

# Barrio 6 de Diciembre

Processing Report  
20 December 2021



# Survey Data

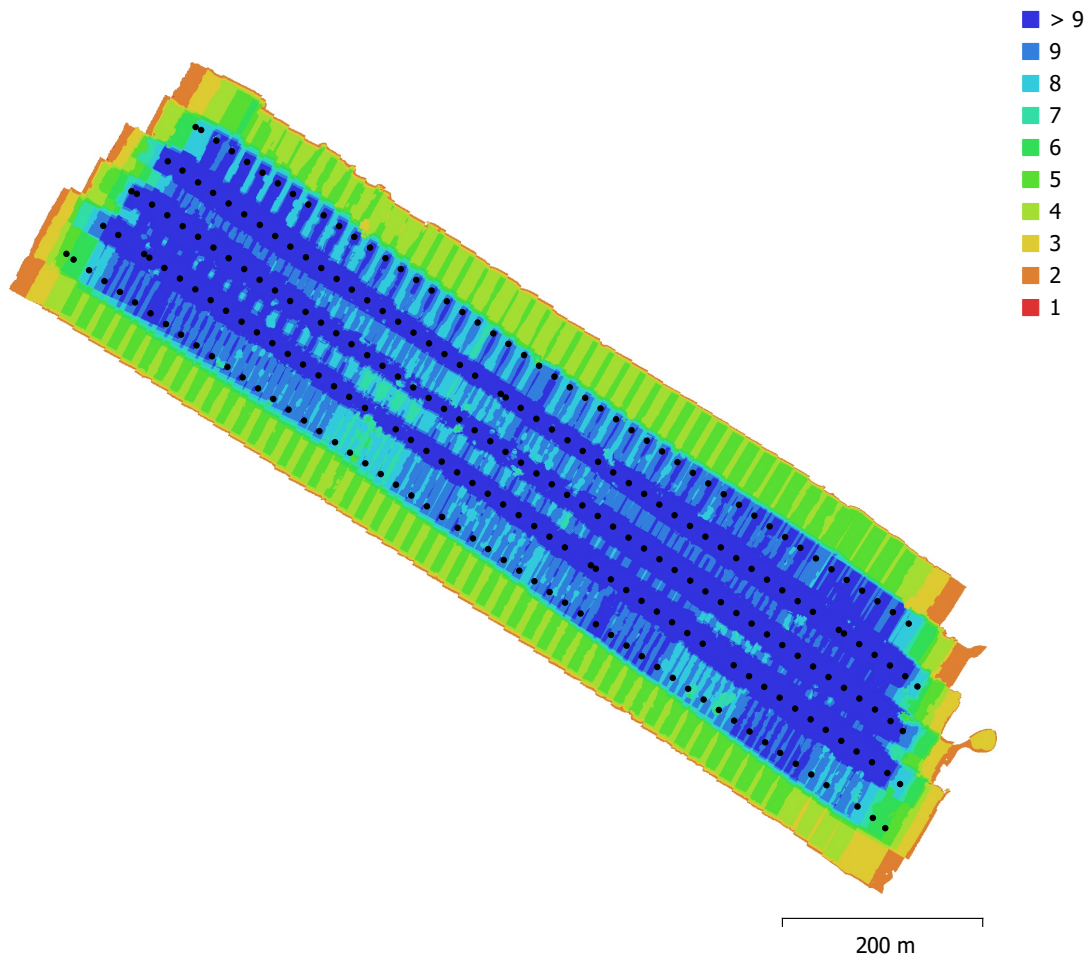


Fig. 1. Camera locations and image overlap.

|                    |                     |                     |           |
|--------------------|---------------------|---------------------|-----------|
| Number of images:  | 255                 | Camera stations:    | 255       |
| Flying altitude:   | 87.9 m              | Tie points:         | 230,799   |
| Ground resolution: | 2.35 cm/pix         | Projections:        | 992,141   |
| Coverage area:     | 0.3 km <sup>2</sup> | Reprojection error: | 0.618 pix |

| Camera Model   | Resolution  | Focal Length | Pixel Size          | Precalibrated |
|----------------|-------------|--------------|---------------------|---------------|
| FC6310 (8.8mm) | 4864 x 3648 | 8.8 mm       | 2.61 x 2.61 $\mu$ m | No            |

Table 1. Cameras.

