Modern Cartography at BEV

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BEV – Bundesamt für Eich- und Vermessungswesen

Content

- **New analogue und digital Products**
  - **The new official map series**
  - **AMap mobile**
  - **International datasets**

- **Current Developments**
  - **Deriving KM50-V automatically**
  - **Modification of production environment**

- **Possible Products and Services**

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Kartographische **M**odelle

**structured
digital
availability
of
map content**

↓

*Raster data,
Vektor data*
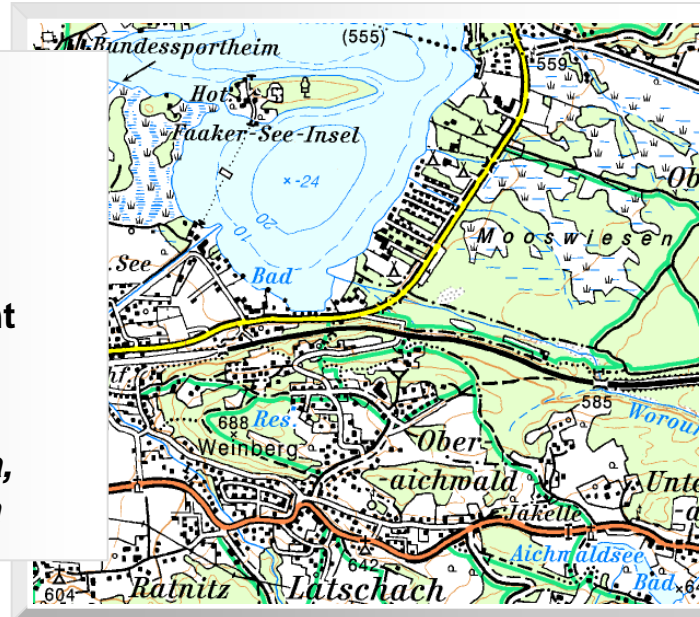
KM50-R (KM50-V)

KM200-R

KM250-V

KM500-V (KM500-R)

Cartographic
Models
are
Scale dependent!

Digital provision in BEV Geoportal
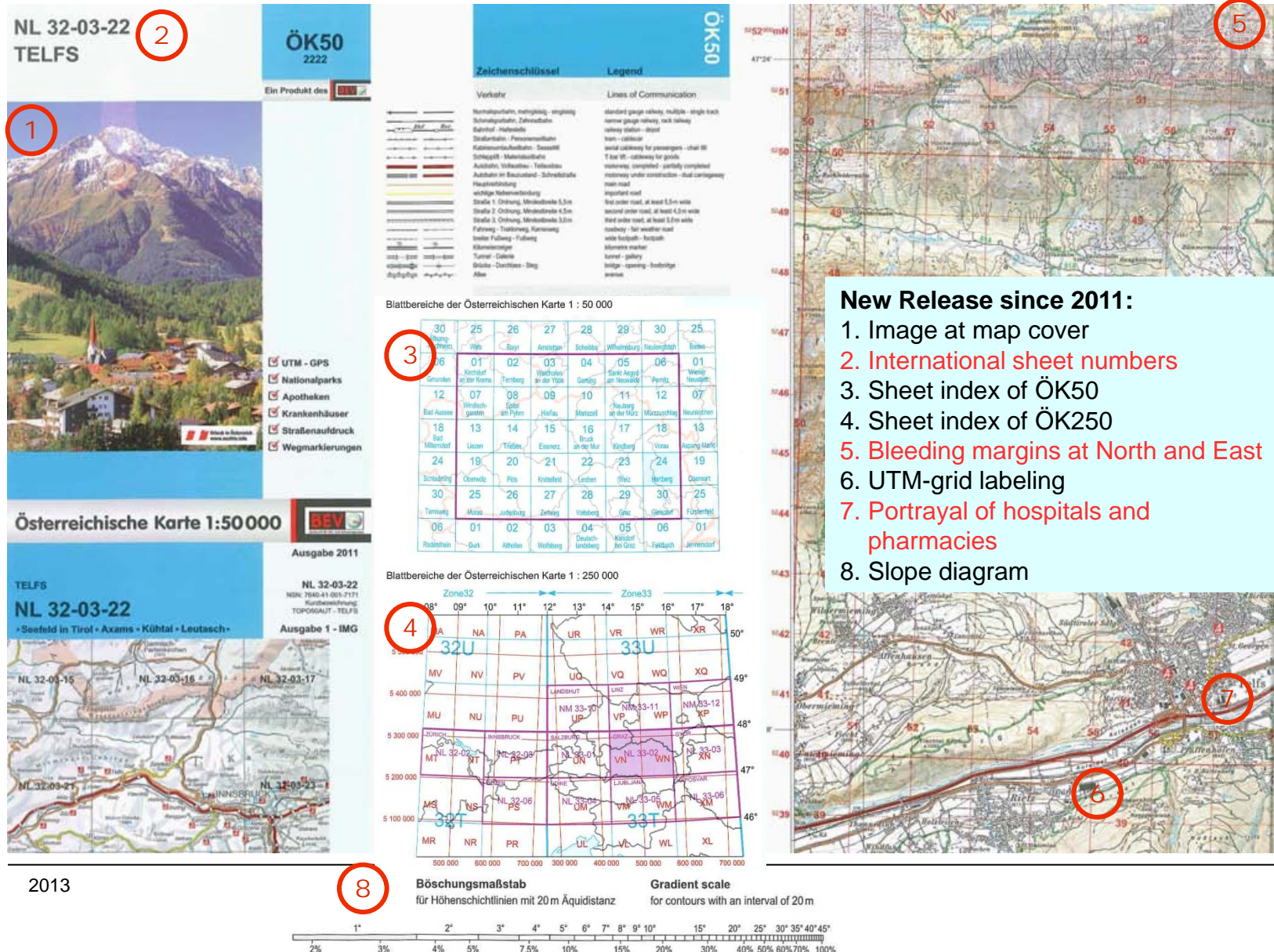
Analogue map series since 2011

- ÖK25V   enlargement of ÖK50
- ÖK50   basic map series   civilian-military
- ~~ÖK200   map series of provinces~~   abandoned
- ÖK250   medium scale map series   civilian-military
- ÖK500   small scale map   civilian-military
- region maps 1: 50 000, 1: 25 000

**civilian - military maps for
national crisis and disaster management**

New civilian-military release of ÖK50

New Release since 2011:
1. Image at map cover
2. International sheet numbers
3. Sheet index of ÖK50
4. Sheet index of ÖK250
5. Bleeding margins at North and East
6. UTM-grid labeling
7. Portrayal of hospitals and pharmacies
8. Slope diagram

2013

6

New civilian-military release of ÖK250
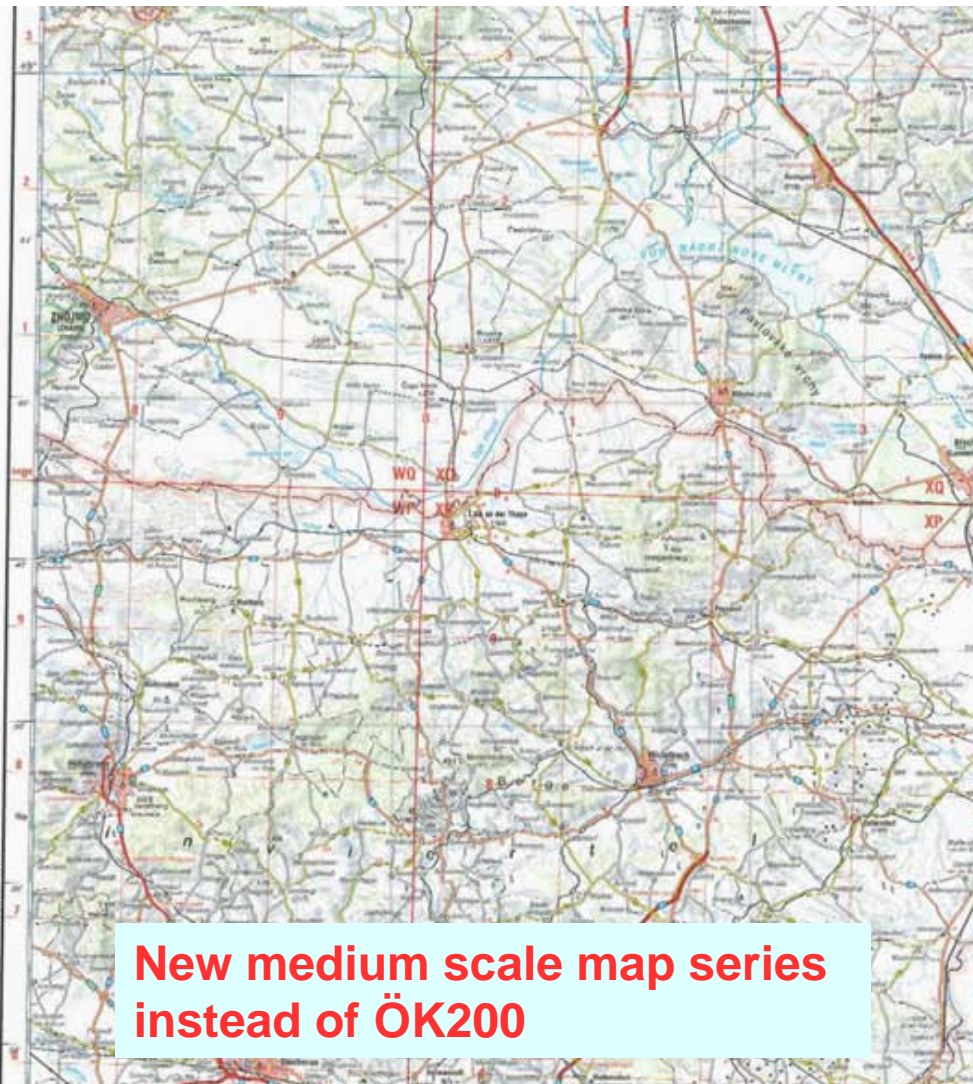
New medium scale map series instead of ÖK200
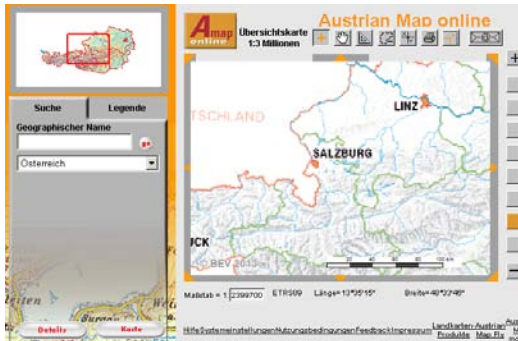
New civilian-military release of ÖK500

