

# Kapp Morton

Processing Report  
27 January 2022



# Survey Data

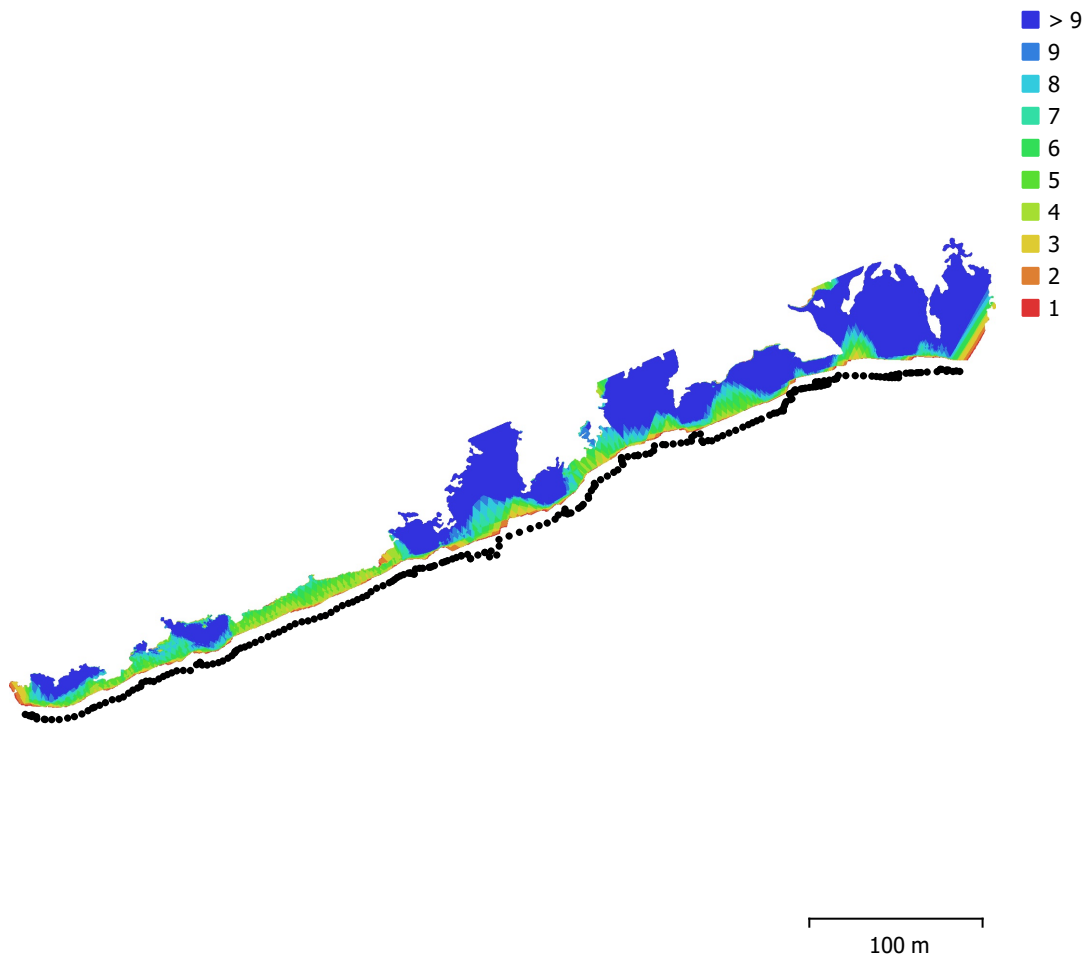


Fig. 1. Camera locations and image overlap.

Number of images:	259	Camera stations:	259
Flying altitude:	14.1 m	Tie points:	261,215
Ground resolution:	3.14 mm/pix	Projections:	807,705
Coverage area:	0.0153 km <sup>2</sup>	Reprojection error:	0.57 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
L1D-20c (10.26mm)	5472 x 3648	10.26 mm	2.41 x 2.41 $\mu$ m	No

Table 1. Cameras.

