

Topographic Database Using Airborne Laser Scanner Data

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INTERNATIONAL INSTITUTE FOR GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

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 - Laser data
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 - Densifying 2d map
 - Segmentation
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 - Surface modelling
- Results
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Introduction

Research project
3D Modelling
3D Acquisition

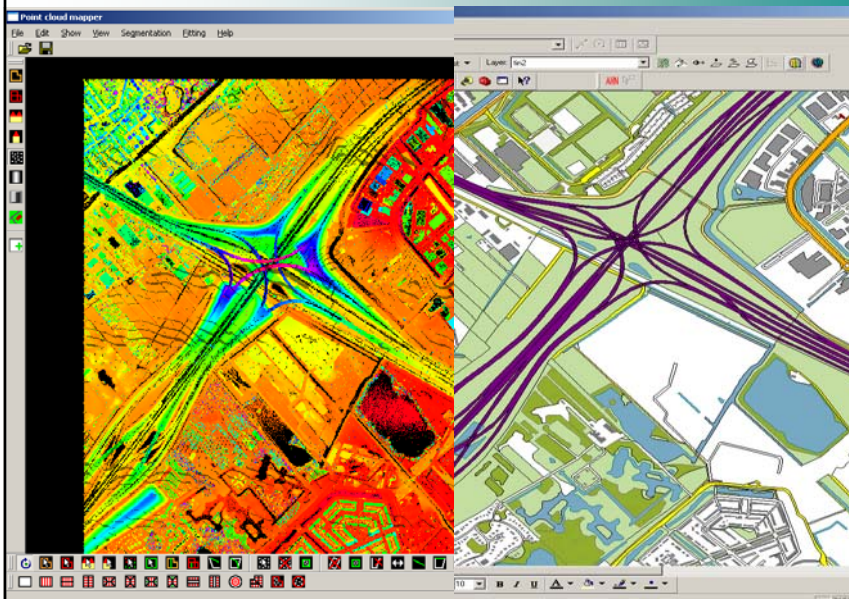
TU Delft: Oosterom,
Verbree, Penninga

ITC Enschede:
Vosselman,
Oude Elberink

- Growing demand
 - 3D data
 - Automated acquisition
- Data fusion: laser data + 2d map
- Now: focus on infrastructure



Data properties



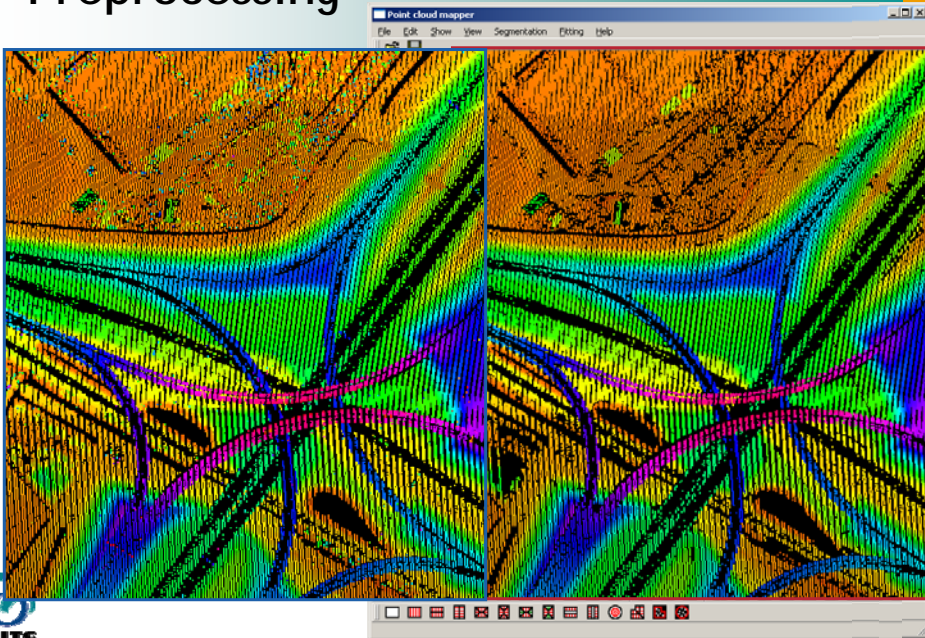
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Approach - overview

