

# Agisoft PhotoScan

Processing Report  
05 December 2017



# Survey Data

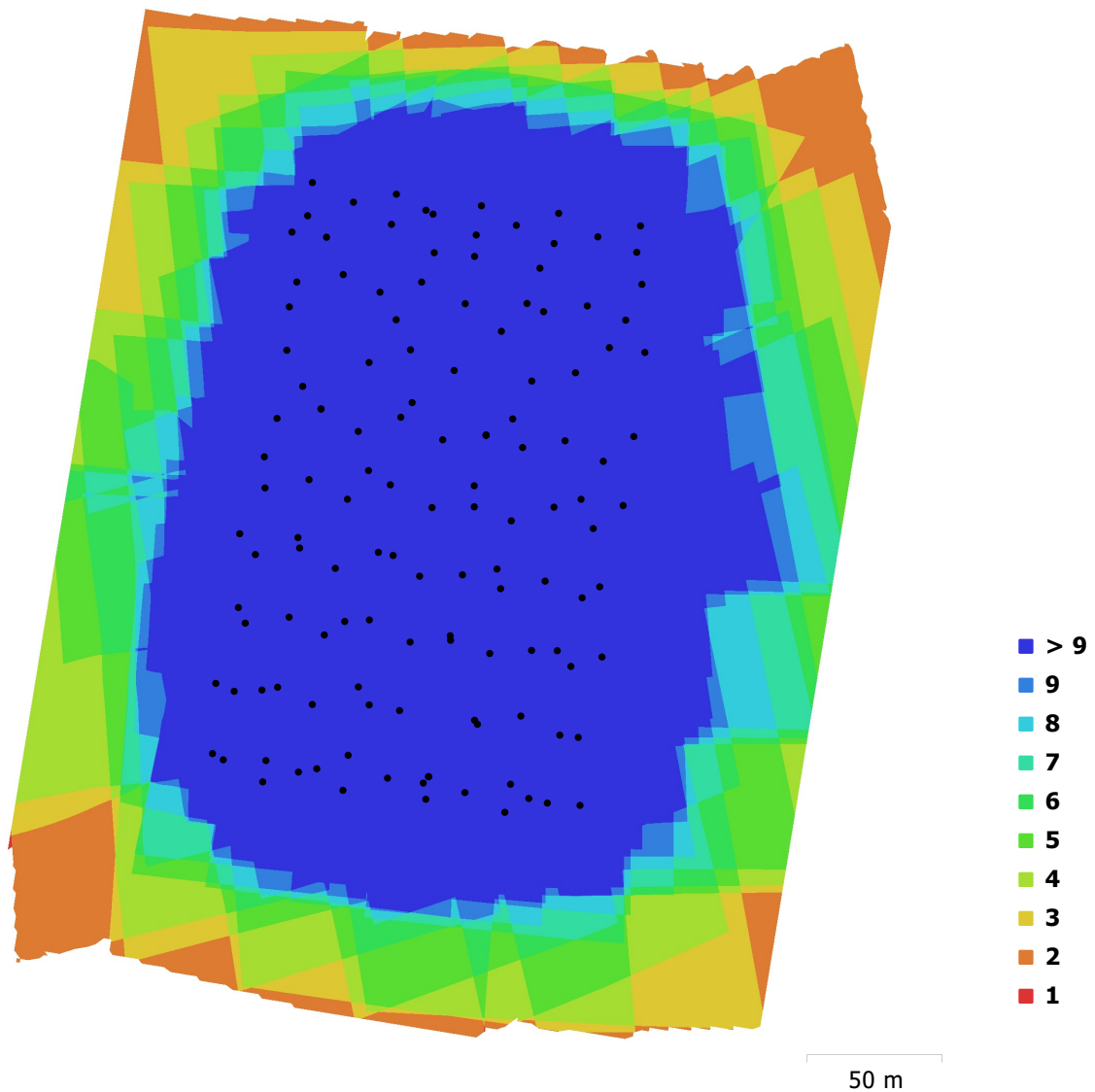


Fig. 1. Camera locations and image overlap.

