



virtualcitySYSTEMS  
The LandXplorer Integration Company

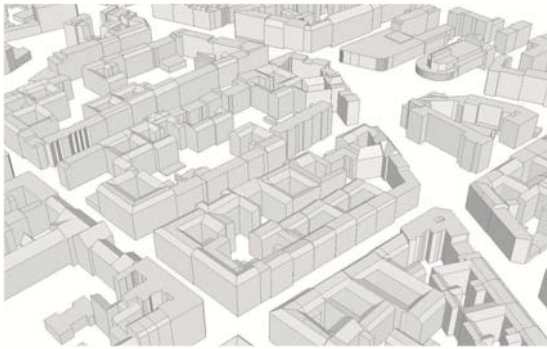


LIDAR Case study

## Building Reconstruction

### BERLIN

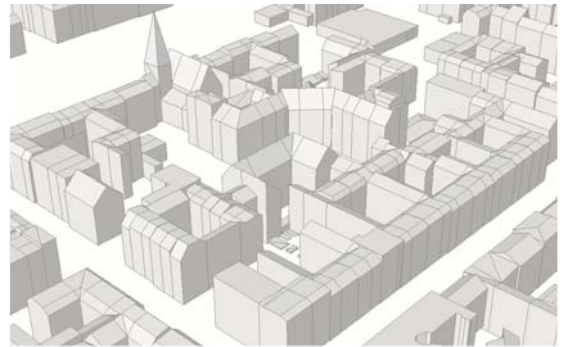
Client: Berlin Partner GmbH, 3D Geo GmbH, Autodesk® GmbH  
Industry: Government  
Total Project Area: 857 km<sup>2</sup>  
No. of Buildings: 474 000  
Project Duration: (East Berlin) March-July 2008 and  
(West Berlin) November 2008-February 2009



#### Project Summary

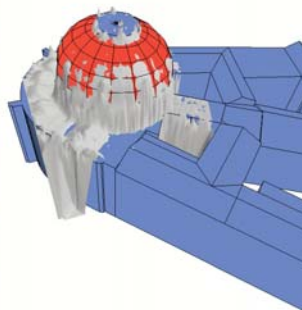
The first 3D building extraction for East Berlin was completed in 2008 using airborne LiDAR in order to update and improve the existing 3D city model in Google Earth. Due to time constraints and the sheer number of buildings, photogrammetry was quickly ruled out as an option. Secondly, the western section of Berlin also needed to be created in 3D in order to establish one comprehensive, fully textured 3D city model. The 3D model of Berlin is owned by Berlin Partner GmbH, which is charged with the economic development and promotion of the city both in Germany and abroad. Used as a

primary instrument for tourism, economic development and location marketing, all buildings had to be true-to-life in their geometric accuracy in order to create LoD3 buildings with individual façade textures.



#### Project Challenges

The extreme building density as well as narrow, crooked roof tops provided the biggest challenges to the project. One roof form in particular – the so-called “Berliner Roof” – necessitated additional programming in order for the software to perform automatic detection. In total, the software’s roof library was expanded from five basic forms to 20 standard roof types.





## Results

Over half million buildings have been extracted from the Berlin LiDAR data set. The resulting 3D Shapefiles contain geo-referenced geometry and attributes such as ridge and eaves heights. The project provided one significant improvement in software performance: the amount of manual editing required after automatic reconstruction to buildings in the inner city fell from 30% to 20%, while the editing to buildings at city limits and in the suburbs was reduced from 20% to 15%. Facade texture application was completed in cooperation with Autodesk®.



## Stewardship

Autodesk® and the Business Location Centre Berlin have now transferred responsibility for the ongoing maintenance and update of the Berlin 3D City Model to virtualcitySYSTEMS GmbH. Events such as the anniversary of the fall of the Berlin Wall as well as the annual Berlin Marathon will be showcased within the 3D city model.

English-language:

[www.3d-stadtmodell-berlin.de/3d/en/seiteo.jsp](http://www.3d-stadtmodell-berlin.de/3d/en/seiteo.jsp)



## Project Input Data

The following data was processed using BuildingReconstruction software:

- Digital terrain model, at 1 point per sq. meter density (1ppm)
- Digital surface model, at 4 points per sq. meter density (4ppm)
- Building footprints
- Digital Orthophoto (10 cm resolution)
- Approx. 100,000 unique oblique aerial images

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