# Camera Calibration

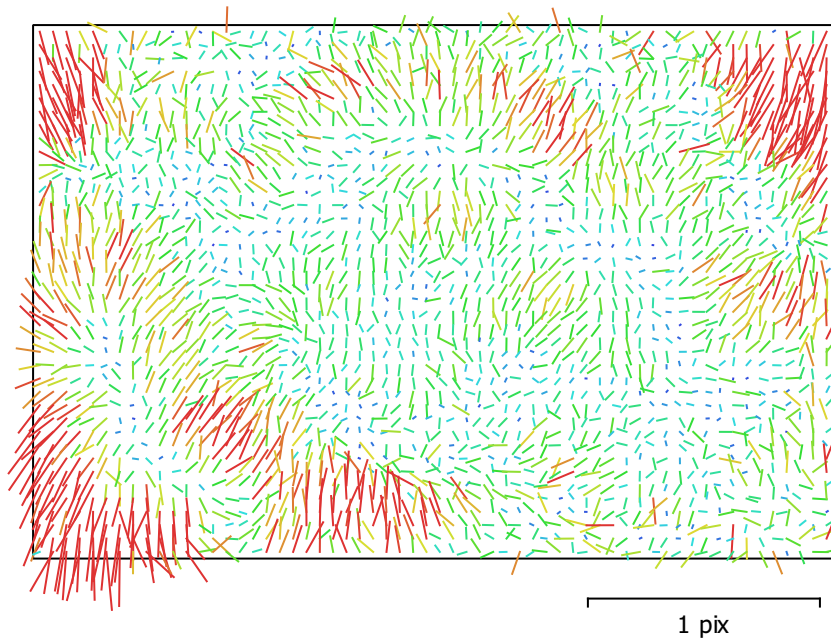


Fig. 2. Image residuals for L1D-20c (10.26mm).

## L1D-20c (10.26mm)

259 images

Type  
Frame

Resolution  
**5472 x 3648**

Focal Length  
**10.26 mm**

Pixel Size  
**2.41 x 2.41  $\mu$ m**

	Value	Error	F	Cx	Cy	B1	K1	K2	K3	P1	P2
<b>F</b>	<b>4401.21</b>	0.88	1.00	-0.00	0.96	-0.99	-0.00	0.04	-0.05	0.01	0.13
<b>Cx</b>	<b>15.7403</b>	0.25		1.00	-0.02	0.01	0.04	-0.02	0.03	0.97	-0.03
<b>Cy</b>	<b>6.02109</b>	0.81			1.00	-0.98	-0.02	0.03	-0.04	-0.00	0.32
<b>B1</b>	<b>-71.8029</b>	1				1.00	0.03	-0.03	0.04	-0.00	-0.14
<b>K1</b>	<b>-0.00158646</b>	4.6e-05					1.00	-0.90	0.84	0.04	0.03
<b>K2</b>	<b>0.0305087</b>	0.00019						1.00	-0.98	-0.02	0.03
<b>K3</b>	<b>-0.039096</b>	0.00024							1.00	0.03	-0.06
<b>P1</b>	<b>0.00149661</b>	1.6e-05								1.00	-0.02
<b>P2</b>	<b>-0.00266258</b>	8.4e-06									1.00

Table 2. Calibration coefficients and correlation matrix.

