



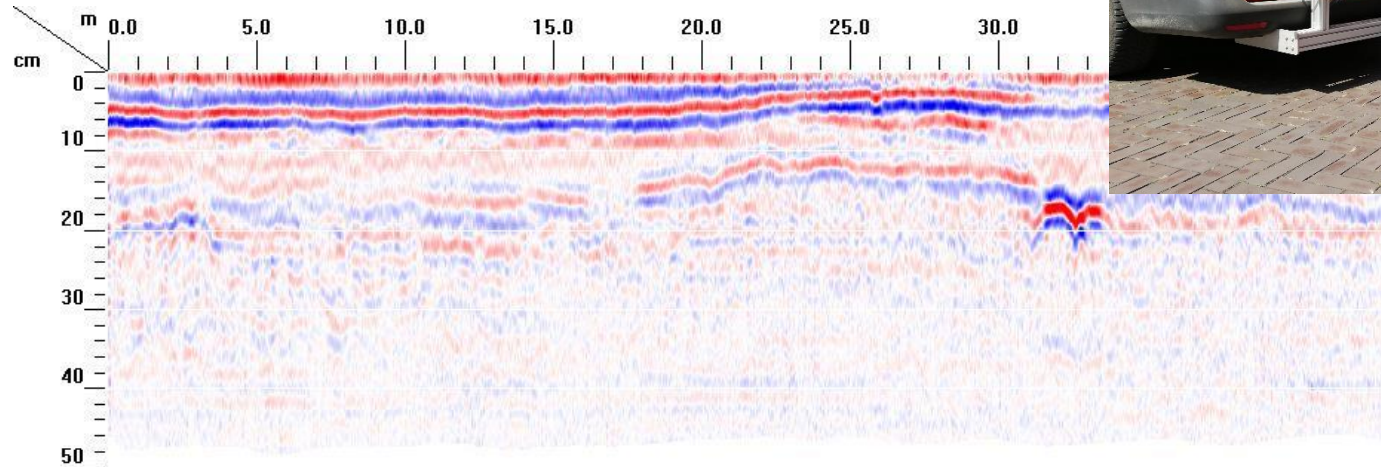
Combined Visual Exploration of 2D Ground Radar and 3D Point Cloud Data for Road Environments

Johannes Wolf, Sören Discher, Leon Masopust,
Sebastian Schulz, Rico Richter, and Jürgen Döllner
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3D GeoInfo 2018, Delft, Netherlands

2D Ground Radar Data (GPR)

- Antennas mounted to mobile mapping vehicle
- Four radar antennas with two different frequencies
- Used for below-ground analysis
 - Examination of the road foundations



GPR in 3D Point Clouds

Johannes Wolf

Chart 2

3D Point Cloud Data

- LiDAR scanners mounted on top of mobile mapping vehicle
- One left-oriented, one right-oriented scanner
- Used for above-ground analysis
 - Pavement condition
 - Road markings
 - Road signs
 - ...



