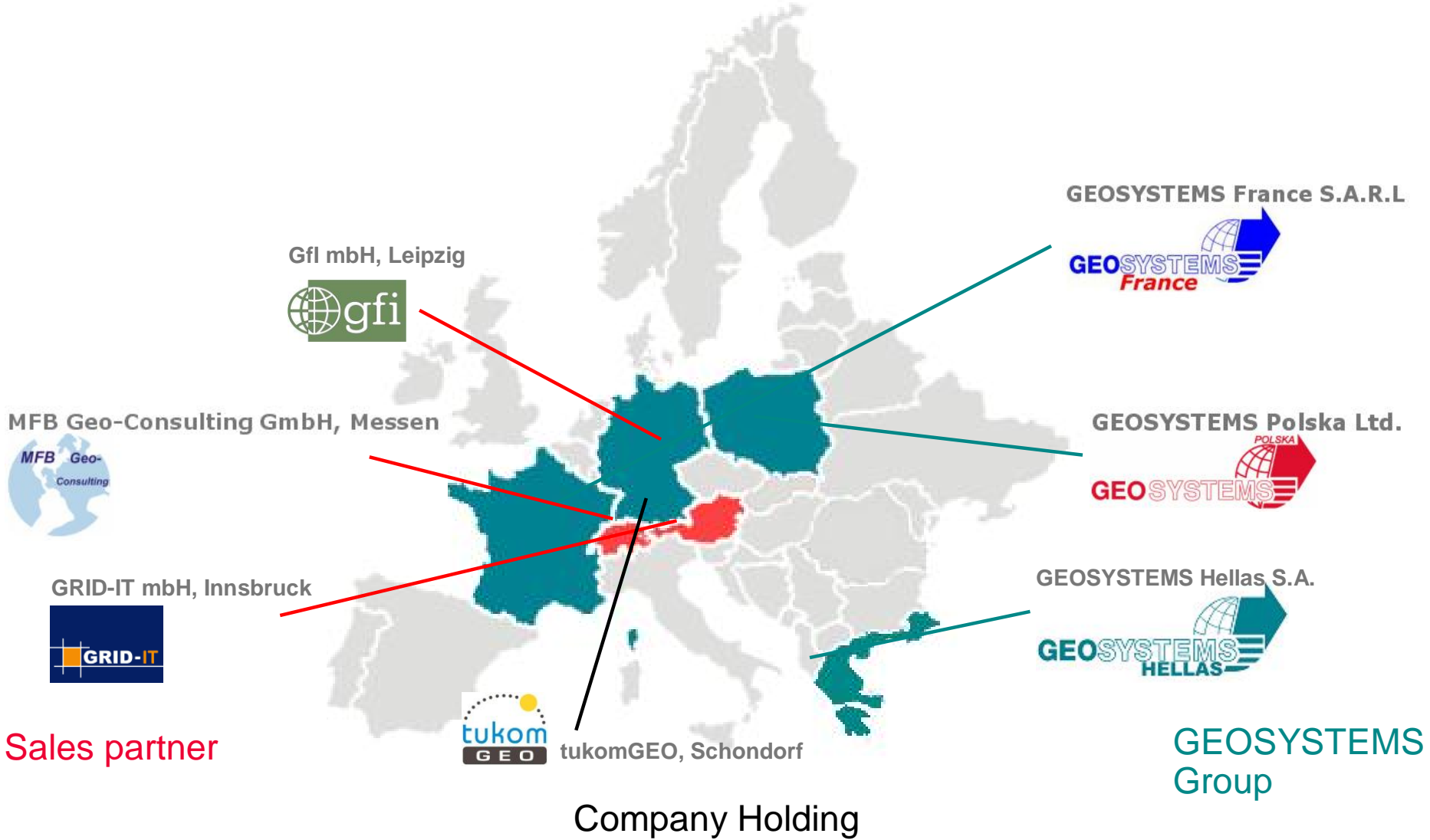


Benchmark State, Results and Evaluation

Ralf Schneider, GEOSYSTEMS GmbH

GEOSYSTEMS in Europe



Sales partner

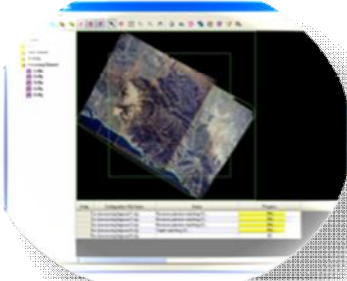
Company Holding

GEOSYSTEMS Group

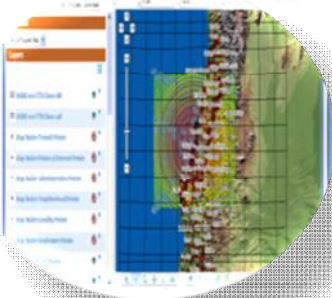
GEOSYSTEMS – Product Portfolio



ERDAS IMAGINE
for Remote Sensing

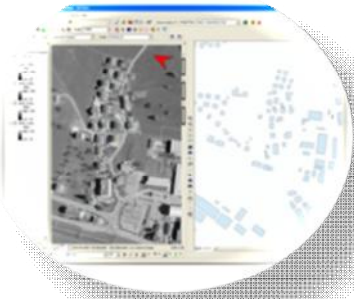


LPS
for Photogrammetry



**ERDAS
APOLLO**

for Geodata Management



Stereo Analyst
for Stereo Plotting

United Workflows



PI

GIS

Together at last!