# Camera Locations

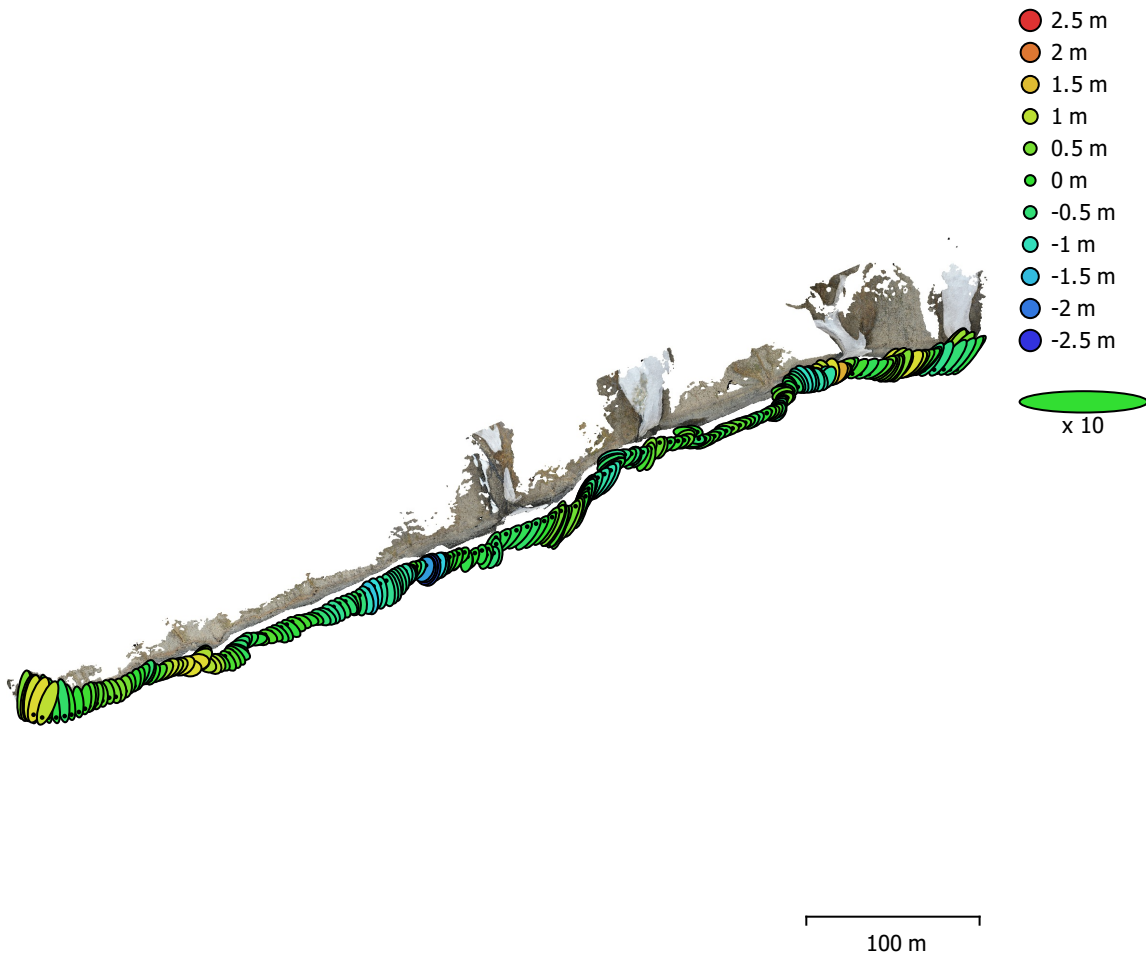


Fig. 3. Camera locations and error estimates.

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)
0.531577	0.881807	0.663498	1.02964	1.2249

Table 3. Average camera location error.

