

Castle Rocks September 2021

Processing Report - Valorie had issues with the project crashes on the Caughlin Puget computer. Peter ran the final batch processing on Megan Cattau's Puget computer.

04 March 2022



Survey Data

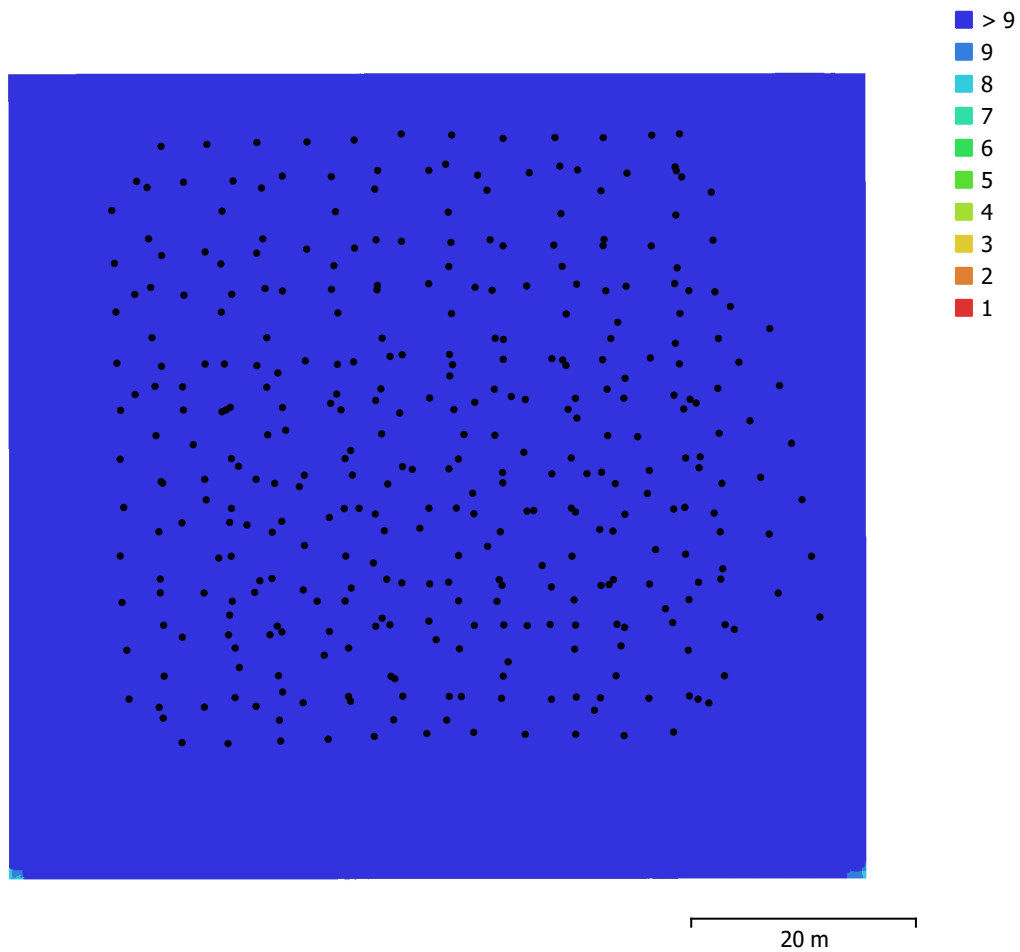


Fig. 1. Camera locations and image overlap.

Number of images:	355	Camera stations:	355
Flying altitude:	32.6 m	Tie points:	2,091,746
Ground resolution:	7.73 mm/pix	Projections:	9,321,371
Coverage area:	5.46e+03 m ²	Reprojection error:	1.02 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