Applied Software for the Dense Matching

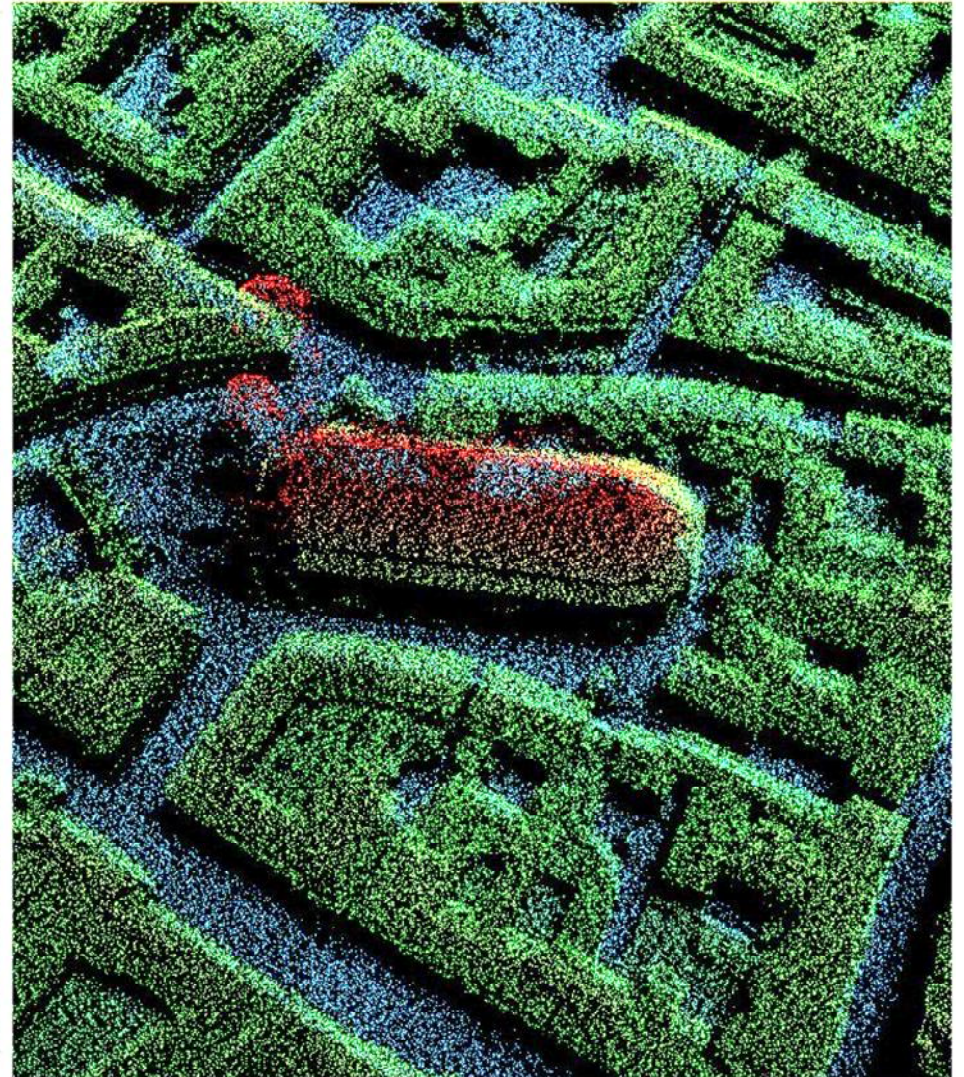
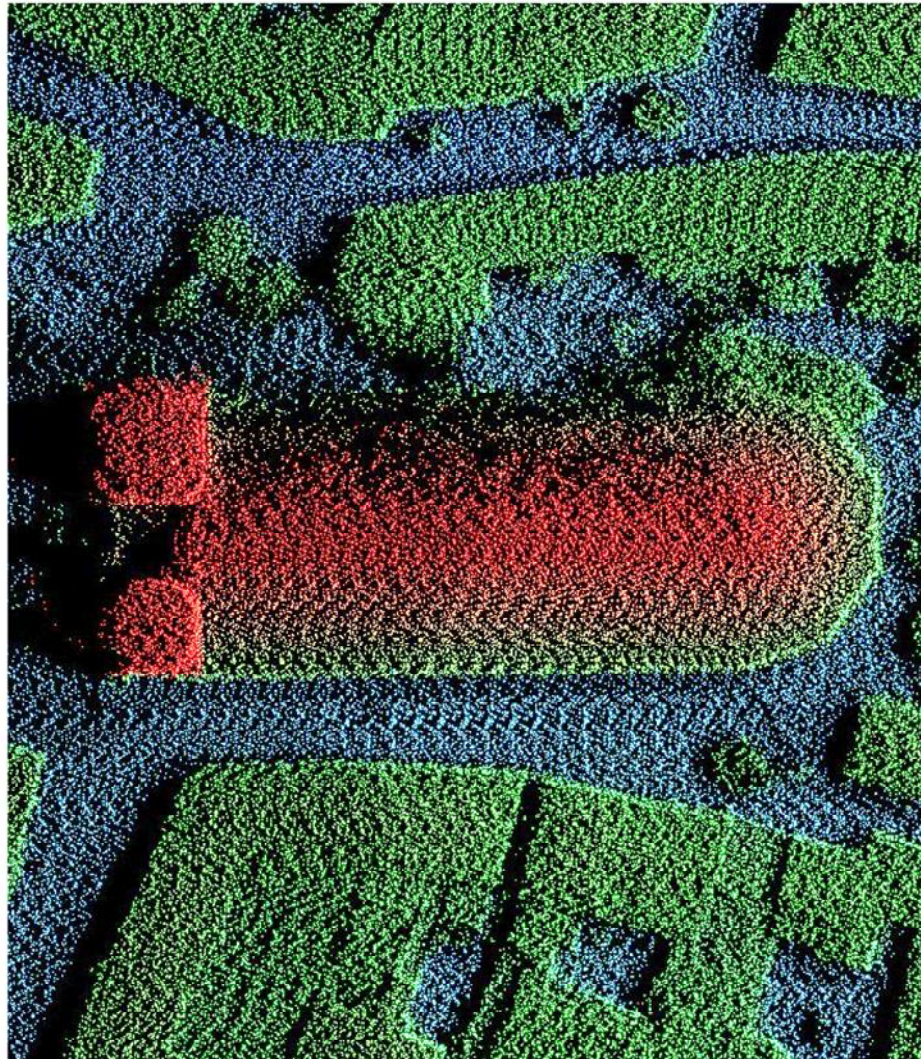
- LPS eATE 2013
 - Normalized Cross Correlation (NCC)
- LPS eATE 2014
 - Normalized Cross Correlation (NCC)
 - **Semi Global Matching (SGM) ***

