

# Pallen

Processing Report  
08 December 2021



# Survey Data

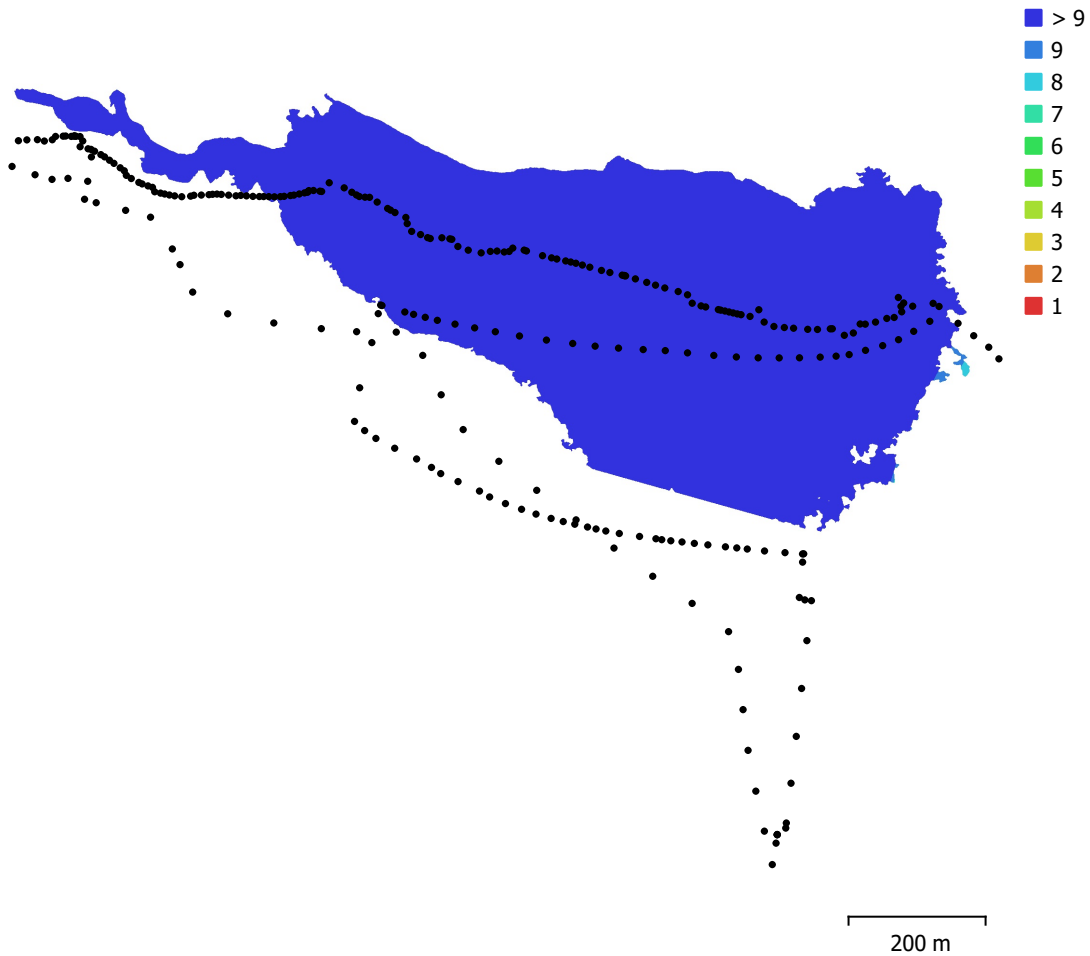


Fig. 1. Camera locations and image overlap.

Number of images:	267	Camera stations:	267
Flying altitude:	172 m	Tie points:	171,103
Ground resolution:	3.65 cm/pix	Projections:	947,455
Coverage area:	0.375 km <sup>2</sup>	Reprojection error:	0.787 pix

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

Table 1. Cameras.

