

Sander_2022-10-20_H20T_60m_Wide

Processing Report
28 June 2024



Survey Data

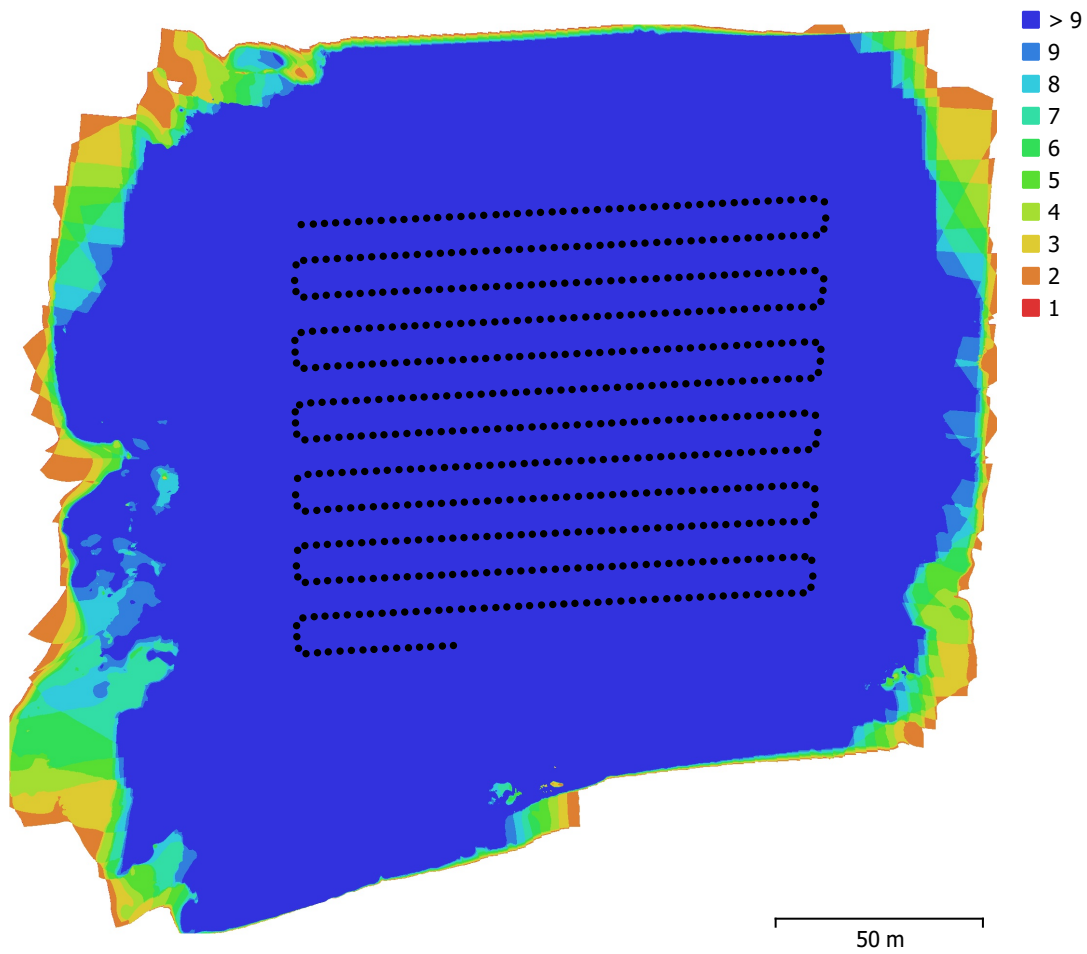


Fig. 1. Camera locations and image overlap.

| | | | |
|--------------------|------------------------|---------------------|-----------|
| Number of images: | 596 | Camera stations: | 596 |
| Flying altitude: | 63.2 m | Tie points: | 158,677 |
| Ground resolution: | 2.14 cm/pix | Projections: | 1,326,671 |
| Coverage area: | 0.0429 km ² | Reprojection error: | 1.34 pix |

| Camera Model | Resolution | Focal Length | Pixel Size | Precalibrated |
|---------------|-------------|--------------|-------------------|---------------|
| ZH20T (4.5mm) | 4056 x 3040 | 4.5 mm | 1.6 x 1.6 μ m | No |

Table 1. Cameras.

