

# Qaamasoq

Processing Report

23 Mai 2023



# Survey Data

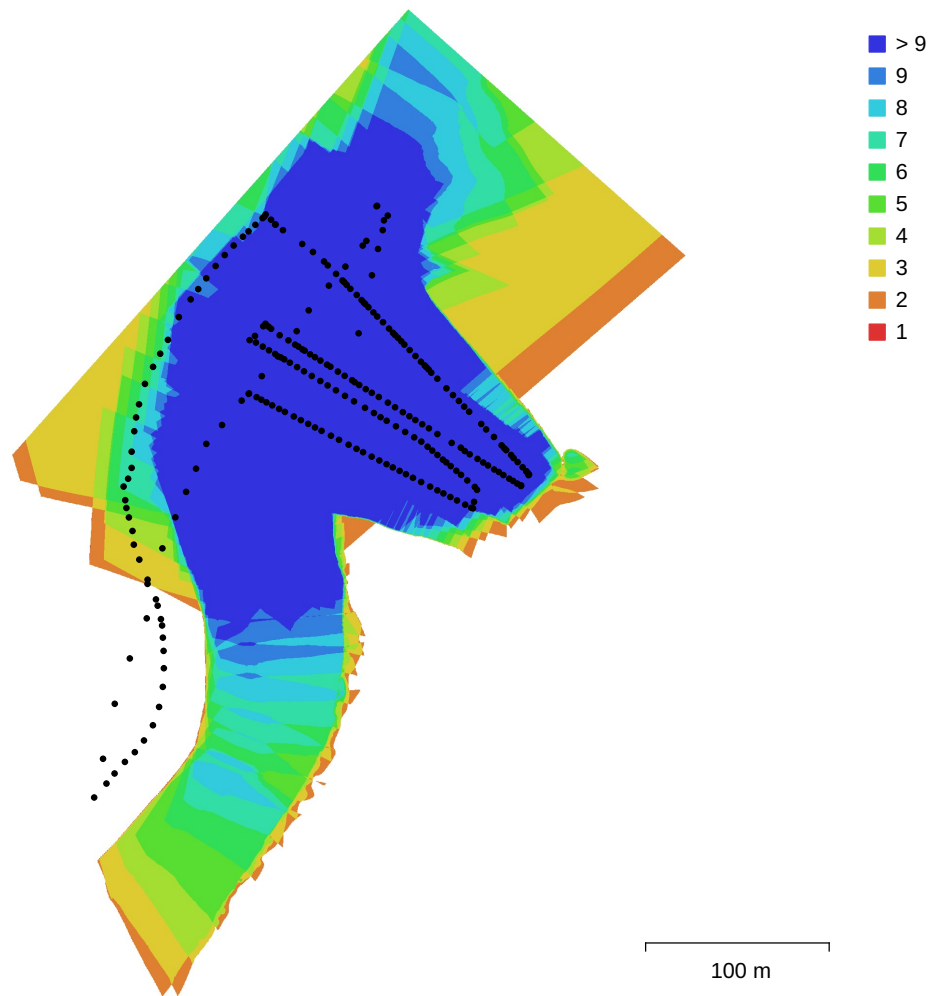


Fig. 1. Camera locations and image overlap.

|                    |                        |                     |           |
|--------------------|------------------------|---------------------|-----------|
| Number of images:  | 247                    | Camera stations:    | 247       |
| Flying altitude:   | 59.2 m                 | Tie points:         | 505,069   |
| Ground resolution: | 1.26 cm/pix            | Projections:        | 1,954,755 |
| Coverage area:     | 0.0788 km <sup>2</sup> | Reprojection error: | 0.296 pix |

| Camera Model    | Resolution  | Focal Length | Pixel Size        | Precalibrated |
|-----------------|-------------|--------------|-------------------|---------------|
| XT705 (10.57mm) | 5472 x 3648 | 10.57 mm     | 2.4 x 2.4 $\mu$ m | No            |

Table 1. Cameras.

