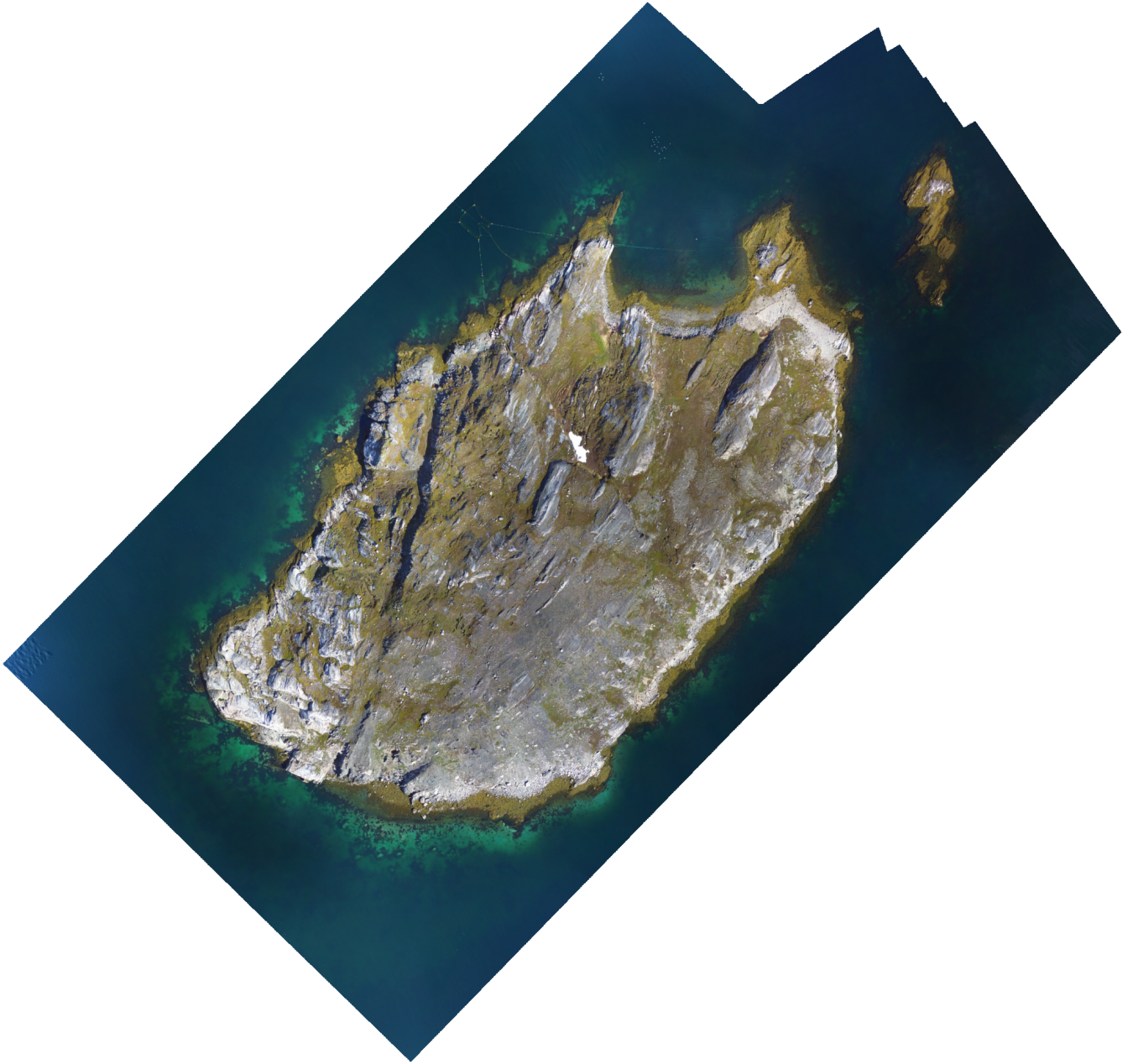


# CARMA 20170705\_KFIsland

Processing Report

24 March 2020



# Survey Data

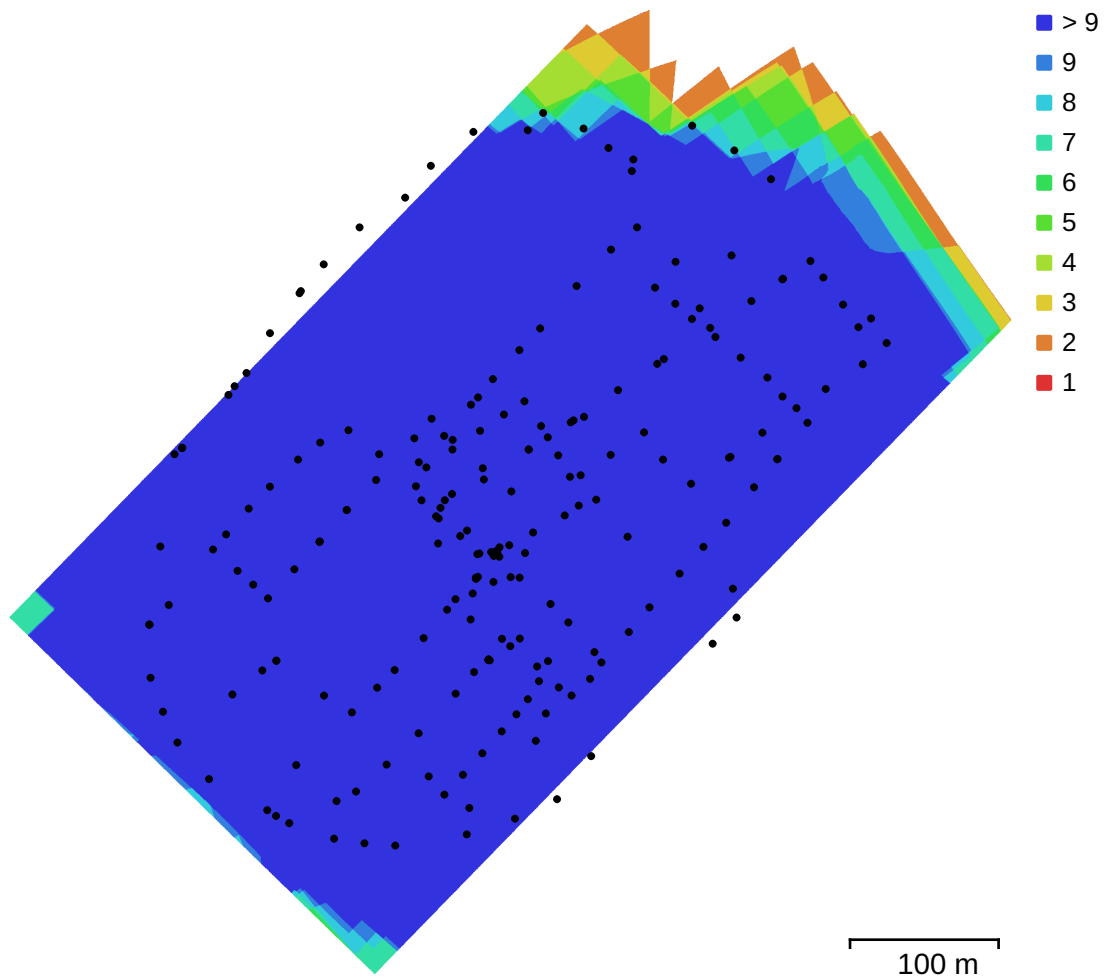


Fig. 1. Camera locations and image overlap.

Number of images:	218	Camera stations:	218
Flying altitude:	138 m	Tie points:	93,263
Ground resolution:	4.86 cm/pix	Projections:	343,322
Coverage area:	0.212 km <sup>2</sup>	Reprojection error:	0.317 pix

Camera Model	Resolution	Focal Length	Pixel Size	Precalibrated
FC300C (3.61mm)	4000 x 3000	3.61 mm	1.56 x 1.56 μm	No

Table 1. Cameras.