- Preprocessing data
 - Segment laser data
 - Densify map data
- Adding height to map points
 - Interpolate laser data
 - Detect multiple heights
 - Add semantics
- Reconstruct new 3D polygons
 - Multiple levels
- Adding heights to surfaces
 - Add laser data or knowledge

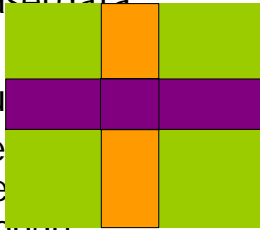


Preprocessing

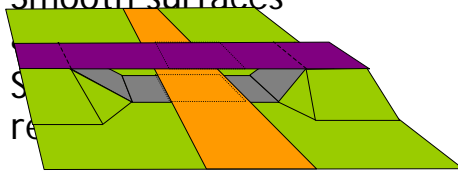


Preprocessing

- Laserdata
 - Su
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 - Hough
 - Smooth surfaces
 - S
 - re
- Topographic map
 - More map points needed in 3D



Interchange in 2D

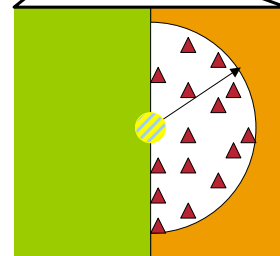
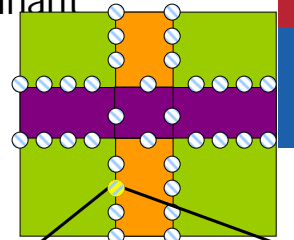


Interchange in 3D



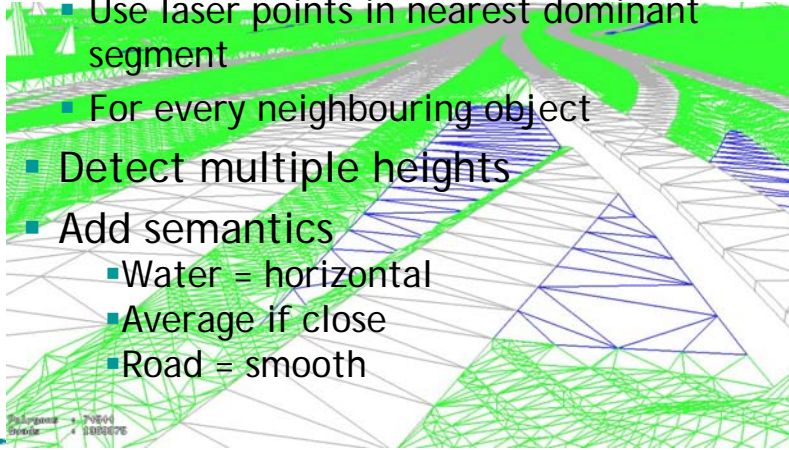
Adding height to map points

- Interpolation
 - Use laser points in nearest dominant segment
 - For every neighbouring object
- Detect multiple heights
- Add semantics
 - Water = horizontal
 - Average if close
 - Road = smooth



