An Overview of current ESRI – swisstopo Projects

ESRI Czech User Conference – Prague – October 22, 2009

Stefan Kappeler, ESRI Schweiz AG
Outline

- Cartography – general production workflow
- Map production at swisstopo
  - TOPGIS
    - (Topographic Geographic Information System)
  - Genius-DB
    - (Cartographic Production System)
- Discussion
GIS vs Cartography

GIS
- Geography in a computer
- Database & data models, features with attributes
- Data combination and analysis
- Maps as thematic visual reports

Cartography
- Map as a communication medium
- Clarity and presentation are as important as content
- Consistency of style is important …
- … but freedom of expression is vital
- ‘Map’ is result of ‘author’s execution of choices’ (ICA)
ESRI has a Complete Cartography Solution

- Database for master data and derived products
- Cartographic Representations
- Prioritised drawing order (symbol level drawing)
- Masking (selective erase)
- Generalization (simplify for smaller scales)*
- Layouts, legends, furniture
- Text placement – Maplex
- Production Line Tool Set – PLTS
- ArcGIS Online to provide Cartographic bases*

* Not implemented at swisstopo
Map Production Workflow at swisstopo

TOPGIS – Topographic Geographic Information System
Genius-DB – Cartographic Production System
Production Process (1/2)

Previous process for collecting vector data

Topographic Data Collection → Map Production → 1:25'000 Map

VECTOR25

New process for collecting vector data

Topographic Data Collection → TLM → Products
Production Process (2/2)

- Change of production workflow
  - Topographic Landscape Model (TLM)
  - Digital Cartographic Models (DCM)

- Core projects
  - TOPGIS (Production of TLM)
  - Genius-DB (Cartography)
TOPGIS Data Flow
System Architecture

2D Desktop Clients
- Customization
- ArcGIS Extensions
- ArcGIS Desktop

3D Desktop Clients
- Customization
- ArcGIS Extensions
- ArcGIS Desktop

Mobile Field Clients
- Customization
- ArcGIS Extensions
- ArcGIS Desktop

Web Clients
- Web Browser
- CartoWeb

ArcGIS Image Server

DataHub
- Customization
- ArcGIS Server
- FME Server

Ortho Imagery
- Oriented ADS40 Images

Geodatabases File System
- TLM
- DTM-TLM
- DCM
- VEC200
Double flat screens with ArcGIS + TOPGIS tools

Stereo screen with Stereo Analyst for ArcGIS + TOPGIS tools

11 button 3D mouse
3D Editing

- Buildings
- Roads, Railroads
- Waterbodies
- DTM
2.5D Editing

- Land cover
- Hiking trails
- Routes

Administrative boundaries
Point objects
Workflows: TOPGIS Navigator
Consistent handling of z-values in 2.5D

- Z Capture Environment
- Edit Tools
- Object Categories
- Snap Settings
- Change Management Attributes
Productivity: Attribute Editor (1/2)

<table>
<thead>
<tr>
<th>Objektart</th>
<th>4m Strasse</th>
<th>Object-ID</th>
<th>739207</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kunstbaute</td>
<td>keine</td>
<td>Stufe</td>
<td>0</td>
</tr>
<tr>
<td>Belagsart</td>
<td>Hart</td>
<td>Kreisel</td>
<td>&lt;Null&gt;</td>
</tr>
<tr>
<td>Richtungsgest.</td>
<td>&lt;Null&gt;</td>
<td>Anzahl Streifen</td>
<td>&lt;Null&gt;</td>
</tr>
<tr>
<td>Radstreifen</td>
<td>Kein</td>
<td>Trottoir</td>
<td>&lt;Null&gt;</td>
</tr>
<tr>
<td>Minimalbreite</td>
<td>2000</td>
<td>Pannenstreifen</td>
<td>&lt;Null&gt;</td>
</tr>
<tr>
<td>Verk.-Beschr.</td>
<td>Wohnstrasse</td>
<td>Einbahn</td>
<td>&lt;Null&gt;</td>
</tr>
<tr>
<td>Befahrbarkeit</td>
<td>k_W</td>
<td>Eröffnung</td>
<td>03.03.1903</td>
</tr>
<tr>
<td>Eigentümer</td>
<td>&lt;Null&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Productivity: Attribute Editor (2/2)
TLM Data Example
Cartographic Production Systems Project

Genius-DB
Data management, WYSIWYG, interactive editing

(ESRI)

DCM300

VEC200\textsuperscript{Carto}

DCM25

TLM\textsuperscript{25}

SysDab
Cartographic Generalization
(non-ESRI)

VECTOR200

TLM
Genius-DB Workflow

- production planning
- activate work unit
- import generalized data
- edit vector data
- edit border elements
- create map sheet
Genius-DB Symbolization

- Replace or omit sections of polygon outlines (Forests)
- Orient polygon fill symbols (Orchards)
- Adjust line patterns
Genius-DB Edittools
Genius-DB Carto Process One-Klick Tools

- Open Carto Process Chooser
- Adjust Alignments
- Calculate Control Points
- Create Annotations
- Create Masks
- Create Under- and Overpass Masks
- Create Escarpment Symbology
- Adjust Roundabout Symbology
- Adjust Line Caps
- Adjust Line Transitions
- Calculate Substitute Symbology
Create Roundabout Symbology

Roundabout point <14m

Roundabout line >14m

© swisstopo 2009
Create Over- and Underpass Masks
Create Escarpment Symbology
Create Substitute Symbology
Create Annotations
Create Annotation Masks
GeniusDB QA Toolbar (1/2)

- Fast
  - Optimized for large data volume
- Flexible
  - Configurable in Genius Data Dictionary
  - Extensible
- During work / Before integrating data into seamless DKM
- Test types
  - Geometry
  - Attribute
  - Topology
  - Network connectivity
  - Graphic conflict
GeniusDB QA Toolbar (2/2)
Summary

Complete Data Capture and Mapping Workflow for NMAs
- TOPGIS
- Genius-DB

Components from TOPGIS and Genius-DB
- System allows up to 50 concurrent users
- One-Click Edit-Tools
- High end Quality Assurance Framework
- Attribute-Editor
- Seamless integrated Field Data Collection Workflow

Customer Value
- Efficient Production $\rightarrow$ Saves time and reduces costs
- Many concurrent users $\rightarrow$ Products are up-to-date
- High performance quality tests for large datasets
Topographic Map of Switzerland

Thank you!