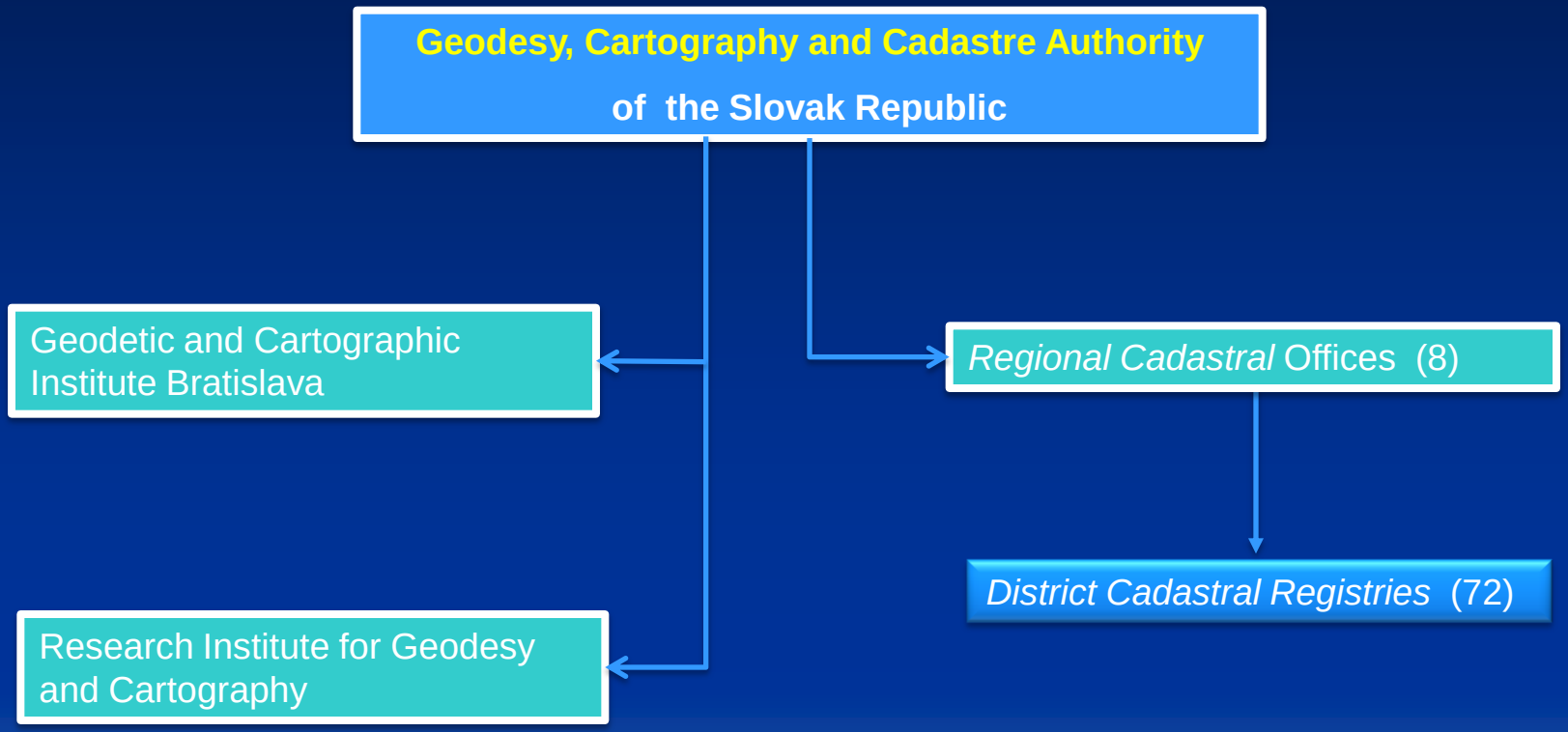
Geodetic and Cartographic Institute Bratislava
Chlumeckého 4, Bratislava, SLOVAKIA

