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**Processing Report
10 May 2022**



Survey Data

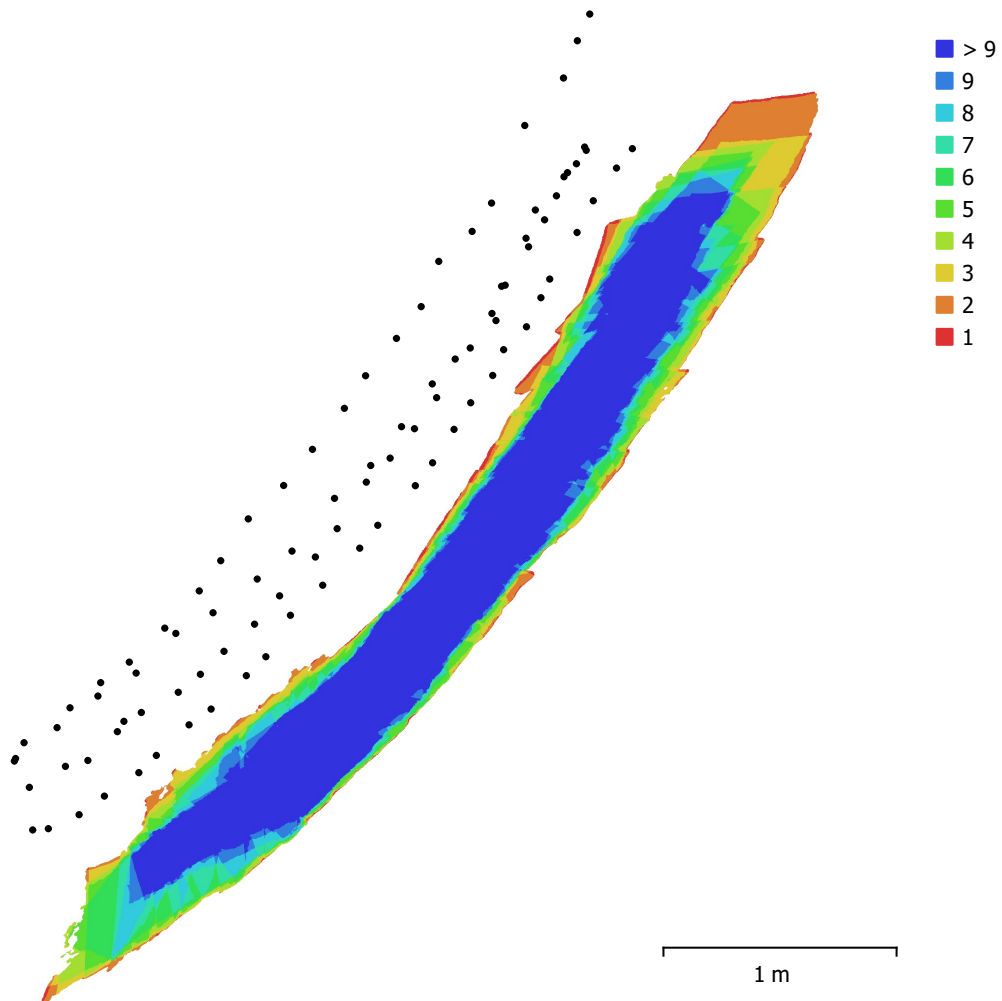


Fig. 1. Camera locations and image overlap.

Number of images:	94	Camera stations:	94
Flying altitude:	70.5 cm	Tie points:	69,521
Ground resolution:	0.211 mm/pix	Projections:	147,973
Coverage area:	2.23 m ²	Reprojection error:	0.297 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibration
iPhone SE, iPhone SE back camera 4.15mm f/2.2 (4.15mm)	4032 x 3024	4.15 mm	1.23 x 1.23 μm	No

Table 1. Cameras.

