# Quercus_petraea_3N

**Processing Report**

**07 November 2018**

# Survey Data

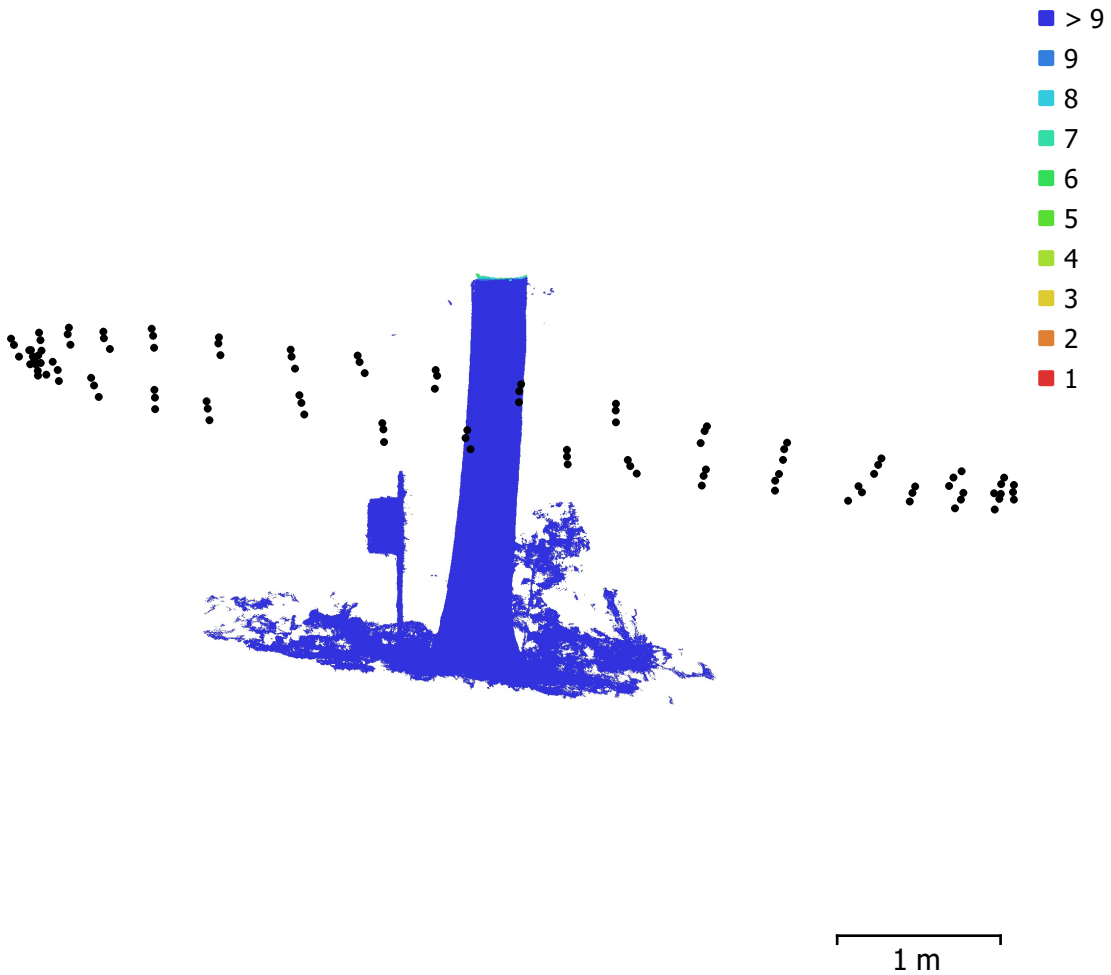


Fig. 1. Camera locations and image overlap.

| | | | |
|---|---|---|---|
| Number of images: | 108 | Camera stations: | 108 |
| Flying altitude: | 3.38 m | Tie points: | 126,254 |
| Ground resolution: | 0.346 mm/pix | Projections: | 365,717 |
| Coverage area: | 1.79 m² | Reprojection error: | 0.647 pix |

| Camera Model | Resolution | Focal Length | Pixel Size | Precalibrated |
|---|---|---|---|---|
| Canon EOS 70D (35 mm) | 5472 x 3648 | 35 mm | 4.17 x 4.17 µm | No |

Table 1. Cameras.