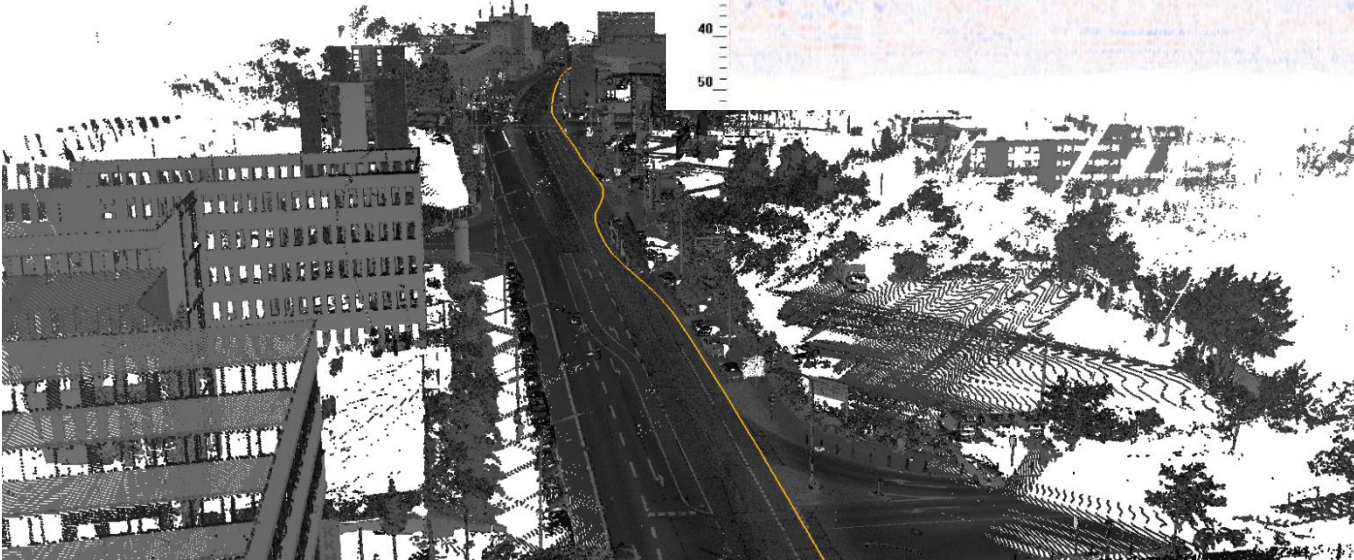
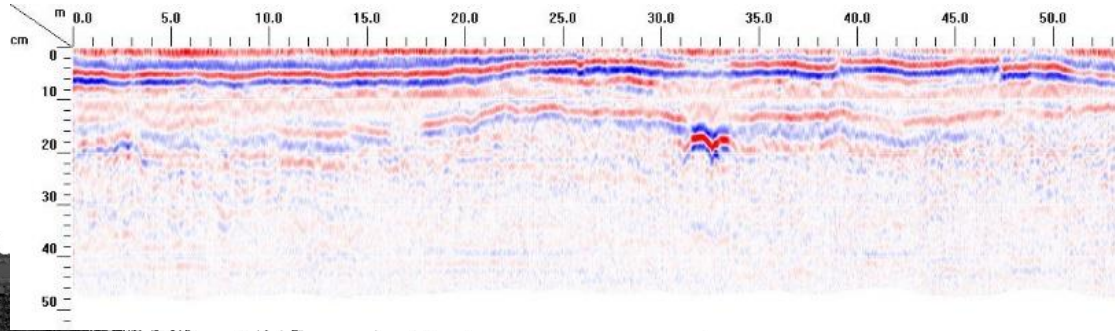
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Chart 3

Data Sources

- 2D Ground Radar Profiles
- 3D Point Cloud Scan
- GPS-Trajectory



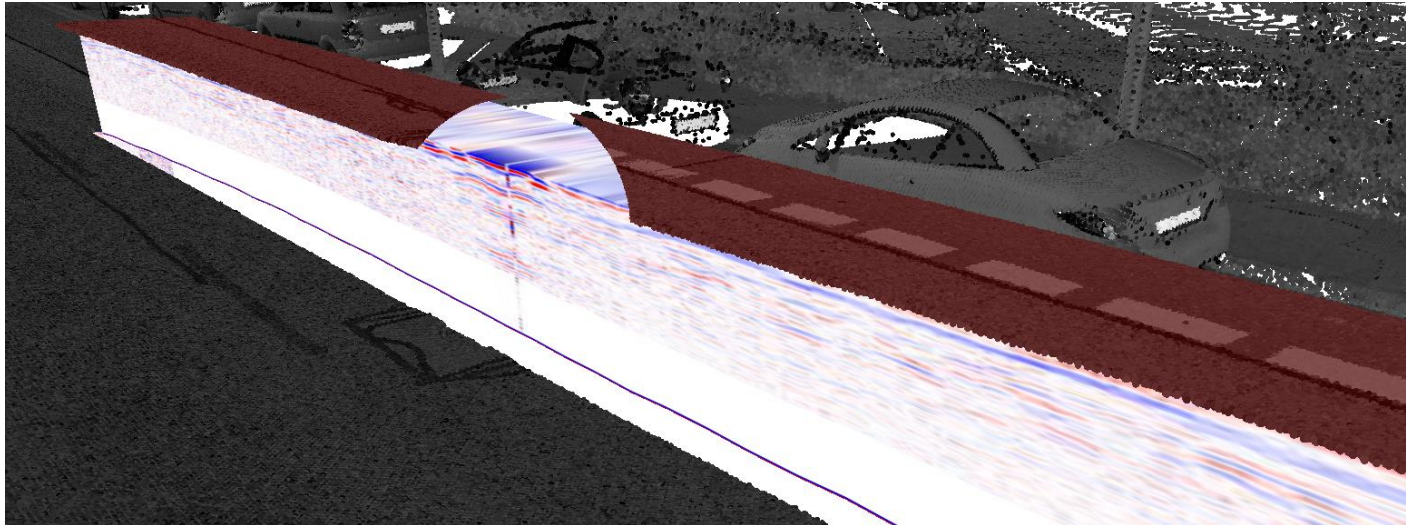
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Chart 4