Camera Calibration

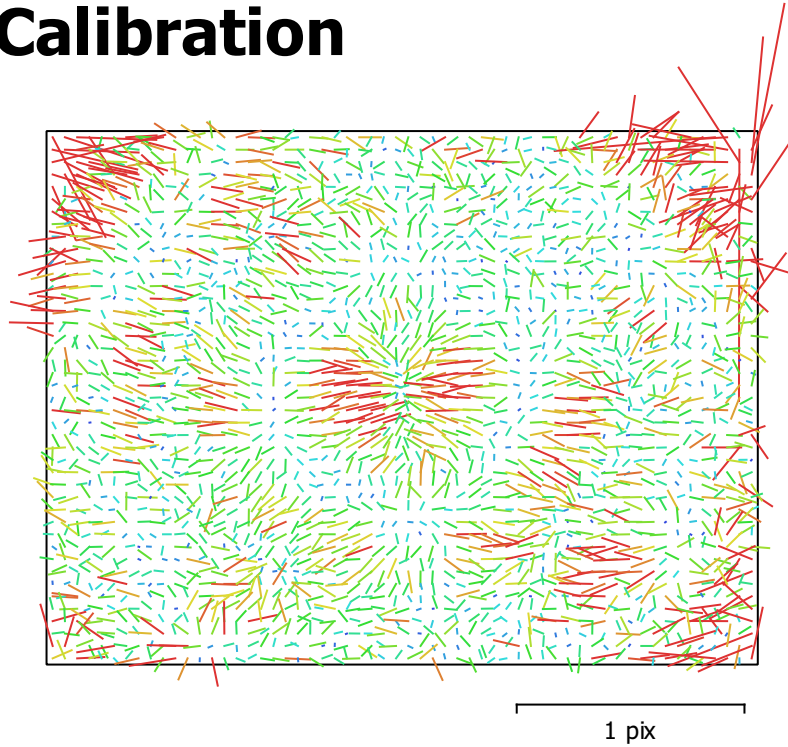


Fig. 2. Image residuals for iPhone SE, iPhone SE back camera 4.15mm f/2.2 (4.15mm).

iPhone SE, iPhone SE back camera 4.15mm f/2.2 (4.15mm)

94 images

Type	Resolution	Focal Length	Pixel Size
Frame	4032 x 3024	4.15 mm	1.23 x 1.23 μm

	Value	Error	F	Cx	Cy	K1	K2	K3	P1	P2
F	3340.91	0.62	1.00	0.24	-0.64	0.21	-0.19	0.01	-0.03	0.26
Cx	-10.777	0.14		1.00	-0.25	0.12	-0.09	0.06	0.61	-0.11
Cy	13.2558	0.27			1.00	-0.30	0.15	-0.02	-0.09	0.42
K1	0.112139	0.00015				1.00	-0.91	0.82	0.06	-0.19
K2	-0.183705	0.00068					1.00	-0.96	-0.01	-0.07
K3	0.0106293	0.00094						1.00	0.02	0.04
P1	-0.000860392	1.2e-05							1.00	-0.25
P2	0.0018224	2.8e-05								1.00

Table 2. Calibration coefficients and correlation matrix.

