

# Virtual 3D City Model of Berlin



## LandXplorer Studio Used as 3D Authoring and Presentation System

### ABOUT THE PROJECT

Within the project “3D City Model of Berlin” of the Senate Department of Economics, Labour and Women’s Issues and the Senate Department of Urban Development, the 3D Geo GmbH was ordered to integrate LandXplorer Studio as 3D authoring and presentation system into the newly developing 3D geodata infrastructure of the Business Location Center, which provides companies and investors with one-stop firsthand information in multimedia form.

LandXplorer was chosen as the best product as a result of a call for tenders in the domain of virtual 3d city model systems. The software was customized by a bi-directional interface and was so extended to cope with the central 3D database of the Berlin Partner GmbH.

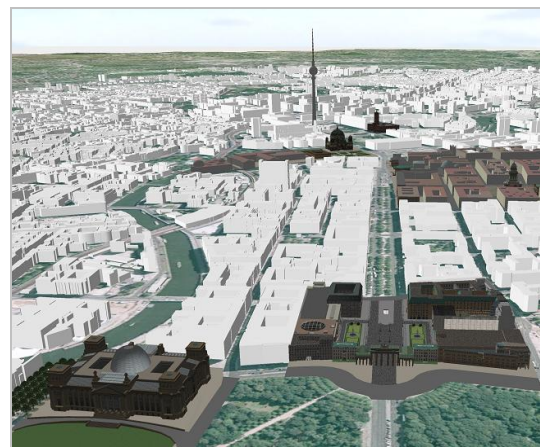


Example of high-detail models of buildings and street areas. The image shows the area of the Brandenburger Tor, Pariser Platz, and “Unter den Linden”.

### TASKS

The virtual 3D city model of Berlin acts as a complex geoinformation space, integrating and linking spatial data taken from the Berlin Partner GmbH, the administrations of Berlin, and from private geodata sources. The gained information space can be interactively communicated to potential investors, to companies, to politicians, and to the general

public. This way, an effective access to a large, heterogeneous geo-referenced data portfolio has been obtained and a never reached level of the interactive presentation and communication of city spatial information becomes possible.



City area showing LOD 1, 2, 3, and 4 building models as well as aerial photograph.

### STANDARDS

The LandXplorer system is optimized for handling large and very large amounts of geodata that occur in all “real-world-applications”, as for example in the case of aerial photographs having 500 GB or containing more than 150,000 building models. The system offers full support for 3D basic data generated by laser-scan 3D data (LIDAR) and photogram metric methods.

An open design of the LandXplorer interfaces based on first international standards for virtual 3D city models in form of GML and CityGML make it possible to export the digital contents of the virtual 3D city model Berlin in a format transparent way as well as to import 2D/3D geodata and 2D/3D computer graphics data. The functionality is complemented by the digital right management (DRM) for geodata that offers different distribution and business models.

### PROJECT REQUIREMENTS

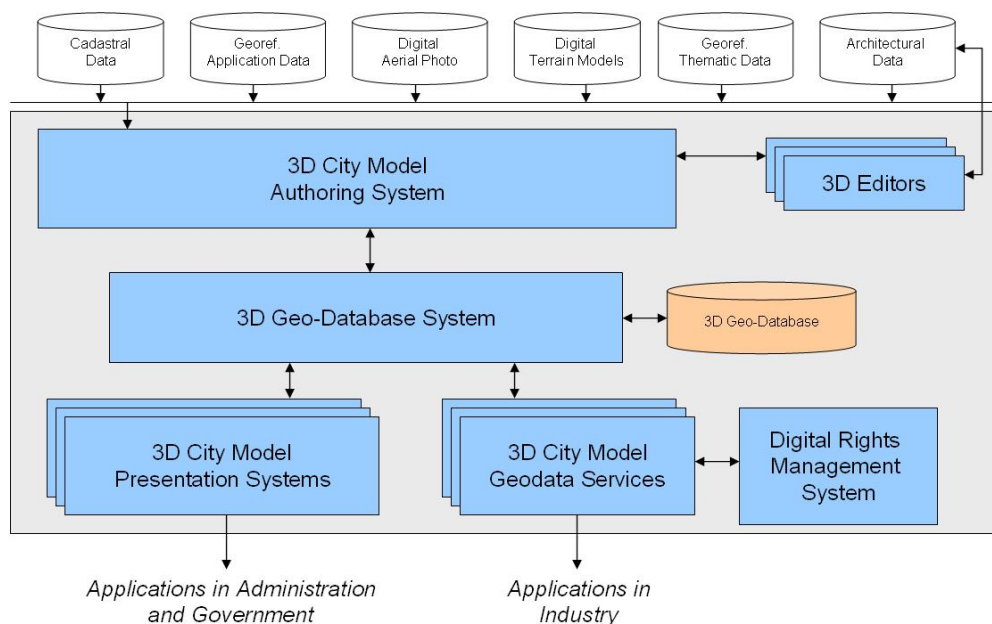
- Integration of official and up-to-date 2D- and 3D geodata.
- Object-orientated modelling and integration of geodata.
- Large collection of functions for illustrating the content of city models in different media (incl. video, DVD, internet).
- Universal applicability in digital tasks, products, and services.
- Flexible configuration of the data portfolio for specific use in administration and economics.
- Expandable data portfolio to detailed models and model alternatives.
- Incorporation of the existing 3D city model "Planwerk Innenstadt".
- Platform for the unified and consolidated portfolio of urban geoinformation, particularly of the Berlin administration.

