# Esperantodalen

**Filtered by:**
**Reprojection error: 0.3;**
**Reconstruction error: 15;**
**Projection accuracy: 3;**
**Dense cloud confidence: 3-255;**
**Connected component size: 99%**

**16 February 2022**

# Survey Data

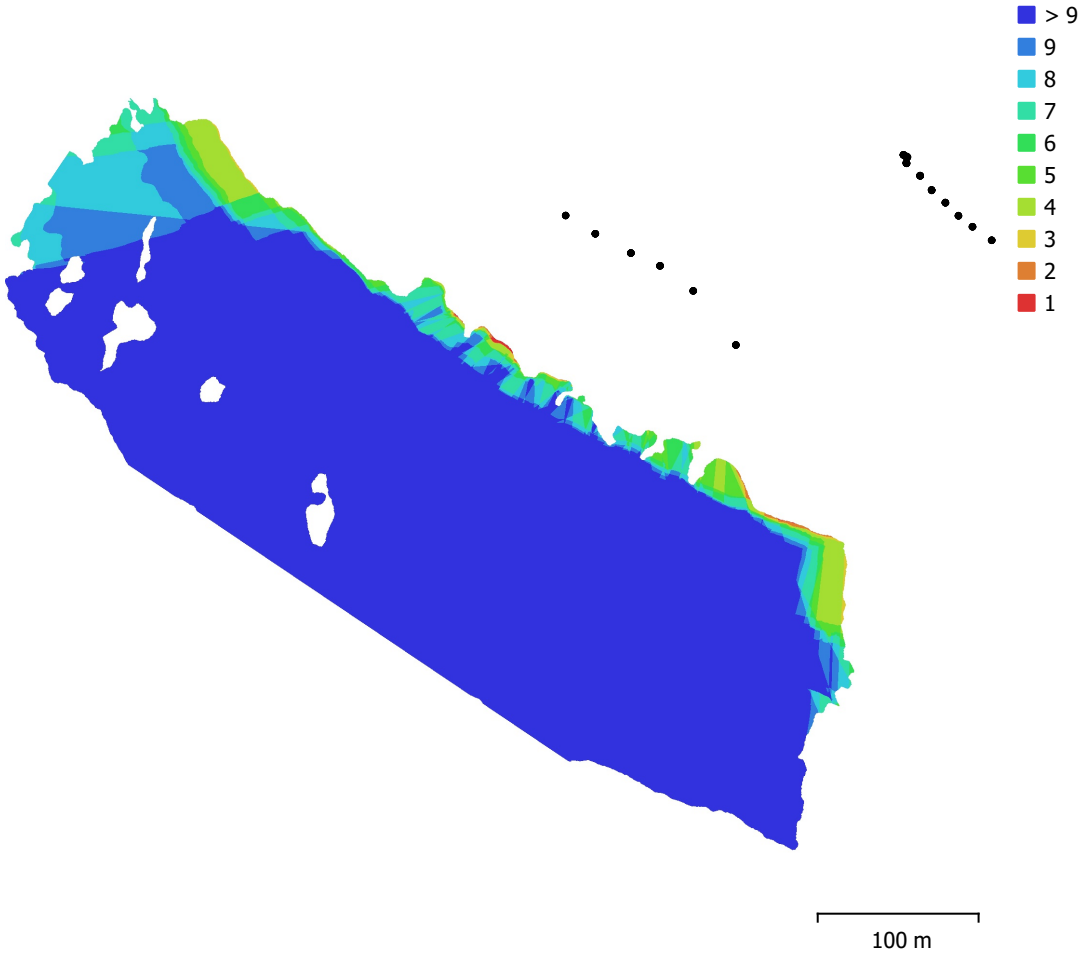


Fig. 1. Camera locations and image overlap.

| | | | |
|---|---|---|---|
| Number of images: | 138 | Camera stations: | 131 |
| Flying altitude: | 282 m | Tie points: | 121,063 |
| Ground resolution: | 2.44 cm/pix | Projections: | 643,348 |
| Coverage area: | 0.104 km² | Reprojection error: | 0.244 pix |

| Camera Model | Resolution | Focal Length | Pixel Size | Precalibrated |
|---|---|---|---|---|
| NIKON D5300 (50mm) | 6000 x 4000 | 50 mm | 4 x 4 µm | No |

Table 1. Cameras.