* actually implemented in Leica Geosystems XPro and ImageStation ISAE-E

The DSM results have been produced using ISAE-E

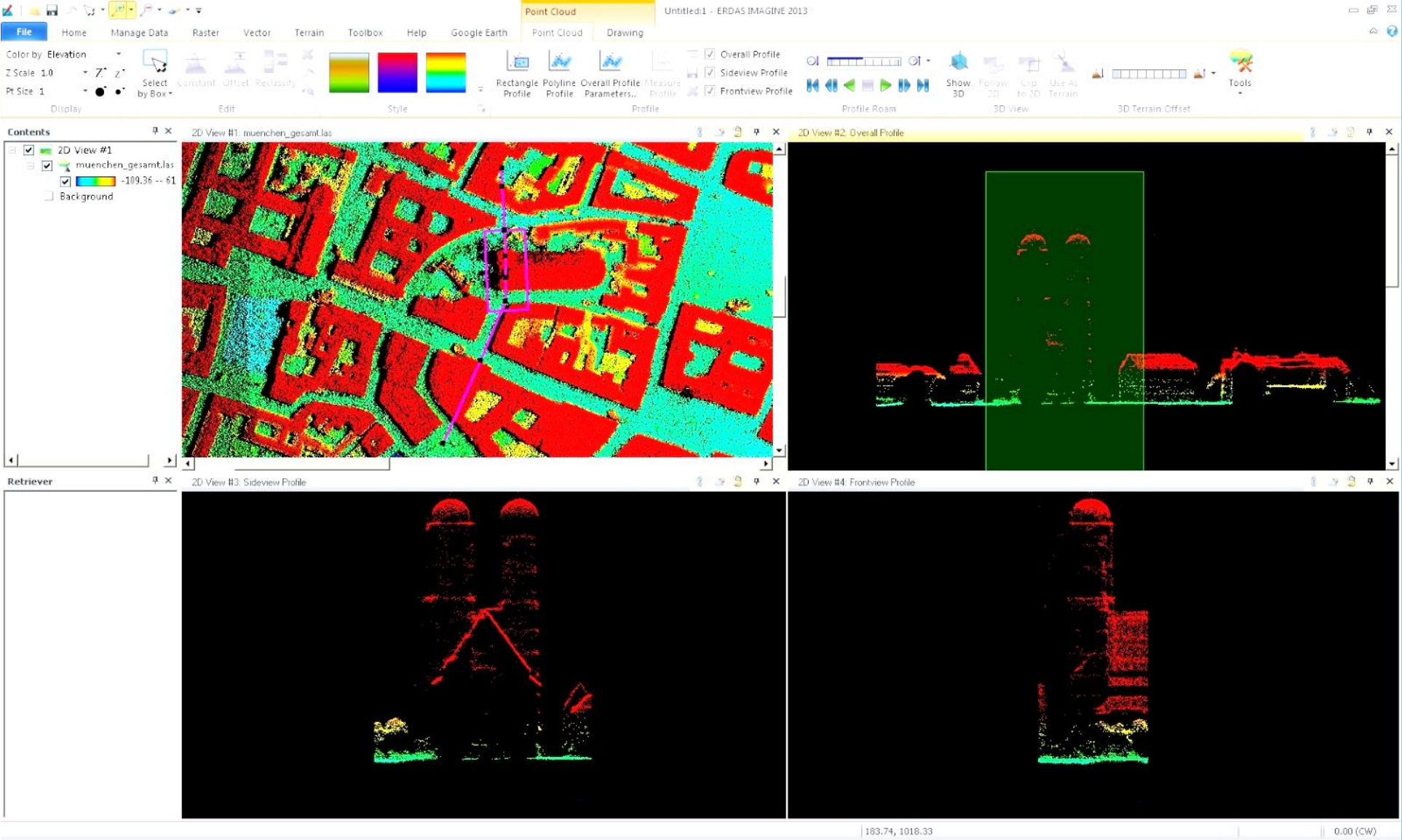
SGM Result Munich

§ LAS 2D and 3D point visualisation with the Point Cloud Tool of LPS