# Camera Calibration

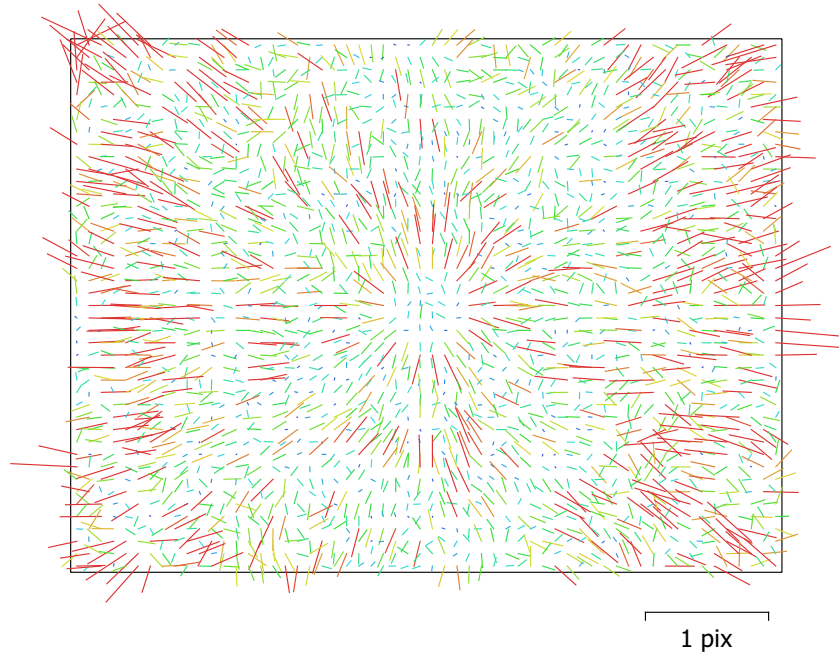


Fig. 2. Image residuals for FC6310 (8.8mm).

## FC6310 (8.8mm)

255 images

Type  
Frame

Resolution  
**4864 x 3648**

Focal Length  
**8.8 mm**

Pixel Size  
**2.61 x 2.61  $\mu\text{m}$**

|           | Value               | Error   | Cx   | Cy   | B1   | B2    | K1    | K2    | K3    | K4    | P1    | P2    |
|-----------|---------------------|---------|------|------|------|-------|-------|-------|-------|-------|-------|-------|
| <b>F</b>  | <b>3372.58</b>      |         |      |      |      |       |       |       |       |       |       |       |
| <b>Cx</b> | <b>-9.67462</b>     | 0.039   | 1.00 | 0.01 | 0.04 | -0.01 | 0.00  | -0.00 | 0.00  | -0.00 | 0.27  | -0.02 |
| <b>Cy</b> | <b>13.2553</b>      | 0.032   |      | 1.00 | 0.02 | 0.02  | 0.00  | -0.00 | 0.00  | -0.00 | -0.03 | 0.33  |
| <b>B1</b> | <b>-0.345545</b>    | 0.021   |      |      | 1.00 | -0.02 | 0.01  | -0.01 | 0.01  | -0.01 | 0.01  | 0.00  |
| <b>B2</b> | <b>-0.115691</b>    | 0.02    |      |      |      | 1.00  | -0.00 | 0.00  | -0.00 | 0.00  | 0.00  | 0.01  |
| <b>K1</b> | <b>0.0171839</b>    | 4.3e-05 |      |      |      |       | 1.00  | -0.97 | 0.93  | -0.88 | 0.01  | 0.00  |
| <b>K2</b> | <b>-0.0687241</b>   | 0.00021 |      |      |      |       |       | 1.00  | -0.99 | 0.96  | -0.00 | -0.00 |
| <b>K3</b> | <b>0.114221</b>     | 0.00039 |      |      |      |       |       |       | 1.00  | -0.99 | 0.00  | -0.00 |
| <b>K4</b> | <b>-0.0640932</b>   | 0.00025 |      |      |      |       |       |       |       | 1.00  | -0.01 | 0.00  |
| <b>P1</b> | <b>-5.4815e-05</b>  | 1.4e-06 |      |      |      |       |       |       |       |       | 1.00  | -0.07 |
| <b>P2</b> | <b>-0.000308078</b> | 1.5e-06 |      |      |      |       |       |       |       |       |       | 1.00  |

Table 2. Calibration coefficients and correlation matrix.

