Multidimensional Cadastral System in Germany

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TS08C - GIS, 3D Data and Cadastre Multidimensional Cadastral System in Germany
Content

- About my home place
- Efforts on 2D level
- Efforts on 3D level
- Efforts on 4D level
- Conclusions
Germany
82 Mio. inhabitants
0.35 Mio. km²

64 Mio. cadastral parcels
[5 trillion (10^{12}) EUR]

40 Mio. buildings

Bavaria
70 550 km² (=20% of Germany)
12 Mio. inhabitants
Official Cadastre in Germany

Responsibility: 16 German States (Länder) – independent in cadastre issues –

Structure

<table>
<thead>
<tr>
<th>Structure</th>
<th>16 Surveying, Mapping and Cadastral Authorities</th>
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<tbody>
<tr>
<td></td>
<td>plus 255 Regional Authorities</td>
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<tr>
<td></td>
<td>plus 1523 Licensed Surveyors</td>
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<td>(in all German states except Bavaria)</td>
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Cadastral Specialists in total

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<tr>
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<th>33 000 (Germany)</th>
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<tr>
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<td>2 900 (Bavaria)</td>
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The Development of the cadastre, the global context

The development of the cadastre

- SDI
- data integration
- digitalization
- multi purpose
- property
- taxation

1800 1900 1980 2015
Fit for purpose?

First cadastral survey of the year 1872

residential area

rural area
Efforts on 2D Level

ALK
Automated Real Estate Map

ALB
Automated Cadastral Register

ALKIS
Integrated modeling: triple-A Model

ATKIS
Official Topographic and Cartographic Information System

AFIS
Geodetic Reference Points
3D Cadastre in Germany

- Cadastral law: Cadastral information should be improved and developed by taking into account the requirements of the public users and the possibilities of the technology.
- There is a need for a nation wide harmonised dataset for the third dimension (building height, DTM).
- A real 3D cadastre is currently not necessary since there are practical solution which are properly working.
- The possibilities (benefits) of capturing rights and restrictions on parcels are currently evaluated.
Ongoing Discussion:
Is a 3D Cadastre really needed?
Efforts on 3D Level

3D-Models of Buildings
...as geographic core data in Germany

to be done by private surveyors

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<tr>
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<th>LoD0</th>
<th>LoD1</th>
<th>LoD2</th>
<th>LoD3</th>
<th>LoD4</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>2.5D Geländemodell</td>
<td>Klötzenmodell</td>
<td>Standarddachformen</td>
<td>Reale Dachform</td>
<td>Modell von Innen- und Außenraum</td>
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- **finished**
- **some states (e.g. Bavaria): finished**
- **work in progress**
- **others: until 2016**
New in Germany: 3D buildings
(exported to GoogleEarth)
Versioning rules:
• major changes of attributes cause the „deletion“ of the object; the deleted object remains in the data base
• minor changes of attributes cause a new version
• no structural differences between current and historical data
• conceptually:
  • object „container“ holding all versions, one ID for one object
  • each version carries ID and life cycle information
- Incremental update information directly out of the database.
- Information extraction for ANY time stamp or time frame possible (the current date is only a specific case).
- Serves data delivery and allows the management of historical information.
Benefits of the time component in cadastral information systems

- Enquiries about the development of a parcel in case of disputes
- Monitoring the development of cities and villages over time
- Statistical of changes of land use and land cover
- Planning purposes
- Historical archiving
- Monitoring of cultural heritage.
Conclusions

- Big efforts have been done to evolve the cadastre in Germany to be part of a SDI as a multi-purpose cadastre.
- Modern GIS technology is up and running in cadastral offices.
- There is a great demand for 3D data but not yet for 3D cadastre information.
- The fourth dimension is already implemented for differential updating of user systems; the technology can be also used for storing and providing historical information.
- Short:
  - 2D ✓
  - 3D ✓
  - 4D ✓
  - 5D ???
For more information see
www.adv-online.de

Thank you for your attention!

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