|                    |                       |                     |         |
|--------------------|-----------------------|---------------------|---------|
| Number of images:  | 132                   | Camera stations:    | 131     |
| Flying altitude:   | 76.9 m                | Tie points:         | 24,694  |
| Ground resolution: | 2.89 cm/pix           | Projections:        | 79,712  |
| Coverage area:     | 0.103 km <sup>2</sup> | Reprojection error: | 3.2 pix |

| Camera Model    | Resolution  | Focal Length | Pixel Size          | Precalibrated |
|-----------------|-------------|--------------|---------------------|---------------|
| FC330 (3.61 mm) | 4000 x 3000 | 3.61 mm      | 1.56 x 1.56 $\mu$ m | No            |

Table 1. Cameras.

# Camera Calibration

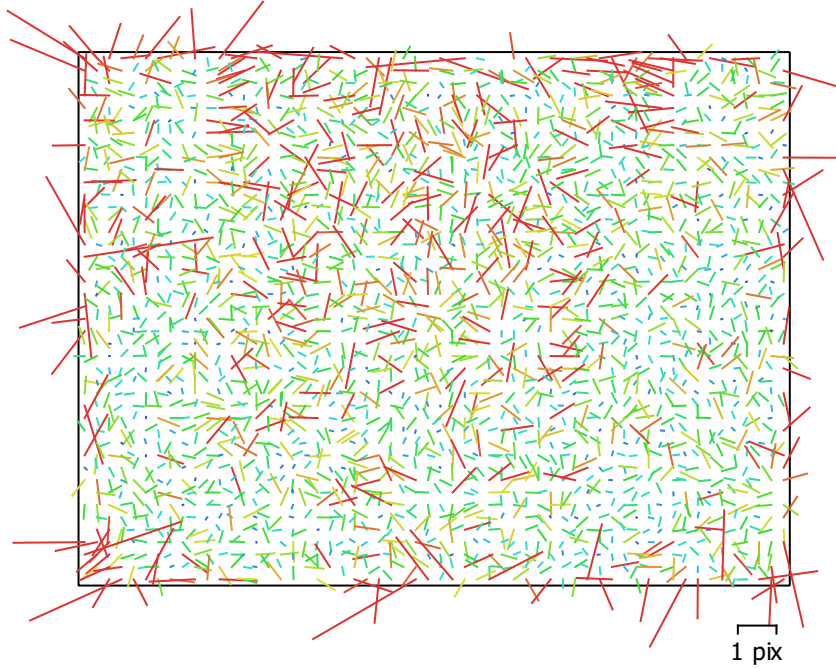


Fig. 2. Image residuals for FC330 (3.61 mm).

## FC330 (3.61 mm)

132 images

Type  
**Frame**

Resolution  
**4000 x 3000**

Focal Length  
**3.61 mm**

Pixel Size  
**1.56 x 1.56  $\mu\text{m}$**

|           | Value              | Error   | F    | Cx   | Cy    | B1    | B2    | P1   | P2    |
|-----------|--------------------|---------|------|------|-------|-------|-------|------|-------|
| <b>F</b>  | <b>2347.99</b>     | 0.27    | 1.00 | 0.01 | -0.32 | -0.10 | -0.01 | 0.00 | -0.06 |
| <b>Cx</b> | <b>-12.245</b>     | 0.19    |      | 1.00 | 0.01  | 0.01  | 0.07  | 0.86 | 0.04  |
| <b>Cy</b> | <b>43.1864</b>     | 0.16    |      |      | 1.00  | -0.05 | -0.02 | 0.02 | 0.66  |
| <b>B1</b> | <b>5.06308</b>     | 0.062   |      |      |       | 1.00  | 0.03  | 0.01 | -0.03 |
| <b>B2</b> | <b>1.44003</b>     | 0.063   |      |      |       |       | 1.00  | 0.02 | -0.02 |
| <b>P1</b> | <b>0.000401566</b> | 3e-05   |      |      |       |       |       | 1.00 | 0.05  |
| <b>P2</b> | <b>0.000461667</b> | 2.3e-05 |      |      |       |       |       |      | 1.00  |

Table 2. Calibration coefficients and correlation matrix.