# Camera Calibration

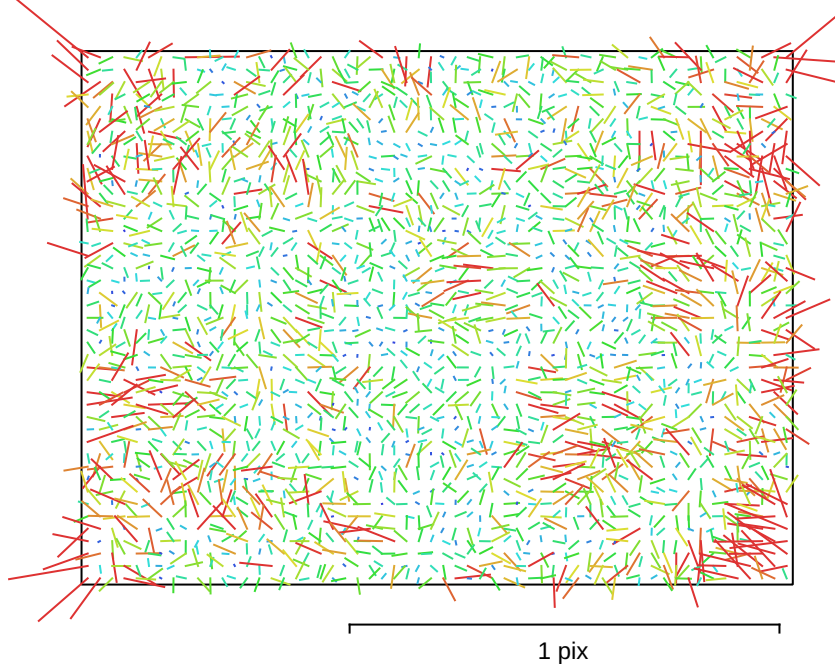


Fig. 2. Image residuals for FC300C (3.61mm).

## FC300C (3.61mm)

218 images

Type	Resolution	Focal Length	Pixel Size
Frame	<b>4000 x 3000</b>	<b>3.61 mm</b>	<b>1.56 x 1.56 <math>\mu\text{m}</math></b>

	Value	Error	F	Cx	Cy	B1	B2	K1	K2	K3	K4	P1	P2	P3	P4
F	2707.33	0.16	1.00	0.13	-0.55	0.01	-0.07	-0.22	0.18	-0.11	0.10	-0.00	0.19	-0.26	0.12
Cx	17.8305	0.071		1.00	-0.08	0.02	0.09	0.04	-0.01	0.02	-0.02	0.71	-0.02	-0.00	-0.03
Cy	16.5378	0.094			1.00	-0.10	0.17	0.02	-0.06	0.03	-0.03	0.08	-0.03	0.27	-0.07
B1	0.146356	0.018				1.00	0.02	-0.07	-0.00	0.01	-0.01	-0.07	0.19	-0.13	0.07
B2	-0.542588	0.016					1.00	0.00	-0.01	0.01	-0.01	0.02	0.07	0.01	0.01
K1	-0.146525	6.5e-05						1.00	-0.94	0.89	-0.83	0.09	-0.16	0.09	-0.07
K2	0.164434	0.00027							1.00	-0.98	0.95	-0.02	0.05	-0.06	0.04
K3	-0.091227	0.00047								1.00	-0.99	0.02	-0.03	0.04	-0.03
K4	0.0364563	0.00027									1.00	-0.02	0.02	-0.03	0.03
P1	-2.01799e-05	3.6e-06										1.00	-0.28	0.29	-0.25
P2	0.00011895	7.1e-06											1.00	-0.84	0.73
P3	1.41445	0.2												1.00	-0.94
P4	-0.454558	0.14													1.00

Table 2. Calibration coefficients and correlation matrix.