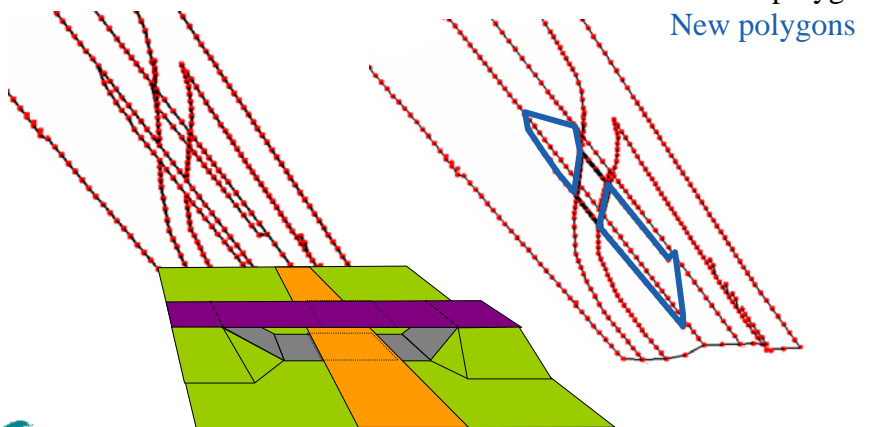
Adding height to map points

- Interpolation
 - Use laser points in nearest dominant segment
 - For every neighbouring object
- Detect multiple heights
- Add semantics
 - Water = horizontal
 - Average if close
 - Road = smooth



Reconstruct new polygons

- Multiple levels

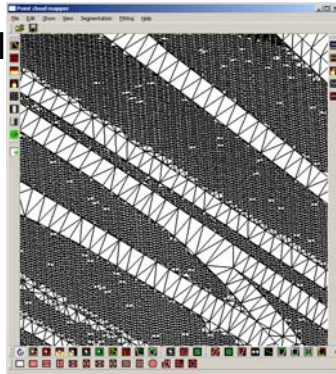


Interchange in 3D



Adding height to surfaces

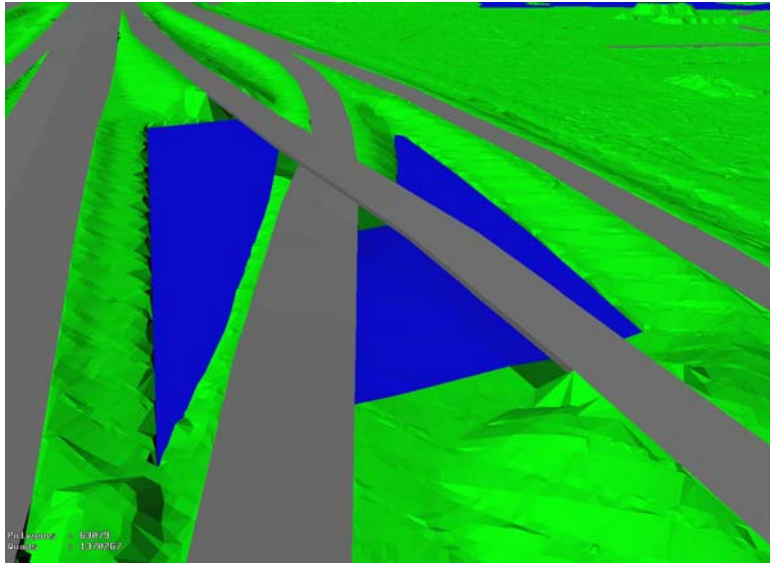
- Laser data
 - Add to meadow etc.
 - Perform morphological filtering near edges
- Modelling
 - Roads, buildings, water



