Workshop of the ICA Commission on Generalisation and Multiple Representation
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# Integration of the Topographical Database, VMap L2 and selected cadastral data – a step towards the integrated, MRDB reference database in Poland

Dariusz Gotlib
Robert Olszewski
Warsaw University of Technology

## TOWARDS MULTIRESOLUTION TOPOGRAPHICAL DATABASE IN POLAND

- **Three steps towards the integrated, MRDB reference database in Poland**

**1) Harmonization of existing topographical databases**

**2) Joining TBD and Vmap databases**

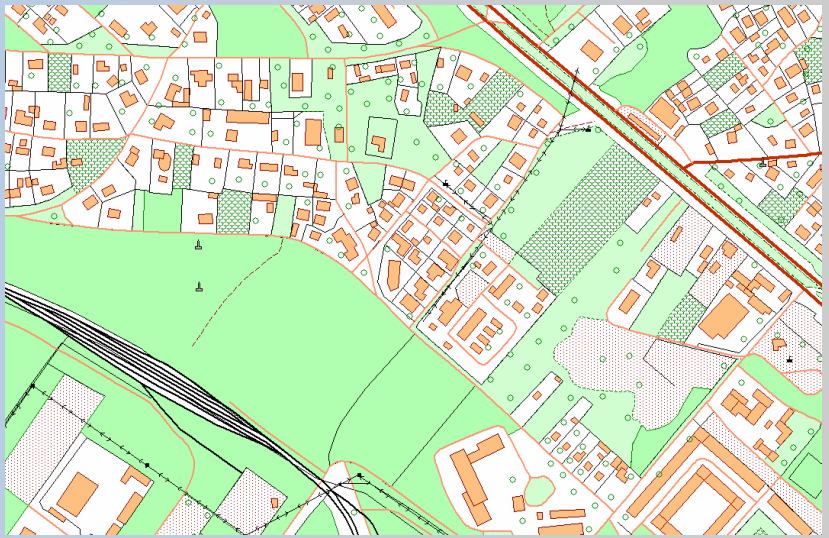
**3) Developing of existing topographical data model (characteristic for Polish NSDI) towards MRDB model**

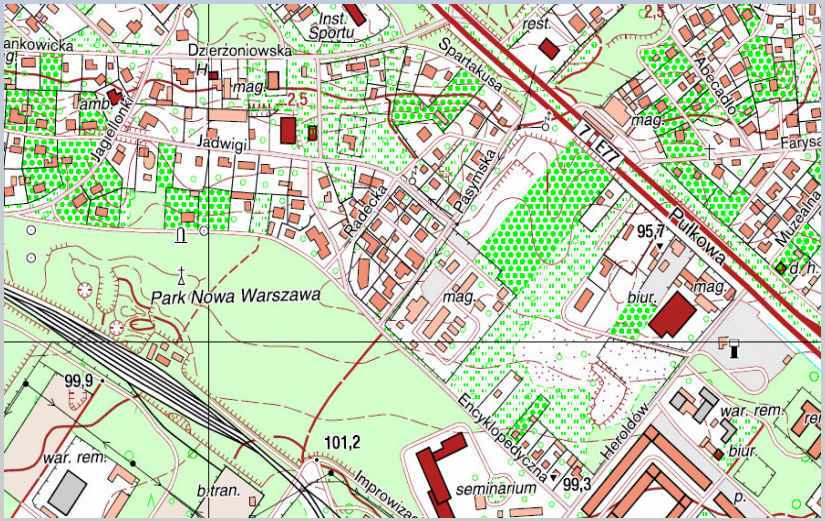
## POLISH SPATIAL DATA INFRASTRUCTURE

- **Polish NSDI**
  - **The "General Geographical Database" – BDO**
    (level of detail 1:250 000),
  - **VMap Level 2**
    (level of detail 1:50 000),
  - **Topographical Database – TBD**
    (level of detail 1:10 000)
  - **"EGiB" - Cadastral database**