# Camera Calibration

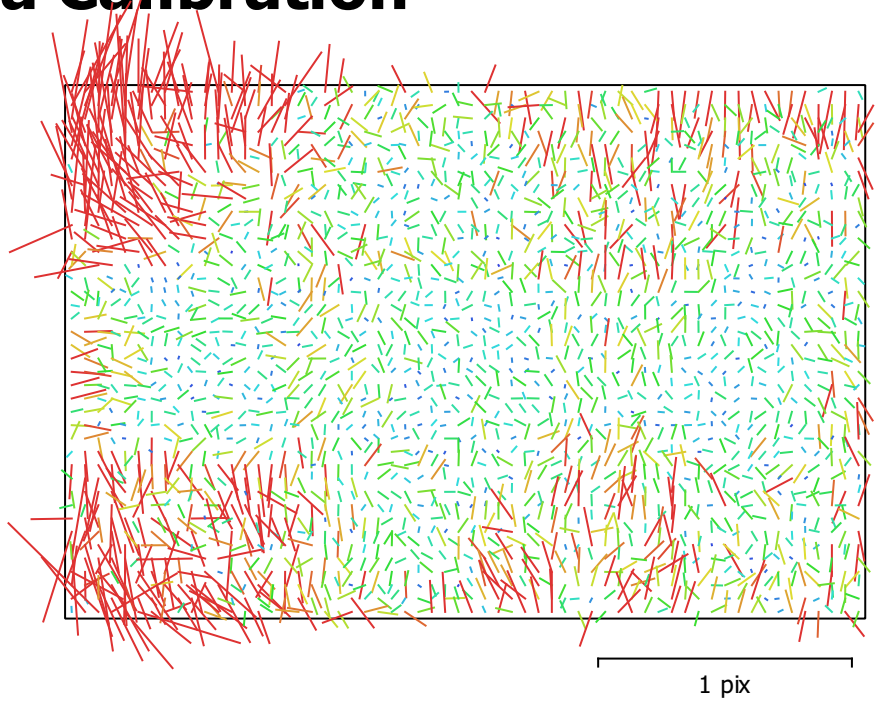


Fig. 2. Image residuals for Canon EOS 70D (35 mm).

**Canon EOS 70D (35 mm)**

108 images

| Type | Resolution | Focal Length | Pixel Size |
|---|---|---|---|
| **Frame** | **5472 x 3648** | **35 mm** | **4.17 x 4.17 µm** |

| | Value | Error | F | B2 | K1 | K2 | P1 | P2 |
|---|---|---|---|---|---|---|---|---|
| **F** | **8466.49** | 0.68 | 1.00 | -0.00 | 0.43 | 0.06 | -0.11 | 0.01 |
| **B2** | **-0.0591057** | 0.11 | | 1.00 | -0.00 | -0.00 | -0.04 | 0.05 |
| **K1** | **-0.0765009** | 9.5e-05 | | | 1.00 | -0.84 | -0.01 | -0.00 |
| **K2** | **0.0845297** | 0.00064 | | | | 1.00 | 0.02 | 0.00 |
| **P1** | **0.000590349** | 3.8e-06 | | | | | 1.00 | 0.02 |
| **P2** | **0.000203852** | 4.4e-06 | | | | | | 1.00 |

Table 2. Calibration coefficients and correlation matrix.