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Austrian Map - AMap

AMap online

www.austrianmap.at

AMap Fly 5.0 (DVD)

only few DVDs available
will be abandoned

AMap mobile

for iPhone and Android

Development of AMap mobile

- **Technical and organisational cooperation with swisstopo.ch**

- **Programing (iOS and Android) by external partner**

- **Launching of iOS – Edition: September 2012 (for iPhone und iPad)**

- **Launching of Android – Edition: March 2013 (from Android-Version 2.2 „Froyo")**

Data inside App

In both editions:

- **Overview map 1:1 Million (free of charge)**
- **Cartographic Model 1:500 000 (free of charge)**
- **Cartographic Model 1:200 000**
- **Cartographic Model 1:50 000**
- **Geonam**
- **Elevation model**
- **Data volume about 4 and 4,5 GB**

Common Functions (iOS und Android)

- **Structure of menu is the same**
- **Continuous zooming in maps of all scales**
- **Recording of tracks using GPS**
- **Vertical profile of tracks**
- **Placing of POIs**
- **Searching via Geonam or coordinates**
- **Metadata of the displayed map sheet (KM50)**
- **Display of coordinates in UTM or WGS84**
- **Import / Export in GPX-format (for tracks)**
- **Use of compass (if available)**
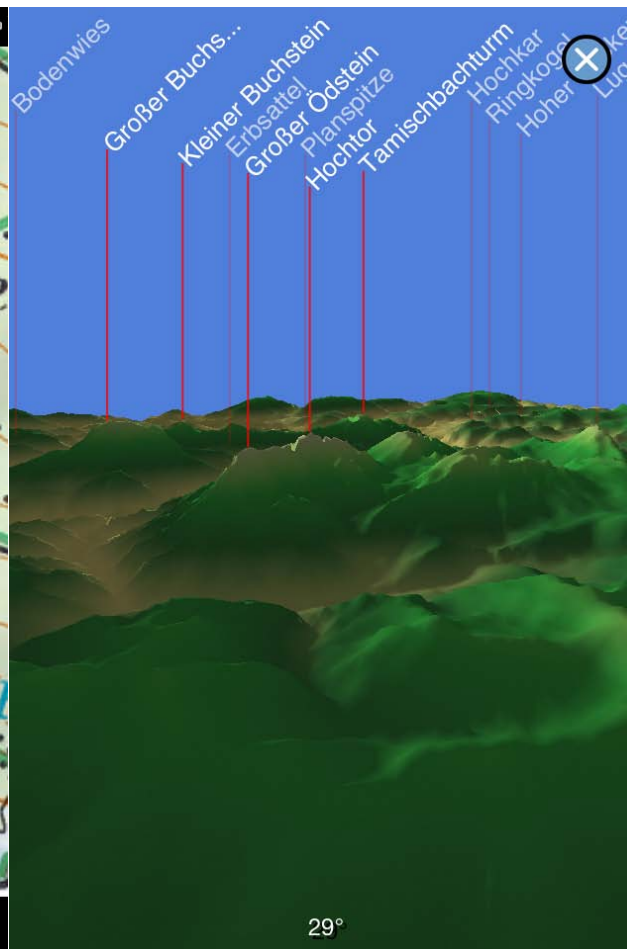
Differences between iOS and Android

In principle:

- **Due to technical reasons there are differences in functionalities**

- **Usage and Performance are dependent on device and Android-version**

- **Development for iOS is „easier"**

- **Fewer functions at Android (i.e. no Panorama- and Augmented Reality function) result in more stability**

iOS views

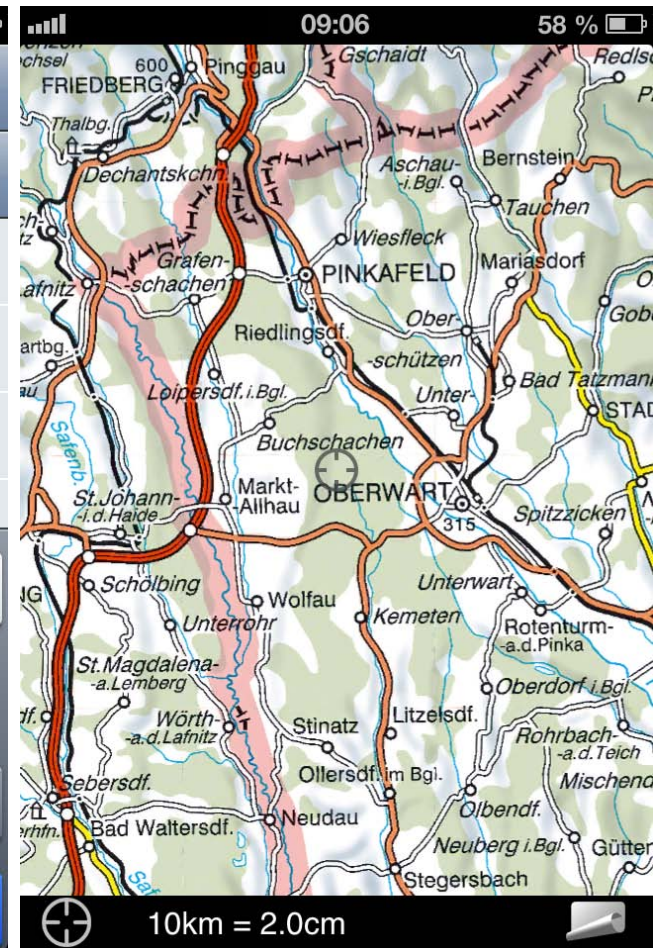**View 1:50 000 with POI** **Panorama-View** **Track-Infos and vertical profile**
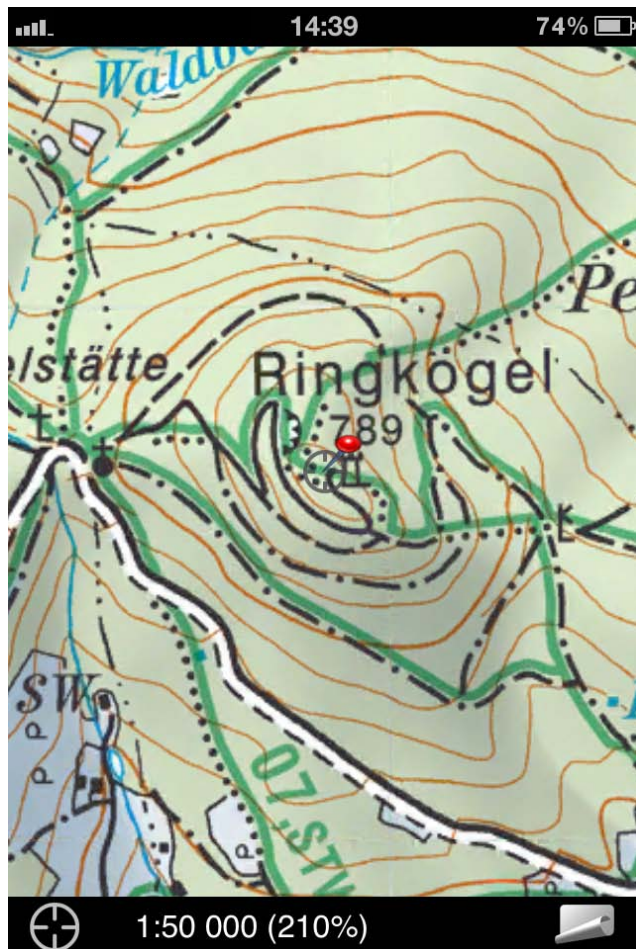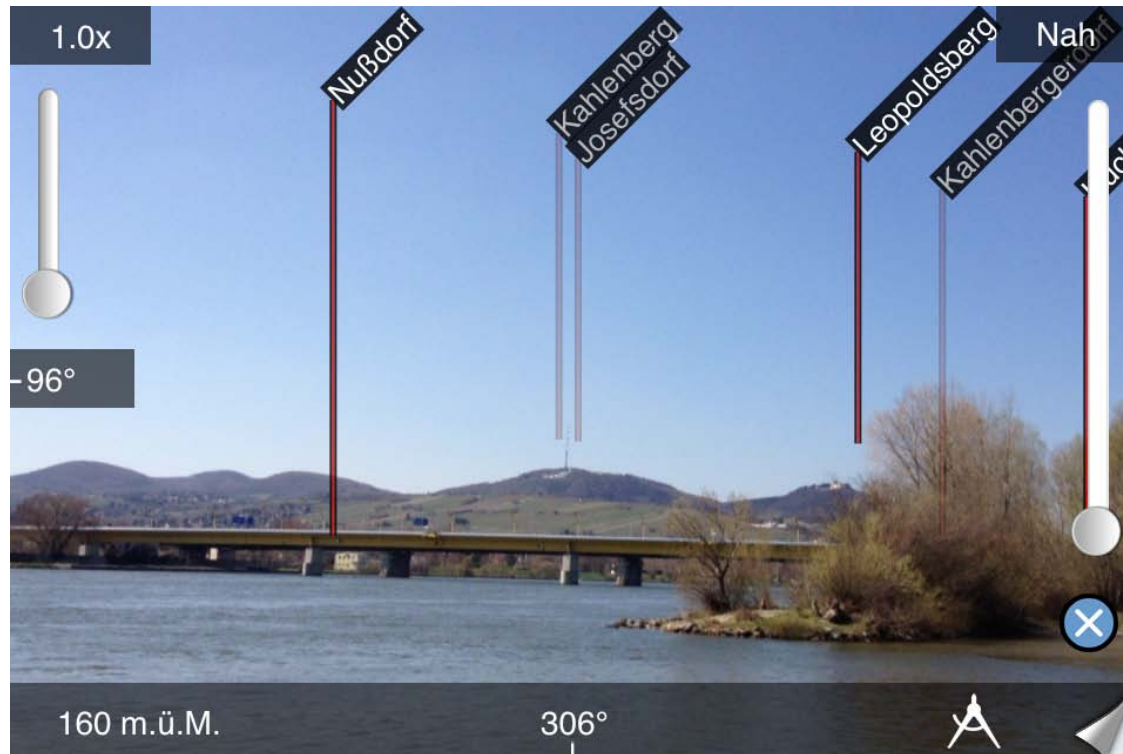
iOS views

