3D buildings

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Contents

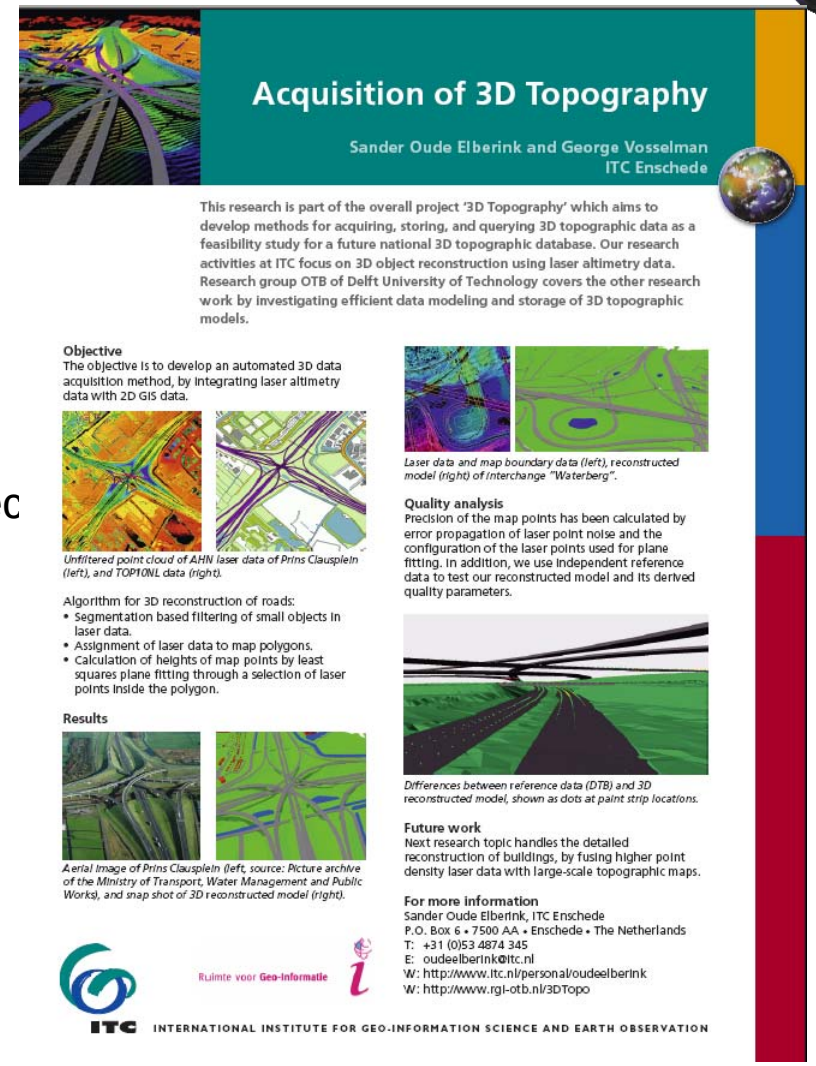
- Publications Nov 07- march 08
- 3D Enschede
- 2008 – 2009

Publications accepted

- 3D Geo-Info
  - **Oude Elberink, S**. (2008) Re - using laser scanner data in applications for 3D topography. *In: Advances in 3D geoinformation systems / ed. by ed. by P. van Oosterom, S. Zlatanova, F. Penninga and E. Fendel. Berlin : Springer, 2008. (Lecture Notes in Geoinformation and Cartography)* ISBN 978-3-540-72134-5 pp. 87-99.
- Photogrammetric Journal of Finland
  - "Quality Analysis of 3D Road Reconstruction“
  - Accepted with minor revisions, resubmitted February 2008
- ISPRS Congress (July 2008)
  - **Oude Elberink, S**., 2008. Problems in Automated Building Reconstruction based on Dense Airborne Laser Scanning Data. *International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences*, 37 (part 3A).
- GeoInformatics Magazine (March 2008)
  - Re-using laser data / Hergebruik van laseraltimetrie data

Publications

- VI Matrix (Februari 2008)
  - Poster + explanation 3D Acquistion
- Annual report ITC
- The Photogrammetric Record
  - 3D Reconstruction of infrastructural objec
  - In review phase
- GIS Magazine (July 2008)
  - Hergebruik van laseraltimetrie data



Acquisition of 3D Topography

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This research is part of the overall project '3D Topography' which aims to develop methods for acquiring, storing, and querying 3D topographic data as a feasibility study for a future national 3D topographic database. Our research activities at ITC focus on 3D object reconstruction using laser altimetry data. Research group OTB of Delft University of Technology covers the other research work by investigating efficient data modeling and storage of 3D topographic models.

Objective
The objective is to develop an automated 3D data acquisition method, by integrating laser altimetry data with 2D GIS data.

Unfiltered point cloud of AHN laser data of Prins Clausplein (left), and TOP10NL data (right).

Algorithm for 3D reconstruction of roads:
- Segmentation based filtering of small objects in laser data.
- Assignment of laser data to map polygons.
- Calculation of heights of map points by least squares plane fitting through a selection of laser points inside the polygon.

Results

Aerial image of Prins Clausplein (left, source: Picture archive of the Ministry of Transport, Water Management and Public Works), and snap shot of 3D reconstructed model (right).