Spatial Data Infrastructure in Slovakia

Mgr. Ľuboslav Michalík

GSDI 11 WORLD CONFERENCE, Rotterdam, The Netherlands, 15-19 June 2009

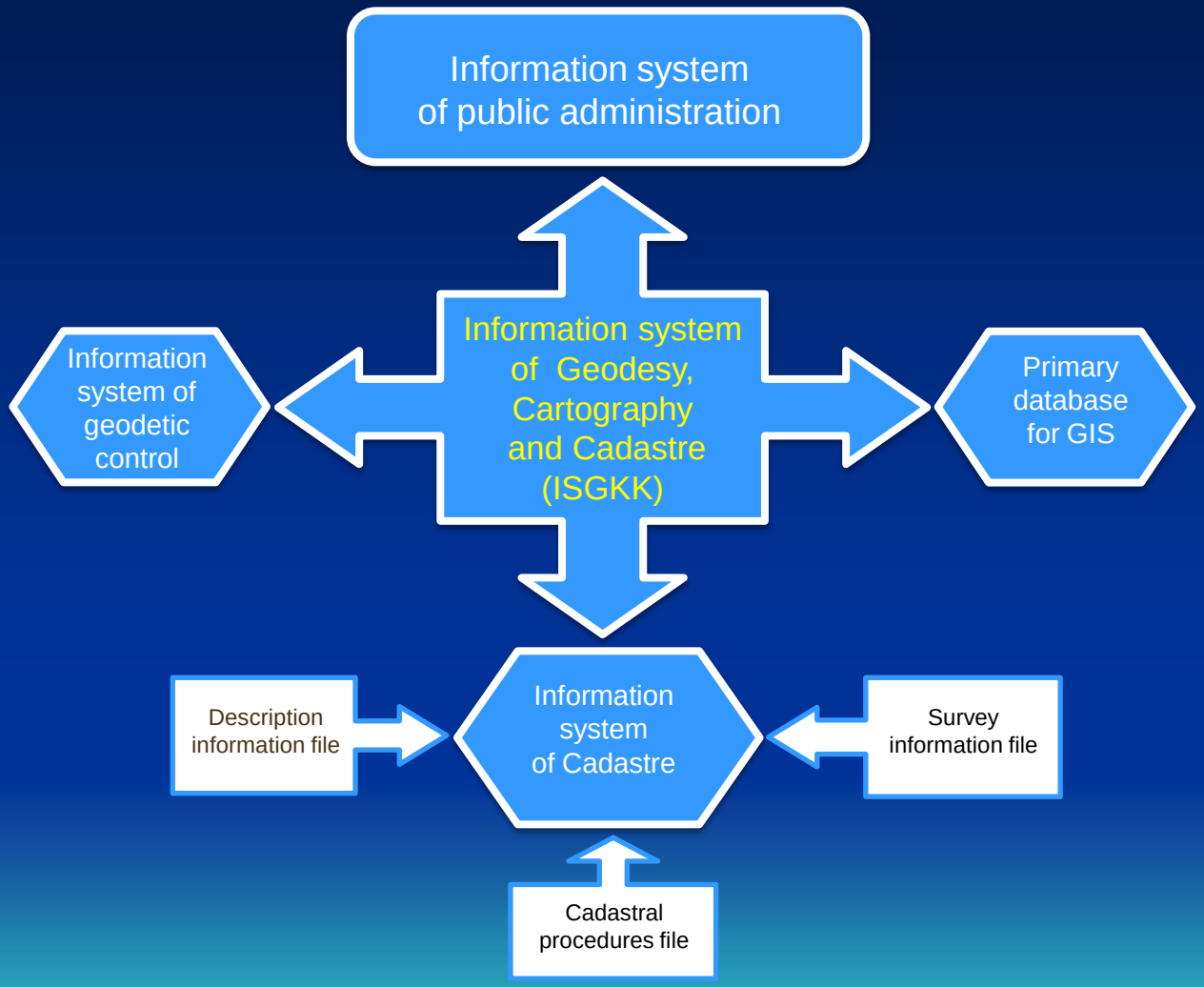
Organisational structure



Main tasks of the Geodetic and Cartographic Institute Bratislava

- administration of the Information System of the Geodesy, Cartography and Cadastre on the central level,
- administration of the Slovak Geodetic Observation System - ***SKPOS***,
- establishment, updating and renewal of spatial, horizontal, vertical and gravity geodetic control, including its modernization,
- monumentation and measurement of the geodetic points of the state boundary and updating of the geodetic part of the boundary documentation work,
- carrying out the examination work, analyses, studies and special non-standard geodetic work in the field of geodetic control,
- providing the generation and updating of the Primary database for the Geographic Information System,
- scanning of large-scale maps,
- administration of the branch information centre,
- administration of the Central Archive of Geodesy and Cartography,
- preparation of the drafts of the standardization of geographical names, edition of the geographical names publications and documentation of the standardization results,
- provision, accessing and publication of the information from the state documentation.

Information system of Geodesy, Cartography and Cadastre



INSPIRE Spatial Data Themes

Annex I	*Annex II*	*Annex III*
Coordinate reference systems	Elevation	Statistical units
Geographical grid systems	Land cover	Buildings
Geographical names	Orthoimagery	Soil
Administrative units	Geology	Land use
Addresses		Human health and safety
Cadastral parcels		Utility and governmental services
Transport networks		Environmental monitoring facilities
Hydrography		Production and industrial facilities
Protected sites		Agricultural and aquaculture facilities

Data Specifications Testing

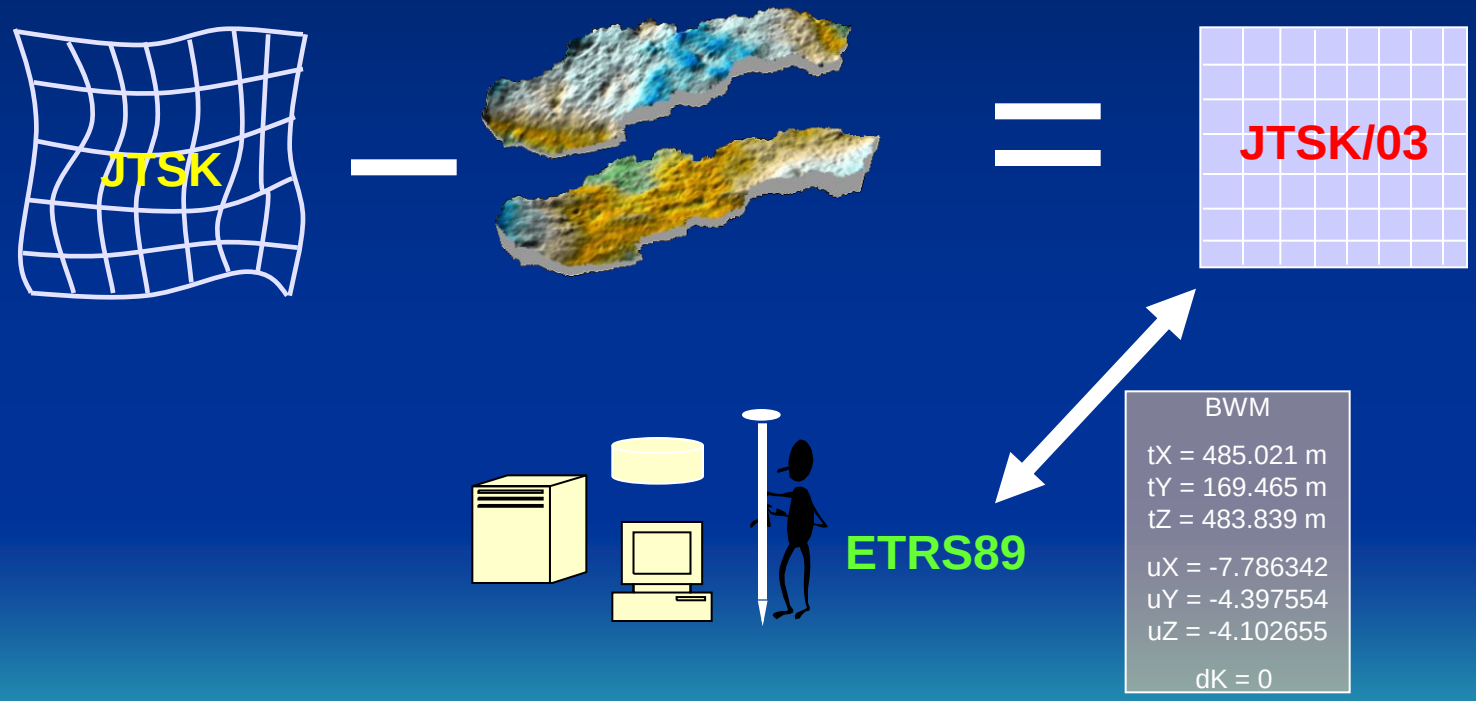
- we have tested Cadastral parcels according to INSPIRE Data Specification on Cadastral Parcels Draft Guidelines (D 2.8.I.6)
- tested with cadastral data on Czech – Slovak border (*Skalica*)