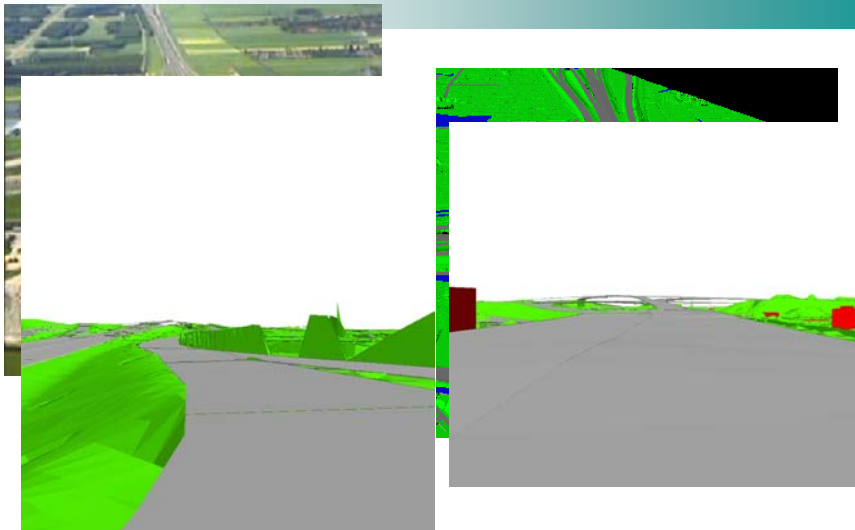
Results



Results

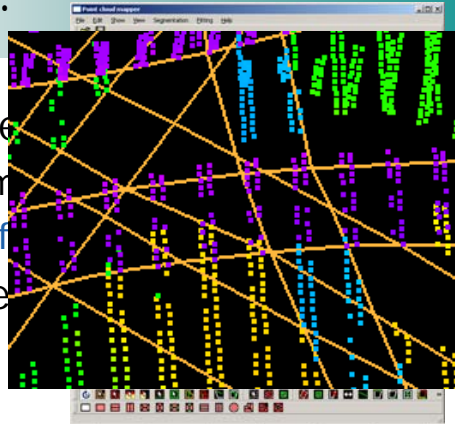


Results



At the moment...

- Adding knowledge
 - Merging road segments
 - Detect & correct f
- Preparing 4 prese



And the next moment...

- Building reconstruction
- Quality measures for 3D map



Conclusions

- Complex infrastructural objects can be reconstructed in 3D
- New polygons are created where needed
- Not yet correctly, or not yet automatically

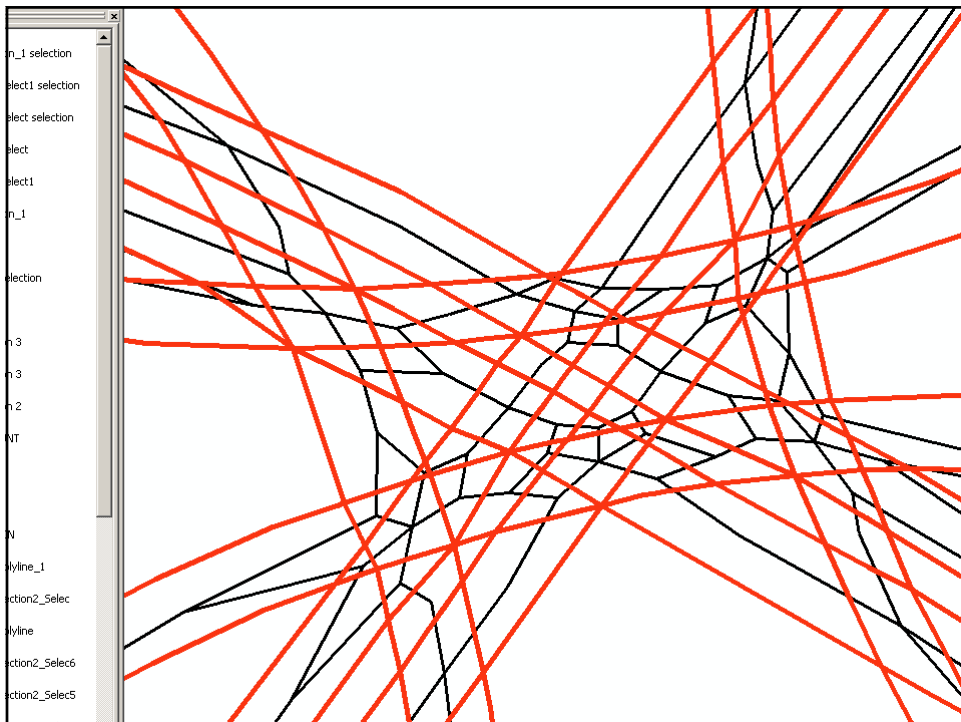


Thank you for your attention.

Questions?



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Extra slides