Editing Tracks   **Search via Geonam**   **View 1:500 000**

iOS views

Augmented Reality – View with iPhone

Android views

View 1:200 000   **main menu**   **View 1:50 000 with Track**
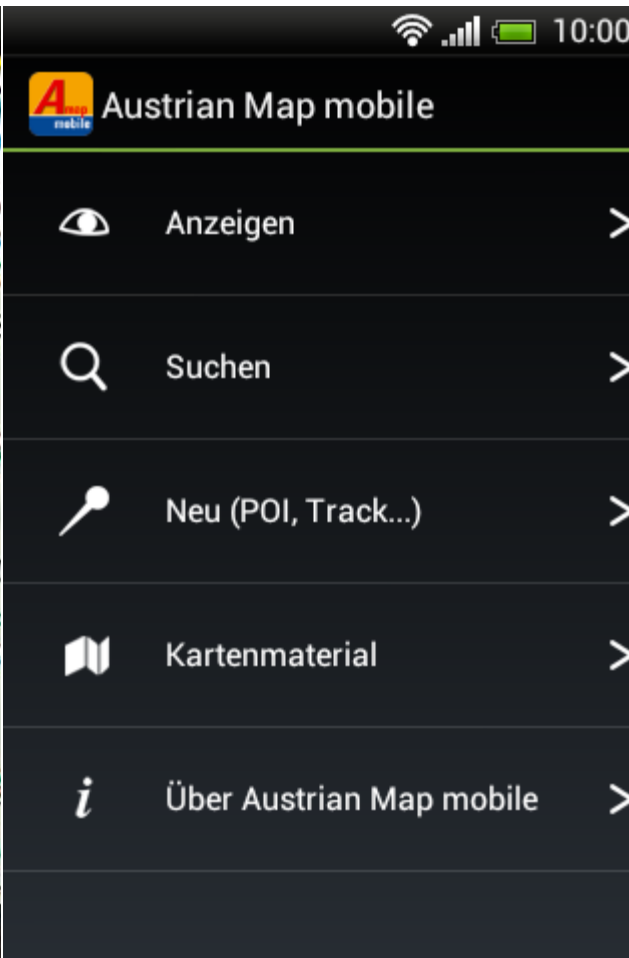
Android views

Metadata **Search menu** **Search via Geonam**
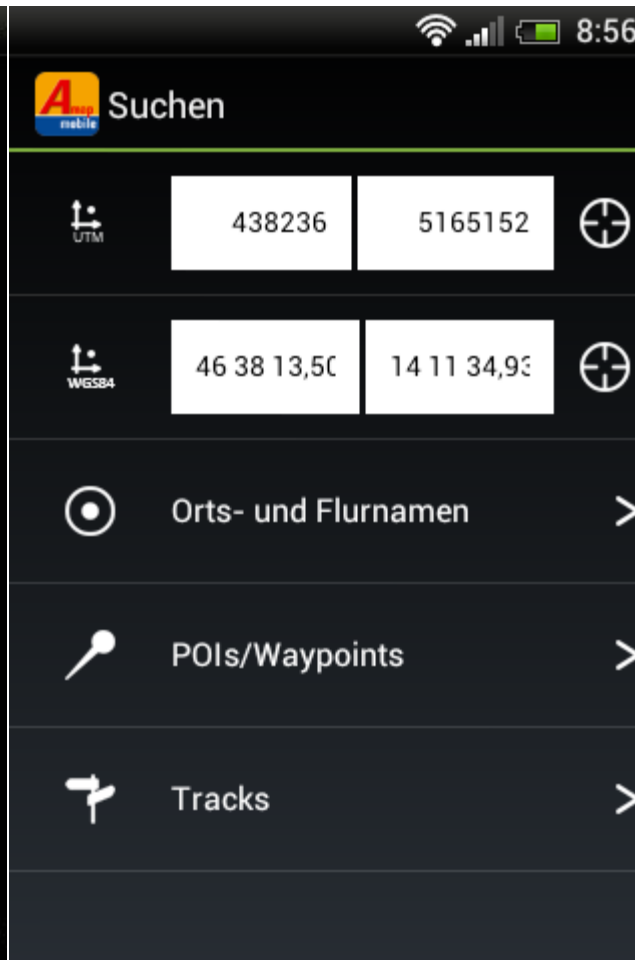
Problematic issues at Apps

- **Performance in case of weak processors / low RAM**

- **System crash at devices with low performance (low memory, usually at Android)**

- **unknown problems due to plenty of Android devices**

- **Problems with recovery of bought map data (Data Backup by users!)**

- **In general: Battery operation of Smartphones or Tablets is often too short for longer (walking-)tours**

Outlook

- **Continuous updates of map data**
- **Additions for Android: Panorama, Augmented Reality**
- **Developments for other operating systems are not planned**
- **Data add-ons (i.e. Orthophotos) are possible**
- **Further developments are matter of BEV strategy in future**

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- **Possible Products and Services**

EuroGeographics

- Association of European National Mapping and Cadastral Agencies
- Currently 56 organisations from 45 countries
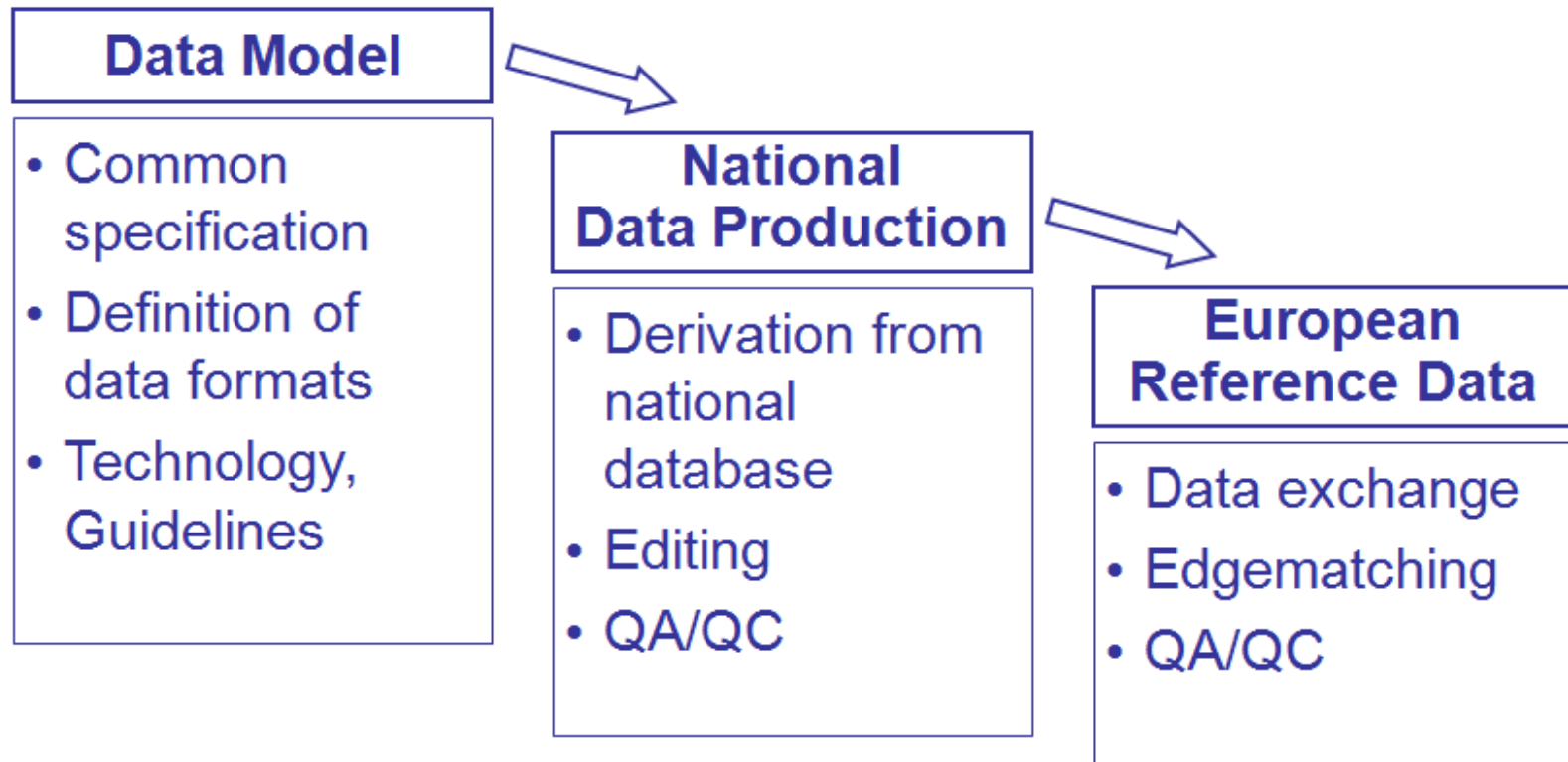- www.eurogeographics.org