# Camera Locations

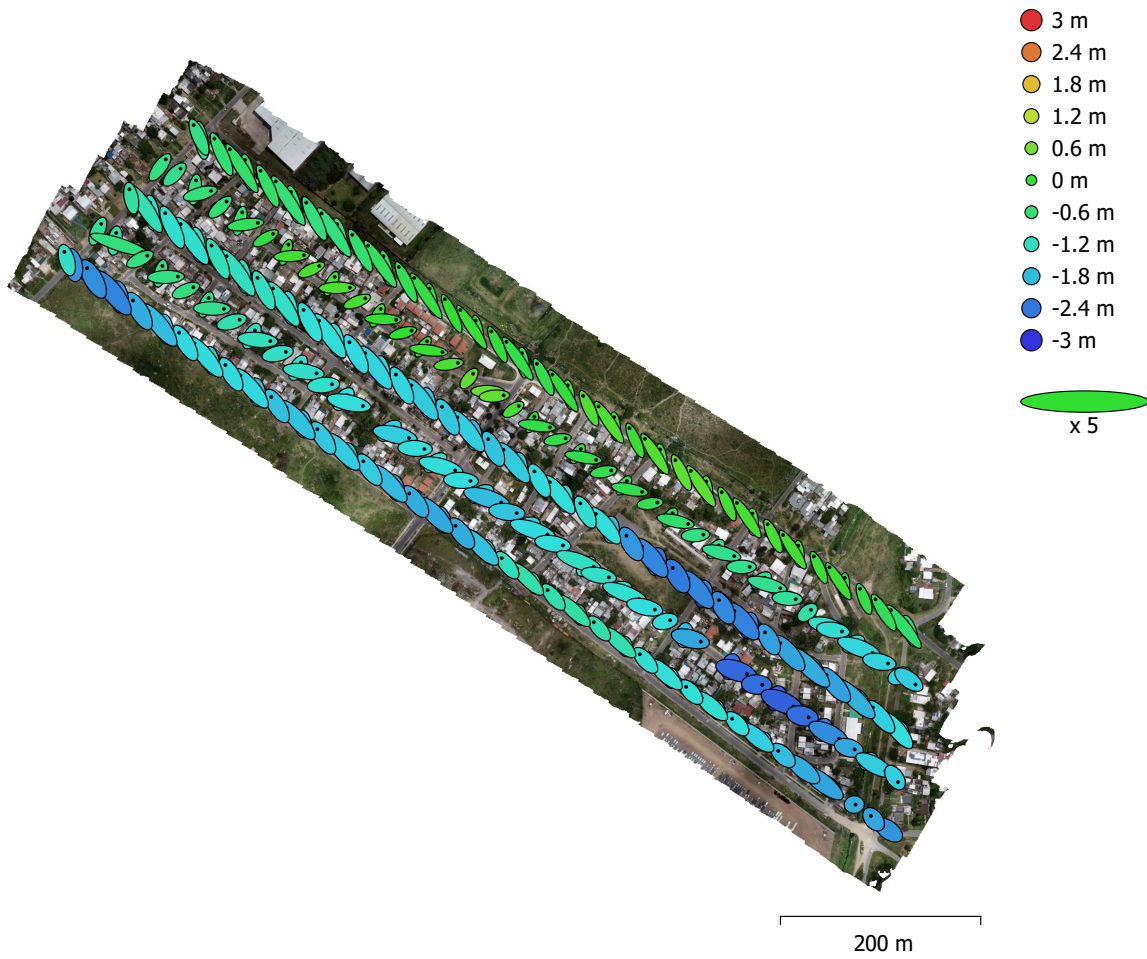


Fig. 3. Camera locations and error estimates.

Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.

Estimated camera locations are marked with a black dot.

| <b>X error (m)</b> | <b>Y error (m)</b> | <b>Z error (m)</b> | <b>XY error (m)</b> | <b>Total error (m)</b> |
|--------------------|--------------------|--------------------|---------------------|------------------------|
| 3.12901            | 3.52825            | 1.35132            | 4.71585             | 4.90564                |

Table 3. Average camera location error.

X - Easting, Y - Northing, Z - Altitude.