# Camera Calibration

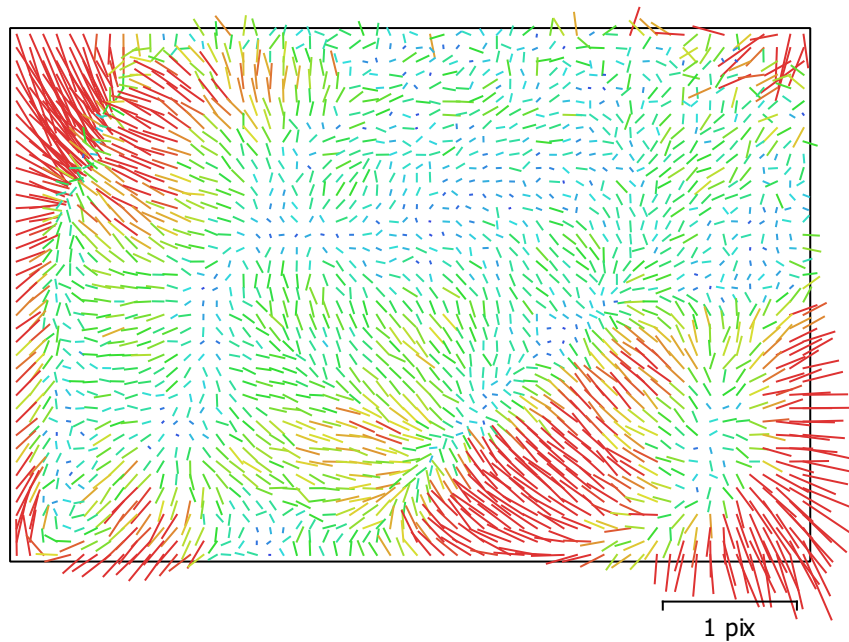


Fig. 2. Image residuals for L1D-20c (10.26mm).

## L1D-20c (10.26mm)

267 images

Type	Resolution	Focal Length	Pixel Size
<b>Frame</b>	<b>5472 x 3648</b>	<b>10.26 mm</b>	<b>2.41 x 2.41 <math>\mu</math>m</b>

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	P1	P2
<b>F</b>	<b>4401.77</b>	0.12	1.00	0.17	0.04	-0.75	-0.23	-0.05	0.07	-0.06	0.00	-0.03
<b>Cx</b>	<b>-21.1089</b>	0.091		1.00	0.04	-0.20	0.08	0.03	-0.02	0.01	0.83	0.08
<b>Cy</b>	<b>-45.5393</b>	0.13			1.00	-0.45	-0.06	-0.03	-0.00	0.00	0.08	0.53
<b>B1</b>	<b>-18.8575</b>	0.12				1.00	0.03	0.02	0.01	-0.01	0.00	-0.13
<b>B2</b>	<b>-34.6882</b>	0.11					1.00	-0.02	0.01	-0.01	-0.09	-0.01
<b>K1</b>	<b>0.00926185</b>	3.5e-05						1.00	-0.96	0.90	0.03	-0.07
<b>K2</b>	<b>0.0483225</b>	0.00015							1.00	-0.98	-0.02	0.03
<b>K3</b>	<b>-0.0534648</b>	0.0002								1.00	0.01	-0.03
<b>P1</b>	<b>-0.000463327</b>	5.8e-06									1.00	0.14
<b>P2</b>	<b>-0.00323128</b>	3e-06										1.00

Table 2. Calibration coefficients and correlation matrix.