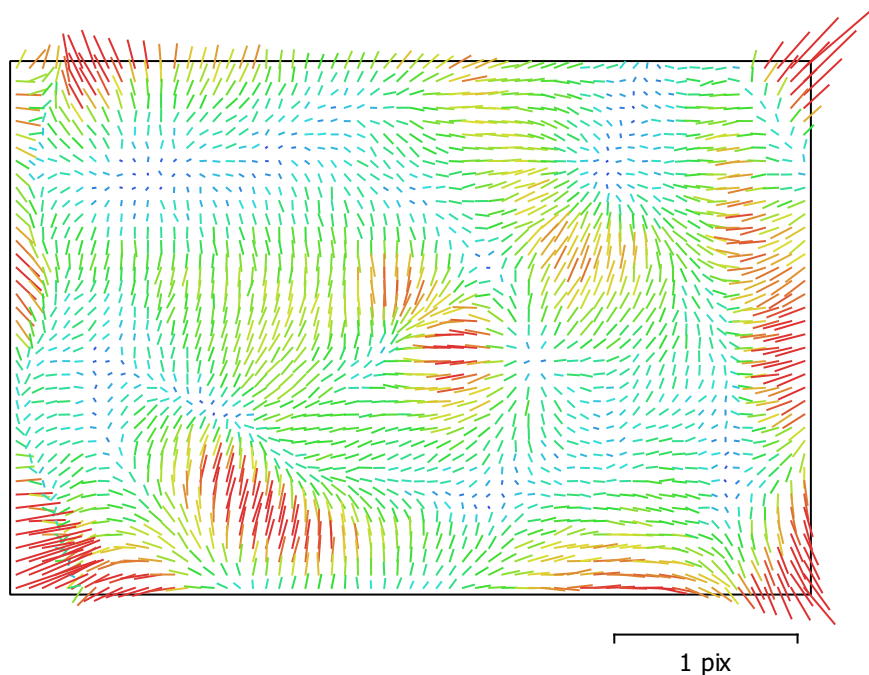


Fig. 2. Image residuals for Test_Pro (10.26mm).

Test_Pro (10.26mm)

355 images, rolling shutter

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	4252.72	0.36	1.00	-0.69	-0.97	0.23	-0.64	-0.88	0.01	-0.01	0.23	0.76	0.93
Cx	-2.20009	0.018		1.00	0.67	-0.02	0.74	0.60	0.00	0.00	-0.15	-0.86	-0.64
Cy	-3.96181	0.052			1.00	-0.36	0.67	0.85	0.00	0.00	-0.21	-0.74	-0.96
B1	-13.5171	0.0015				1.00	-0.19	-0.26	-0.04	0.06	-0.01	0.11	0.42
B2	-0.718164	0.0018					1.00	0.58	-0.00	0.00	-0.14	-0.77	-0.67
K1	-0.180509	3.3e-05						1.00	-0.41	0.38	-0.54	-0.71	-0.88
K2	0.00749236	6.9e-05							1.00	-0.98	0.93	0.00	0.01
K3	-0.00627124	0.00014								1.00	-0.97	0.00	0.00
K4	0.0333853	9.5e-05									1.00	0.16	0.20
P1	0.00140465	7.5e-07										1.00	0.75
P2	0.000368917	2e-06											1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