# Camera Calibration

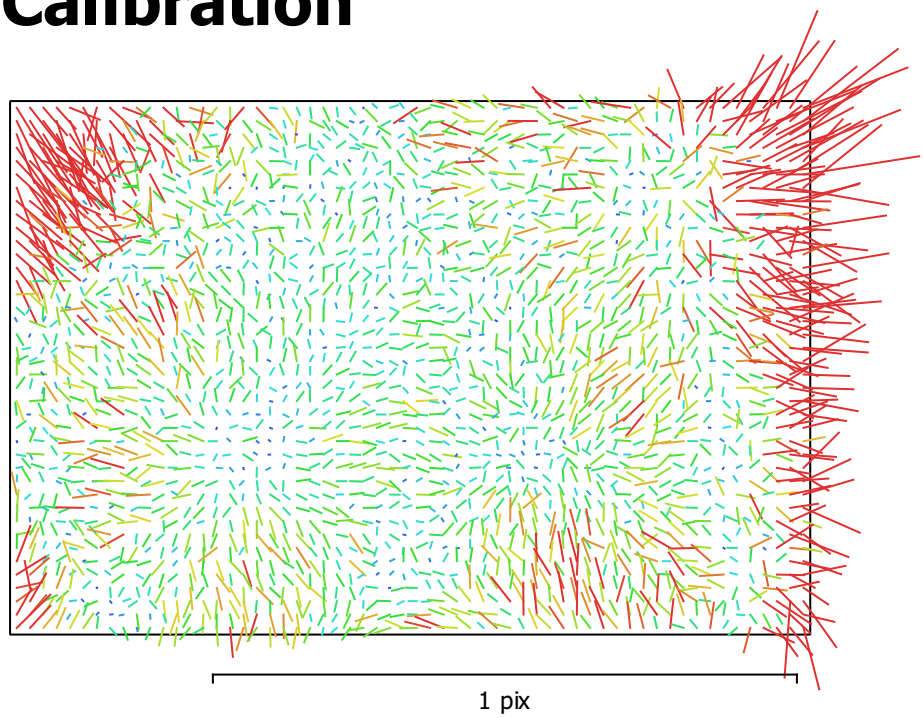


Fig. 2. Image residuals for NIKON D5300 (50mm).

**NIKON D5300 (50mm)**

138 images

| Type | Resolution | Focal Length | Pixel Size |
|---|---|---|---|
| **Frame** | **6000 x 4000** | **50 mm** | **4 x 4 µm** |

| | Value | Error | F | Cx | Cy | K1 | K2 | K3 | P1 | P2 |
|---|---|---|---|---|---|---|---|---|---|---|
| **F** | **12685.1** | 0.15 | 1.00 | 0.24 | 0.37 | -0.03 | 0.08 | -0.07 | 0.19 | 0.37 |
| **Cx** | **-62.1855** | 0.28 | | 1.00 | -0.10 | 0.10 | -0.06 | 0.06 | 0.96 | -0.13 |
| **Cy** | **-21.1684** | 0.3 | | | 1.00 | 0.00 | 0.01 | -0.00 | -0.12 | 0.95 |
| **K1** | **-0.00517416** | 0.00011 | | | | 1.00 | -0.97 | 0.91 | 0.10 | -0.00 |
| **K2** | **0.0818326** | 0.0034 | | | | | 1.00 | -0.98 | -0.07 | 0.01 |
| **K3** | **0.0850591** | 0.03 | | | | | | 1.00 | 0.07 | -0.01 |
| **P1** | **-0.00150611** | 6.5e-06 | | | | | | | 1.00 | -0.15 |
| **P2** | **-0.000501329** | 7.4e-06 | | | | | | | | 1.00 |

Table 2. Calibration coefficients and correlation matrix.