# Camera Locations

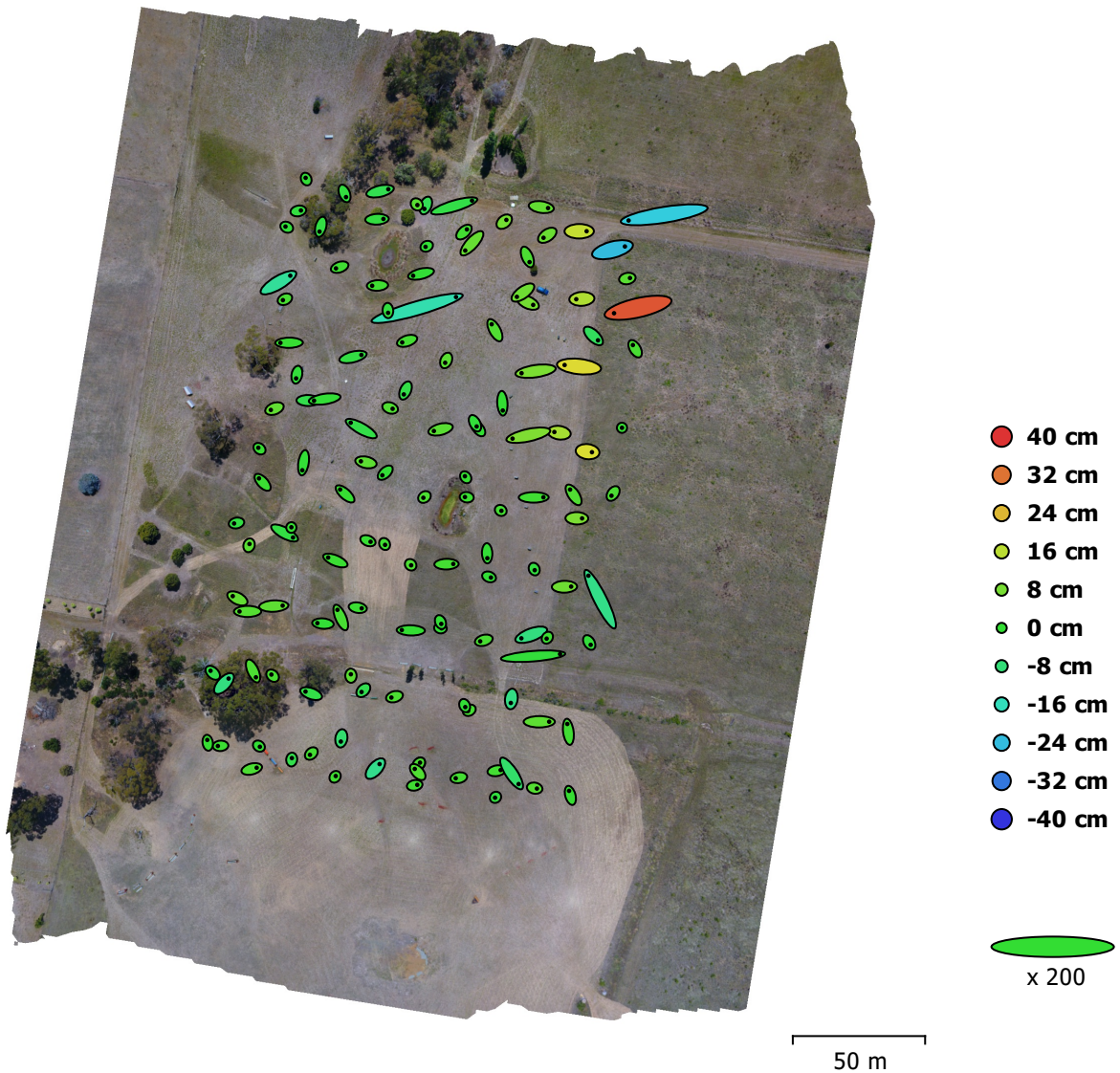


Fig. 3. Camera locations and error estimates.