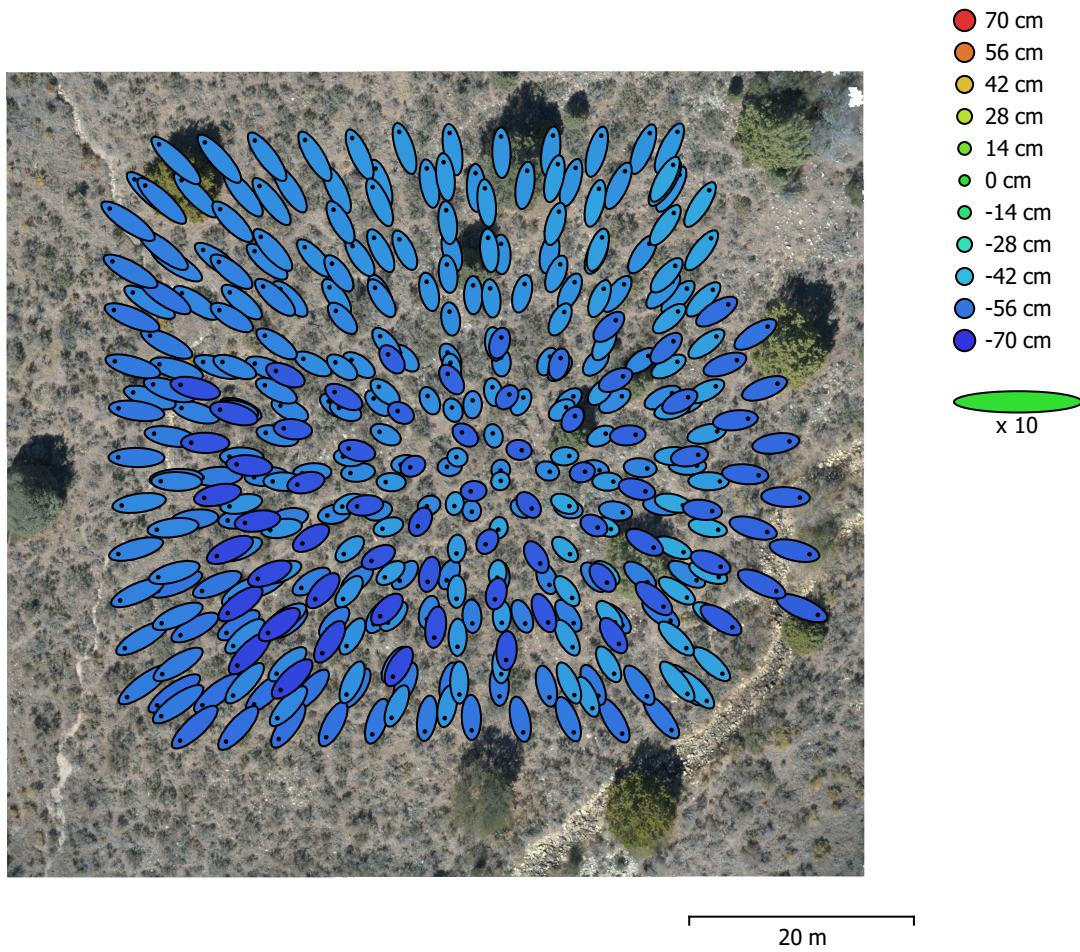


Fig. 3. Camera locations and error estimates.

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 (cm)	Y error (cm)	Z error (cm)	XY error (cm)	Total error (cm)
16.6659	15.1695	53.8973	22.5358	58.419