# Camera Locations

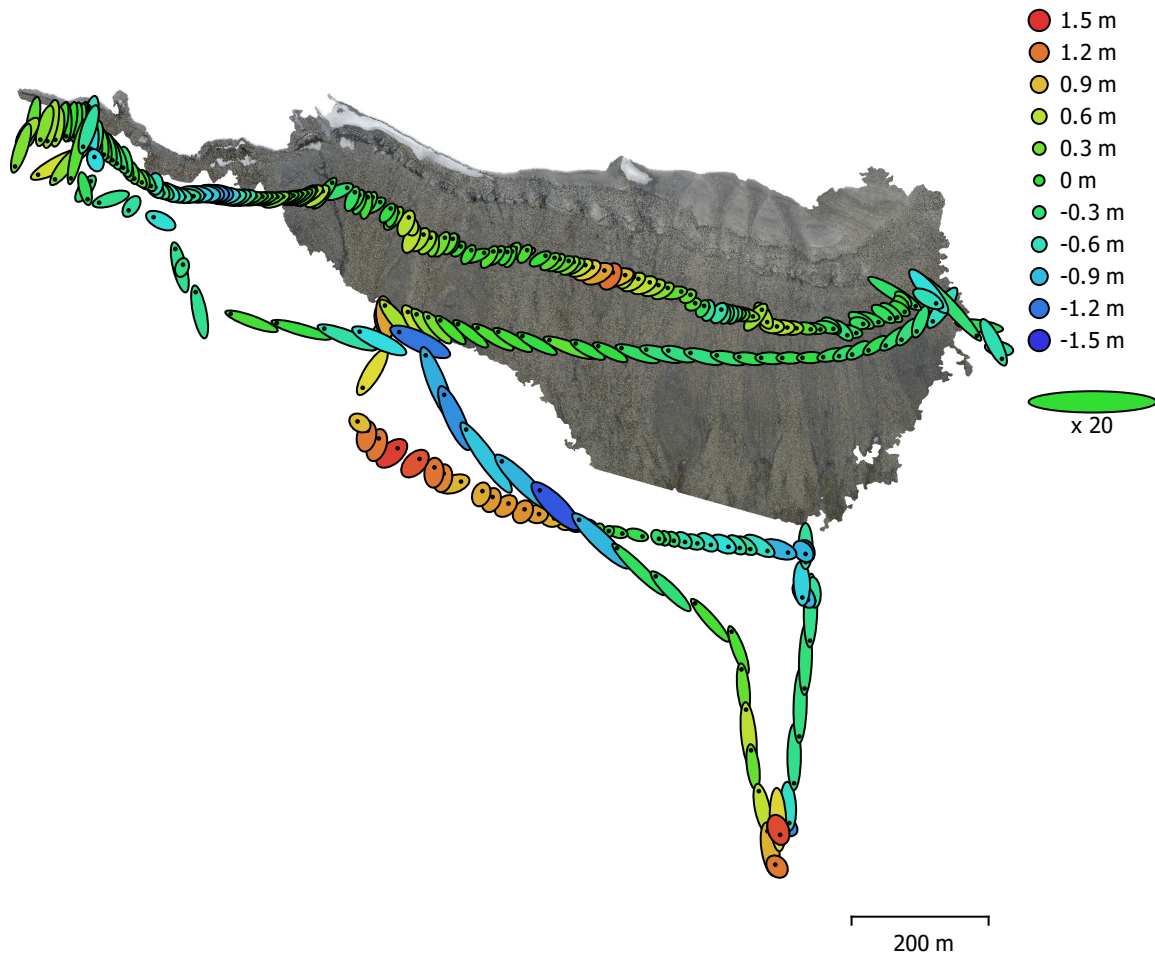


Fig. 3. Camera locations and error estimates.

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)
1.11253	1.38952	0.541865	1.78003	1.86067