EuroGeographics Pan-European Datasets

VGD
(Cadastre)

KM1000-V

Products
Harmonisation
Data models
Reference data

EuroBoundaryMap
1:100 000

EuroGlobalMap
1:1 000 000

KM250-V

DGM

EuroRegionalMap
1: 250 000

EuroDEM
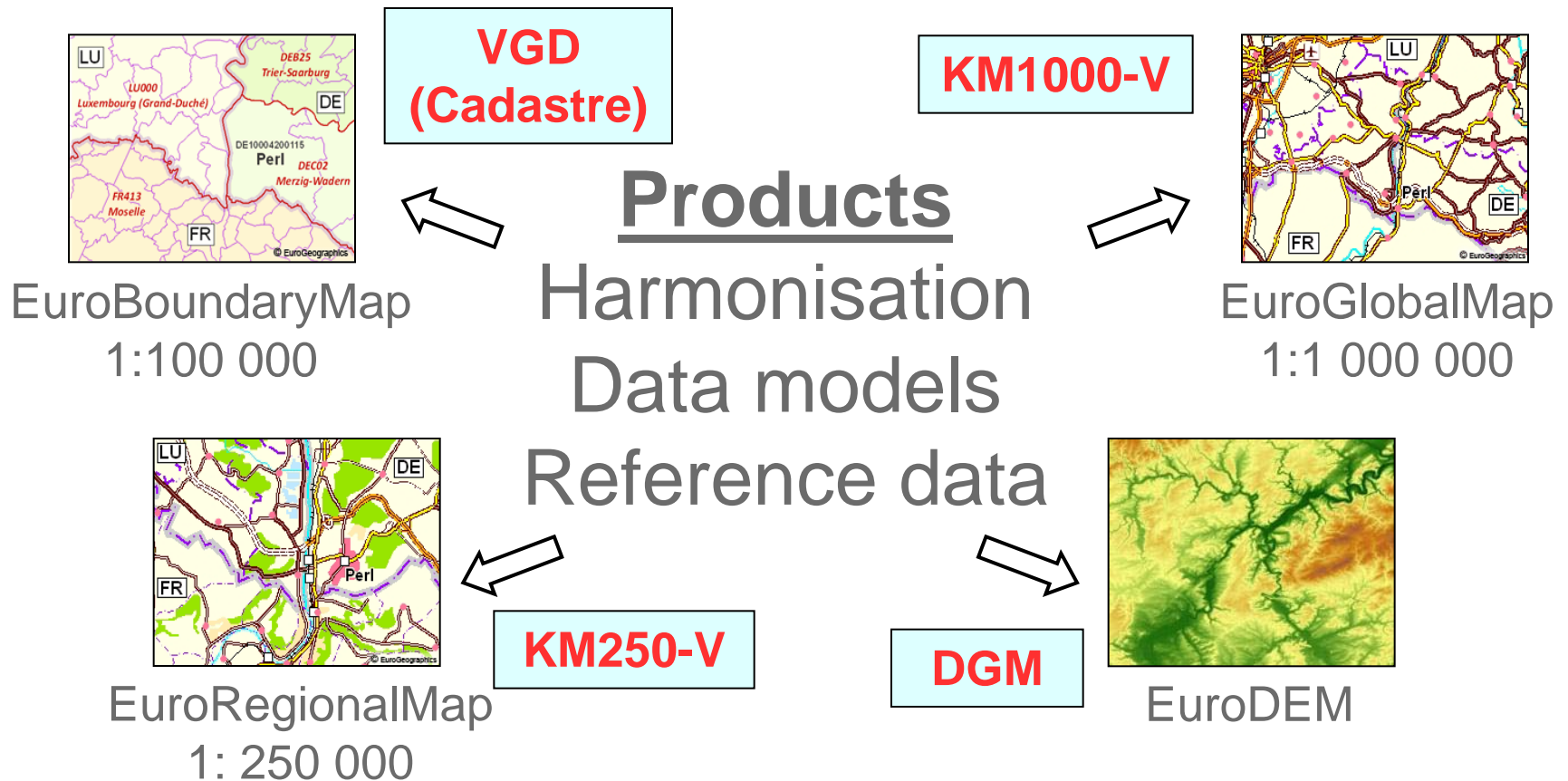
EuroRegionalMap (ERM)

- Multifunctional topographical reference dataset

- Scale 1:250 000

- Thematic Layers:
  - Administrative boundaries
  - Hydrography (rivers, lakes, sea, wetland, glacier)
  - Transport Network (roads, railways, airports, ferry lines)
  - Settlements (built-up areas)
  - Vegetation and Soil (wood/forest, plantation, agricultural area)
  - Miscellaneous objects (national parks, points of interest)
  - Named Location (geographical names)

- Production manager: IGN, Belgium

- Production Management Team

ERM Regions

Group A
Group B
Group C
Group D

Finland

Norway

NORTH SEA

Russia

Estonia

GIS-Centras

Latvia

Denmark

Lithuania

Belarus

Great Britain

KADNL

Ireland

Nether-
lands

Poland

IGNB

Ukraine

Germany

Belgium

Czech
Republic

Luxembourg

BEV

Slovakia

Moldova

ATLANTIC OCEAN

IGNF

Austria

Hungary

France

Switzer-
land

Romania

Slovenia

Croatia

Serbia

Bulgaria

Italy

Bosnia-
Herze-
govina

Monte-
negro

Mace-
donia

Portugal

Albania

Turkey

Spain

Greece

MEDITERRANEAN SEA

Malta

BEV – Department Cartography

Workflow

Data Model

- Common specification
- Definition of data formats
- Technology, Guidelines

National Data Production

- Derivation from national database
- Editing
- QA/QC

European Reference Data

- Data exchange
- Edgematching
- QA/QC

Requirements

Coordinates	Geographical in degrees (longitude, latitude) with decimal fraction and based on the ETRS89 spatial reference system (which corresponds to WGS84 reference system)
Horizontal geometric resolution	equivalent precision of 5 meters or 0.2 in arc-seconds or 0.00005 in decimal degrees
Positional accuracy	125 meters
Minimum size of polygon	0.06 km²
Feature coding structure	DIGEST FACC Edition 2.1, Sep. 2001
Character sets used	UNICODE system or ISO8859 –series
Metadata	According to INSPIRE