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

Ground Control Points

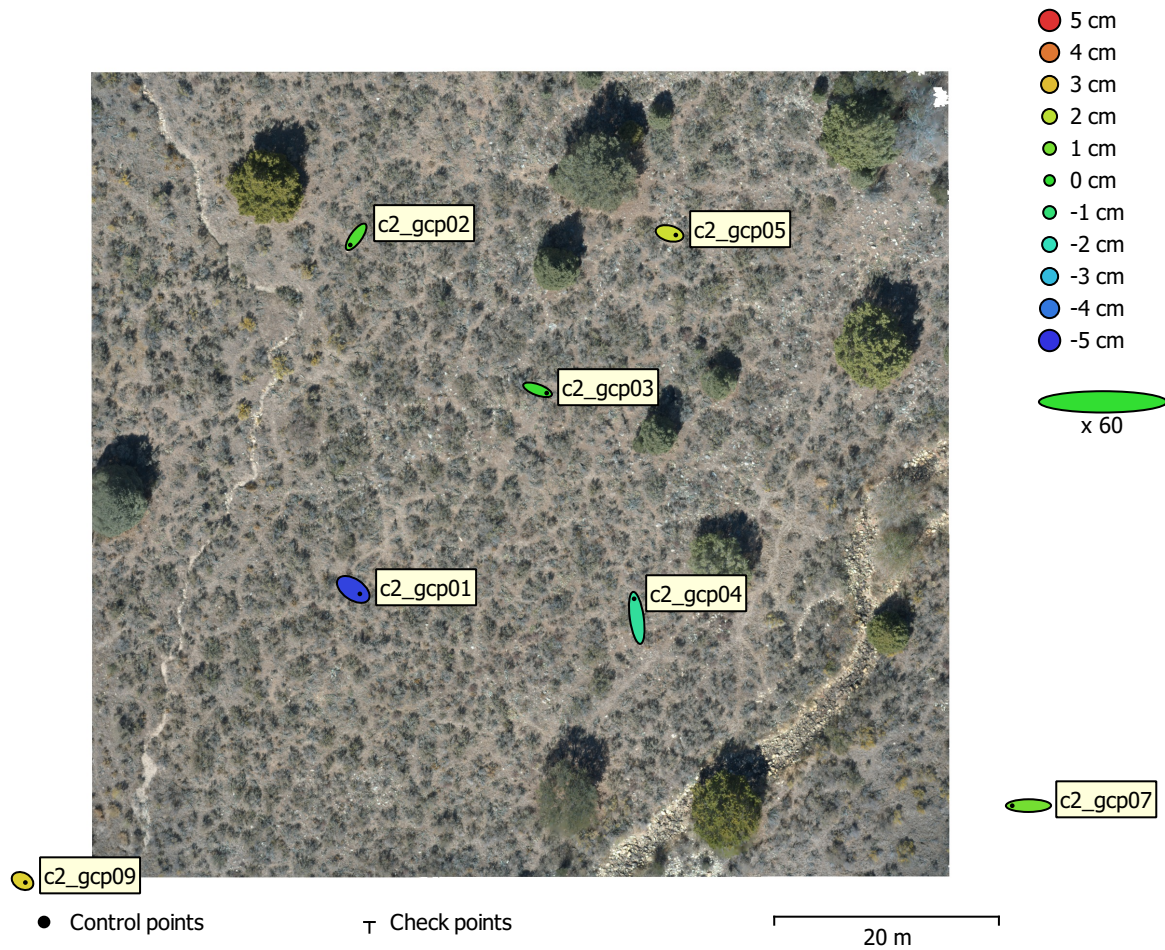


Fig. 4. GCP locations and error estimates.

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)
7	2.45543	2.42202	2.34028	3.44896	4.168

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)
c2_gcp01	1.96241	-1.33153	-4.75171	5.31063	0.551 (120)
c2_gcp02	-1.74347	-2.41589	0.425468	3.00952	0.500 (103)
c2_gcp03	2.70618	-0.979033	0.132657	2.88088	0.528 (152)
c2_gcp04	-0.788706	5.6633	-1.53169	5.91955	0.551 (132)
c2_gcp05	1.85282	-0.472266	2.25086	2.95336	0.573 (102)
c2_gcp07	-4.81887	-0.0240655	0.956216	4.91289	0.470 (9)
c2_gcp09	0.844519	-0.445719	2.68965	2.85414	0.383 (3)
Total	2.45543	2.42202	2.34028	4.168	0.539