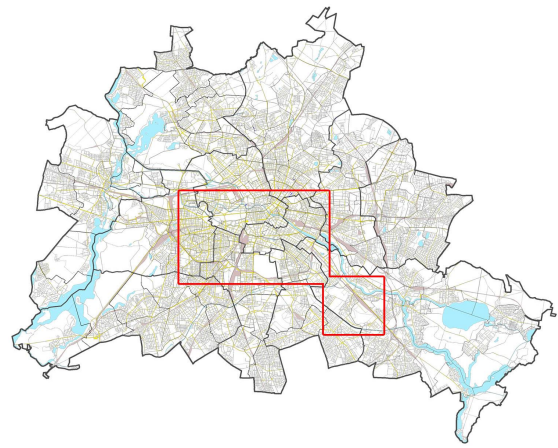
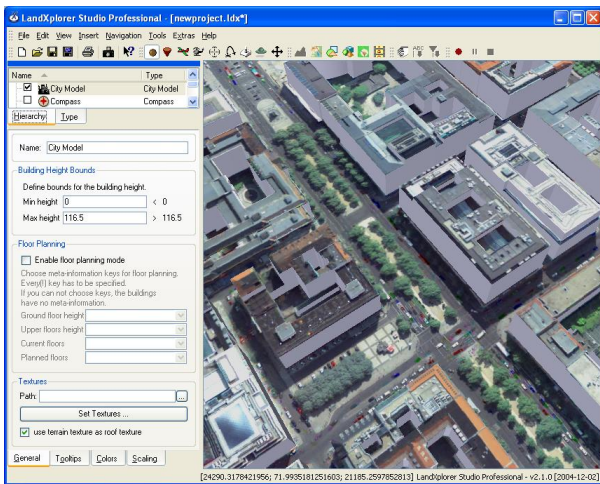
### FUNDAMENTAL DATA

- **ALK Cadastral Database:** The cadastral database ("ALK") offers the official 2D footprints as well as additional thematic information for each building.
- **CAD Models:** For specific planning areas of the city as well as for important elements of the city scape, CAD and 3D architecture models with a high level of details are available.
- **Aerial Photography:** For the core of the city area, high-resolution orthogonal aerial photography is available, complemented by lower-resolution aerial photography for the periphery.
- **Terrain Models:** For the core of the city area, a high-resolution, grid-based 3D digital terrain model is available.

### SYSTEM COMPONENTS OF THE BERLIN SYSTEM

- **3D Database System:** It administrates the components of the city model and offers an SQL interface. The database scheme orientates on CityGML, an OGC-Standard for virtual 3D city models that is still in development. Its implementation is based on Oracle 10g.
- **City Model Authoring System:** Supports the creation, composition, and maintenance of city model objects. As a real-time 3D application it offers an interactive access to the complete city model database used by experts. Its implementation is based on LandXplorer Studio.
- **City Model Editors:** With these tools building and environment models are geometrically constructed and edited. It is particularly used by the architecture working group of the Senate Department of Urban Planning. Enhanced editor systems for geometric modelling can be integrated as well.
- **BLC Presentation System:** Presents and interactively explores the Berlin 3D model. This system offers functions for demonstrating, animating, exploring, and analyzing city model information. Its implementation is based on LandXplorer Studio.
- **City Model Geodata Services:** They access the city model via standardized web services and newly developed 3D web serves; they can be customized to specific user and application requirements.





## BUILDING MODELS

- **LOD-0:** Regional Model. Representation in 2 ½ D, with the additional 3D landmarks.
- **LOD-1:** Block Model. Representation in 3D, but with a generalized geometry.
- **LOD-2:** Geometric Model. Representation in 3D with detailed geometry and textures.
- **LOD-3:** Architecture Model. Representation in 3D with complete, precise geometry and textures.
- **LOD-4:** Interior Model. Same as LOD-3 with indoor structures and interior objects.

## SUPPORTED DATA CATEGORIES

- **Geo-Referenced Raster Data:** Additional information layers projected onto the terrain model.
- **Geo-Referenced Vector Data:** ESRI Shapefiles, Excel tables, as additional information layer or represented as 3D objects.
- **Geo-Referenced 2D- and 3D Objects:** e.g. 3DS, X3D or VRML objects.
- **CityGML:** standard format for virtual 3D city models.

## AVAILABILITY AND FUTURE ACCESS

- Access through SQL-database grasping (2005)
- Access through standard formats (2005)
- Access through OGC Web Services (2006)
- Access through specialised, company- and application-specific services.
- Main focus on the 3D geo-modelling in the inner-city area and further exterior areas.

## APPLICATION AREAS

- Urban Planning, Architecture
- Entertainment, Event Marketing
- City Information, Tourism
- Real-Estate, Location Marketing
- Energy Supply Industry
- Geo-Information Industry
- Transportation & Telematics
- Environment & Disaster Management
- Homeland Defence
- Telecommunications
- Location-Based Services
- Geosciences

## CONTACT

### Berlin Partner GmbH

Mrs. Karin Teichmann  
Ludwig Erhard Haus  
Fasanenstraße 85  
10623 Berlin  
Fon: +49 30 39980-0  
Fax: +49 30 39980-239  
www.berlin-partner.de

### 3D Geo GmbH

Mr. Marc Hildebrandt  
Foersterstr. 3  
14482 Potsdam  
Fon: +49 0331 70444 37  
Fax: +49 0331 70444 39  
www.3dgeo.de