Camera Locations

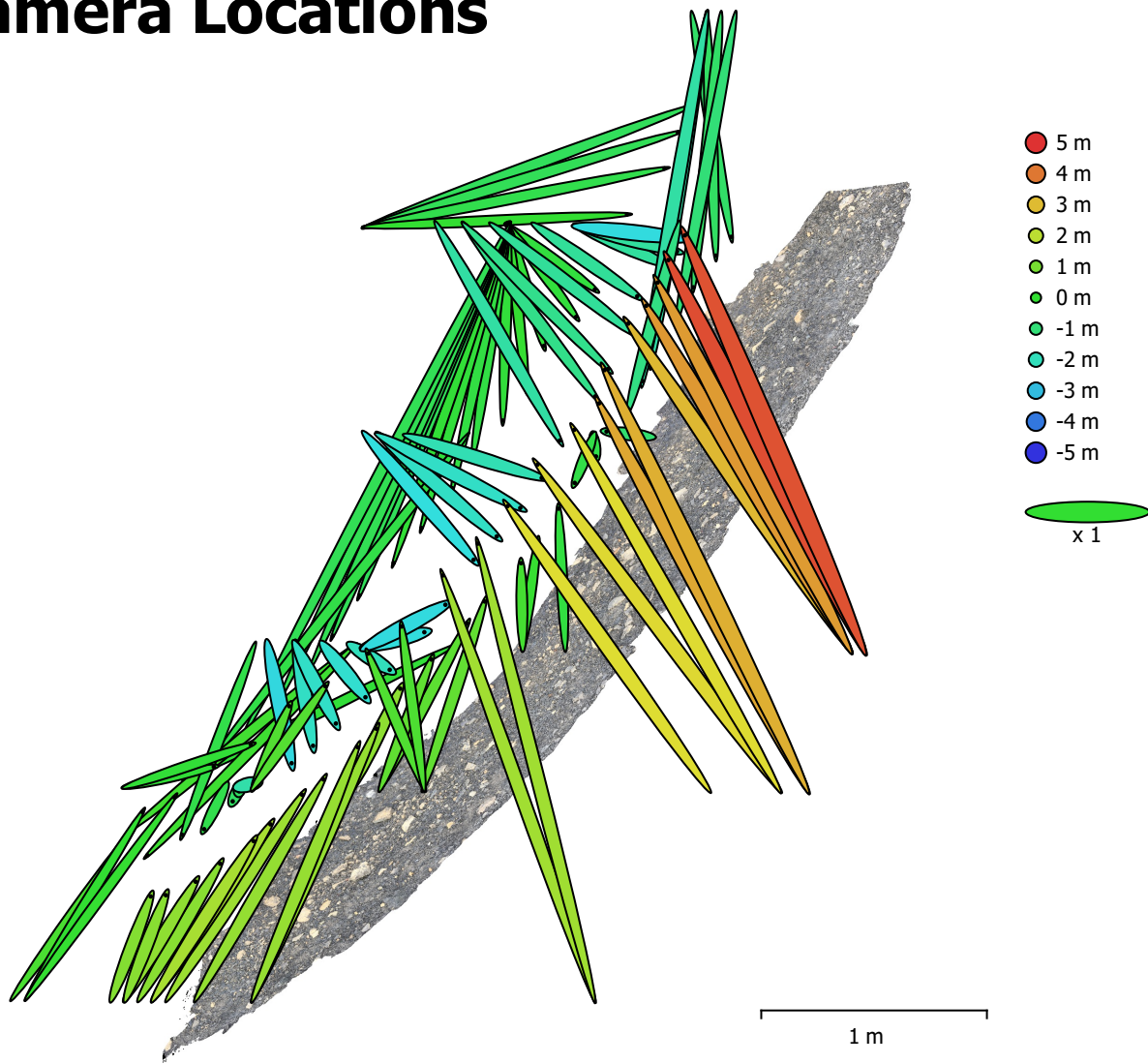


Fig. 3. Camera locations and error estimates.

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)
0.593764	0.989597	1.60558	1.15406	1.97731

Table 3. Average camera location error.