Camera Calibration

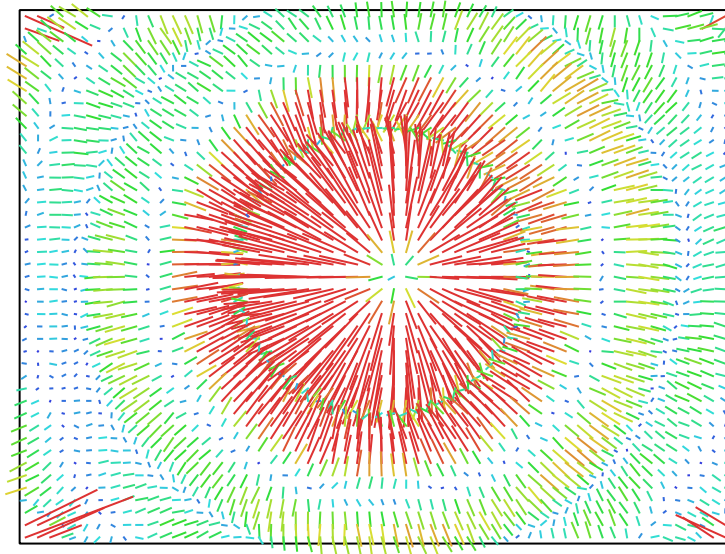


Fig. 2. Image residuals for ZH20T (4.5mm). 1 pix

ZH20T (4.5mm)

596 images

| | | | |
|--------------|--------------------|---------------|---|
| Type | Resolution | Focal Length | Pixel Size |
| Frame | 4056 x 3040 | 4.5 mm | 1.6 x 1.6 μm |

| | Value | Error | F | Cx | Cy | B1 | B2 | K1 | K2 | K3 | K4 | P1 | P2 |
|-----------|--------------------|---------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| F | 2960.97 | 1 | 1.00 | 0.13 | 0.59 | -0.07 | 0.08 | 0.75 | -0.89 | 0.85 | -0.79 | -0.01 | -0.16 |
| Cx | 24.7562 | 0.018 | | 1.00 | 0.16 | -0.12 | 0.01 | 0.13 | -0.12 | 0.12 | -0.11 | 0.32 | 0.01 |
| Cy | -19.9688 | 0.02 | | | 1.00 | -0.05 | -0.03 | 0.45 | -0.53 | 0.51 | -0.48 | -0.01 | 0.10 |
| B1 | -1.86011 | 0.0077 | | | | 1.00 | -0.01 | -0.03 | 0.05 | -0.05 | 0.04 | 0.12 | 0.02 |
| B2 | 0.038785 | 0.0073 | | | | | 1.00 | 0.05 | -0.07 | 0.07 | -0.06 | -0.05 | 0.06 |
| K1 | 0.198548 | 0.0002 | | | | | | 1.00 | -0.92 | 0.90 | -0.88 | 0.05 | 0.01 |
| K2 | -0.688991 | 0.0011 | | | | | | | 1.00 | -0.99 | 0.97 | 0.01 | 0.13 |
| K3 | 0.722817 | 0.0017 | | | | | | | | 1.00 | -0.99 | -0.01 | -0.13 |
| K4 | -0.287184 | 0.00098 | | | | | | | | | 1.00 | 0.01 | 0.12 |
| P1 | 0.000147966 | 1.6e-06 | | | | | | | | | | 1.00 | 0.01 |
| P2 | 2.71107e-05 | 1.5e-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 (cm) | Y error (cm) | Z error (cm) | XY error (cm) | Total (cm) |
|-------|--------------|--------------|--------------|---------------|------------|
| 7 | 1.35399 | 2.49345 | 4.60387 | 2.83736 | 5.40798 |

Table 3. Control points RMSE.