1. Data transformation to ETRS89
2. Filling up all mandatory attributes
3. Creation of a GML file according to INSPIRE requirements

Data Specifications Testing

High precision coordinate transformation from local system to ETRS89

JTSK → JTSK03 → ETRS89 using grid-based transformations (< 10 cm)



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Primary database for GIS

- according to **THE NATIONAL COUNCIL OF THE SLOVAK REPUBLIC ACT No. 215** FROM September 12th, 1995 **about geodesy and cartography as amended by the Act No. 600/2008 Coll.**

- § 2, subsection 14:

  „Primary database for geographic information systems is a real world model with the level of detail and abstraction corresponding to the feature catalog. Primary database for geographic information systems describes geometric and thematic properties of the features in time, enabling the analysis of phenomena and graphic presentations. Primary database for geographic information systems is geometric basis for the national spatial data infrastructure.“

Primary database for GIS

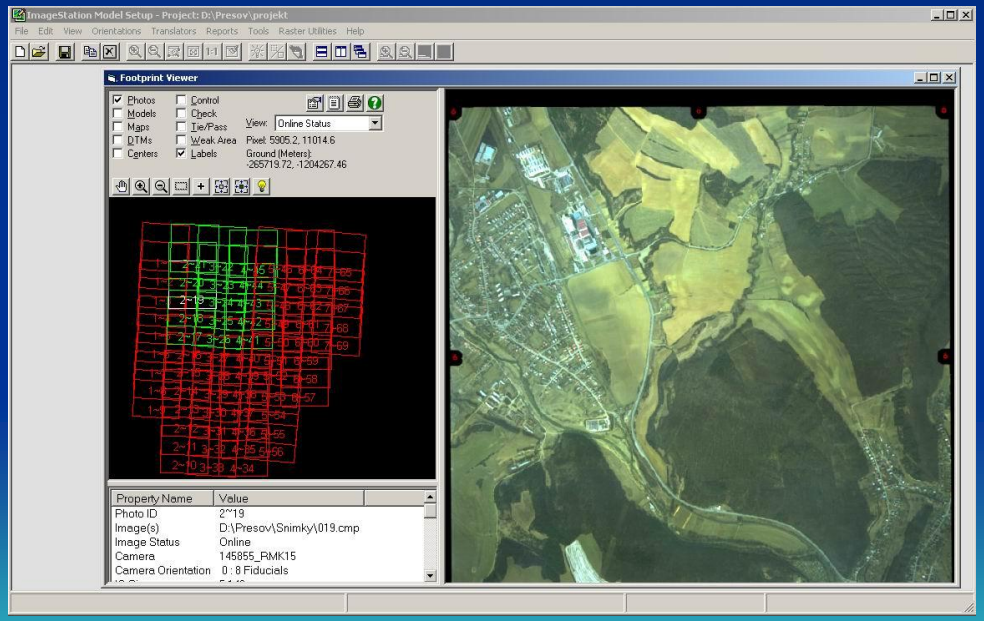
- according to the act Primary database for GIS (*ZB GIS*) is fundamental for building other advanced thematic information systems
- positional accuracy is guaranteed by precise digital aerotriangulation and ground control points measured using ***SKPOS*** (JTSK03)
- based on DIGEST Feature Attribute Coding Catalog (FACC)
- includes: *geographical names, administrative units, transportation networks (roads, railways), hydrography (rivers, lakes, springs, etc.), buildings, ...*