# Camera Calibration

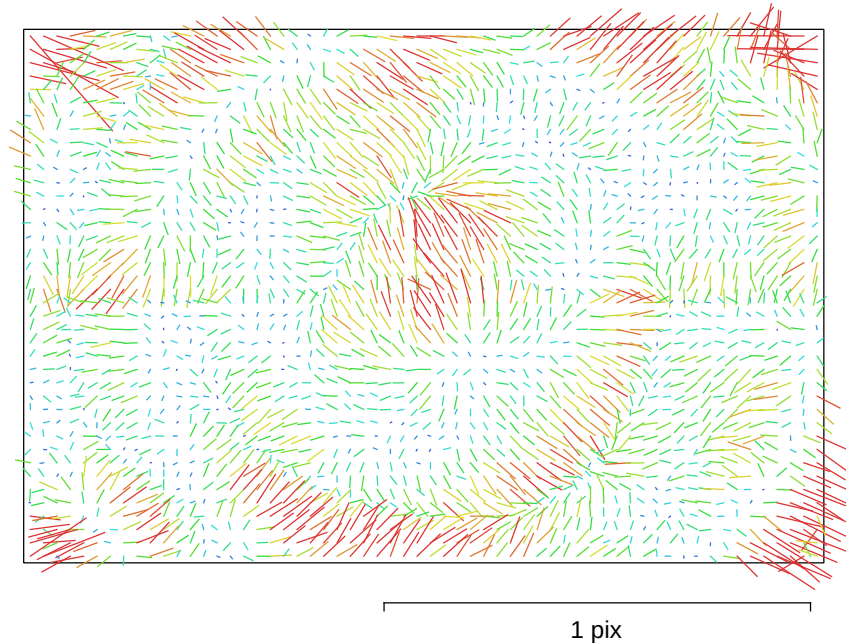


Fig. 2. Image residuals for XT705 (10.57mm).

## XT705 (10.57mm)

247 images

|              |                    |                 |                                    |
|--------------|--------------------|-----------------|------------------------------------|
| Type         | Resolution         | Focal Length    | Pixel Size                         |
| <b>Frame</b> | <b>5472 x 3648</b> | <b>10.57 mm</b> | <b>2.4 x 2.4 <math>\mu</math>m</b> |

|           | Value               | Error   | F    | Cx    | Cy    | B1    | B2    | K1    | K2    | K3    | K4    | P1    | P2    |
|-----------|---------------------|---------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>F</b>  | <b>4197.31</b>      | 0.053   | 1.00 | -0.06 | 0.02  | -0.27 | 0.13  | 0.02  | 0.01  | 0.01  | -0.01 | -0.06 | 0.01  |
| <b>Cx</b> | <b>-6.04542</b>     | 0.014   |      | 1.00  | -0.04 | 0.09  | -0.00 | -0.02 | 0.01  | -0.00 | 0.00  | 0.72  | 0.06  |
| <b>Cy</b> | <b>-3.30578</b>     | 0.012   |      |       | 1.00  | -0.05 | 0.11  | -0.02 | 0.01  | -0.01 | 0.01  | -0.02 | 0.55  |
| <b>B1</b> | <b>-2.71007</b>     | 0.0094  |      |       |       | 1.00  | -0.06 | -0.02 | 0.02  | -0.02 | 0.02  | 0.01  | 0.04  |
| <b>B2</b> | <b>0.00238348</b>   | 0.0084  |      |       |       |       | 1.00  | 0.01  | -0.02 | 0.02  | -0.02 | -0.05 | 0.03  |
| <b>K1</b> | <b>0.0831864</b>    | 3.1e-05 |      |       |       |       |       | 1.00  | -0.96 | 0.91  | -0.86 | -0.03 | -0.02 |
| <b>K2</b> | <b>-0.359843</b>    | 0.0002  |      |       |       |       |       |       | 1.00  | -0.99 | 0.96  | 0.01  | 0.01  |
| <b>K3</b> | <b>0.679644</b>     | 0.00053 |      |       |       |       |       |       |       | 1.00  | -0.99 | -0.01 | -0.01 |
| <b>K4</b> | <b>-0.41774</b>     | 0.00047 |      |       |       |       |       |       |       |       | 1.00  | 0.01  | 0.01  |
| <b>P1</b> | <b>-0.000914757</b> | 1.1e-06 |      |       |       |       |       |       |       |       |       | 1.00  | 0.06  |
| <b>P2</b> | <b>0.000265461</b>  | 8.7e-07 |      |       |       |       |       |       |       |       |       |       | 1.00  |