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

| Label | X error (cm) | Y error (cm) | Z error (cm) | Total (cm) | Image (pix) |
|--------------|---------------------|---------------------|---------------------|-------------------|--------------------|
| Pylone1 | 0.70213 | 2.57278 | -3.38473 | 4.30913 | 0.345 (10) |
| Pylone2 | -2.46641 | -1.79943 | 4.95942 | 5.82383 | 0.827 (10) |
| Pylone3 | -0.598059 | -3.25223 | -4.98149 | 5.97913 | 1.288 (10) |
| Pylone4 | 1.30561 | 0.200628 | 7.17333 | 7.29393 | 0.637 (10) |
| Pylone5 | 0.318038 | -0.696854 | -2.96961 | 3.06681 | 0.750 (10) |
| Pylone6 | 0.236345 | 1.88518 | -2.0016 | 2.75973 | 1.342 (10) |
| RoofRidge1 | 2.00936 | 4.35973 | 4.81872 | 6.80183 | 1.251 (10) |
| Total | 1.35399 | 2.49345 | 4.60387 | 5.40798 | 0.985 |

Table 4. Control points.
X - Easting, Y - Northing, Z - Altitude.

Digital Elevation Model

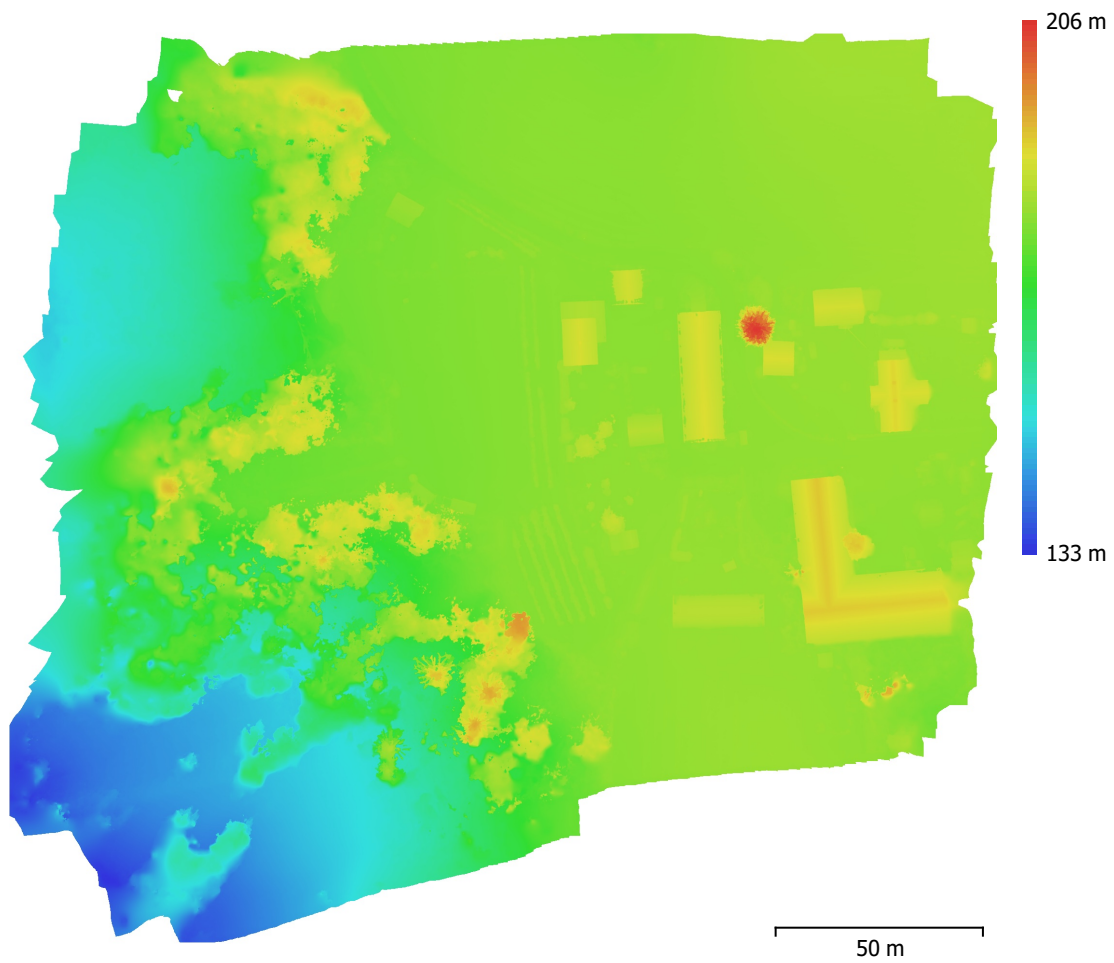


Fig. 4. Reconstructed digital elevation model.