SGM Result Munich

§ LAS profile visualisation with the Point Cloud Tool of LPS

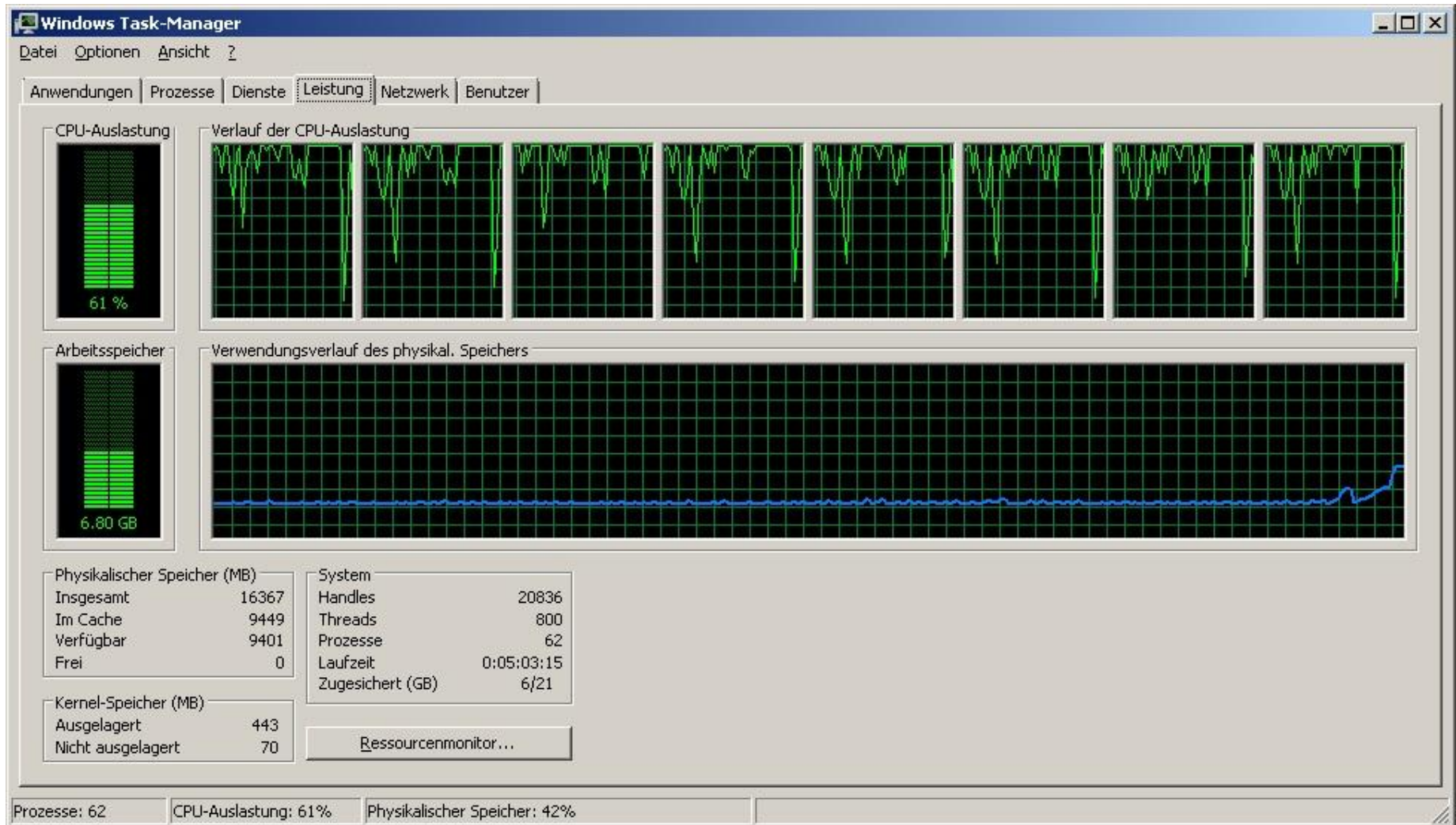


Computation Time Munich

- § Camera DMC II 230
- § 6 Stereo Models processed (40_313 to 40_316 and 41_419 to 41_422)