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

Digital Elevation Model

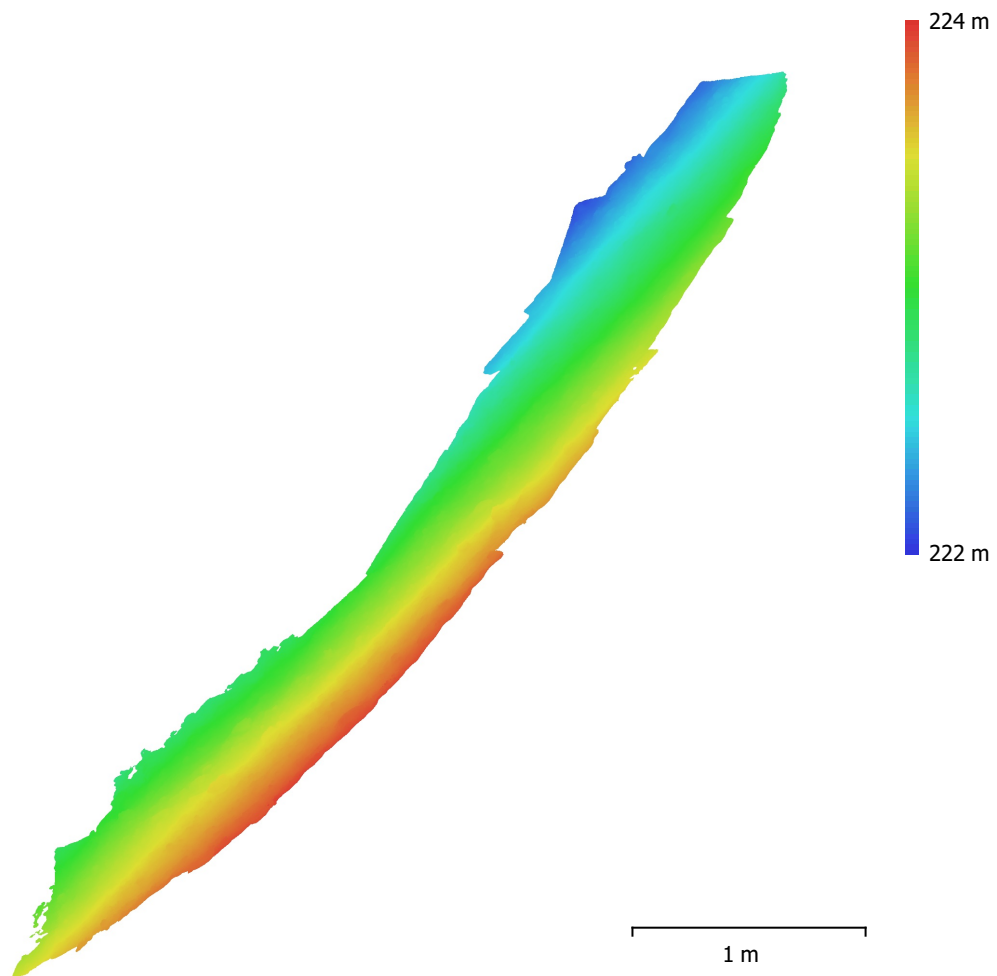


Fig. 4. Reconstructed digital elevation model.

Resolution: 0.422 mm/pix
Point density: 5.6 points/mm²

Processing Parameters

General

Cameras	94
Aligned cameras	94
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

Point Cloud

Points	69,521 of 542,102
RMS reprojection error	0.147688 (0.297499 pix)
Max reprojection error	0.604659 (1.57754 pix)
Mean key point size	1.94744 pix
Point colors	3 bands, uint8
Key points	No
Average tie point multiplicity	2.70467

Alignment parameters

Accuracy	Highest
Generic preselection	Yes
Reference preselection	No
Key point limit	60,000
Tie point limit	0
Exclude stationary tie points	Yes
Guided image matching	No
Adaptive camera model fitting	No
Matching time	11 seconds
Matching memory usage	1.64 GB
Alignment time	30 seconds
Alignment memory usage	159.94 MB

Optimization parameters

Parameters	f, cx, cy, k1-k3, p1, p2
Adaptive camera model fitting	No
Optimization time	2 seconds
Software version	1.7.2.12040
File size	25.53 MB

Depth Maps

Count	92
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Processing time	2 minutes 13 seconds
Memory usage	1.38 GB
Software version	1.7.2.12040
File size	425.97 MB

Dense Point Cloud

Points	32,294,945
Point colors	3 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Processing time	2 minutes 13 seconds
Memory usage	1.38 GB
Dense cloud generation parameters	

Processing time	10 minutes 29 seconds
Memory usage	3.95 GB
Software version	1.7.2.12040
File size	782.66 MB
Model	
Faces	6,458,988
Vertices	3,236,967
Vertex colors	3 bands, uint8
Texture	4,096 x 4,096 x 10, 4 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Processing time	2 minutes 13 seconds
Memory usage	1.38 GB
Reconstruction parameters	
Surface type	Arbitrary
Source data	Dense cloud
Interpolation	Enabled
Strict volumetric masks	No
Processing time	14 minutes 6 seconds
Memory usage	19.09 GB
Texturing parameters	
Mapping mode	Generic
Blending mode	Mosaic
Texture size	4,096
Enable hole filling	Yes
Enable ghosting filter	Yes
UV mapping time	4 minutes 19 seconds
UV mapping memory usage	3.68 GB
Blending time	1 minutes 14 seconds
Blending memory usage	5.44 GB
Software version	1.7.2.12040
File size	539.52 MB
Tiled Model	
Texture	3 bands, uint8
Depth maps generation parameters	
Quality	High
Filtering mode	Mild
Processing time	2 minutes 13 seconds
Memory usage	1.38 GB
Reconstruction parameters	
Source data	Dense cloud
Tile size	256
Face count	High
Enable ghosting filter	No
Processing time	40 minutes 4 seconds
Memory usage	3.45 GB
Software version	1.7.2.12040
File size	644.08 MB
System	
Software name	Agisoft Metashape Professional
Software version	1.7.2 build 12040
OS	Windows 64 bit
RAM	127.71 GB
CPU	Intel(R) Core(TM) i9-10900K CPU @ 3.70GHz
GPU(s)	Quadro RTX 5000