# Camera Locations

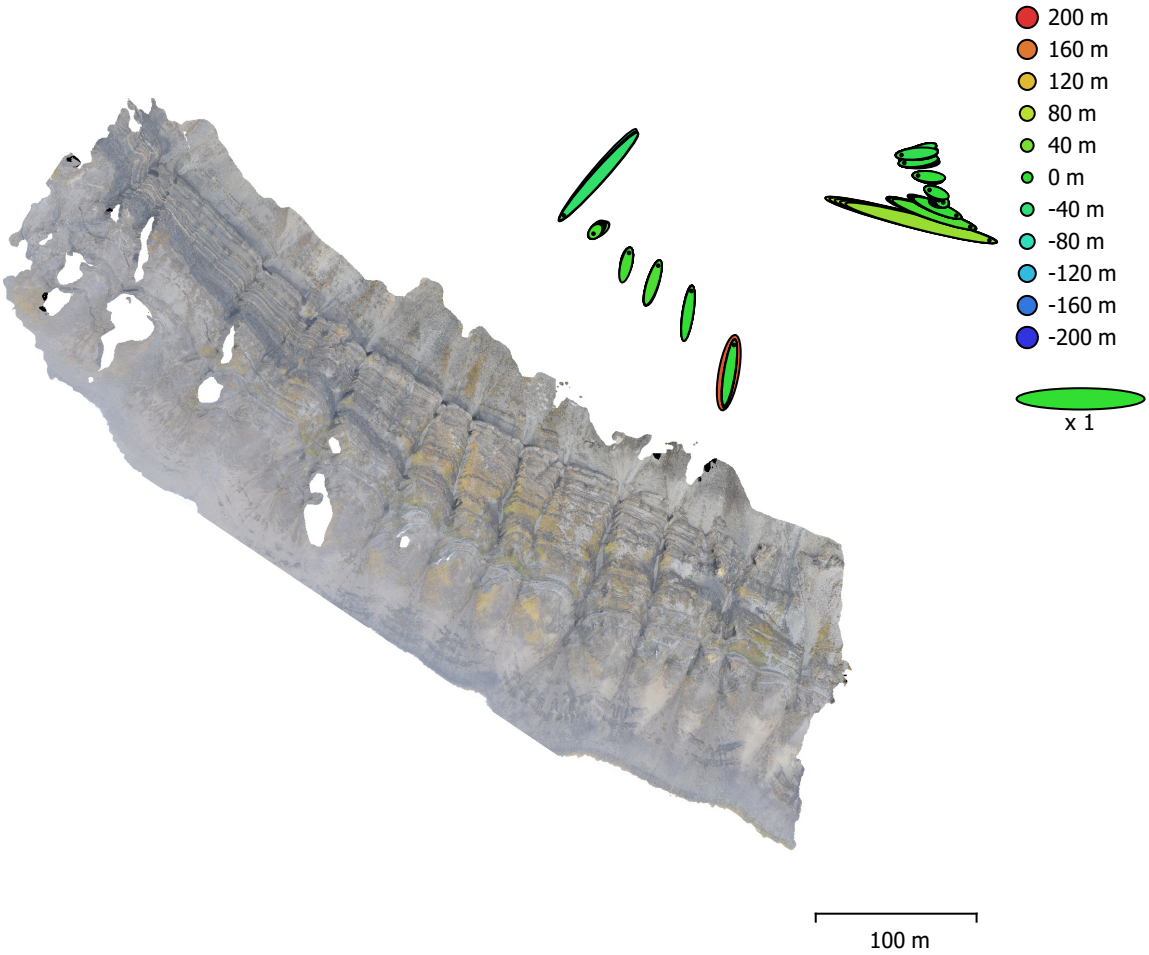


Fig. 3. Camera locations and error estimates.
Z error is represented by ellipse color. X,Y errors are represented by ellipse shape.
Estimated camera locations are marked with a black dot.

| X error (m) | Y error (m) | Z error (m) | XY error (m) | Total error (m) |
|---|---|---|---|---|
| 26.834 | 16.6892 | 26.2266 | 31.6006 | 41.0662 |

