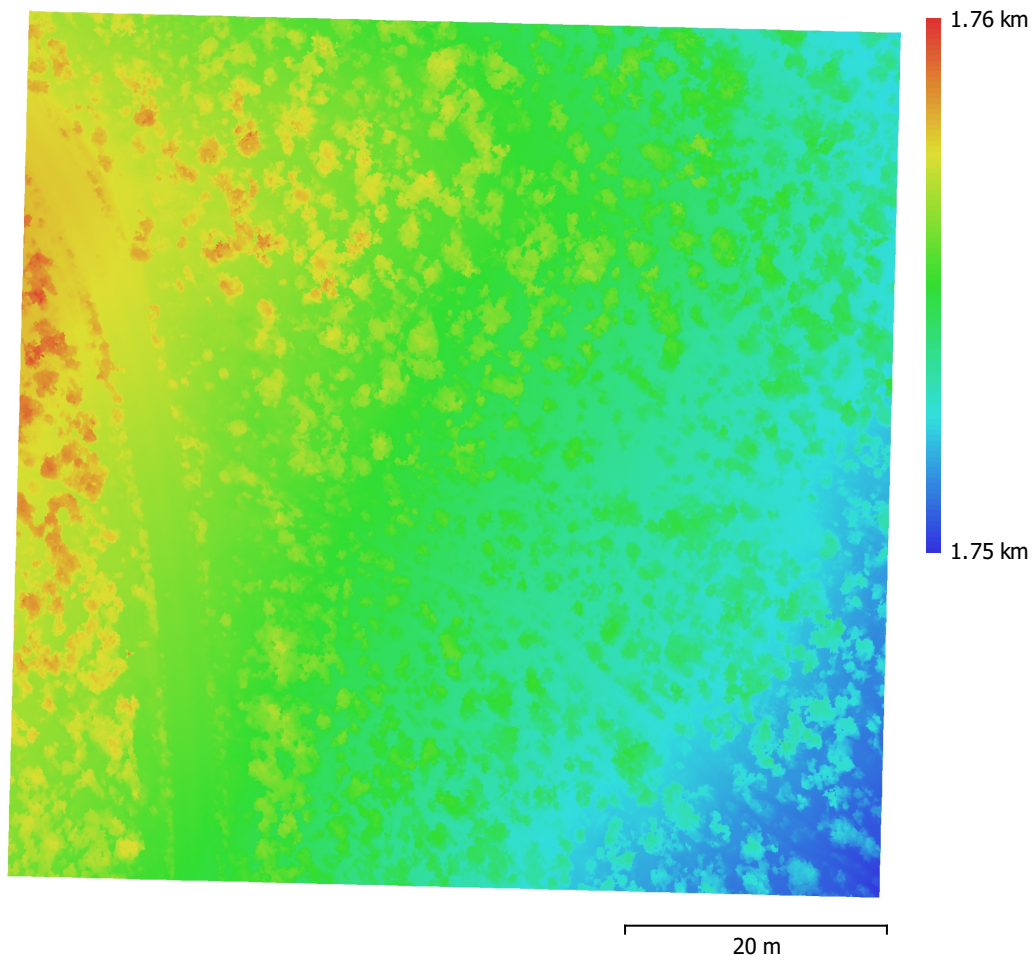


Fig. 5. Reconstructed digital elevation model.

Resolution: 1.29 cm/pix
Point density: 0.602 points/cm²

Processing Parameters

General

Cameras	312
Aligned cameras	312
Markers	11
Scale bars	1
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	4,098,985 of 4,439,543
RMS reprojection error	0.197388 (1.15044 pix)
Max reprojection error	1.06729 (49.8653 pix)
Mean key point size	4.16651 pix
Point colors	3 bands, uint16
Key points	No
Average tie point multiplicity	4.36922

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	10 minutes 2 seconds
Matching memory usage	2.27 GB
Alignment time	42 minutes 25 seconds
Alignment memory usage	2.04 GB

Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k4, p1, p2
Adaptive camera model fitting	No
Optimization time	49 seconds
Date created	2022:01:26 23:36:07
Software version	1.7.5.13229
File size	415.25 MB

Depth Maps

Count	312
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Depth maps generation parameters

Quality	High
Filtering mode	Disabled
Max neighbors	40
Processing time	1 hours 12 minutes
Memory usage	19.58 GB
Date created	2022:01:28 00:13:49
Software version	1.7.5.13229
File size	2.65 GB

Dense Point Cloud

Points	57,199,565
Point colors	3 bands, uint16

Depth maps generation parameters	
Quality	High
Filtering mode	Disabled
Max neighbors	40
Processing time	1 hours 12 minutes
Memory usage	19.58 GB
Dense cloud generation parameters	
Processing time	1 hours 46 minutes
Memory usage	24.60 GB
Date created	2022:01:28 02:00:19
Software version	1.7.5.13229
File size	1.02 GB
Model	
Faces	15,510,906
Vertices	7,768,689
Vertex colors	3 bands, uint8
Texture	4,096 x 4,096, 4 bands, uint16
Depth maps generation parameters	
Quality	High
Filtering mode	Disabled
Max neighbors	40
Processing time	1 hours 12 minutes
Memory usage	19.58 GB
Reconstruction parameters	
Surface type	Arbitrary
Source data	Depth maps
Interpolation	Enabled
Strict volumetric masks	No
Processing time	20 minutes 26 seconds
Memory usage	8.96 GB
Texturing parameters	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	4,096
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	5 minutes 22 seconds
UV mapping memory usage	3.12 GB
Blending time	5 minutes 46 seconds
Blending memory usage	5.99 GB
Blending GPU memory usage	2.50 GB
Date created	2022:01:28 19:38:04
Software version	1.7.5.13229
File size	752.96 MB
DEM	
Size	5,300 x 5,249
Coordinate system	WGS 84 (EPSG::4326)
Reconstruction parameters	
Source data	Dense cloud
Interpolation	Enabled
Processing time	37 seconds
Memory usage	343.34 MB
Date created	2022:01:28 20:49:17
Software version	1.7.5.13229
File size	79.97 MB
Orthomosaic	

Size 6,412 x 6,364
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 10 minutes 6 seconds
Memory usage 3.24 GB
Date created 2022:01:28 20:05:38
Software version 1.7.5.13229
File size 22.93 GB

System

Software name Agisoft Metashape Professional
Software version 1.7.5 build 13229
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