Data Schema

Technical Documents

ERM database templates

ERM Metadata templates

Challenges in Data Harmonisation

Data density

Motorway
Primary
Secondary
Local

Classification
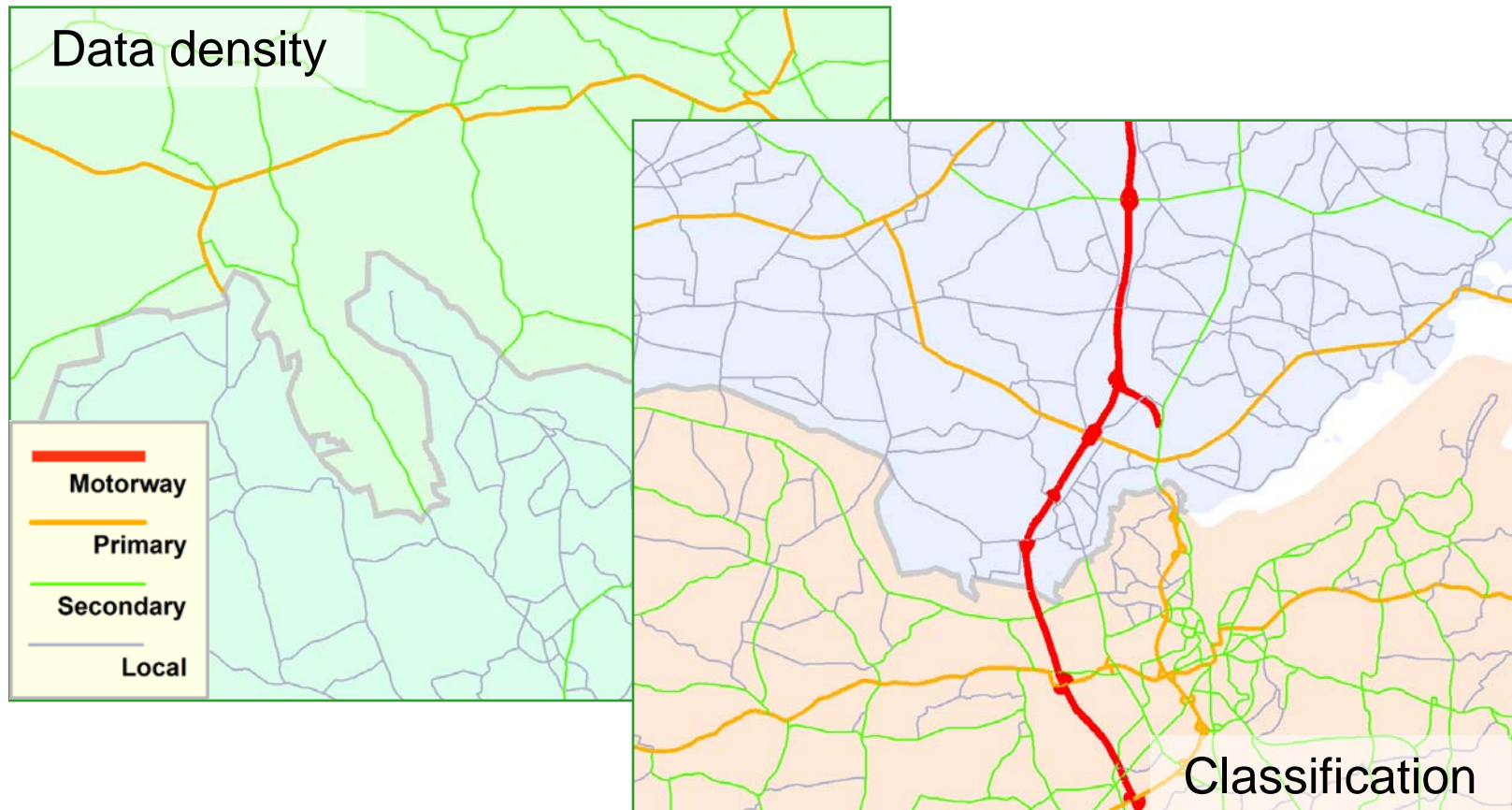
ERM in Future (ELF medium scale)
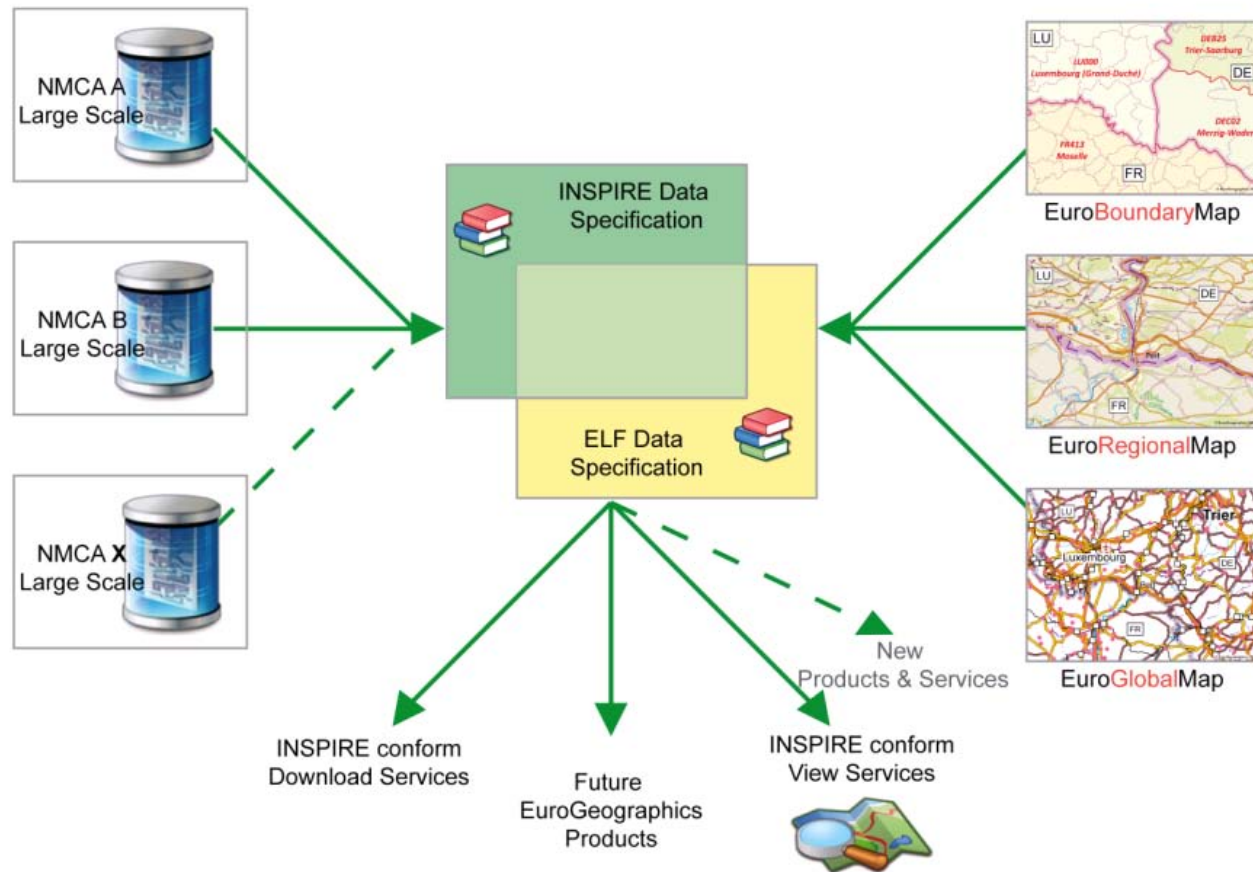
ERM in Future (ELF medium scale)

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Motivation

- **GIS-based map production**
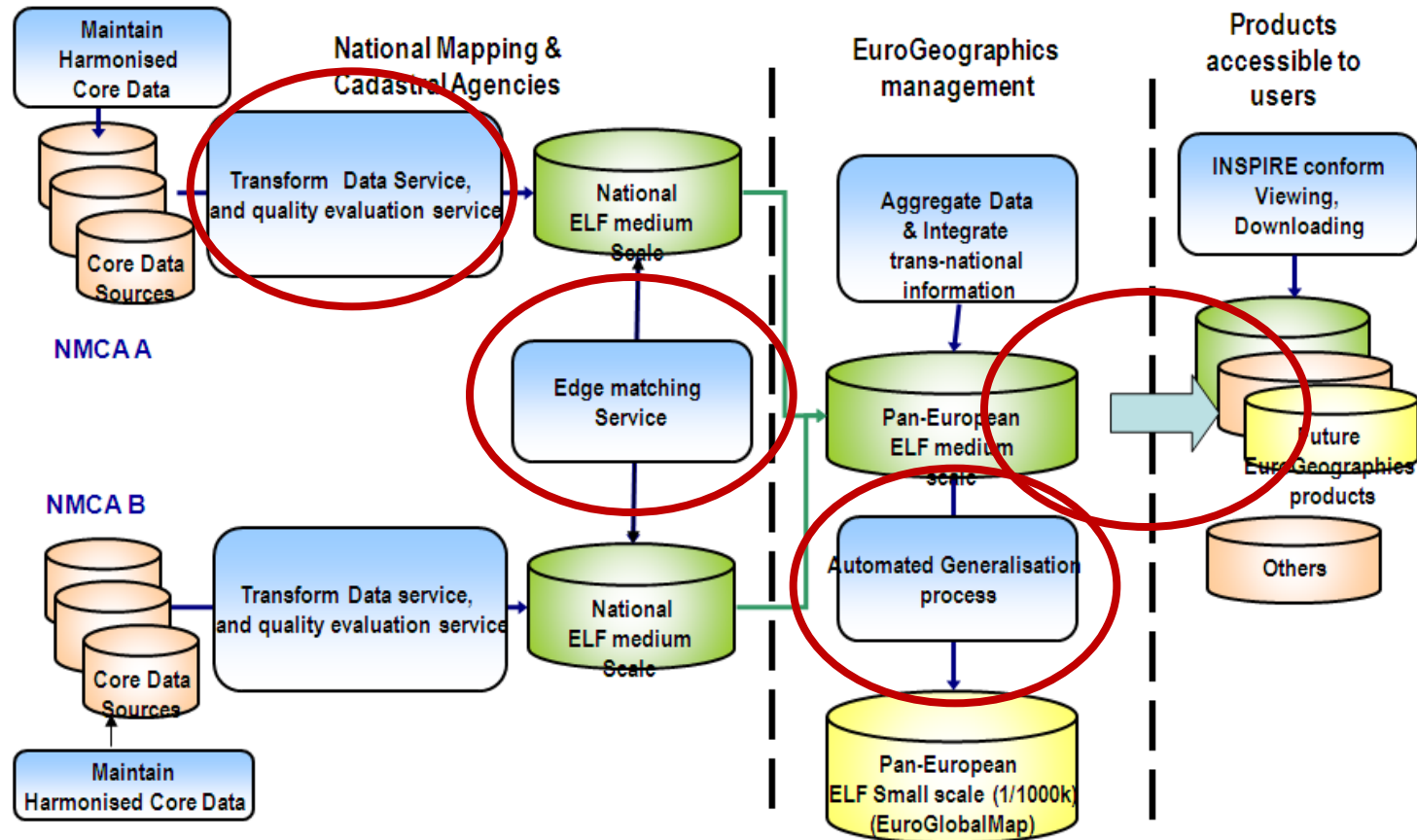 - **Intelligent map data**
    - **Support Automation**
    - **Fast maintenance process**
  - **Many products from one GIS-dataset**
    - **Topographic maps for WEB**
    - **Digital map data inside GIS**
    - **Printed maps**

