swissTLM$^{3D}$

the three-dimensional Topographic Landscape Model of Switzerland

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Contents

• TLM

• Production process

• Products / Applications

• Conclusions
the basic landscape model of Switzerland contains natural and artificial objects, names and administrative boundaries in vector format.

The most accurate and comprehensive 3D vector data set of Switzerland is a countrywide homogenous data set reference for a variety of thematic data sets for the basis for map production.

Bundesamt für Landestopografie swisstopo
11.-13.11.2010
swissTLM$^{3D}$ = GIS data set
TLM ... 
... a 3D GIS dataset
TLM …
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TLM ...
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TLM ...
... a 3D GIS dataset
TLM ...
... a 3D GIS dataset
Production chain (until 2008)

From 3D to 2D

analog -> digital -> analog -> digital

1:10’000 -> 1:25’000

until 4 years

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Need for new technology

- Updating of vector data was done decentralized based on printed maps.

- Old technology and methodology was not adaptive.

- Need for up-to-date and centralized data.
New design of production chain

Dataintegration
- Cadastre
- Foreign organisations
- Federal Offices
- Cantonal Offices
- Railway companies

GIS data sets for
- Federal Offices
- Cantonal Offices
- Cadastre
- Private users
- Commercial users

Datacapturing
- Digital Photogrammetry
- Remote Sensing
- Verification on site with mobil GIS

Map production
New Infrastructur • TOPGIS
• Hard- and software für TLM und DTM • Joins GIS und digital photogrammetry.
• One digital production chain from image acquisition to data export.
• No interfaces, data capture directly in data base • Rule-based data capture (error omission at the early beginning)
• Not bound to one data model (e.g. TLM).
• Facilitates up to 50 concurrent users.
Continuous updating ≠ single data production
Updating and replacement of system

- 2D
- 1:25’000
- 3-10m
- Cartographic generalised
- LV03

- 3D
- 1:5’000 – 1:10’000
- < 1m
- Original captured geometry
- LV95
Updating and replacement of system

1. Migration VEC25 to TLM
   • Model transformation
   • Model transformation
   • 3rd dimension from DTM

2. Composition TLM (1:25'000 > 1:5'000)
   • De-generalisation
   • De-generalisation
   • Desification

3. Simultanous updating for (analogue) map production

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First approximation for 3rd dimension 2D vector data (VEC25) and DTM/DSM.

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geoprotecta 14.11.08 – 15.11.08
Impact of model transformation

Question: What have these roads got in common?
Answer: everything or nothing (depends on DM used!)

- 2m road with steps, hard surface & circulation restriction
- 3m road with hard surface and traffic barrier
- 2m road & 3m road both with hard surface & circ. restriction
- 1m road with natural surface, traffic restriction, hiking route
- 4m road with steps and total traffic restriction
Geometric «de-generalisation»
Geometric «de-generalisation»
Geometric «de-generalisation»
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Geometric «de-generalisation»
Geometric «de-generalisation»
Densification
Densification
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- Urban an regional planning
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- Education
- Culture
- Insurance
- Health service
- Military
- Security
- Civil protection
- Supply and disposal management
- ....
Visualisation
Meteorology
Navigation
Real estate management
Hydrography
Solar Cadastre

www.berneck.ch
Analysis on noise pollution
Disaster management
Brienz, Glyssibach, 2005
Climate change
Example: Gauligletscher

- Innertkirchen (BE)
- length: 6.80 km
- altitude: 2'140 – 3'600 m
- area: 13.70 km²
2011

Change detection : 2012 - 2011

2012
3D Print
Conclusions

• **swissTLM 3D** is the basic landscape model of Switzerland.

• Reliable 3D data at high quality.

• Countrywide homogenous data set.

• Reference for a variety of thematic data sets.

• Basis for map production.

• A national infrastructure.

• Migration from a cartographic to a landscape model means rebuilding everything.