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

# Digital Elevation Model

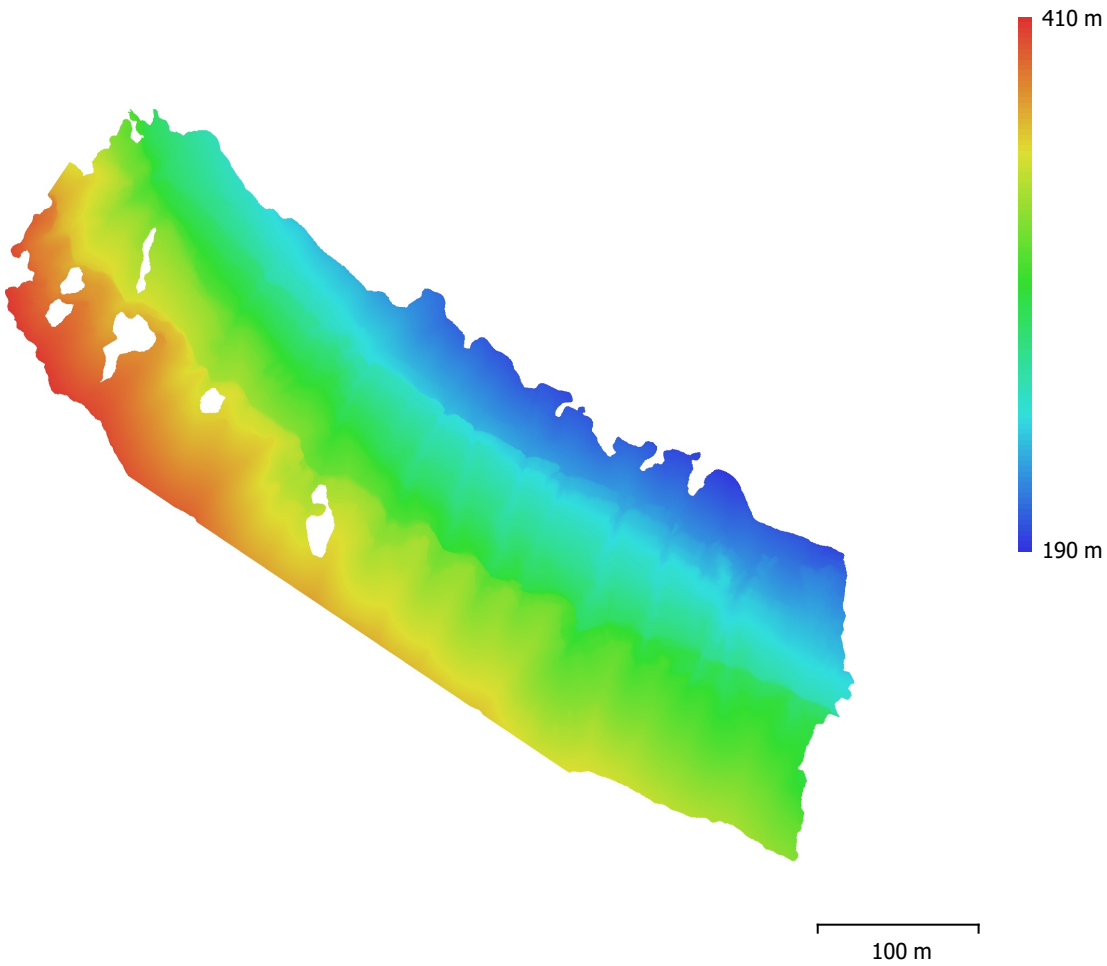


Fig. 4. Reconstructed digital elevation model.