- § Computation time per stereo model: 40 minutes, 4 hours totally
- § Prozessor load 95% per core, RAM load >> 4 GByte

SGM Processing

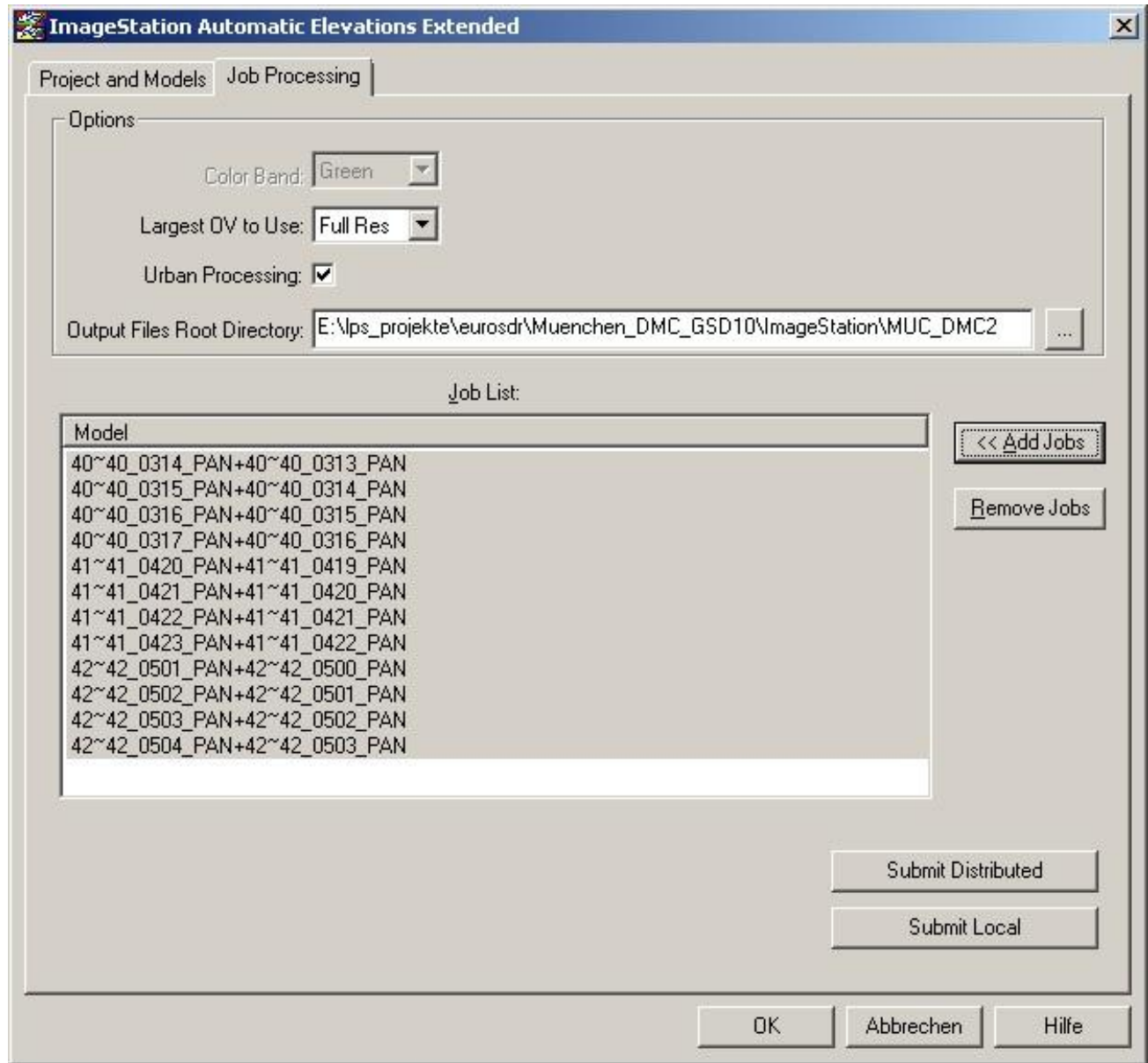
§ Load of the 2 Intel Xeon Quadcore Processors,
16 GB RAM available