Table 2. Calibration coefficients and correlation matrix.

# Camera Locations

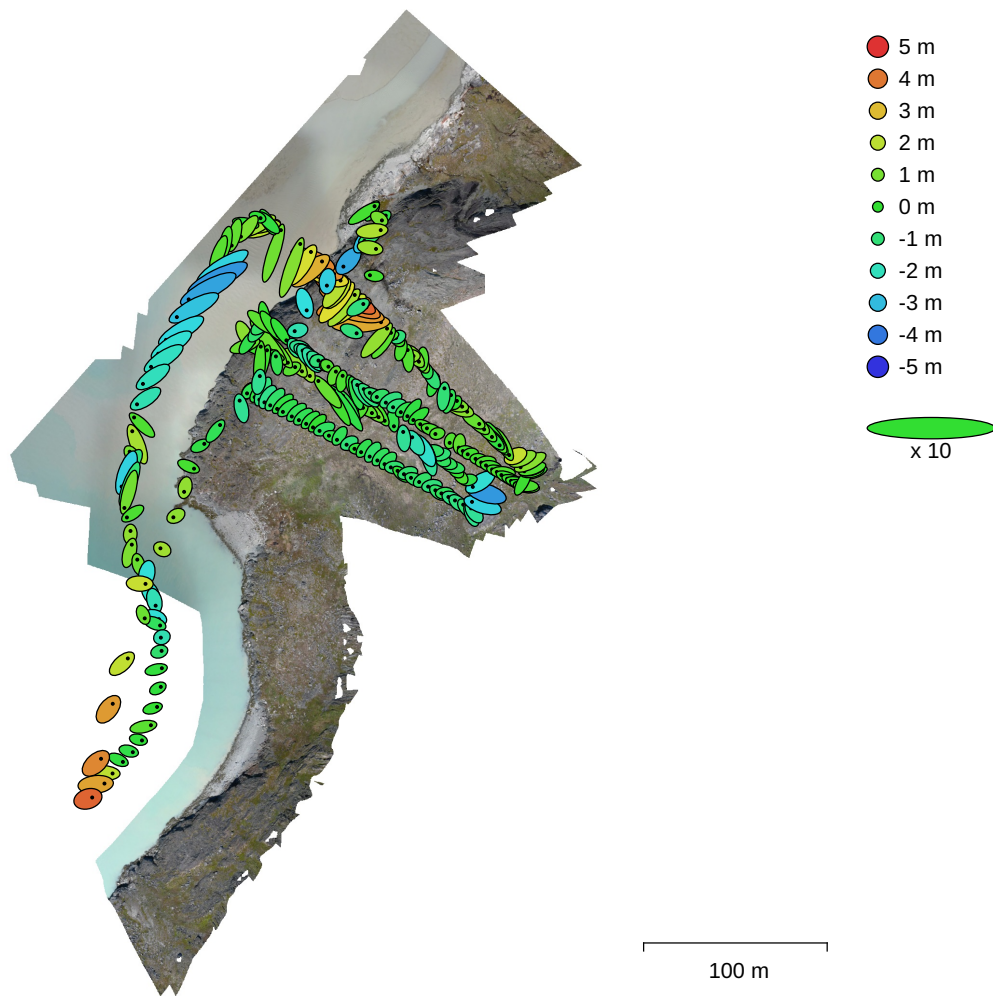


Fig. 3. Camera locations and error estimates.