# Ground Control Points

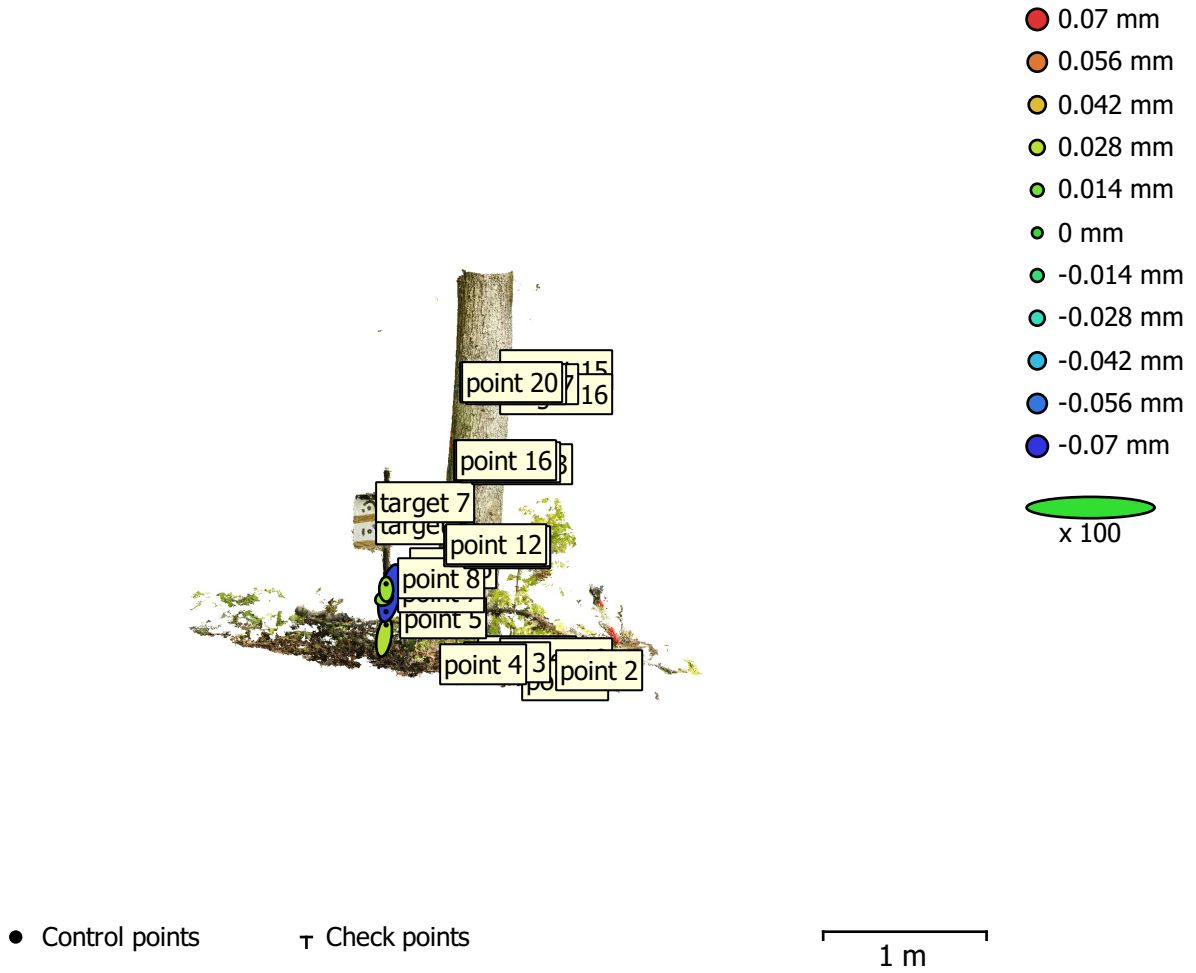


Fig. 3. GCP locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated GCP locations are marked with a dot or crossing.

| Count | X error (mm) | Y error (mm) | Z error (mm) | XY error (mm) | Total (mm) |
|---|---|---|---|---|---|
| 4 | 0.311585 | 1.39772 | 0.0383864 | 1.43203 | 1.43255 |

Table 3. Control points RMSE.

| Label | X error (mm) | Y error (mm) | Z error (mm) | Total (mm) | Image (pix) |
|---|---|---|---|---|---|
| point 5 | 0.255322 | 1.49915 | 0.0256913 | 1.52095 | 0.004 (80) |
| point 6 | -0.505628 | -2.26281 | -0.0663572 | 2.31956 | 0.004 (80) |
| point 7 | 0.259627 | 0.103259 | 0.0189407 | 0.280049 | 0.004 (88) |
| point 8 | -0.00932057 | 0.660398 | 0.0217251 | 0.660821 | 0.004 (92) |
| **Total** | **0.311585** | **1.39772** | **0.0383864** | **1.43255** | **0.004** |

Table 4. Control points.

| Label | X error (mm) | Y error (mm) | Z error (mm) | Total (mm) | Image (pix) |
|---|---|---|---|---|---|
| target 8 | | | | | 1.177 (22) |
| target 9 | | | | | 1.377 (3) |
| target 15 | | | | | 0.458 (5) |
| target 16 | | | | | 0.449 (5) |
| target 7 | | | | | 0.038 (94) |
| target 10 | | | | | 1.349 (30) |
| point 1 | | | | | 28.327 (56) |
| point 2 | | | | | 0.900 (38) |
| point 3 | | | | | 2.755 (37) |
| point 4 | | | | | 10.214 (39) |
| point 9 | | | | | 0.004 (108) |
| point 10 | | | | | 0.004 (108) |
| point 11 | | | | | 0.004 (108) |
| point 12 | | | | | 0.004 (108) |
| point 13 | | | | | 0.004 (75) |
| point 14 | | | | | 0.004 (75) |
| point 15 | | | | | 0.004 (75) |
| point 16 | | | | | 0.004 (75) |
| point 17 | | | | | 0.003 (70) |
| point 18 | | | | | 0.004 (71) |
| point 19 | | | | | 0.004 (71) |
| point 20 | | | | | 0.003 (71) |
| **Total** | | | | | |

Table 5. Check points.

# Scale Bars

| Label | Distance (m) | Error (m) |
|---|---|---|
| target 8_target 7 | 0.145627 | -0.00237257 |
| target 9_target 10 | 0.150298 | 0.00229778 |
| **Total** | | **0.00233547** |

Table 6. Control scale bars.

| Label | Distance (m) | Error (m) |
|---|---|---|
| point 5_point 6 | 0.0808201 | |
| point 5_point 7 | 0.166407 | |
| point 5_point 8 | 0.250906 | |
| **Total** | | |

Table 7. Check scale bars.