Production process DLM / KM

So far:

Data Acquisition
Verification in field
Update Draft for KM50	→	Symbolisation

Data Acquisition
Verification in field
DLM

| Symbolisation |
| KM50-R |
| ÖK50 |

Production process DLM / KM

New:

Data Acquisition
Verification
DLM new	→	Generalisation
		Symbolisation
		KM50-V
		KM50-R
		ÖK50
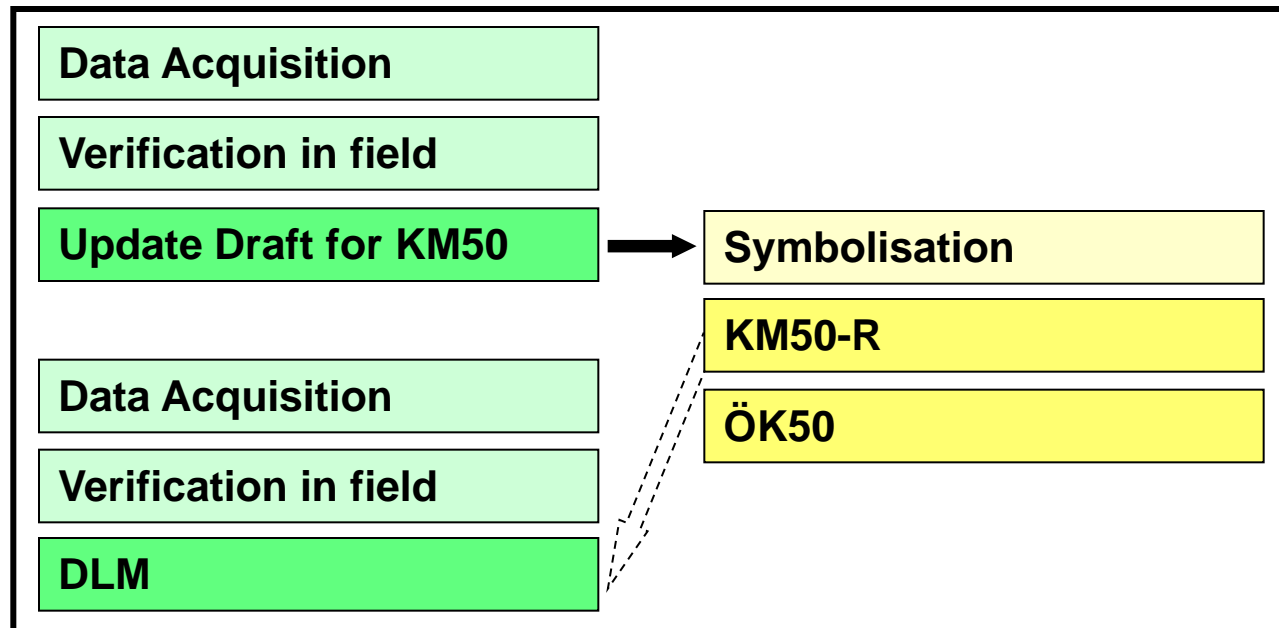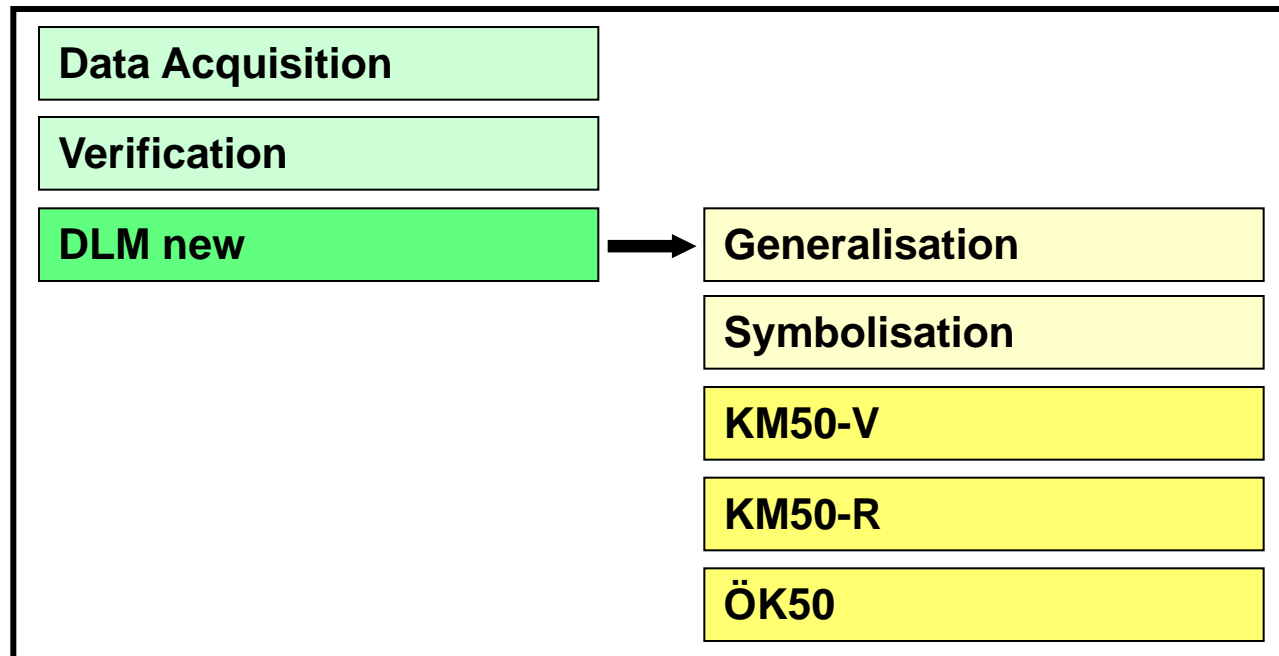
Status of generalization module

automatic generalization

model generalization DLM

selection (lines)

displacement (lines)

generalization of buildings

line object … road, foot path, railway, river

Examples
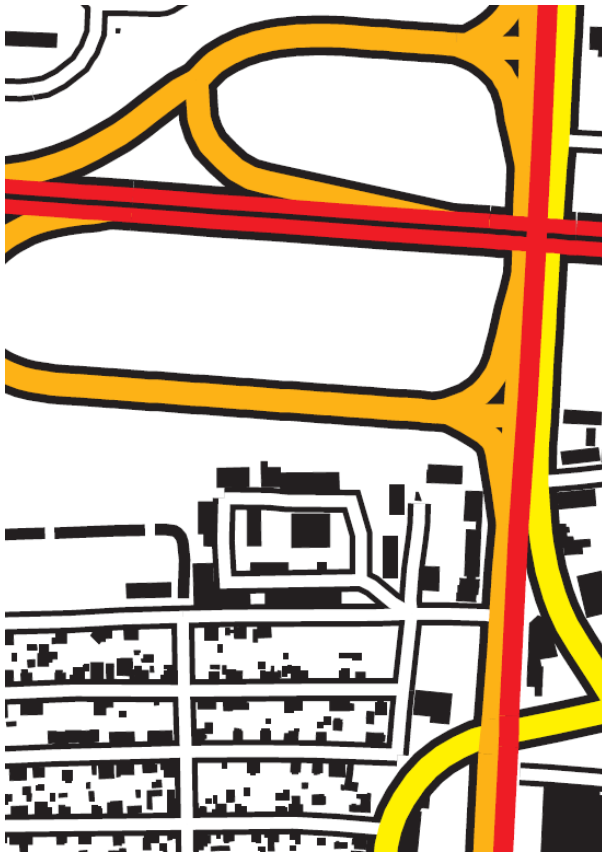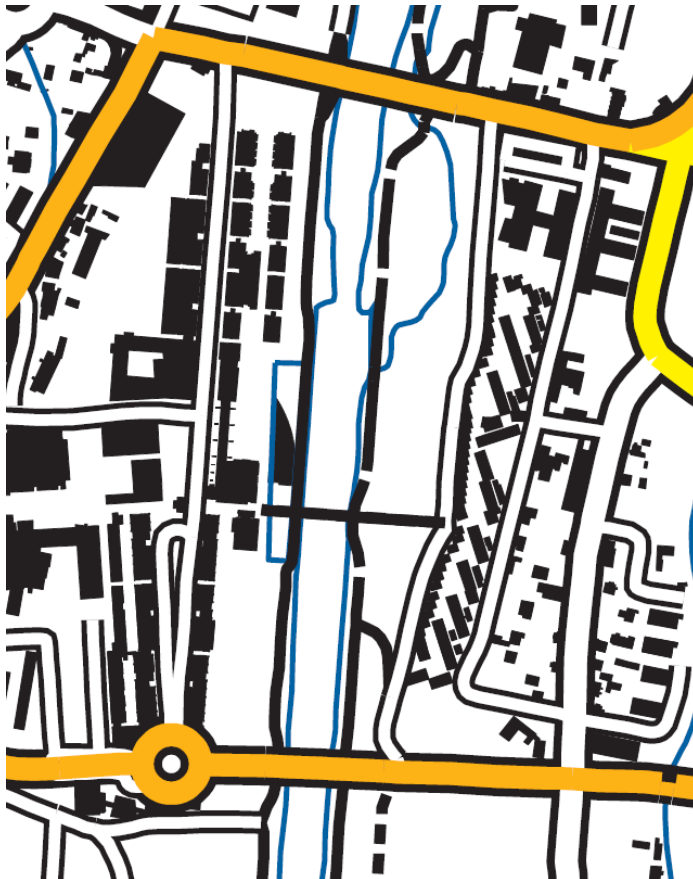