# Ground Control Points

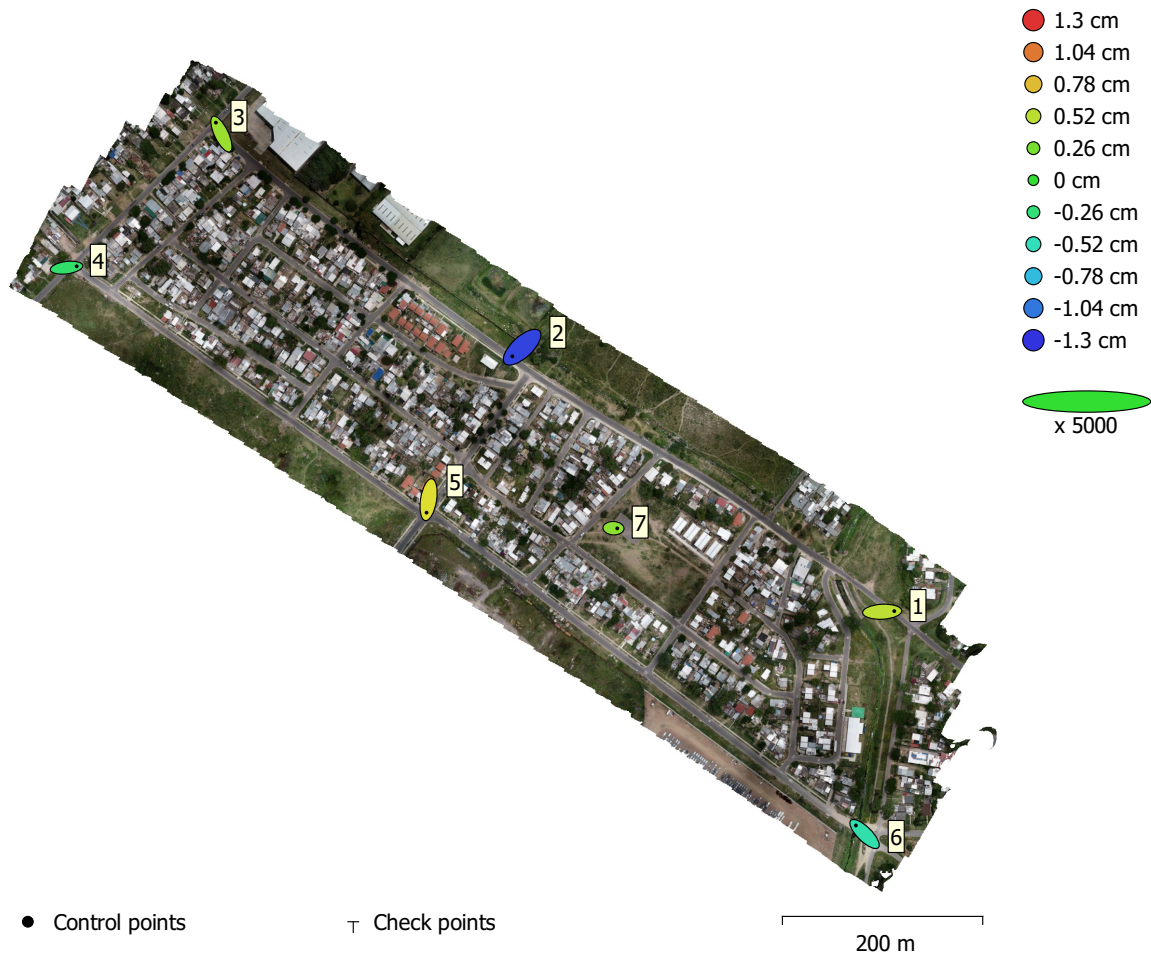


Fig. 4. GCP locations and error estimates.

Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.

Estimated GCP locations are marked with a dot or crossing.

| Count | X error (mm) | Y error (mm) | Z error (mm) | XY error (mm) | Total (mm) |
|-------|--------------|--------------|--------------|---------------|------------|
| 7     | 3.2682       | 3.22985      | 6.2752       | 4.59489       | 7.77761    |

Table 4. Control points RMSE.