# Camera Locations

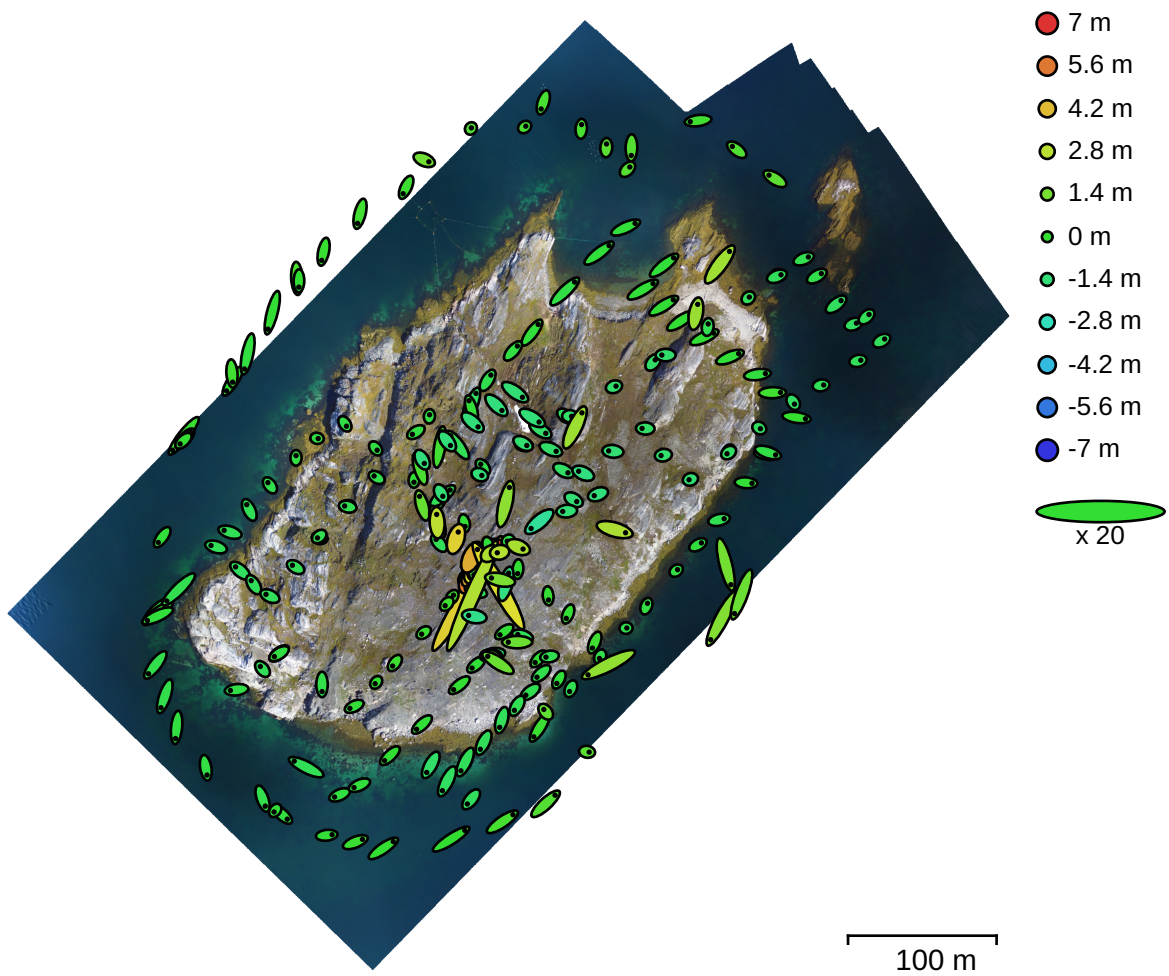


Fig. 3. Camera locations and error estimates.

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)
0.39787	0.534847	1.31342	0.666605	1.4729

Table 3. Average camera location error.