Computation Time Vaihingen

- Camera UltracamX
- 33 Stereo Models processed
- Computation time per stereo model: 20 minutes, 11 hours totally
- Computation time for the 20 cm grid interpolation of 580 million points, 21 hours
 - Tiling of the whole area into more than 400 tiles
 - Computation of a TIN network for each tile
 - Linear interpolation of grid points

ISAE-E Eingabeparameter



ISAE-E Workflow

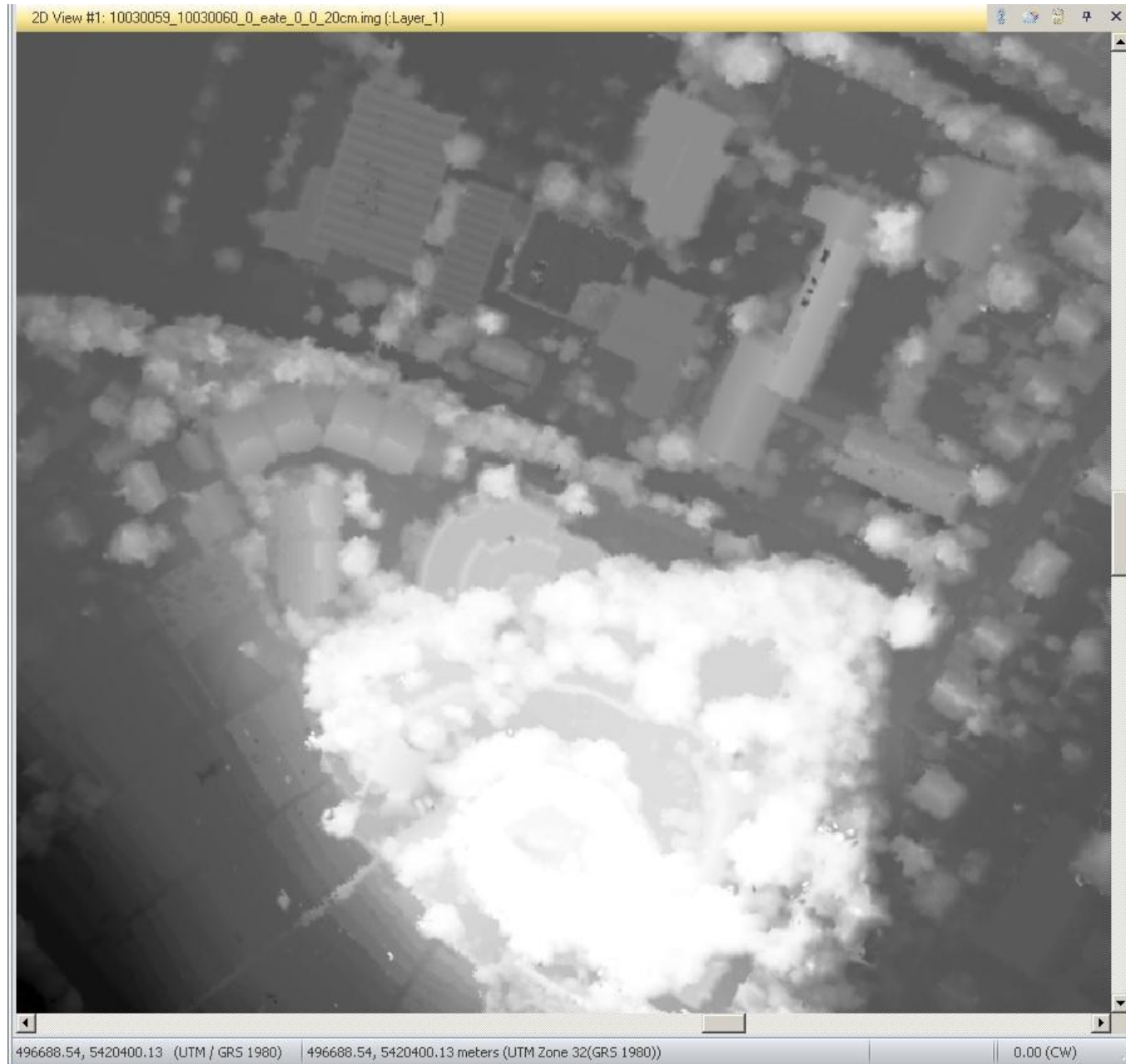
- § Automatic creation of a LPS Blockfile from Inpho projectfile, export of the orientation parameters
- § Manual creation of an IS Project and building of stereo models
- § Modelwise computation of LAS DSM files
- § Merge and interpolation of LAS files with LPS Terrain Prep Tool