X - Easting, Y - Northing, Z - Altitude.

| <b>Label</b> | <b>X error (mm)</b> | <b>Y error (mm)</b> | <b>Z error (mm)</b> | <b>Total (mm)</b> | <b>Image (pix)</b> |
|--------------|---------------------|---------------------|---------------------|-------------------|--------------------|
| 1            | 4.82895             | 0.245874            | 5.27499             | 7.15574           | 0.348 (10)         |
| 2            | -3.91087            | -3.64753            | -12.3473            | 13.4556           | 0.861 (8)          |
| 3            | -2.19893            | 4.55837             | 3.966               | 6.42986           | 0.498 (6)          |
| 4            | 4.04965             | 0.534129            | -2.11409            | 4.59938           | 0.342 (6)          |
| 5            | -0.816033           | -5.19402            | 6.52236             | 8.37765           | 0.452 (9)          |
| 6            | -3.45757            | 3.40758             | -4.60357            | 6.69024           | 0.744 (5)          |
| 7            | 1.51613             | -0.0703761          | 3.38139             | 3.7064            | 0.446 (15)         |
| <b>Total</b> | <b>3.2682</b>       | <b>3.22985</b>      | <b>6.2752</b>       | <b>7.77761</b>    | <b>0.536</b>       |

Table 5. Control points.  
X - Easting, Y - Northing, Z - Altitude.

# Digital Elevation Model

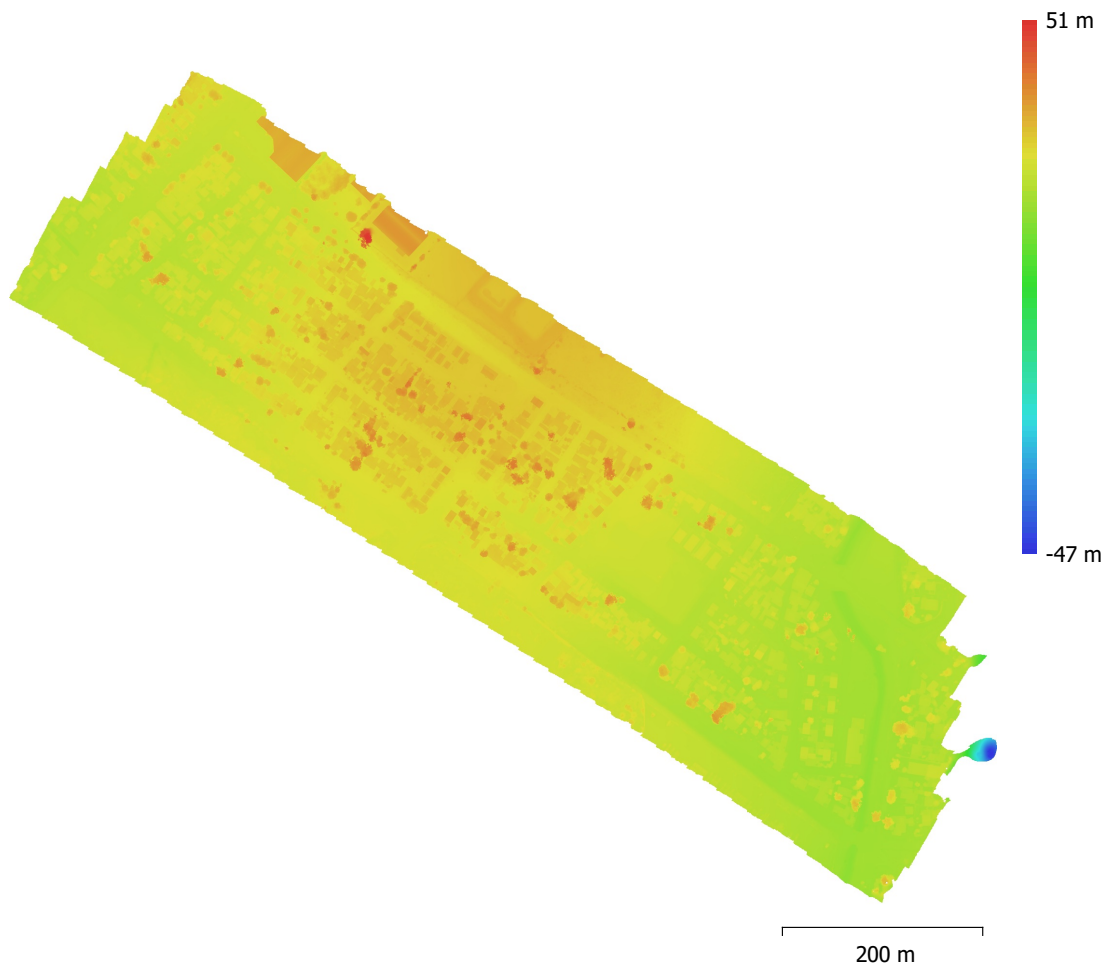


Fig. 5. Reconstructed digital elevation model.