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) |
|-------------|-------------|-------------|--------------|-----------------|
| 0.755123    | 0.71705     | 1.43784     | 1.04133      | 1.77532         |

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

# Digital Elevation Model

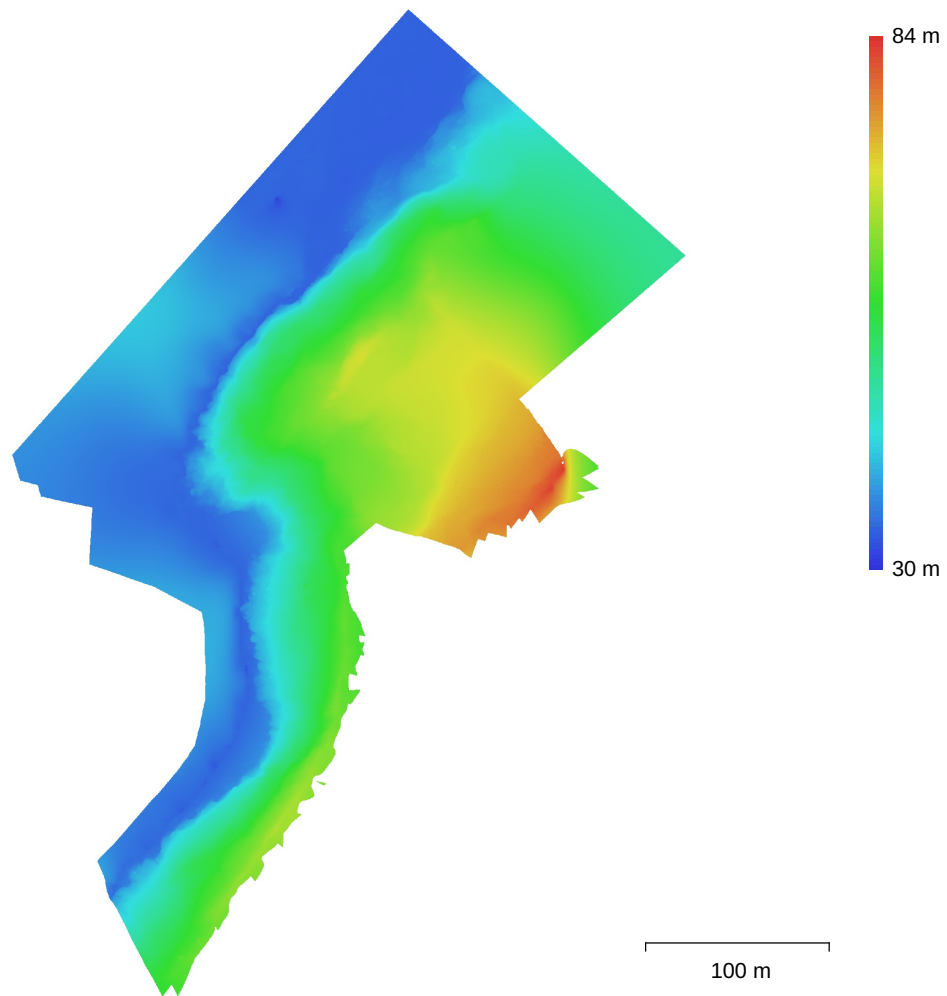


Fig. 4. Reconstructed digital elevation model.