LPS eATE Workflow

- § Automatic creation of a LPS Blockfile from Inpho projectfile
- § Automatic creation of an eATE project from the LPS Blockfile
- § Manual adjustment of strategy parameters
- § Automatic creation of merged LAS and interpolated grid DSM

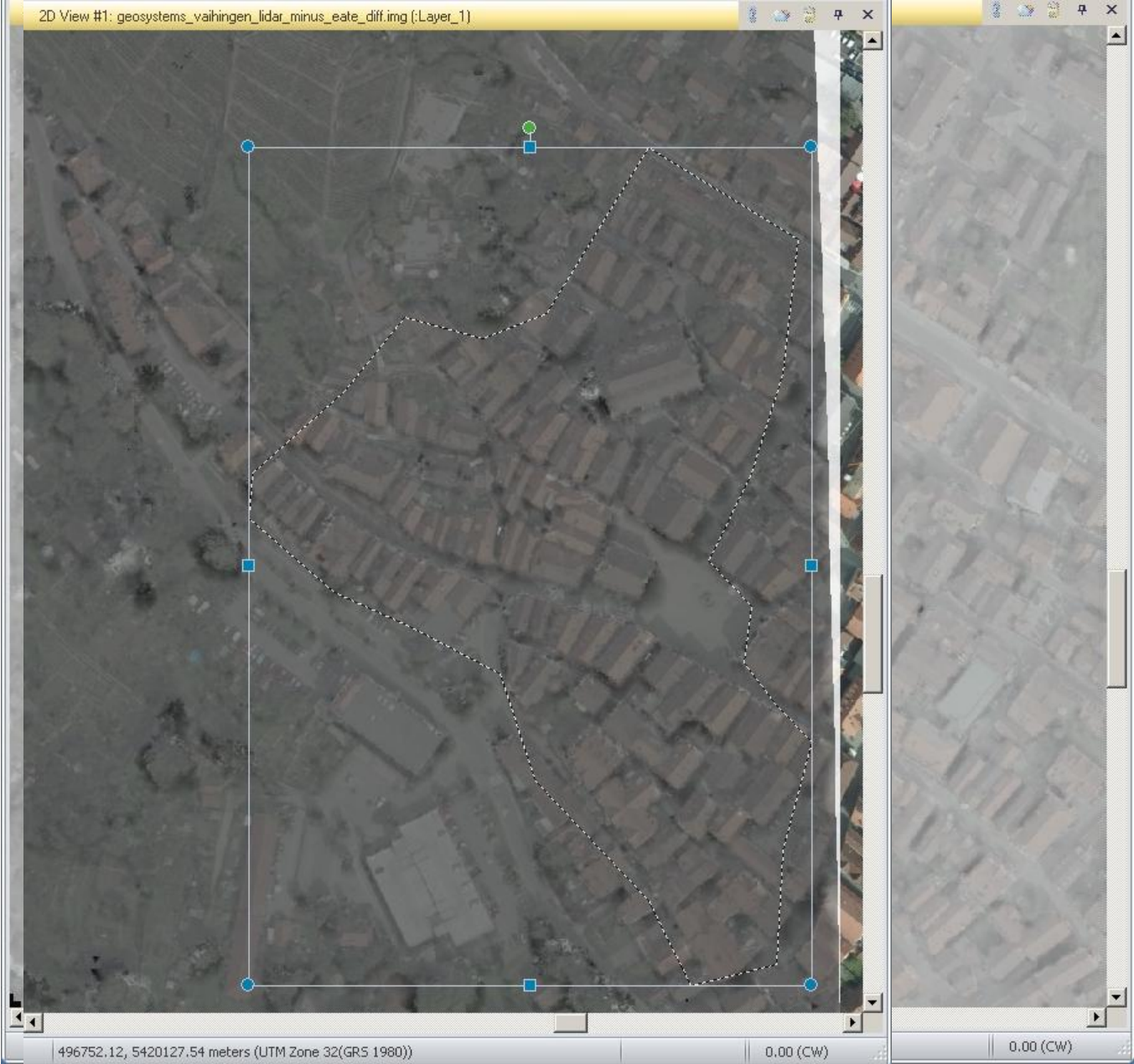
DSM Analysis Vaihingen

§ SGM and eATE DSM



DSM Analysis Vaihingen

§ SGM and eATE DSM Reference Differences



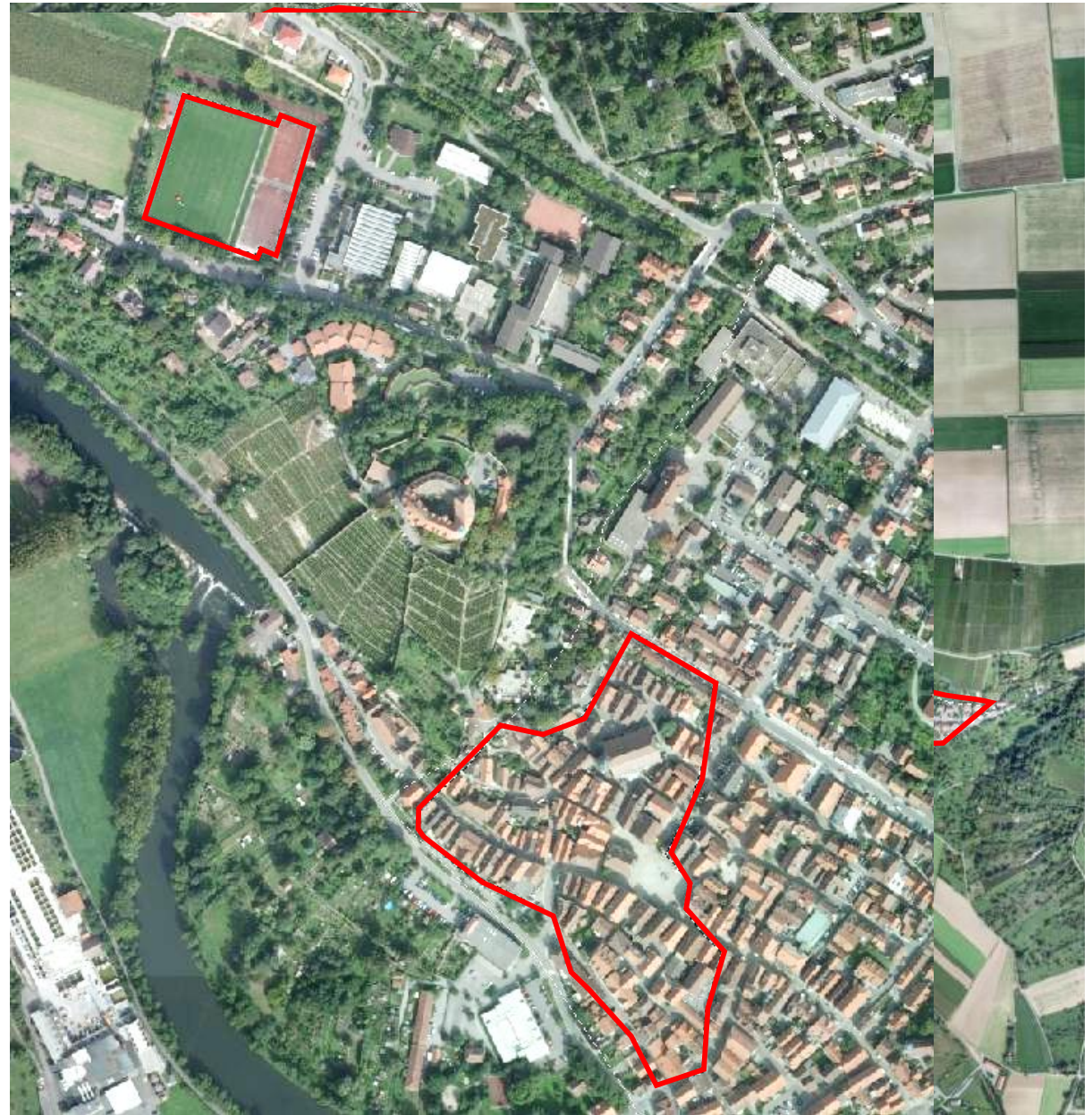
DSM Analysis Vaihingen

- Reference Areas

AOI sport area, 0.9 ha

AOI buildup area, 3.5 ha

AOI buildup area, 2 km²



DSM Analysis Vaihingen

- **Difference 0.2 m LiDAR DSM minus SGM DSM**
 - AOI sport area, 0.9 ha, mean difference -0.087 m, Std.Dev. 0.20 m
 - AOI buildup area, 3.5 ha, mean difference -0.81 m, Std.Dev. 1.9 m
 - AOI buildup area, 2 km², mean difference -0.52 m, Std.Dev. 26.8 m

- **Difference 0.2 m LiDAR DSM minus eATE DSM**
 - AOI sport area, 0.9 ha, mean difference 0.060 m, Std.Dev. 0.30 m
 - AOI buildup area, 3.5 ha, mean difference -0.82 m, Std.Dev. 2.6 m

Vielen Dank für Ihre Aufmerksamkeit!



Dipl.-Ing.

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