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

# Digital Elevation Model

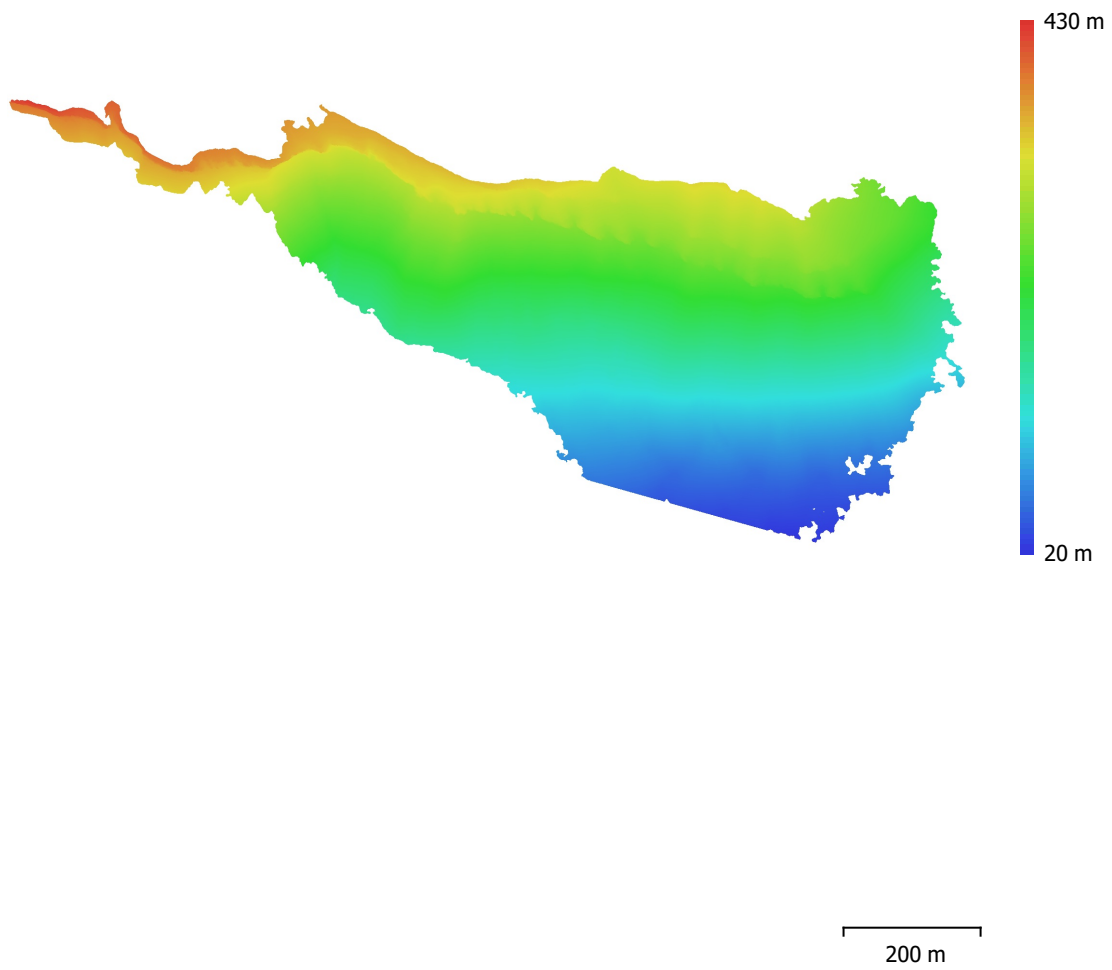


Fig. 4. Reconstructed digital elevation model.

Resolution: 7.3 cm/pix  
Point density: 188 points/m<sup>2</sup>

# Processing Parameters

## General

Cameras	267
Aligned cameras	267
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	171,103 of 204,747
RMS reprojection error	0.41272 (0.786879 pix)
Max reprojection error	1.78299 (42.4728 pix)
Mean key point size	1.76298 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	5.99648

## 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	20 seconds
Matching memory usage	1.10 GB
Alignment time	32 seconds
Alignment memory usage	110.57 MB

## Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	10 seconds
Software version	1.7.2.12040
File size	23.27 MB

## Depth Maps

Count	267
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## Depth maps generation parameters

Quality	High
Filtering mode	Mild
Processing time	0 seconds
Memory usage	4.68 GB
Software version	1.7.2.12040
File size	1.96 GB

## Dense Point Cloud

Points	74,356,253
Point colors	3 bands, uint8

## Depth maps generation parameters

Quality	High
Filtering mode	Mild
Processing time	0 seconds
Memory usage	4.68 GB

## Dense cloud generation parameters

Processing time	6 minutes 11 seconds
Memory usage	9.31 GB
Software version	1.7.2.12040
File size	1.86 GB
<b>Model</b>	
Faces	4,954,802
Vertices	2,487,025
Vertex colors	3 bands, uint8
Texture	4,096 x 4,096 x 10, 4 bands, uint8
<b>Depth maps generation parameters</b>	
Quality	High
Filtering mode	Mild
Processing time	0 seconds
Memory usage	4.68 GB
<b>Reconstruction parameters</b>	
Surface type	Arbitrary
Source data	Dense cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	58 minutes 53 seconds
Memory usage	39.48 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	5 minutes 31 seconds
UV mapping memory usage	4.18 GB
Blending time	3 minutes 30 seconds
Blending memory usage	6.06 GB
Software version	1.7.2.12040
File size	450.39 MB
<b>Tiled Model</b>	
Texture	3 bands, uint8
<b>Reconstruction parameters</b>	
Source data	Mesh
Tile size	256
Face count	Medium
Enable ghosting filter	No
Processing time	18 seconds
Memory usage	3.03 GB
Software version	1.7.2.12040
File size	491.83 MB
<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