Combined Visualization

- Place GPR B-Scans as cuboid into 3D point cloud environment
- Translate B-Scan and points located above for better visibility
- „Magic lens“ for data exploration in area of interest



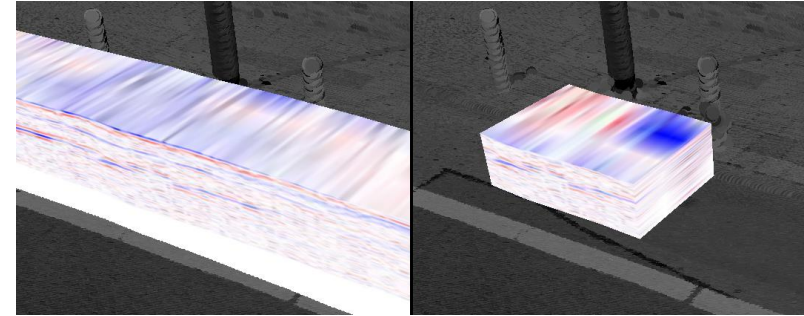
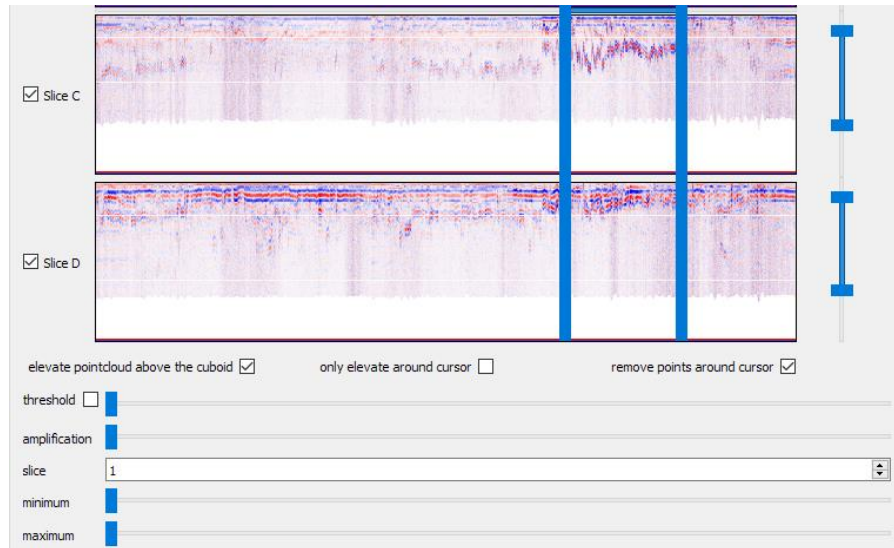
GPR in 3D Point Clouds