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 (cm) | Y error (cm) | Z error (cm) | XY error (cm) | Total error (cm) |
|--------------|--------------|--------------|---------------|------------------|
| 2.91254      | 1.43525      | 6.68261      | 3.24697       | 7.42967          |

Table 3. Average camera location error.

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

# Ground Control Points

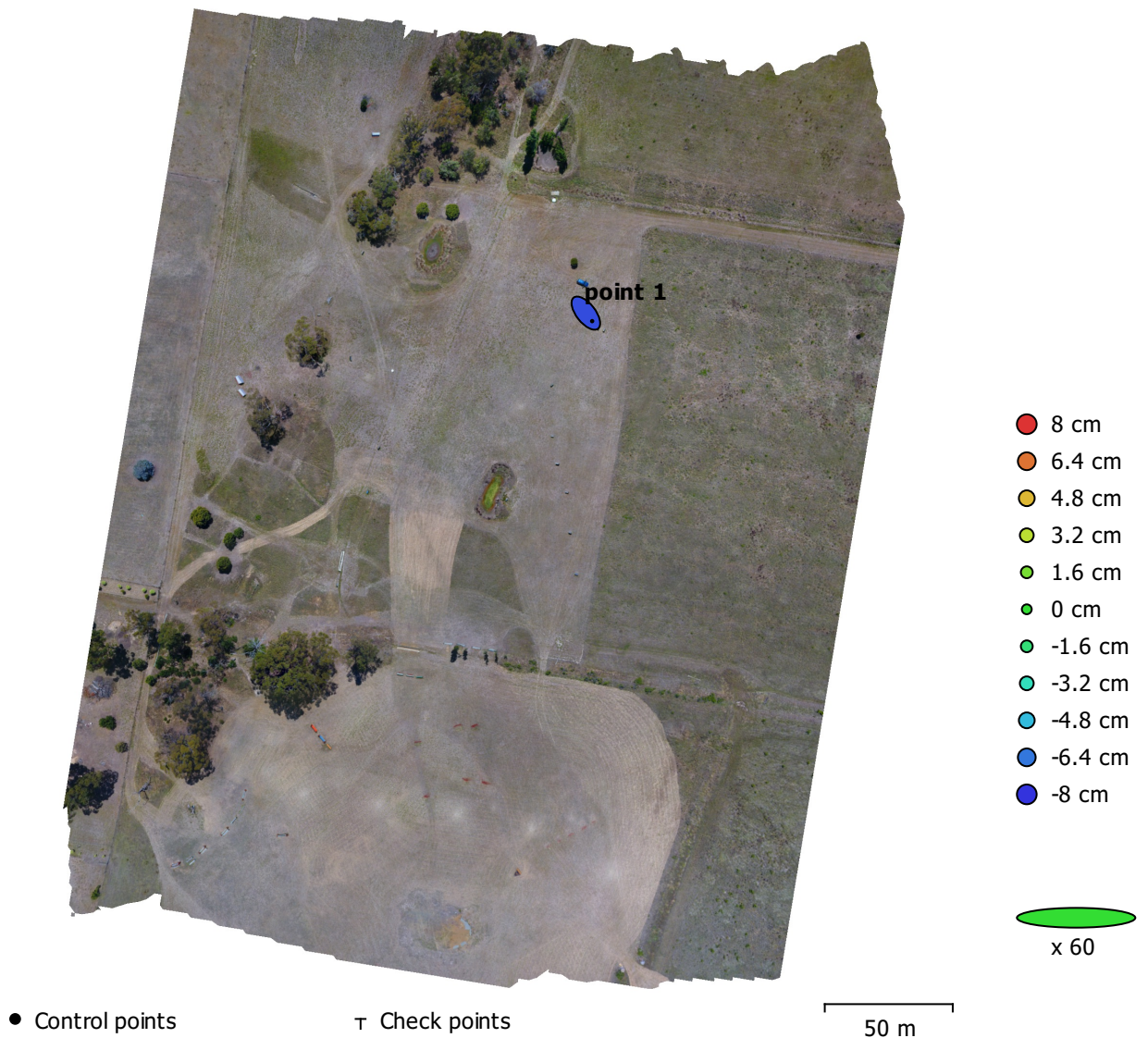


Fig. 4. GCP locations and error estimates.