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

# Digital Elevation Model

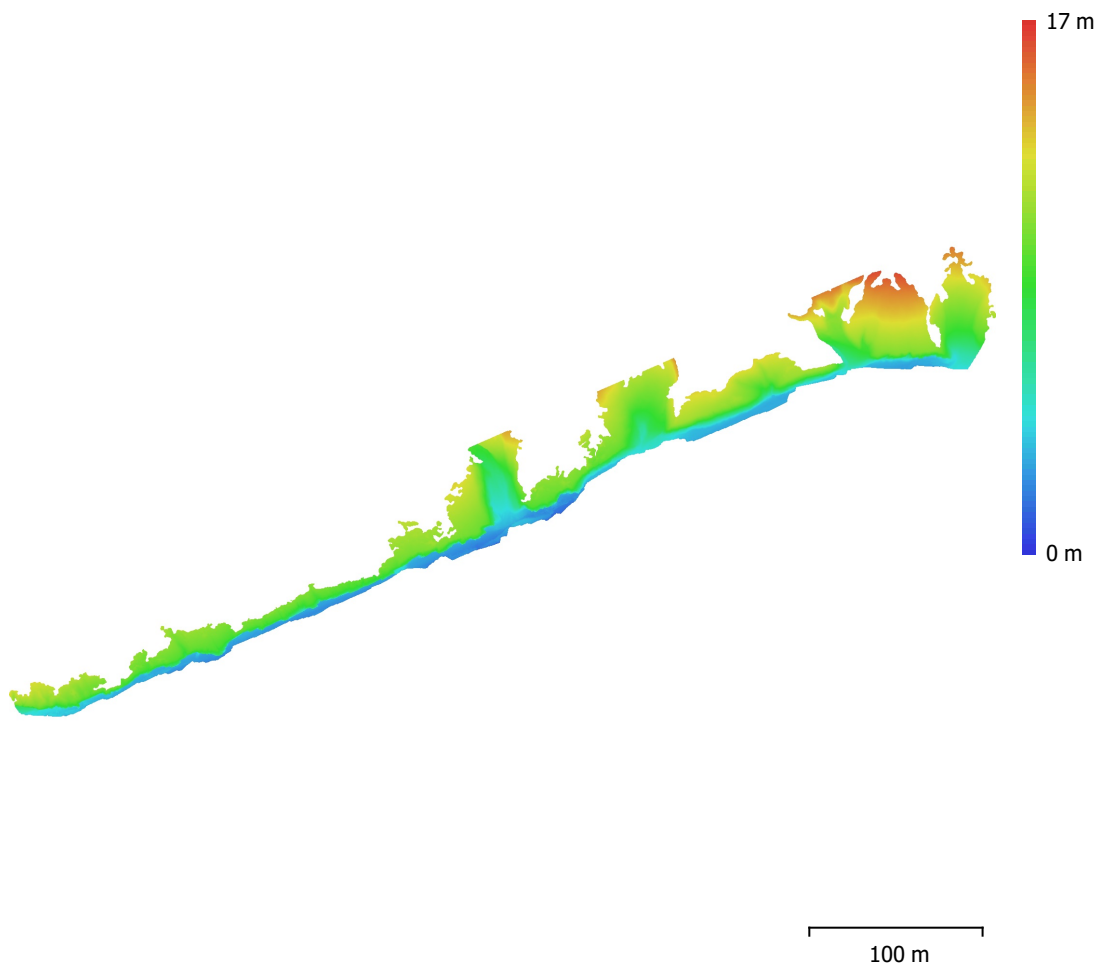


Fig. 4. Reconstructed digital elevation model.

Resolution: 2.46 cm/pix  
Point density: 0.166 points/cm<sup>2</sup>

# Processing Parameters

## General

Cameras	259
Aligned cameras	259
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	261,215 of 309,935
RMS reprojection error	0.355466 (0.569947 pix)
Max reprojection error	2.28342 (49.2329 pix)
Mean key point size	1.59531 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	3.4881

## Alignment parameters

Accuracy	Highest
Generic preselection	No
Reference preselection	No
Key point limit	40,000
Tie point limit	4,000
Exclude stationary tie points	No
Guided image matching	No
Adaptive camera model fitting	Yes
Matching time	46 minutes 40 seconds
Matching memory usage	1.31 GB
Alignment time	2 minutes 44 seconds
Alignment memory usage	209.70 MB

## Optimization parameters

Parameters	f, b1, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	6 seconds
Software version	1.7.2.12040
File size	23.40 MB

## Depth Maps

Count	259
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## Depth maps generation parameters

Quality	Medium
Filtering mode	Mild
Processing time	4 minutes 14 seconds
Memory usage	737.33 MB
Software version	1.7.2.12040
File size	540.28 MB

## Dense Point Cloud

Points	71,016,686
Point colors	3 bands, uint8

## Depth maps generation parameters

Quality	Medium
Filtering mode	Mild
Processing time	4 minutes 14 seconds
Memory usage	737.33 MB

## Dense cloud generation parameters

Processing time	12 minutes 17 seconds
Memory usage	2.77 GB
Software version	1.7.2.12040
File size	1.33 GB
<b>Model</b>	
Faces	4,656,909
Vertices	2,342,204
Vertex colors	3 bands, uint8
Texture	4,096 x 4,096 x 10, 4 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	Medium
Filtering mode	Mild
Processing time	4 minutes 14 seconds
Memory usage	737.33 MB
<b>Reconstruction parameters</b>	
Surface type	Arbitrary
Source data	Dense cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	13 minutes 35 seconds
Memory usage	12.61 GB
<b>Texturing parameters</b>	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	4,096
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	3 minutes 45 seconds
UV mapping memory usage	3.75 GB
Blending time	18 minutes 49 seconds
Blending memory usage	6.31 GB
Software version	1.7.2.12040
File size	463.90 MB
<b>Tiled Model</b>	
Texture	3 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	Medium
Filtering mode	Mild
Processing time	4 minutes 14 seconds
Memory usage	737.33 MB
<b>Reconstruction parameters</b>	
Source data	Dense cloud
Tile size	256
Face count	Medium
Enable ghosting filter	No
Processing time	1 hours 51 minutes
Memory usage	3.23 GB
Software version	1.7.2.12040
File size	2.36 GB
<b>System</b>	
Software name	Agisoft Metashape Professional
Software version	1.7.2 build 12040
OS	Windows 64 bit
RAM	127.78 GB
CPU	Intel(R) Core(TM) i9-9900K CPU @ 3.60GHz
GPU(s)	GeForce RTX 2080