Laser data and map boundary data (left), reconstructed model (right) of interchange "Waterberg".

Quality analysis
Precision of the map points has been calculated by error propagation of laser point noise and the configuration of the laser points used for plane fitting. In addition, we use independent reference data to test our reconstructed model and its derived quality parameters.

Differences between reference data (DTB) and 3D reconstructed model, shown as dots at paint strip locations.

Future work
Next research topic handles the detailed reconstruction of buildings, by fusing higher point density laser data with large-scale topographic maps.

For more information
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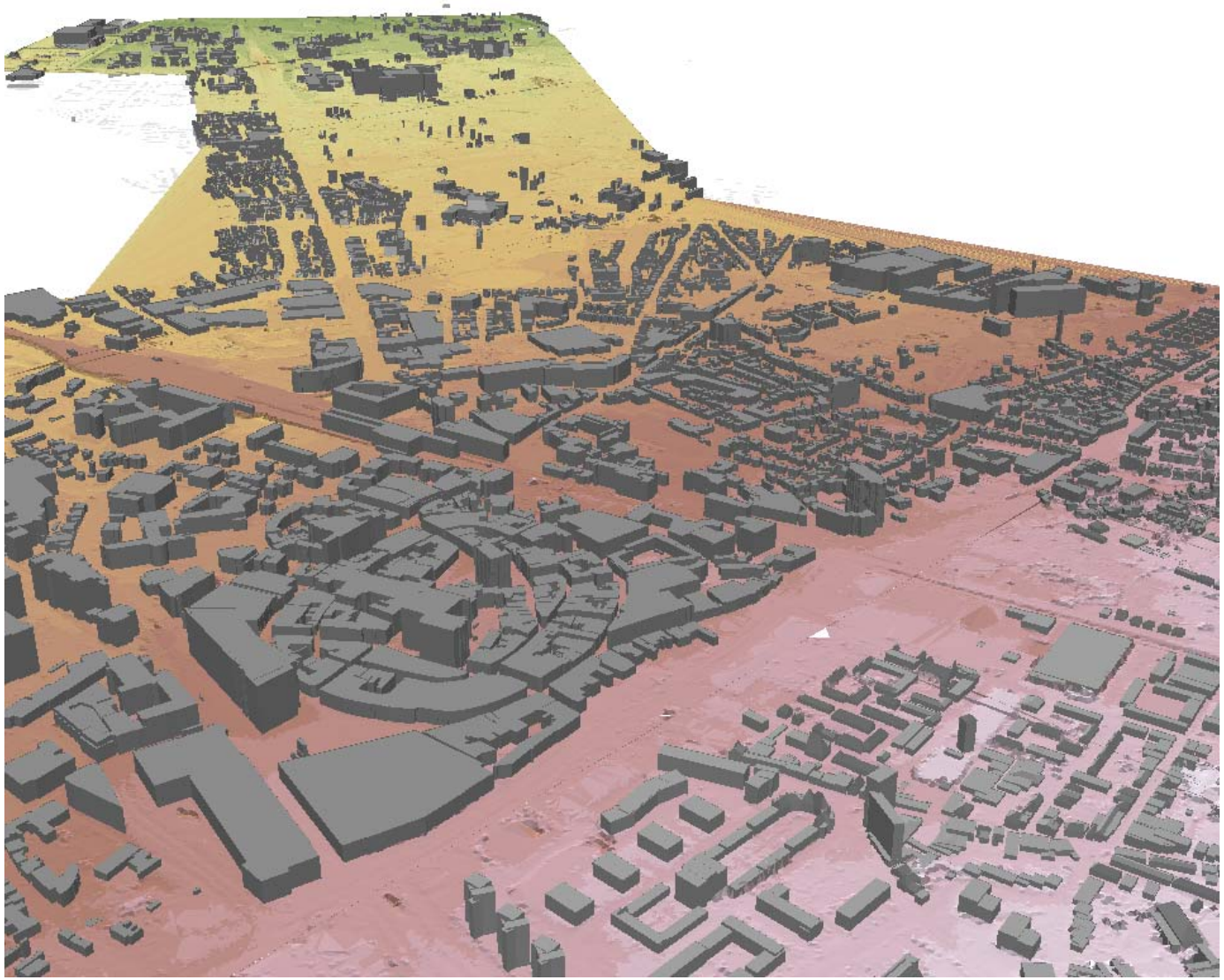
Ruimte voor Geo-Informatie

ITC INTERNATIONAL INSTITUTE FOR GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

3D Enschede (2.5D so far)



Level of Detail (acc. Kolbe/CityGML)

- LOD0 –Regional model
  - 2.5D Digital Terrain Model
- LOD1 –City/ Site model
  - “block model“ w/o roof structures
- LOD2 –City/ Site model
  - textured, differentiated roof structures
- LOD3 –City/ Site model
  - Detailed architecture model
- LOD4 –Interior model
  - “walkable“ architecture models

ITC

“Do you have … in 3D?”

- Interest from other’s:
  - Application departments within ITC
  - ITC Etalagemiddag (what ITC does for (local) governments)
  - Institute of Photogrammetry, Hannover (&asks for data PCP)
  - Students from UT (estimate # inhabitants using 3D geo-info)
  - Joris Bak, Hanneke van Giffen (HvU)