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

# Digital Elevation Model

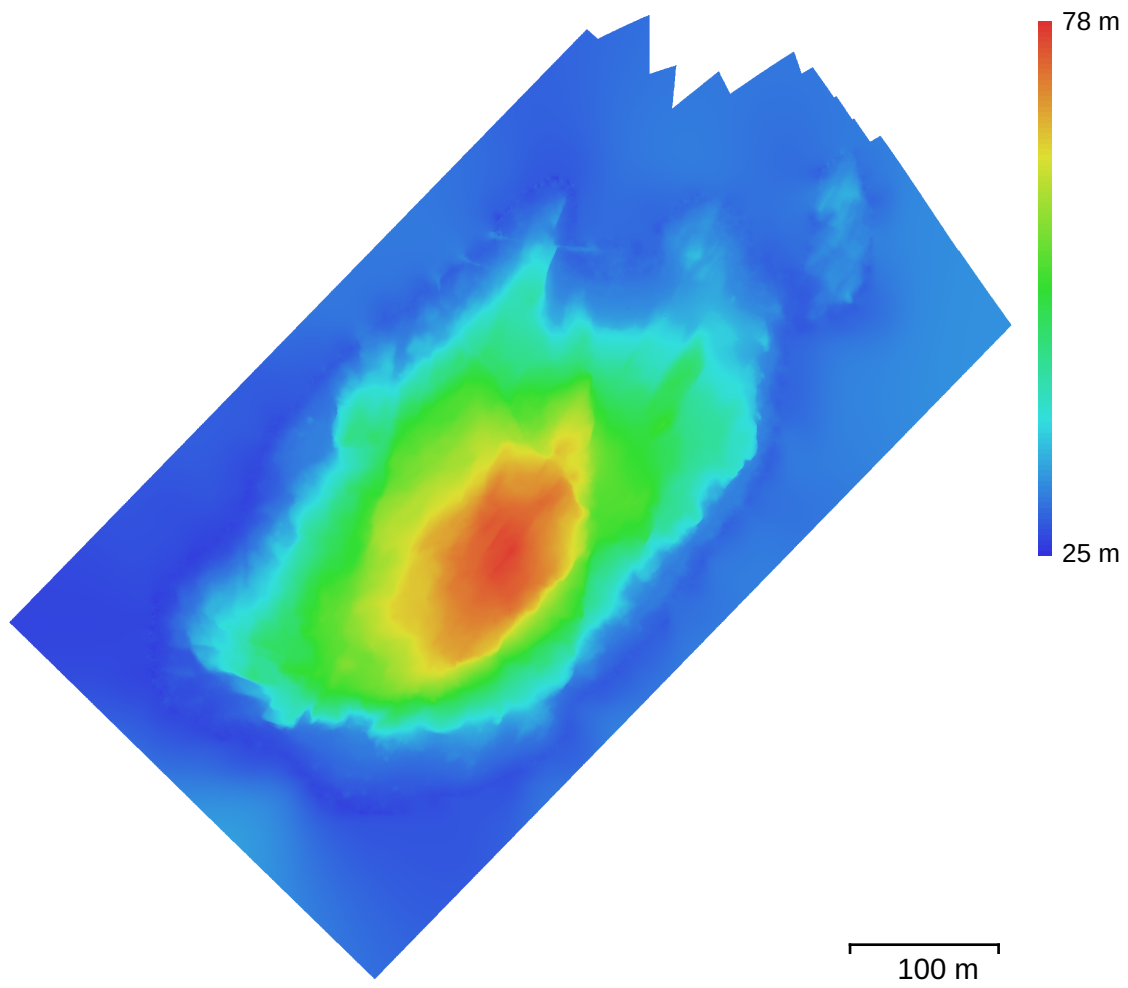


Fig. 4. Reconstructed digital elevation model.

Resolution: 19.4 cm/pix  
Point density: 26.5 points/m<sup>2</sup>

# Processing Parameters

## General

Cameras	218
Aligned cameras	218
Coordinate system	WGS 84 (EPSG::4326)
Rotation angles	Yaw, Pitch, Roll

## Point Cloud

Points	93,263 of 914,274
RMS reprojection error	0.165537 (0.317394 pix)
Max reprojection error	0.399883 (1.13317 pix)
Mean key point size	1.91059 pix
Point colors	3 bands, uint8
Key points	Yes
Average tie point multiplicity	6.14771

## Alignment parameters

Accuracy	High
Generic preselection	Yes
Reference preselection	Yes
Key point limit	60,000
Tie point limit	0
Adaptive camera model fitting	No
Matching time	17 minutes 19 seconds
Alignment time	9 minutes 31 seconds

## Optimization parameters

Parameters	f, b1, b2, cx, cy, k1-k4, p1-p4
Adaptive camera model fitting	No
Optimization time	4 seconds

## Dense Point Cloud

Points	4,413,150
Point colors	3 bands, uint8

## Reconstruction parameters

Quality	Medium
Depth filtering	Aggressive
Depth maps generation time	9 minutes 49 seconds
Dense cloud generation time	7 minutes 23 seconds

## DEM

Size	3,754 x 3,790
Coordinate system	WGS 84 (EPSG::4326)

## Reconstruction parameters

Source data	Dense cloud
Interpolation	Enabled
Processing time	4 seconds

## Orthomosaic

Size	13,896 x 13,356
Coordinate system	WGS 84 (EPSG::4326)
Colors	3 bands, uint8

## Reconstruction parameters

Blending mode	Mosaic
Surface	DEM
Enable hole filling	Yes
Processing time	2 minutes 50 seconds

## Software

Version	1.4.4 build 6848
Platform	Linux 64