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Chart 5

Combined Visualization

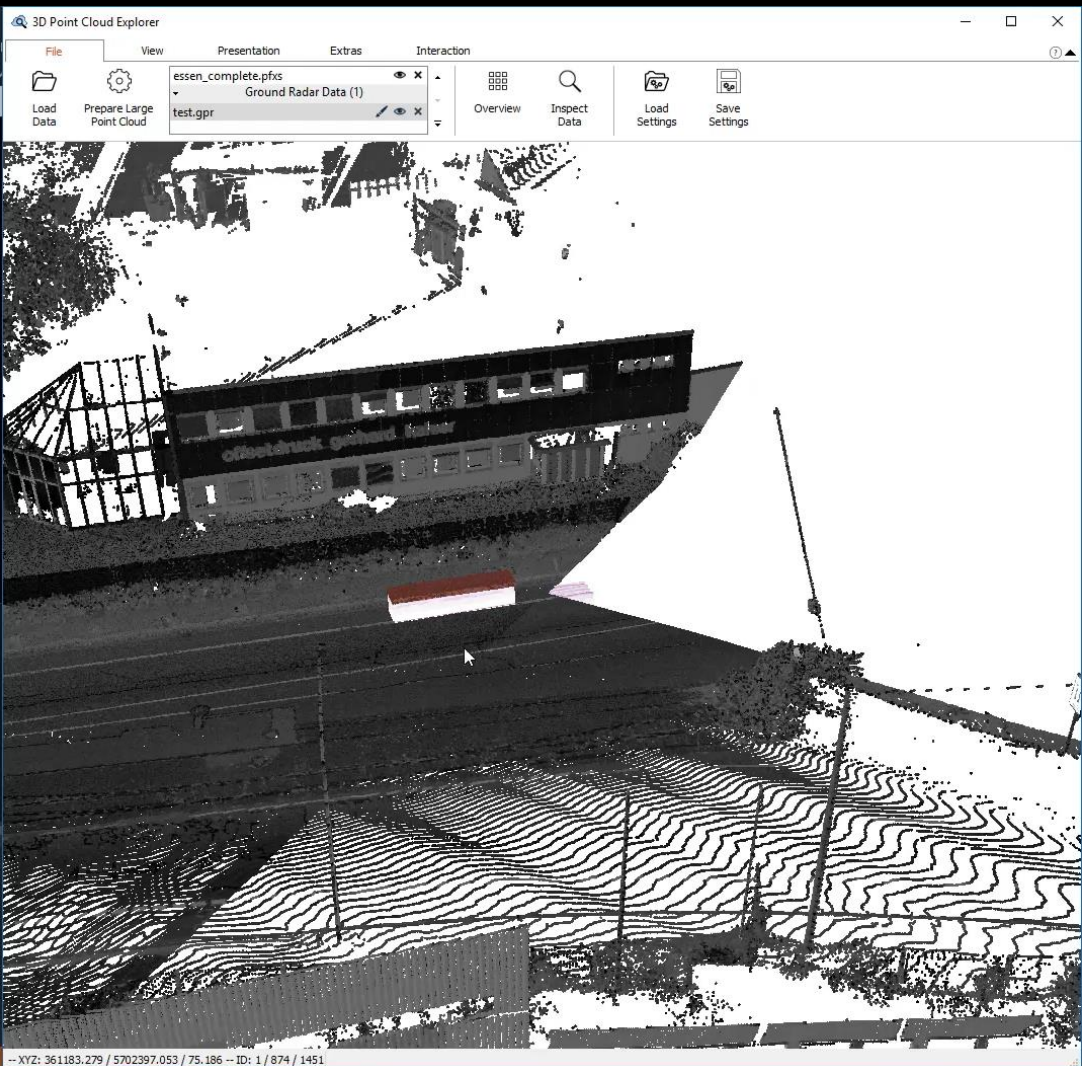
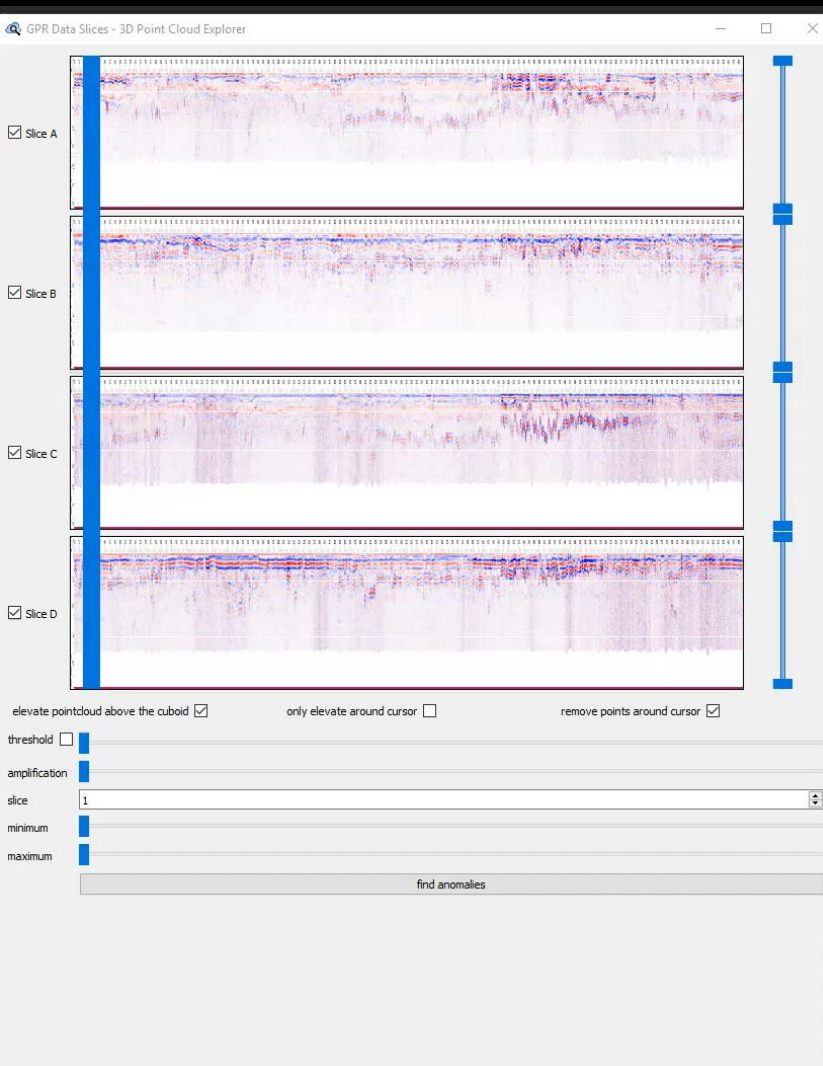
- Detail view for GPR data
- Slicing B-Scans to explore data inside the cuboid
- Threshold configuration for B-Scans