Resolution: 5 cm/pix
Point density: 400 points/m²

Processing Parameters

General

| | |
|-------------------|--|
| Cameras | 596 |
| Aligned cameras | 596 |
| Markers | 7 |
| Coordinate system | ETRS89 / UTM zone 32N + NN2000 height (EPSG::5972) |
| Rotation angles | Yaw, Pitch, Roll |

Tie Points

| | |
|--------------------------------|------------------------|
| Points | 158,677 of 191,838 |
| RMS reprojection error | 0.226522 (1.34216 pix) |
| Max reprojection error | 3.60387 (42.4615 pix) |
| Mean key point size | 5.61919 pix |
| Point colors | 3 bands, uint8 |
| Key points | No |
| Average tie point multiplicity | 13.8045 |

Alignment parameters

| | |
|-------------------------------|----------------------|
| Accuracy | High |
| Generic preselection | Yes |
| Reference preselection | Source |
| Key point limit | 40,000 |
| Key point limit per Mpx | 1,000 |
| Tie point limit | 4,000 |
| Exclude stationary tie points | Yes |
| Guided image matching | No |
| Adaptive camera model fitting | Yes |
| Matching time | 1 minutes 53 seconds |
| Matching memory usage | 1.07 GB |
| Alignment time | 5 minutes 30 seconds |
| Alignment memory usage | 1.64 GB |

Optimization parameters

| | |
|-------------------------------|--------------------------|
| Parameters | f, cx, cy, k1-k3, p1, p2 |
| Adaptive camera model fitting | Yes |
| Optimization time | 17 seconds |
| Date created | 2024:06:28 14:10:37 |
| Software version | 2.1.0.17532 |
| File size | 125.41 MB |

Depth Maps

| | |
|-------|-----|
| Count | 596 |
|-------|-----|

Depth maps generation parameters

| | |
|------------------|----------------------|
| Quality | High |
| Filtering mode | Mild |
| Max neighbors | 16 |
| Processing time | 14 minutes 6 seconds |
| Memory usage | 5.34 GB |
| Date created | 2024:06:28 14:39:00 |
| Software version | 2.1.0.17532 |
| File size | 2.59 GB |

DEM

| | |
|-------------------|--|
| Size | 4,763 x 4,380 |
| Coordinate system | ETRS89 / UTM zone 32N + NN2000 height (EPSG::5972) |

Depth maps generation parameters

| | |
|----------------------------------|--|
| Quality | High |
| Filtering mode | Mild |
| Max neighbors | 16 |
| Processing time | 14 minutes 6 seconds |
| Memory usage | 5.34 GB |
| Reconstruction parameters | |
| Source data | Depth maps |
| Interpolation | Enabled |
| Processing time | 3 minutes 48 seconds |
| Memory usage | 18.11 GB |
| Date created | 2024:06:28 14:42:49 |
| Software version | 2.1.0.17532 |
| File size | 72.79 MB |
| Orthomosaic | |
| Size | 9,520 x 8,760 |
| Coordinate system | ETRS89 / UTM zone 32N + NN2000 height (EPSG::5972) |
| Colors | 3 bands, uint8 |
| Reconstruction parameters | |
| Blending mode | Mosaic |
| Surface | DEM |
| Enable hole filling | Yes |
| Enable ghosting filter | No |
| Processing time | 5 minutes 41 seconds |
| Memory usage | 1.79 GB |
| Date created | 2024:06:28 14:59:10 |
| Software version | 2.1.0.17532 |
| File size | 6.30 GB |
| System | |
| Software name | Agisoft Metashape Professional |
| Software version | 2.1.0 build 17532 |
| OS | Windows 64 bit |
| RAM | 127.15 GB |
| CPU | AMD Ryzen 9 7950X 16-Core Processor |
| GPU(s) | NVIDIA GeForce RTX 4080 SUPER |