# Digital Elevation Model

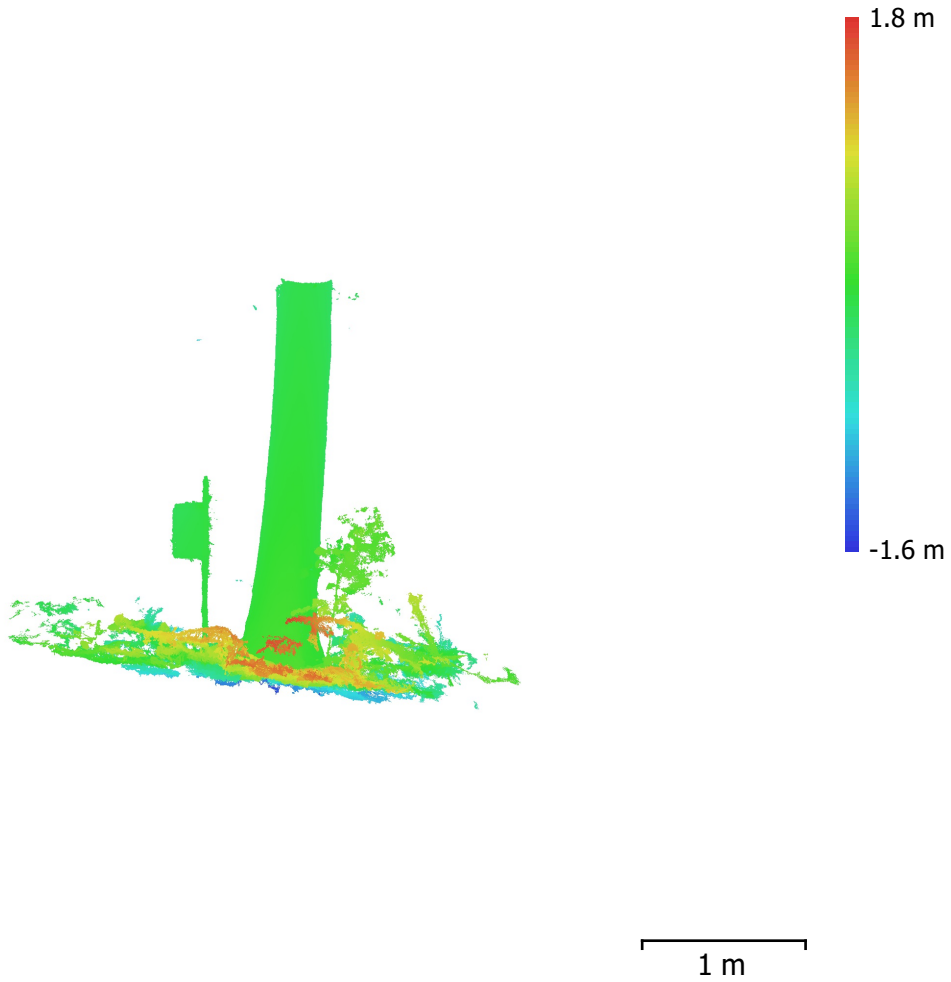


Fig. 4. Reconstructed digital elevation model.

| | |
|---|---|
| Resolution: | unknown |
| Point density: | unknown |

# Processing Parameters

| | |
|---|---|
| **General** | |
| Cameras | 108 |
| Aligned cameras | 108 |
| Markers | 26 |
| Scale bars | 5 |
| Coordinate system | Local Coordinates (m) |
| Rotation angles | Yaw, Pitch, Roll |
| **Point Cloud** | |
| Points | 126,254 of 158,952 |
| RMS reprojection error | 0.138754 (0.6466 pix) |
| Max reprojection error | 0.426559 (16.8003 pix) |
| Mean key point size | 4.59755 pix |
| Point colors | 3 bands, uint8 |
| Key points | No |
| Average tie point multiplicity | 3.09891 |
| **Alignment parameters** | |
| Accuracy | High |
| Generic preselection | Yes |
| Key point limit | 40,000 |
| Tie point limit | 4,000 |
| Adaptive camera model fitting | Yes |
| Matching time | 33 minutes 56 seconds |
| Alignment time | 2 minutes 57 seconds |
| **Depth Maps** | |
| Count | 108 |
| **Reconstruction parameters** | |
| Quality | Medium |
| Filtering mode | Aggressive |
| Processing time | 1 hours 35 minutes |
| **Dense Point Cloud** | |
| Points | 4,501,245 |
| Point colors | 3 bands, uint8 |
| **Reconstruction parameters** | |
| Quality | Medium |
| Depth filtering | Aggressive |
| Depth maps generation time | 1 hours 35 minutes |
| Dense cloud generation time | 18 minutes 39 seconds |
| **Software** | |
| Version | 1.4.4 build 6848 |
| Platform | Windows 64 |