Photogrammetry

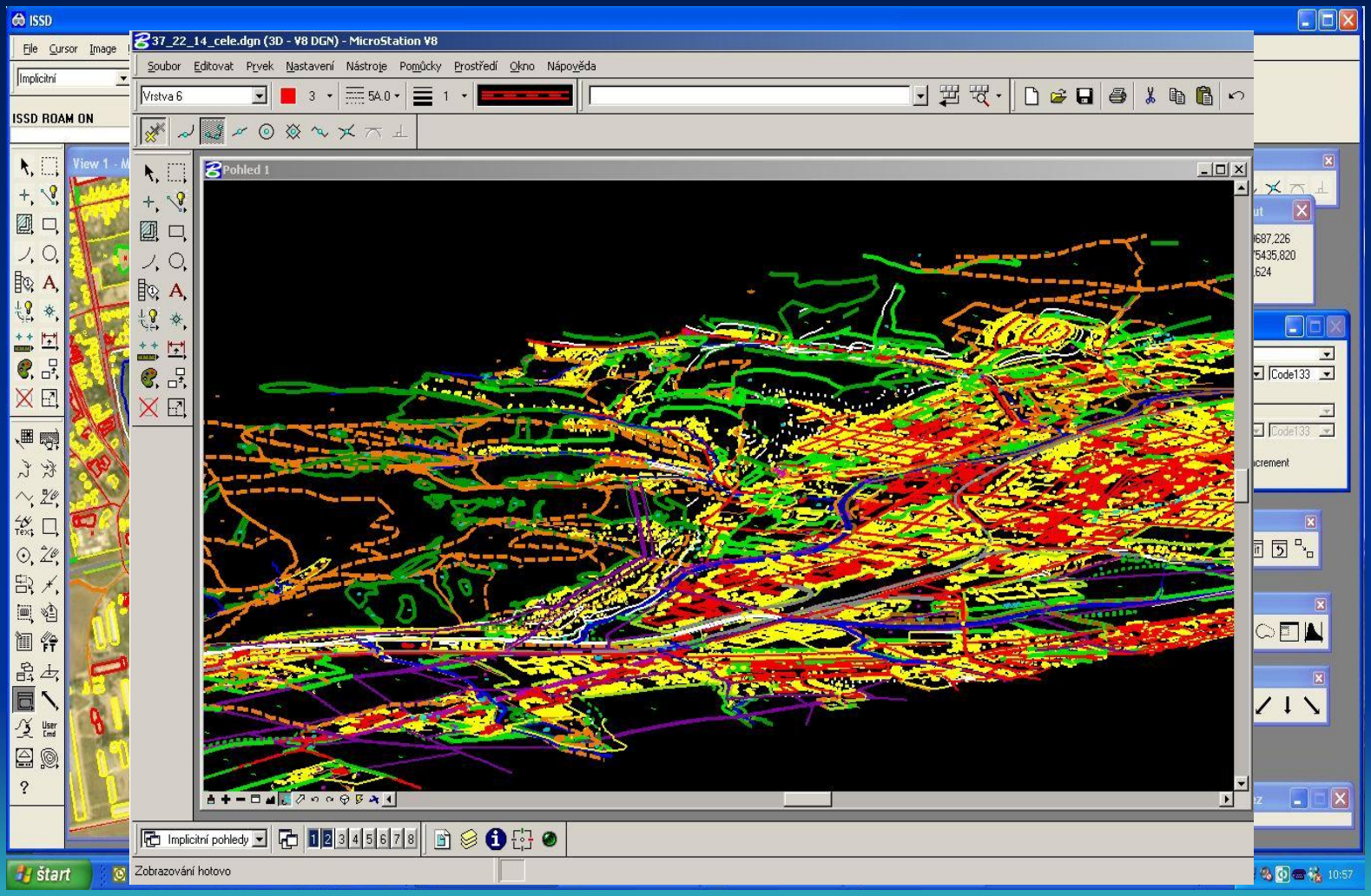
- Primary technique of data acquisition for GIS
- Since 2004 digital photogrammetry based on Z/I technology
- Digital photogrammetric scanner - Z/I Photoscan
- HP® workstations with active stereo kit
- Software: Bentley MicroStation v8 + Intergraph ImageStation (including modules ISAT, ISPM, ISSD, ISFC, ISAE)

Photogrammetry

- Aerial photos in scales 1:14 000 – 1:20 000
- Automatic aerotriangulation (ISAT)
- Photogrammetric project (ISPM)
- 3D vector data acquisition in stereoscopic mode



3D data acquisition



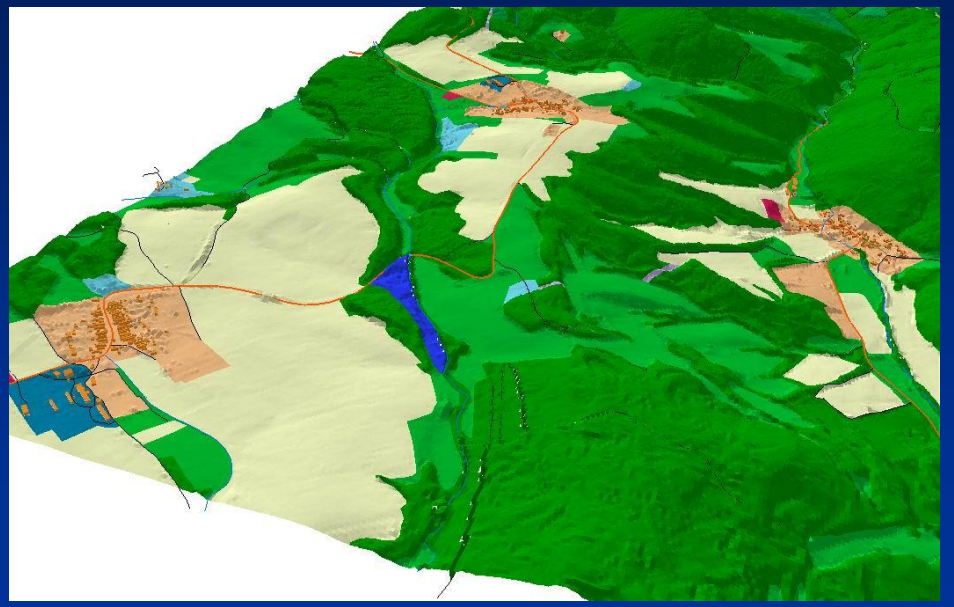
Primary database for GIS – facts and figures

126 Feature Classes

44 Composite features

292 Relational classes

2164 Attribute domains



So far we have acquired:

> 1 400 000 Features

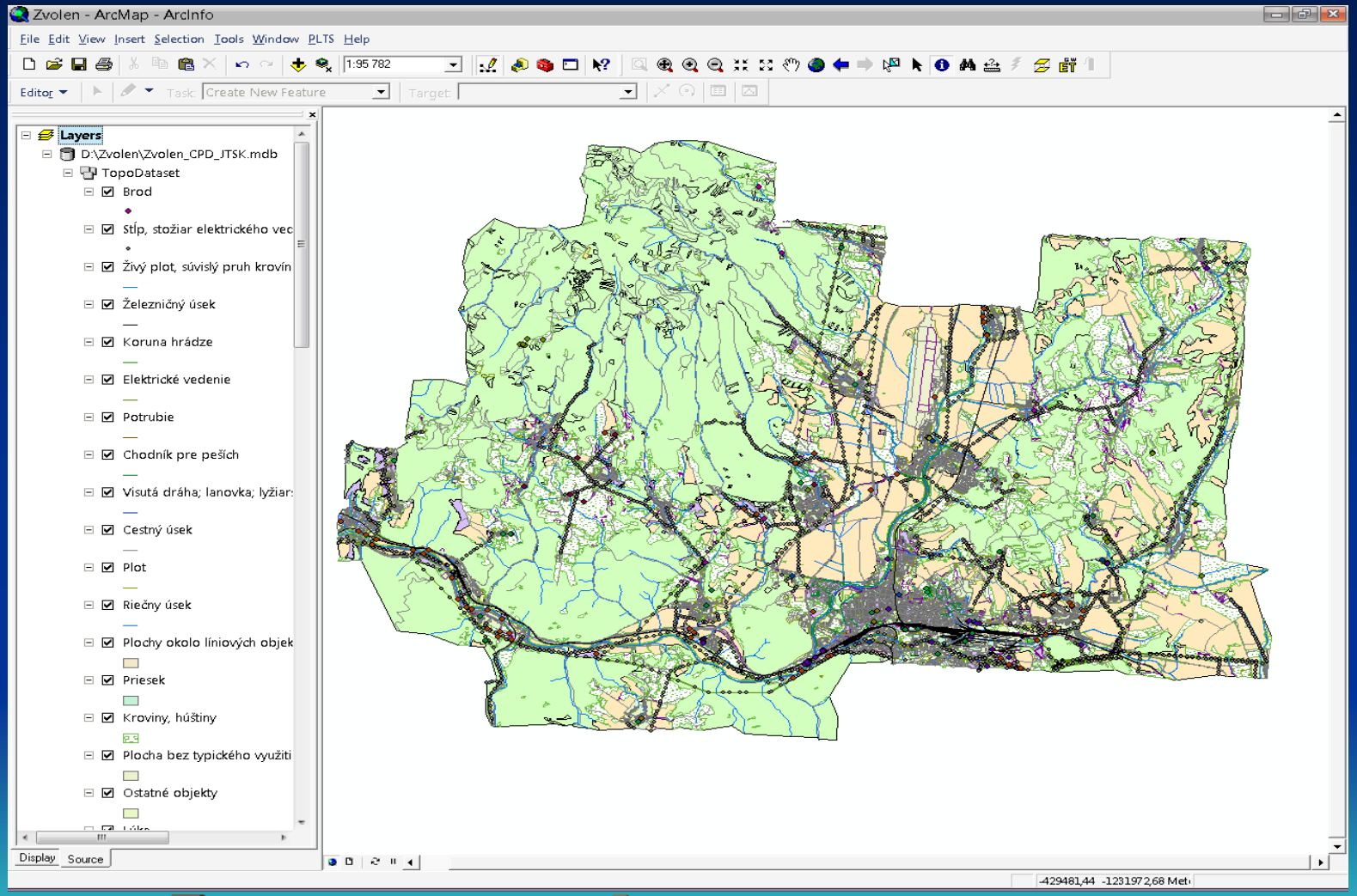
> 17 340 000 Attribute values

> 5 100 Composite features with more than **57 000** attribute values

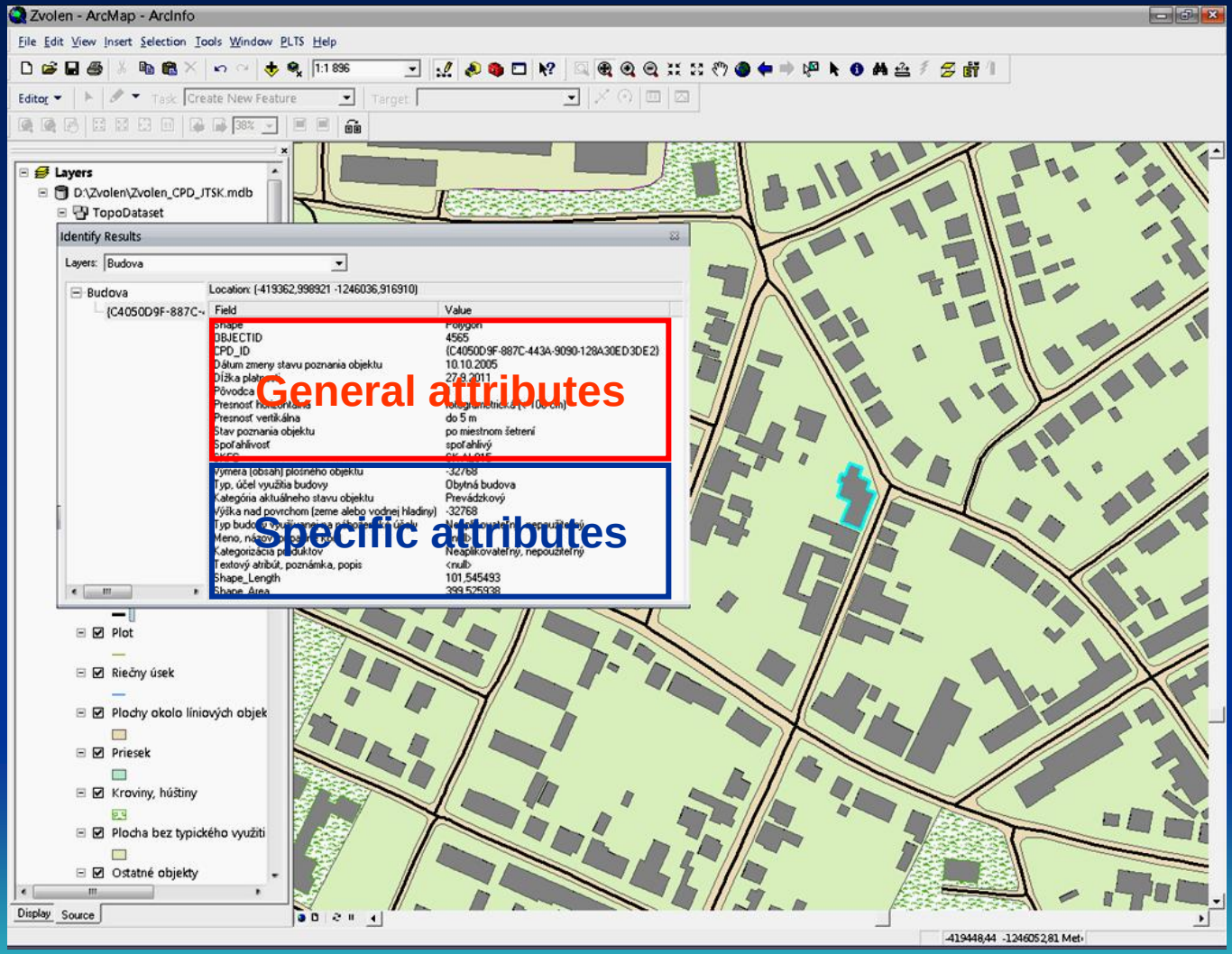
Primary database for GIS

1. Import of 3D data from photogrammetry
2. Topological checking on geometry
3. Filling of general attributes, specific attributes
4. Attribute checking
5. Local inquiry
6. Creation of composite objects
7. Completness check, checking topology and attributes
8. Storing to central database (ArcSDE + Oracle 10g)
(9.) Publishing (Geoportal, individually, preparing map series)