Resolution: 2.52 cm/pix  
Point density: 0.158 points/cm<sup>2</sup>

# Processing Parameters

## General

|                   |                     |
|-------------------|---------------------|
| Cameras           | 247                 |
| Aligned cameras   | 247                 |
| Coordinate system | WGS 84 (EPSG::4326) |
| Rotation angles   | Yaw, Pitch, Roll    |

## Point Cloud

|                                |                         |
|--------------------------------|-------------------------|
| Points                         | 505,069 of 1,611,059    |
| RMS reprojection error         | 0.112083 (0.295864 pix) |
| Max reprojection error         | 0.273955 (2.23945 pix)  |
| Mean key point size            | 2.61178 pix             |
| Point colors                   | 3 bands, uint8          |
| Key points                     | No                      |
| Average tie point multiplicity | 4.08917                 |

## Alignment parameters

|                               |                      |
|-------------------------------|----------------------|
| Accuracy                      | High                 |
| Generic preselection          | Yes                  |
| Reference preselection        | Source               |
| Key point limit               | 60,000               |
| Tie point limit               | 0                    |
| Exclude stationary tie points | No                   |
| Guided image matching         | No                   |
| Adaptive camera model fitting | No                   |
| Matching time                 | 4 minutes 25 seconds |
| Matching memory usage         | 1.33 GB              |
| Alignment time                | 7 minutes 38 seconds |
| Alignment memory usage        | 871.77 MB            |

## Optimization parameters

|                               |                          |
|-------------------------------|--------------------------|
| Parameters                    | f, cx, cy, k1-k3, p1, p2 |
| Adaptive camera model fitting | Yes                      |
| Optimization time             | 6 seconds                |
| Software version              | 1.7.1.11797              |
| File size                     | 116.73 MB                |

## Depth Maps

|   |                       |
|---|-----------------------|
| Count                                   | 247                   |
| <b>Depth maps generation parameters</b> |                       |
| Quality                                 | High                  |
| Filtering mode                          | Mild                  |
| Processing time                         | 59 minutes 31 seconds |
| Memory usage                            | 6.88 GB               |
| Software version                        | 1.7.1.11797           |
| File size                               | 1.55 GB               |

## Dense Point Cloud

|              |                |
|--------------|----------------|
| Points       | 71,008,527     |
| Point colors | 3 bands, uint8 |

## Depth maps generation parameters

|                 |                       |
|-----------------|-----------------------|
| Quality         | High                  |
| Filtering mode  | Mild                  |
| Processing time | 59 minutes 31 seconds |
| Memory usage    | 6.88 GB               |

## Dense cloud generation parameters

|                 |                       |
|-----------------|-----------------------|
| Processing time | 33 minutes 50 seconds |
|-----------------|-----------------------|

|                                  |  |
|----------------------------------|--|
| Memory usage                     | 13.17 GB                                 |
| Software version                 | 1.7.1.11797                              |
| File size                        | 1.02 GB                                  |
| <b>DEM</b>                       |  |
| Size                             | 21,524 x 22,179                          |
| Coordinate system                | WGS 84 + EGM96 height                    |
| <b>Reconstruction parameters</b> |  |
| Source data                      | Dense cloud                              |
| Interpolation                    | Enabled                                  |
| Processing time                  | 1 minutes 4 seconds                      |
| Memory usage                     | 340.59 MB                                |
| Software version                 | 1.7.1.11797                              |
| File size                        | 611.42 MB                                |
| <b>Orthomosaic</b>               |  |
| Size                             | 29,153 x 42,746                          |
| Coordinate system                | WGS 84 + EGM96 height                    |
| Colors                           | 3 bands, uint8                           |
| <b>Reconstruction parameters</b> |  |
| Blending mode                    | Mosaic                                   |
| Surface                          | DEM                                      |
| Enable hole filling              | Yes                                      |
| Enable ghosting filter           | No                                       |
| Processing time                  | 8 minutes 31 seconds                     |
| Memory usage                     | 9.19 GB                                  |
| Software version                 | 1.7.1.11797                              |
| File size                        | 8.58 GB                                  |
| <b>System</b>                    |  |
| Software name                    | Agisoft Metashape Professional           |
| Software version                 | 1.7.1 build 11797                        |
| OS                               | Linux 64 bit                             |
| RAM                              | 125.62 GB                                |
| CPU                              | Intel(R) Core(TM) i7-9800X CPU @ 3.80GHz |
| GPU(s)                           | Quadro P1000                             |