**GPR in 3D Point
Clouds**

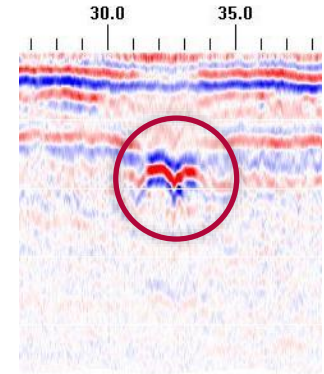
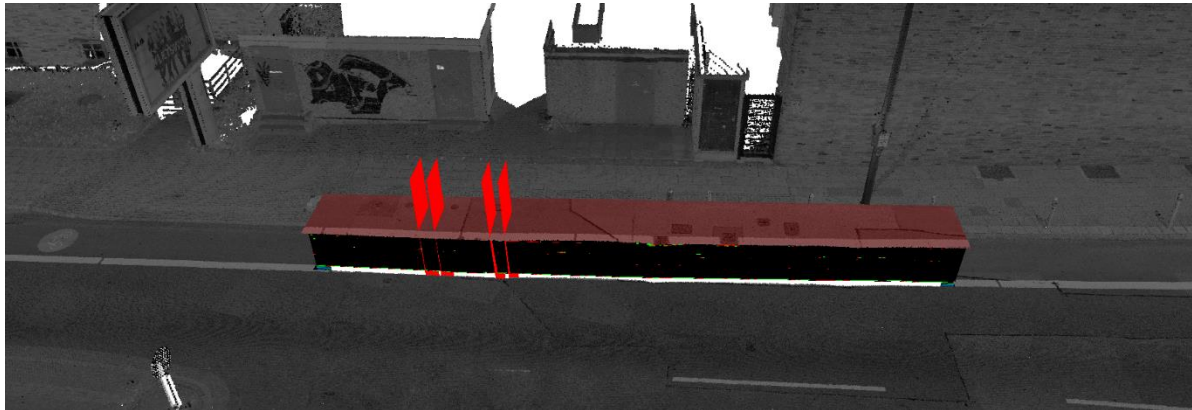
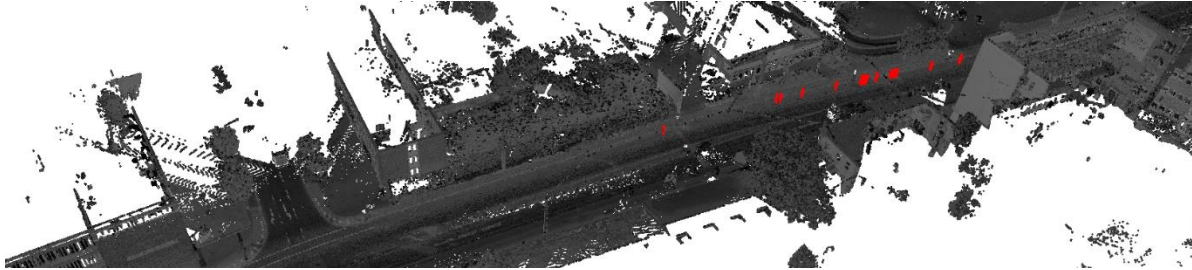
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Chart 6



Future Work: Anomaly Detection

- Automated detection and highlighting of irregularities in radar data



GPR in 3D Point Clouds

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Chart 8



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