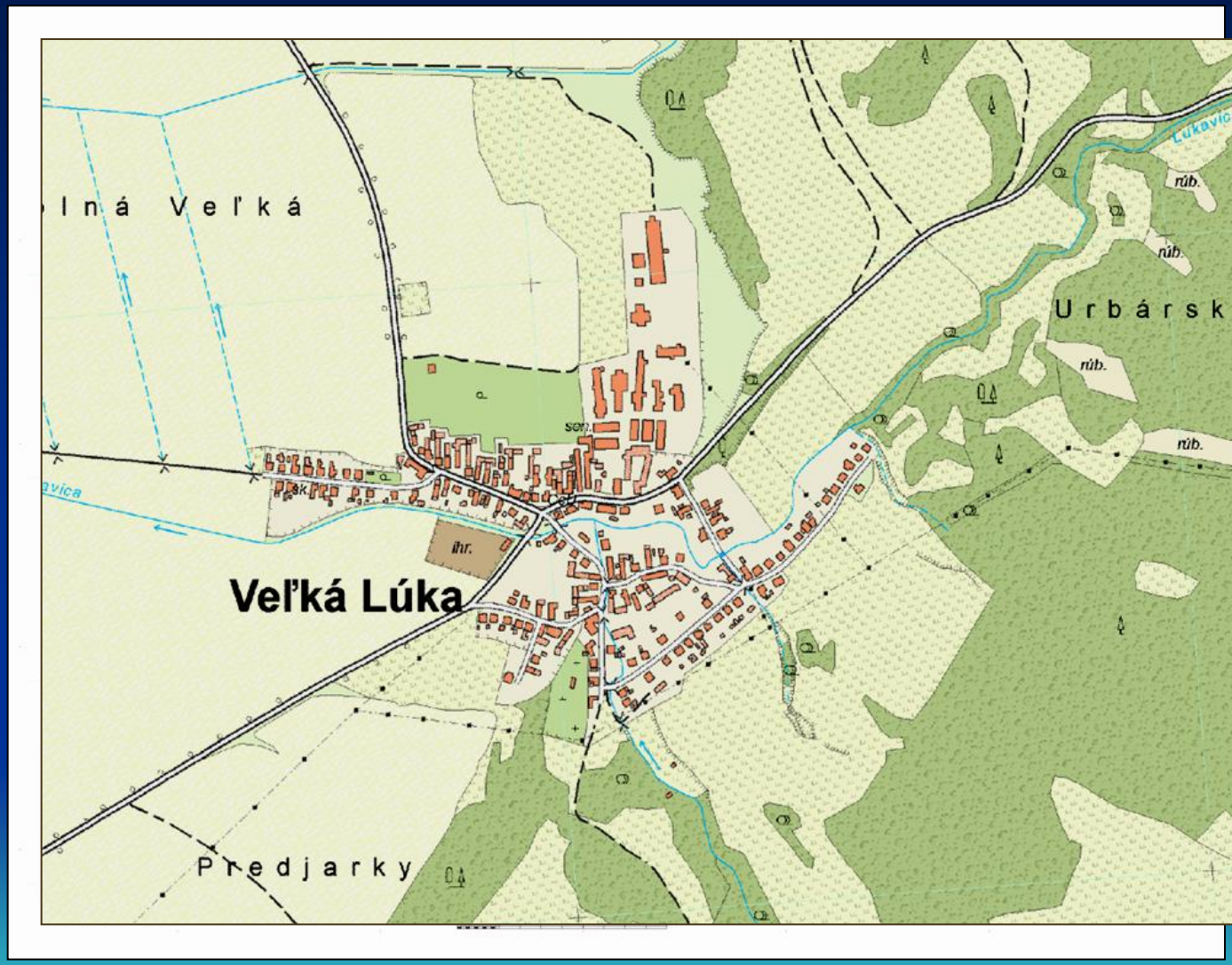
Primary database for GIS



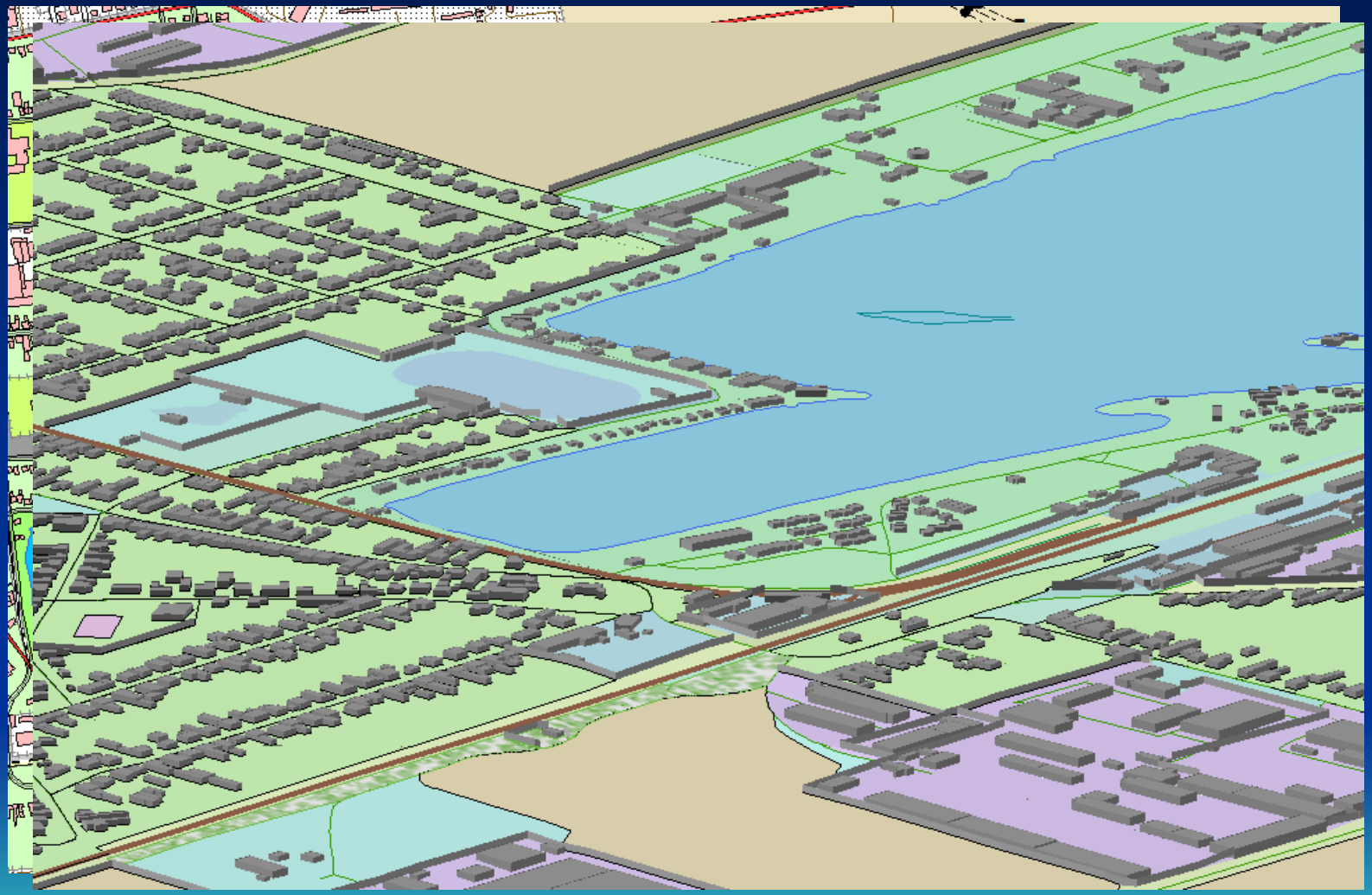
Primary database for GIS - attributes



Map proposal derived from Primary database for GIS



Visualization of Primary database for GIS



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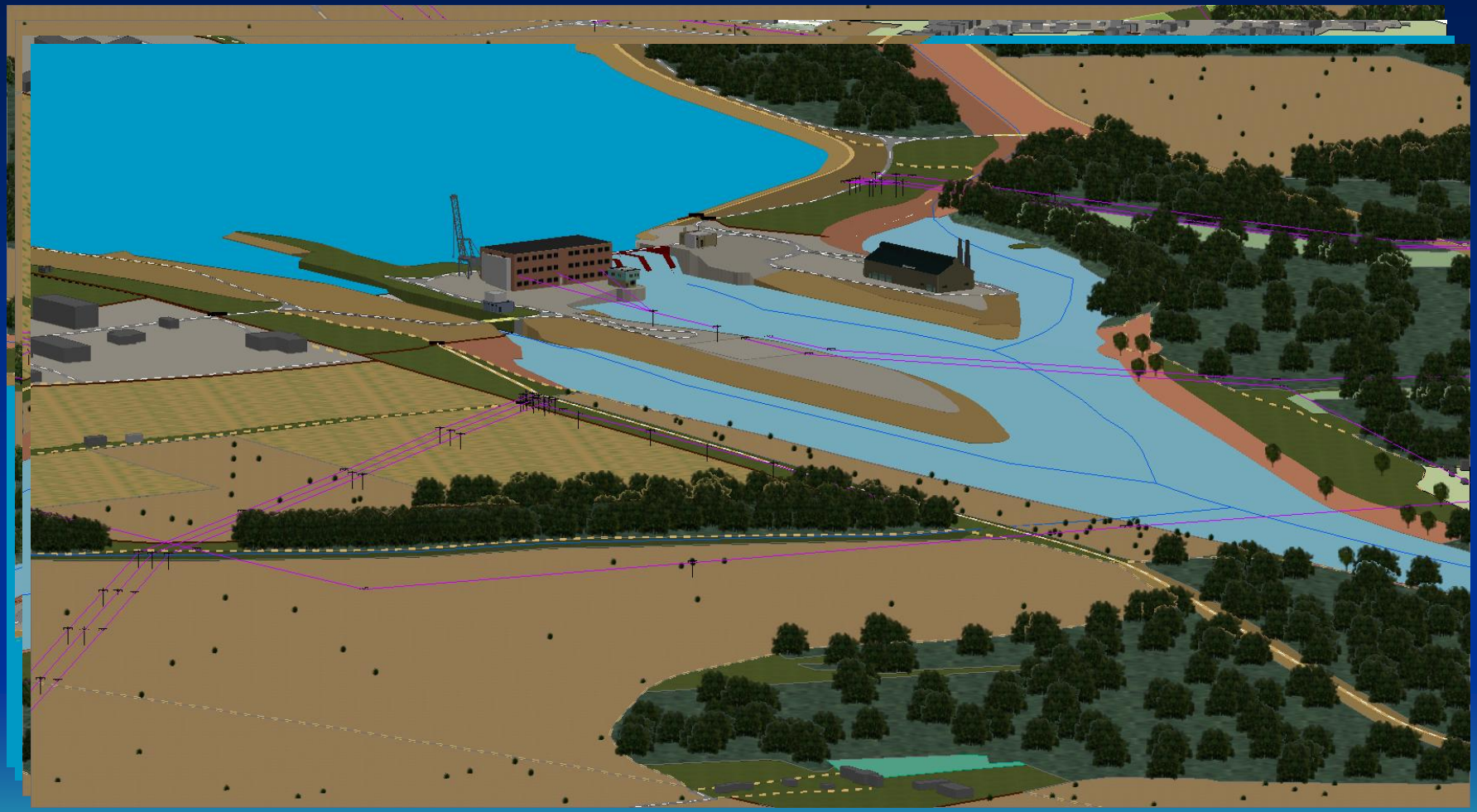
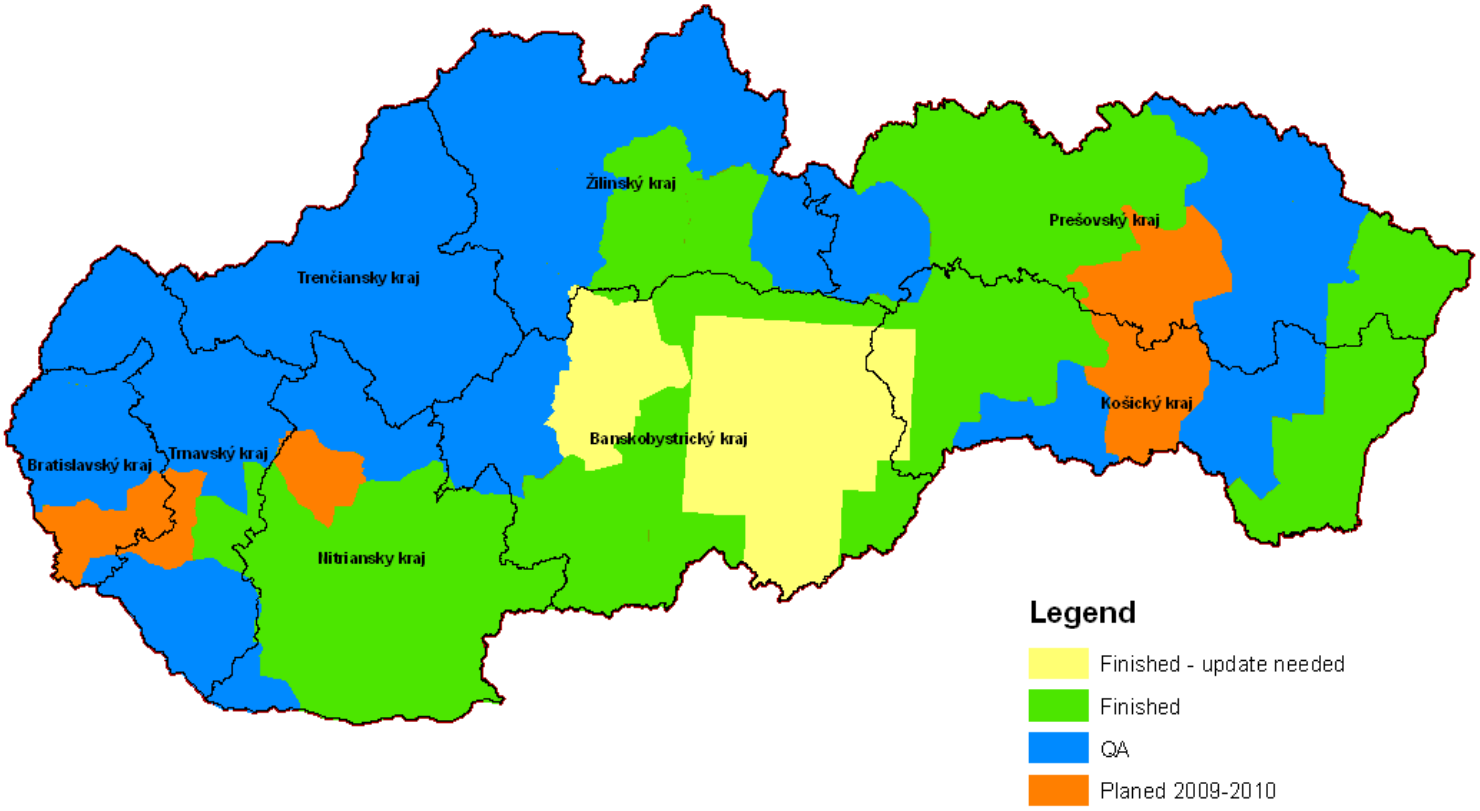


River dam „Kráľová“

Schedule for data acquisition

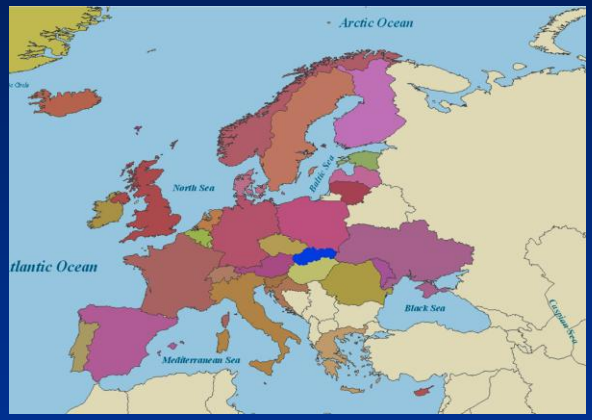
Primary database for GIS in cooperation with army



International Cooperation

We participate on projects of EuroGeographics:

- **EuroRegionalMap (ERM)** 1 : 250 000
- **EuroGlobalMap (EGM)** 1 : 1 000 000
- **EuroBoundaryMapy (EBM)** *formerly SABE*
- **EuroGeoNames (EGN)**



= reference data enabling spatial analysis and geographic backdrop for presentation and visualization, seamless and harmonised data produced in cooperation by the National Mapping and Cadastral Agencies of Europe, using official National Databases

= generalized from THE SEAMLESS VECTOR MAP 1:50 000 (SVM50)

Issues and challenges

- Upgrade of photogrammetric production line and update data in Primary database for GIS
- Publish data and metadata using services (OGC Services)
- Provide data for INSPIRE Spatial data themes
- Create and provide portal ⇨ building of information systems in public administration, building of information society and e-Government
- *„Do better decisions by using the proper data“*

Thank you
for your attention !

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