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 (cm) | Y error (cm) | Z error (cm) | XY error (cm) | Total (cm) |
|-------|--------------|--------------|--------------|---------------|------------|
| 1     | 8.21336      | 10.4266      | 7.43787      | 13.273        | 15.2149    |

Table 4. Control points RMSE.

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

| <b>Label</b> | <b>X error (cm)</b> | <b>Y error (cm)</b> | <b>Z error (cm)</b> | <b>Total (cm)</b> | <b>Image (pix)</b> |
|--------------|---------------------|---------------------|---------------------|-------------------|--------------------|
| point 1      | 8.21336             | -10.4266            | -7.43787            | 15.2149           | 1.187 (26)         |
| <b>Total</b> | <b>8.21336</b>      | <b>10.4266</b>      | <b>7.43787</b>      | <b>15.2149</b>    | <b>1.187</b>       |

Table 5. Control points.  
X - Longitude, Y - Latitude, Z - Altitude.

# Digital Elevation Model

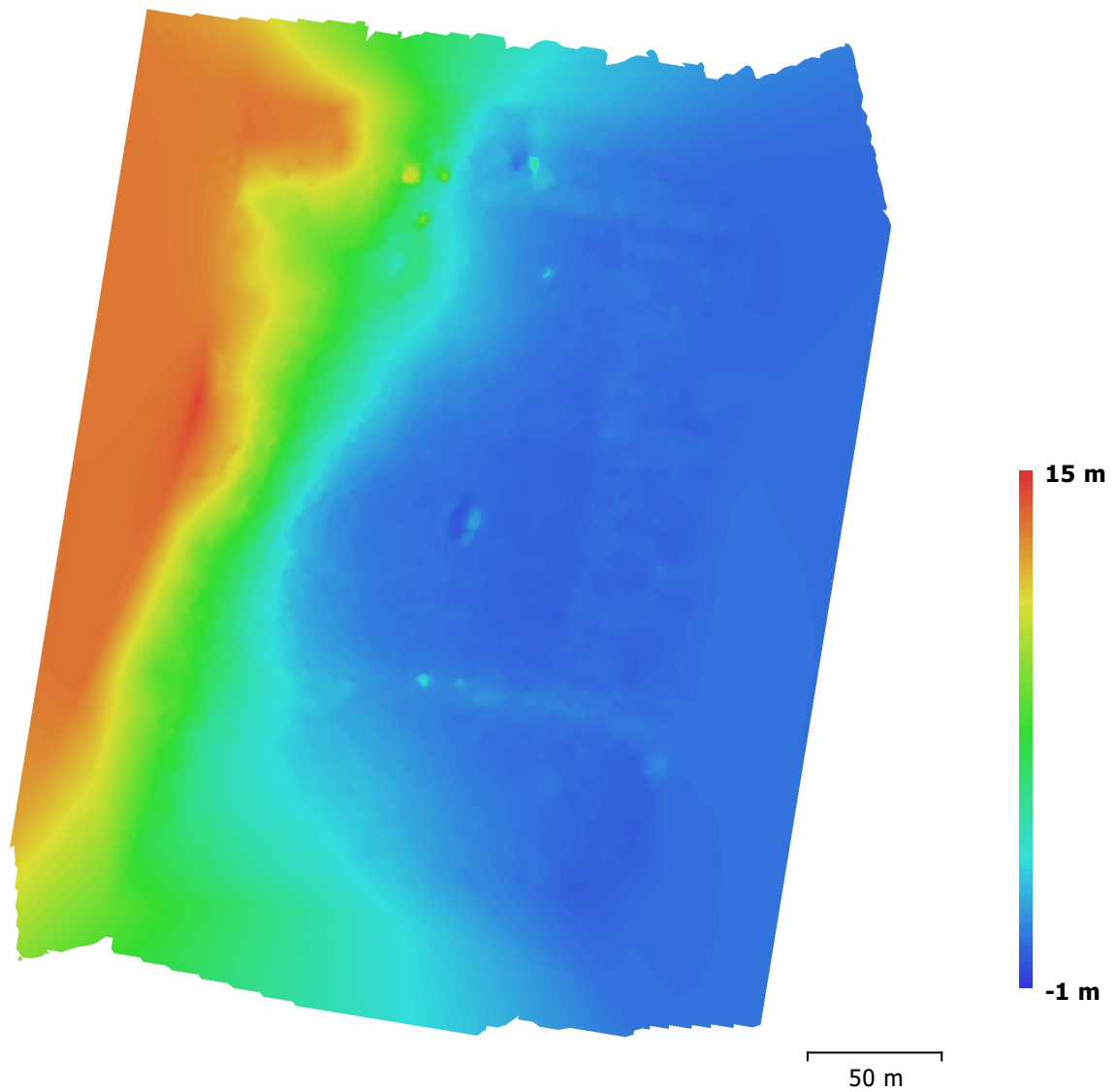


Fig. 5. Reconstructed digital elevation model.

Resolution: 1.4 m/pix  
Point density: 0.512 points/m<sup>2</sup>

# Processing Parameters

## General

|                   |                     |
|-------------------|---------------------|
| Cameras           | 132                 |
| Aligned cameras   | 131                 |
| Markers           | 1                   |
| Coordinate system | WGS 84 (EPSG::4326) |
| Rotation angles   | Yaw, Pitch, Roll    |

## Point Cloud

|                        |                        |
|------------------------|------------------------|
| Points                 | 24,694 of 32,646       |
| RMS reprojection error | 0.18709 (3.19502 pix)  |
| Max reprojection error | 0.768504 (60.7681 pix) |
| Mean key point size    | 14.8636 pix            |
| Effective overlap      | 4.08231                |

### Alignment parameters

|                               |                       |
|-------------------------------|-----------------------|
| Accuracy                      | Low                   |
| Generic preselection          | Yes                   |
| Reference preselection        | Yes                   |
| Key point limit               | 40,000                |