DLM symbolized for 1:50 000   KM50-V
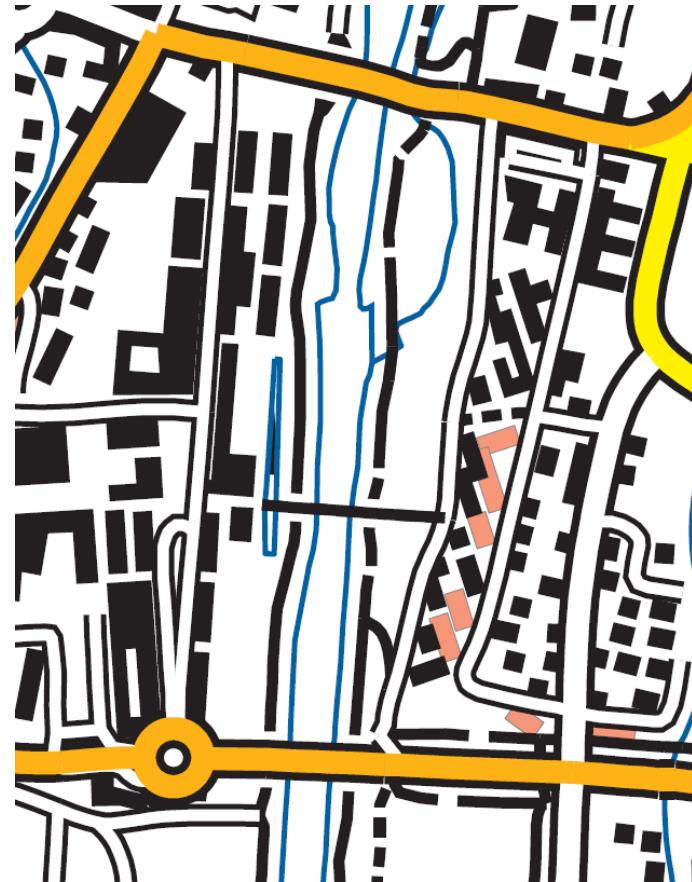
Examples

DLM symbolized for 1:50 000   KM50-V

Examples

DLM symbolized for 1:50 000   KM50-V
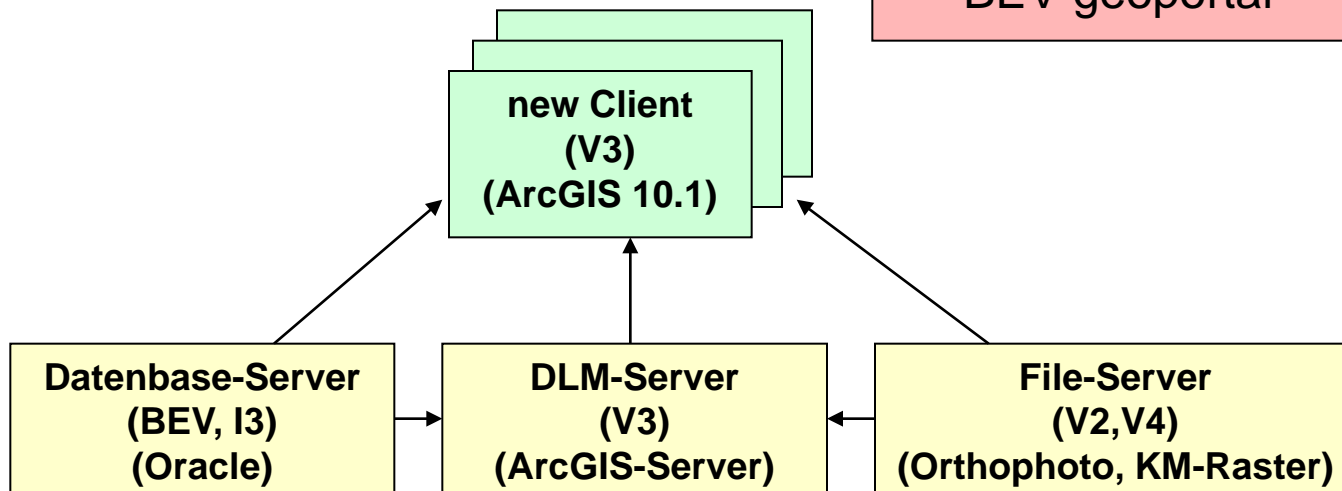
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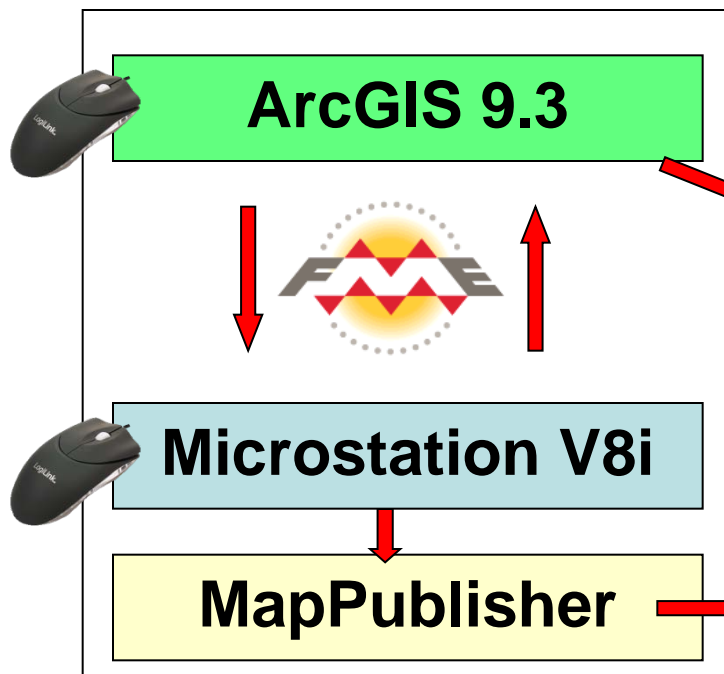
DLM Migration

- ArcGIS 10.1
- Oracle Datenbank

Data model in line with

- Cartographic Models
- INSPIRE
- BEV geoportal

```
                    new Client
                      (V3)
                  (ArcGIS 10.1)


Datenbase-Server    DLM-Server       File-Server
  (BEV, I3)            (V3)             (V2,V4)
  (Oracle)       (ArcGIS-Server)   (Orthophoto, KM-Raster)
```
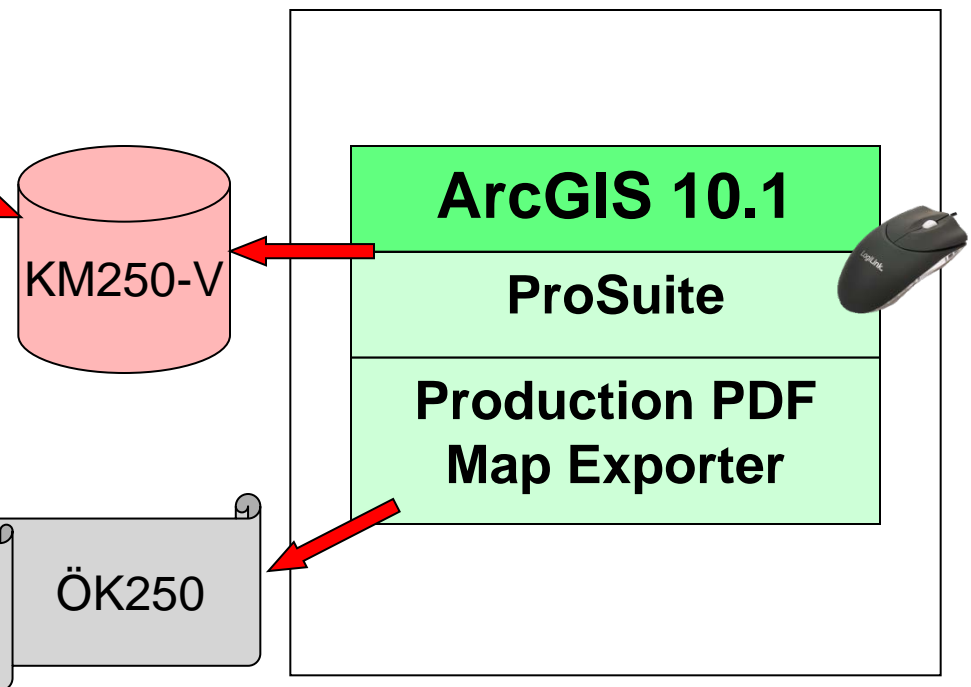
KM250-V Editing with ArcGIS

Right now:

In testing:

ArcGIS 9.3

Microstation V8i

MapPublisher

KM250-V

ÖK250

ArcGIS 10.1

ProSuite

Production PDF Map Exporter
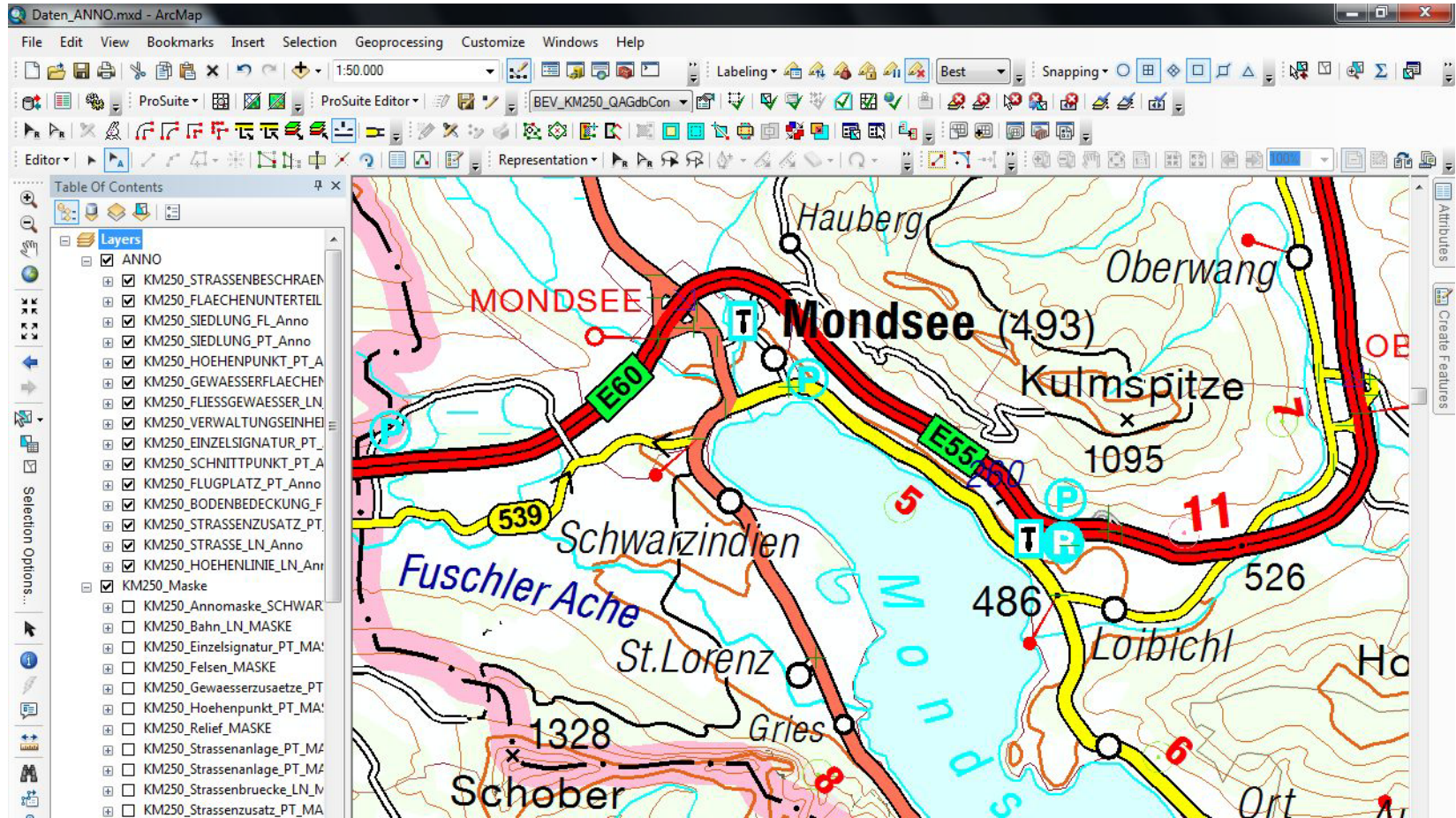
KM250-V Editing with ArcGIS

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Possible Products and Services

- KM10-V, KM25-V
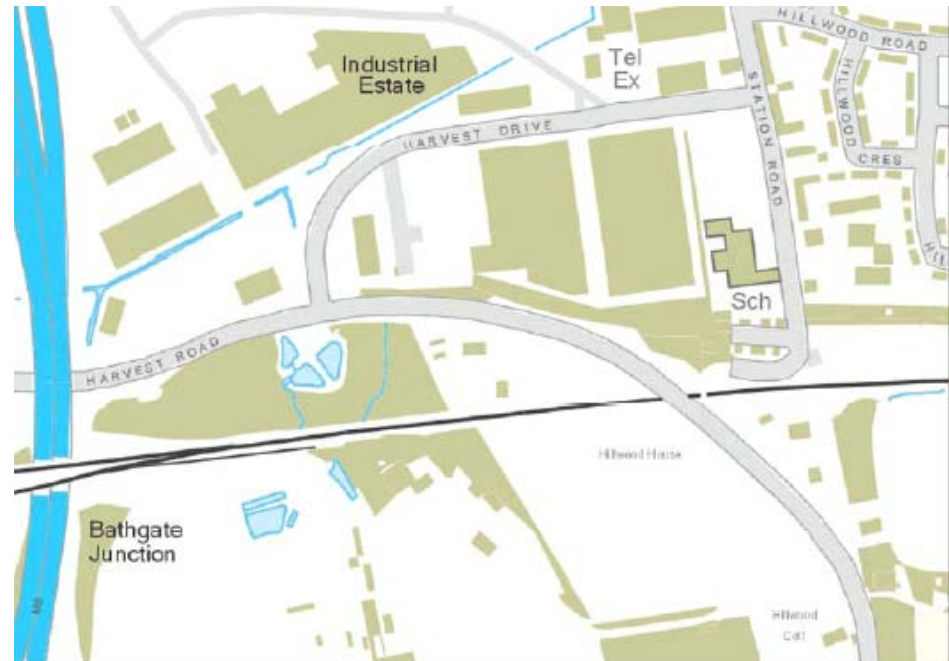- GeoService of Cartographic Models
- Print-on-demand

KM10-V

- Vector data resp. online maps in scale 1:10 000
  - Derived from DLM with buildings and street names
  - Symbolized for 1:10 000

- Examples in Europe
  - KMS - National Survey
    and Cadastre of Denmark

© Kort & Matrikelstyrelsen

KM10-V

- Vector data resp. online maps in scale 1:10 000
  - Derived from DLM with buildings and street names
  - Symbolized for 1:10 000

- Examples in Europe
  - Ordnance Survey GB
    OS VectorMap Local

KM10-V

- Vector data resp. online maps in scale 1:10 000
  - Derived from DLM with buildings and street names
  - Symbolized for 1:10 000

- Examples in Europe
  - LVG Bayern: Digitale Ortskarte 1:10 000 - DOK

KM25-V

- Vector data resp. online maps in scale 1:25 000
  - Derived from DLM
  - Symbolized for 1:25 000
- Examples in Europe
  - Swisstopo: DKM25

KM25-V

- Vector data resp. online maps in scale 1:25 000
  - Derived from DLM
  - Symbolized for 1:25 000
- Examples in Europe
  - Ordnance Survey GB
    OS VectorMap District

GeoService of Cartographic Models

- ## Multi-scale web mapping
  Designing not just one map but
  - 20 zoom levels
  - of increasing content
  - all consistent

➡ Combination with foreground information from GIS

➡ Integration in foreign applications

Zoom Level	Map Scale
19	1 : 1,128.497176
18	1 : 2,256.994353
17	1 : 4,513.988705
16	1 : 9,027.977411
15	1 : 18,055.954822
14	1 : 36,111.909643
13	1 : 72,223.819286
12	1 : 144,447.638572
11	1 : 288,895.277144
10	1 : 577,790.554289
9	1 : 1,155,581.108577
8	1 : 2,311,162.217155
7	1 : 4,622,324.434309
6	1 : 9,244,648.868618
5	1 : 18,489,297.737236
4	1 : 36,978,595.474472
3	1 : 73,957,190.948944
2	1 : 147,914,381.897889
1	1 : 295,828,763.795777
0	1 : 591,657,527.59155

Bing/Google/Esri scale/zoom levels

GeoService of Cartographic Models

Zoom Level	Map Scale
19	1 : 1,128.497176
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Orthophoto

Cadastre

KM10-V

KM25-V

KM50-V

KM250-V

KM500-V

KM1000-V

GeoService of Cartographic Models

- With different map designs

GeoService of Cartographic Models

- With different map designs
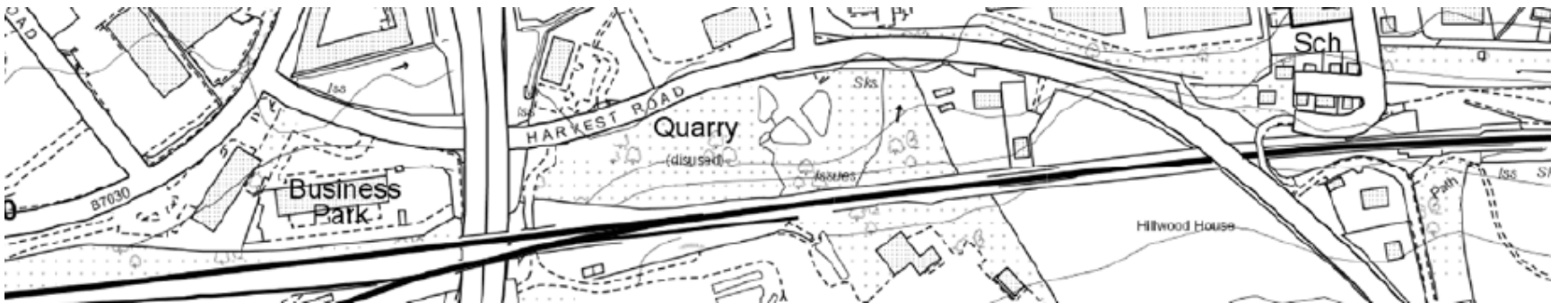
Print-on-Demand

- Service for printing (plotter) of personalized maps
  - Individual map extent, map title, image for map cover, ….
- Examples in Europe
  - Ordnance Survey GB
  - NLS Finland
  - IGN Belgium
  - IGN France
  - Lantmäteriet Sweden

Print-on-Demand

Print-on-Demand

Questions