| | |
|---|---|
| Resolution: | 9.77 cm/pix |
| Point density: | 105 points/m² |

# Processing Parameters

| | |
|---|---|
| **General** | |
| Cameras | 138 |
| Aligned cameras | 131 |
| Coordinate system | WGS 84 (EPSG::4326) |
| Rotation angles | Yaw, Pitch, Roll |
| **Point Cloud** | |
| Points | 121,063 of 772,788 |
| RMS reprojection error | 0.119872 (0.24415 pix) |
| Max reprojection error | 0.3476 (1.59403 pix) |
| Mean key point size | 2.02392 pix |
| Point colors | 3 bands, uint8 |
| Key points | No |
| Average tie point multiplicity | 4.96493 |
| **Alignment parameters** | |
| Accuracy | Highest |
| Generic preselection | Yes |
| Reference preselection | No |
| Key point limit | 60,000 |
| Tie point limit | 0 |
| Exclude stationary tie points | Yes |
| Guided image matching | No |
| Adaptive camera model fitting | No |
| Matching time | 24 minutes 2 seconds |
| Matching memory usage | 2.93 GB |
| Alignment time | 6 minutes 55 seconds |
| Alignment memory usage | 409.27 MB |
| **Optimization parameters** | |
| Parameters | f, cx, cy, k1-k3, p1, p2 |
| Adaptive camera model fitting | No |
| Optimization time | 3 seconds |
| Software version | 1.7.2.12040 |
| File size | 63.55 MB |
| **Depth Maps** | |
| Count | 128 |
| **Depth maps generation parameters** | |
| Quality | Medium |
| Filtering mode | Mild |
| Processing time | 7 minutes 53 seconds |
| Memory usage | 1.70 GB |
| Software version | 1.7.2.12040 |
| File size | 228.24 MB |
| **Dense Point Cloud** | |
| Points | 16,557,366 |
| Point colors | 3 bands, uint8 |
| **Depth maps generation parameters** | |
| Quality | Medium |
| Filtering mode | Mild |
| Processing time | 7 minutes 53 seconds |
| Memory usage | 1.70 GB |
| **Dense cloud generation parameters** | |

| | |
|---|---|
| Processing time | 6 minutes 30 seconds |
| Memory usage | 5.27 GB |
| Software version | 1.7.2.12040 |
| File size | 312.25 MB |
| **Model** | |
| Faces | 3,301,495 |
| Vertices | 1,655,646 |
| Vertex colors | 3 bands, uint8 |
| Texture | 4,096 x 4,096 x 10, 4 bands, uint8 |
| **Depth maps generation parameters** | |
| Quality | Medium |
| Filtering mode | Mild |
| Processing time | 7 minutes 53 seconds |
| Memory usage | 1.70 GB |
| **Reconstruction parameters** | |
| Surface type | Arbitrary |
| Source data | Dense cloud |
| Interpolation | Enabled |
| Strict volumetric masks | No |
| Processing time | 5 minutes 43 seconds |
| Memory usage | 8.57 GB |
| **Texturing parameters** | |
| Mapping mode | Generic |
| Blending mode | Mosaic |
| Texture size | 4,096 |
| Enable hole filling | Yes |
| Enable ghosting filter | Yes |
| UV mapping time | 4 minutes 5 seconds |
| UV mapping memory usage | 3.98 GB |
| Blending time | 1 minutes 52 seconds |
| Blending memory usage | 6.13 GB |
| Software version | 1.7.2.12040 |
| File size | 320.86 MB |
| **Tiled Model** | |
| Texture | 3 bands, uint8 |
| **Depth maps generation parameters** | |
| Quality | Medium |
| Filtering mode | Mild |
| Processing time | 7 minutes 53 seconds |
| Memory usage | 1.70 GB |
| **Reconstruction parameters** | |
| Source data | Dense cloud |
| Tile size | 256 |
| Face count | High |
| Enable ghosting filter | No |
| Processing time | 52 minutes 20 seconds |
| Memory usage | 5.04 GB |
| Software version | 1.7.2.12040 |
| File size | 1.03 GB |
| **System** | |
| Software name | Agisoft Metashape Professional |
| Software version | 1.7.2 build 12040 |
| OS | Windows 64 bit |
| RAM | 127.78 GB |
| CPU | Intel(R) Core(TM) i9-10900 CPU @ 2.80GHz |
| GPU(s) | NVIDIA GeForce RTX 2080 SUPER |