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

Digital Elevation Model

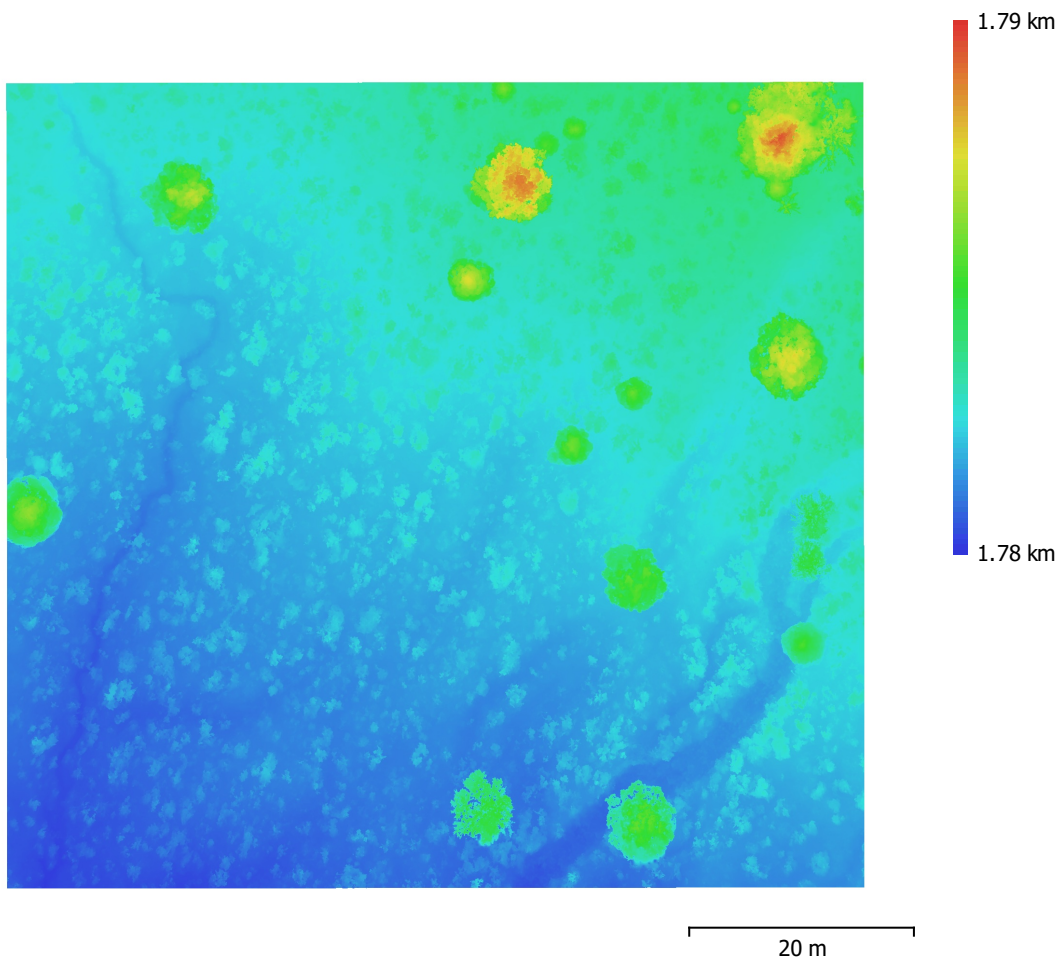


Fig. 5. Reconstructed digital elevation model.

Resolution: 7.72 mm/pix
Point density: 1.68 points/cm²

Processing Parameters

General

Cameras	355
Aligned cameras	355
Markers	7
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	2,091,746 of 2,383,872
RMS reprojection error	0.200851 (1.02051 pix)
Max reprojection error	1.16219 (59.7869 pix)
Mean key point size	3.70447 pix
Point colors	3 bands, uint16
Key points	No
Average tie point multiplicity	6.78392

Alignment parameters

Accuracy	High
Generic preselection	No
Reference preselection	Source
Key point limit	100,000
Key point limit per Mpx	1,000
Tie point limit	0
Exclude stationary tie points	No
Guided image matching	No
Adaptive camera model fitting	No
Matching time	1 hours 14 minutes
Matching memory usage	1.70 GB
Alignment time	36 minutes 23 seconds
Alignment memory usage	1.25 GB

Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k4, p1, p2
Adaptive camera model fitting	No
Optimization time	1 minutes 37 seconds
Date created	2022:02:20 21:43:24
Software version	1.7.5.13229
File size	308.33 MB

Depth Maps

Count	355
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Depth maps generation parameters

Quality	High
Filtering mode	Disabled
Max neighbors	40
Processing time	1 hours 54 minutes
Memory usage	20.43 GB
Date created	2022:02:22 22:44:55
Software version	1.7.5.13229
File size	3.00 GB

Dense Point Cloud

Points	222,550,243
Point colors	3 bands, uint16

Depth maps generation parameters

Quality	Ultra High
Filtering mode	Disabled
Max neighbors	40
Processing time	2 hours 17 minutes
Memory usage	19.78 GB
Dense cloud generation parameters	
Processing time	5 hours 24 minutes
Memory usage	54.34 GB
Date created	2022:02:21 23:51:54
Software version	1.7.5.13229
File size	3.99 GB
Model	
Faces	9,762,087
Vertices	4,889,366
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 54 minutes
Memory usage	20.43 GB
Reconstruction parameters	
Surface type	Arbitrary
Source data	Depth maps
Interpolation	Enabled
Strict volumetric masks	No
Processing time	9 minutes 51 seconds
Memory usage	6.03 GB
Texturing parameters	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	4,096
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	3 minutes 2 seconds
UV mapping memory usage	3.00 GB
Blending time	13 minutes 13 seconds
Blending memory usage	5.51 GB
Blending GPU memory usage	1.91 GB
Date created	2022:03:04 17:58:37
Software version	1.8.1.13915
File size	508.60 MB
DEM	
Size	9,884 x 9,298
Coordinate system	WGS 84 (EPSG::4326)
Reconstruction parameters	
Source data	Dense cloud
Interpolation	Enabled
Processing time	40 seconds
Memory usage	310.54 MB
Date created	2022:03:04 15:03:04
Software version	1.8.1.13915
File size	265.95 MB
Orthomosaic	
Size	9,880 x 9,291

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 30 minutes 42 seconds
Memory usage 2.74 GB
Date created 2022:03:04 19:21:52
Software version 1.8.1.13915
File size 68.14 GB

System

Software name Agisoft Metashape Professional
Software version 1.8.1 build 13915
OS Windows 64 bit
RAM 127.70 GB
CPU Intel(R) Core(TM) i9-10900X CPU @ 3.70GHz
GPU(s) GeForce RTX 2080 Ti