| Tie point limit               | 4,000                 |
| Adaptive camera model fitting | Yes                   |
| Matching time                 | 10 minutes 34 seconds |
| Alignment time                | 1 minutes 33 seconds  |

### Optimization parameters

|                     |                           |
|---------------------|---------------------------|
| Parameters          | f, b1, b2, cx, cy, p1, p2 |
| Fit rolling shutter | Yes                       |
| Optimization time   | 7 seconds                 |

## Dense Point Cloud

|        |           |
|--------|-----------|
| Points | 1,831,673 |
|--------|-----------|

### Reconstruction parameters

|                             |                      |
|-----------------------------|----------------------|
| Quality                     | Low                  |
| Depth filtering             | Disabled             |
| Depth maps generation time  | 38 minutes 6 seconds |
| Dense cloud generation time | 4 minutes 26 seconds |

## Model

|          |        |
|----------|--------|
| Faces    | 28,784 |
| Vertices | 14,530 |

### Reconstruction parameters

|                 |              |
|-----------------|--------------|
| Surface type    | Height field |
| Source data     | Sparse       |
| Interpolation   | Enabled      |
| Face count      | 30,000       |
| Processing time | 2 seconds    |

## Orthomosaic

|                   |                                   |
|-------------------|-----------------------------------|
| Size              | 8,243 x 9,588                     |
| Coordinate system | GDA94 / MGA zone 55 (EPSG::28355) |
| Channels          | 3, uint8                          |

### Reconstruction parameters

|                         |                       |
|-------------------------|-----------------------|
| Blending mode           | Mosaic                |
| Surface                 | Mesh                  |
| Enable color correction | No                    |
| Enable hole filling     | Yes                   |
| Processing time         | 18 minutes 12 seconds |

## Software

|          |                  |
|----------|------------------|
| Version  | 1.3.4 build 5067 |
| Platform | Windows 64       |