Resolution: 4.69 cm/pix  
Point density: 454 points/m<sup>2</sup>

# Processing Parameters

## General

|                   |                             |
|-------------------|-----------------------------|
| Cameras           | 255                         |
| Aligned cameras   | 255                         |
| Markers           | 7                           |
| Coordinate system | WGS 84 / UTM zone 21S EGM08 |
| Rotation angles   | Yaw, Pitch, Roll            |

## Point Cloud

|                                |                         |
|--------------------------------|-------------------------|
| Points                         | 230,799 of 252,809      |
| RMS reprojection error         | 0.183512 (0.618034 pix) |
| Max reprojection error         | 0.713298 (37.8082 pix)  |
| Mean key point size            | 2.97402 pix             |
| Point colors                   | 3 bands, uint8          |
| Key points                     | No                      |
| Average tie point multiplicity | 4.38805                 |

## Alignment parameters

|                               |                      |
|-------------------------------|----------------------|
| Accuracy                      | High                 |
| Generic preselection          | No                   |
| Reference preselection        | Source               |
| Key point limit               | 40,000               |
| Tie point limit               | 4,000                |
| Exclude stationary tie points | Yes                  |
| Guided image matching         | No                   |
| Adaptive camera model fitting | Yes                  |
| Matching time                 | 15 minutes 4 seconds |
| Matching memory usage         | 1.58 GB              |
| Alignment time                | 1 minutes 37 seconds |
| Alignment memory usage        | 163.93 MB            |

## Optimization parameters

|                               |                                  |
|-------------------------------|----------------------------------|
| Parameters                    | f, b1, b2, cx, cy, k1-k4, p1, p2 |
| Adaptive camera model fitting | Yes                              |
| Optimization time             | 2 seconds                        |
| Software version              | 1.7.2.12070                      |
| File size                     | 22.97 MB                         |

## Depth Maps

|   |                    |
|---|--------------------|
| Count                                   | 255                |
| <b>Depth maps generation parameters</b> |                    |
| Quality                                 | High               |
| Filtering mode                          | Aggressive         |
| Processing time                         | 1 hours 33 minutes |
| Memory usage                            | 3.65 GB            |
| Software version                        | 1.7.2.12070        |
| File size                               | 1.65 GB            |

## Dense Point Cloud

|              |                |
|--------------|----------------|
| Points       | 181,378,794    |
| Point colors | 3 bands, uint8 |

## Depth maps generation parameters

|                 |                    |
|-----------------|--------------------|
| Quality         | High               |
| Filtering mode  | Aggressive         |
| Processing time | 1 hours 33 minutes |
| Memory usage    | 3.65 GB            |



**Dense cloud generation parameters**

|                  |                       |
|------------------|-----------------------|
| Processing time  | 16 minutes 32 seconds |
| Memory usage     | 4.00 GB               |
| Software version | 1.7.2.12070           |
| File size        | 2.56 GB               |

**DEM**

|                   |                             |
|-------------------|-----------------------------|
| Size              | 29,790 x 25,379             |
| Coordinate system | WGS 84 / UTM zone 21S EGM08 |

**Reconstruction parameters**

|                  |                     |
|------------------|---------------------|
| Source data      | Dense cloud         |
| Interpolation    | Enabled             |
| Processing time  | 4 minutes 1 seconds |
| Memory usage     | 308.46 MB           |
| Software version | 1.7.2.12070         |
| File size        | 582.77 MB           |

**Orthomosaic**

|                   |                             |
|-------------------|-----------------------------|
| Size              | 41,996 x 35,388             |
| Coordinate system | WGS 84 / UTM zone 21S EGM08 |
| Colors            | 3 bands, uint8              |

**Reconstruction parameters**

|                        |                      |
|------------------------|----------------------|
| Blending mode          | Mosaic               |
| Surface                | DEM                  |
| Enable hole filling    | Yes                  |
| Enable ghosting filter | No                   |
| Processing time        | 8 minutes 46 seconds |
| Memory usage           | 2.07 GB              |
| Software version       | 1.7.2.12070          |
| File size              | 5.08 GB              |

**System**

|                  |  |
|------------------|--|
| Software name    | Agisoft Metashape Professional           |
| Software version | 1.7.2 build 12070                        |
| OS               | Windows 64 bit                           |
| RAM              | 63.93 GB                                 |
| CPU              | Intel(R) Core(TM) i7-9700F CPU @ 3.00GHz |
| GPU(s)           | Radeon(TM) RX 460 Graphics (Baffin)      |