# TOPOGRAPHICAL DATABASE

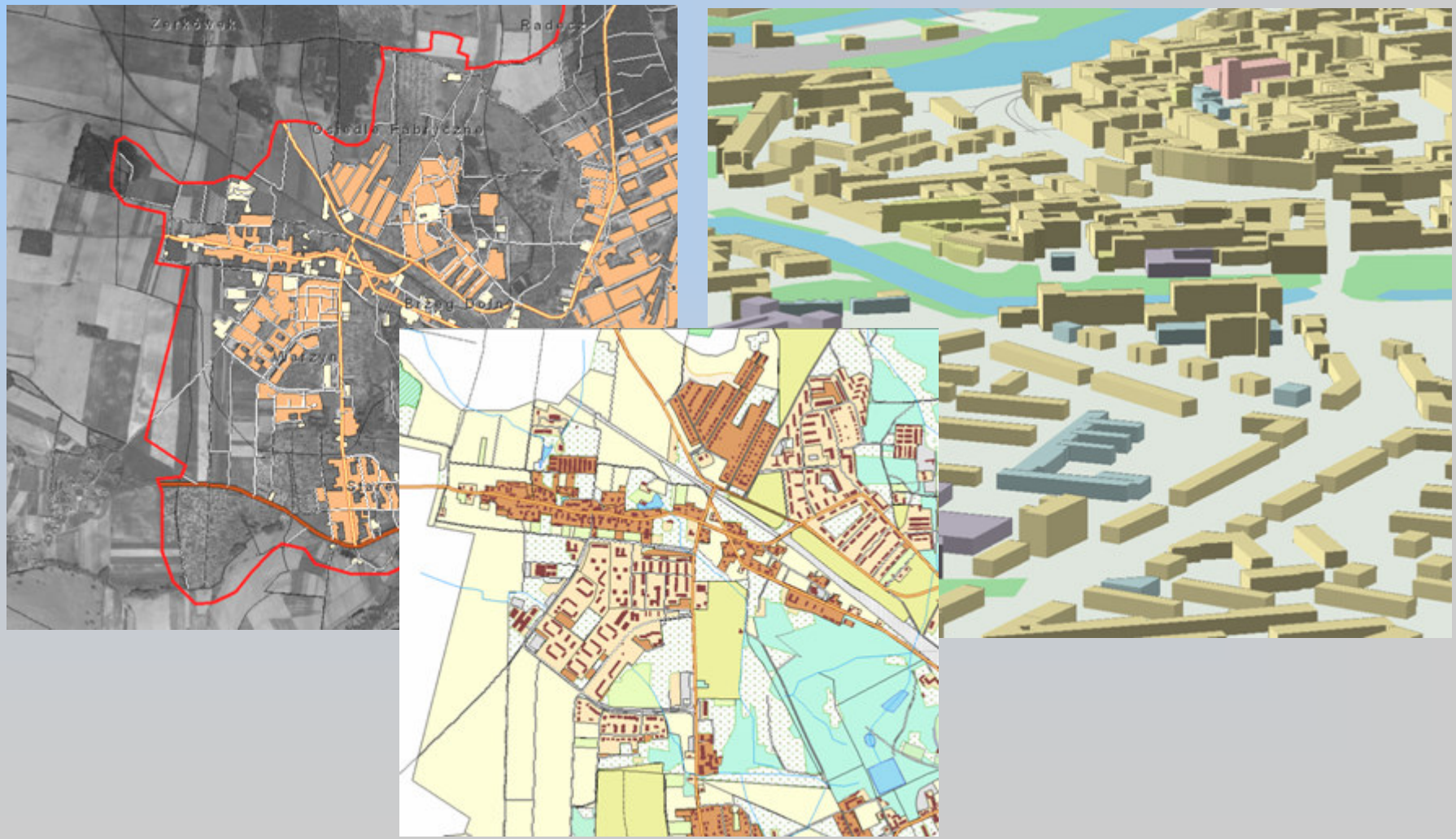
- **TOPO ⇒ DLM**





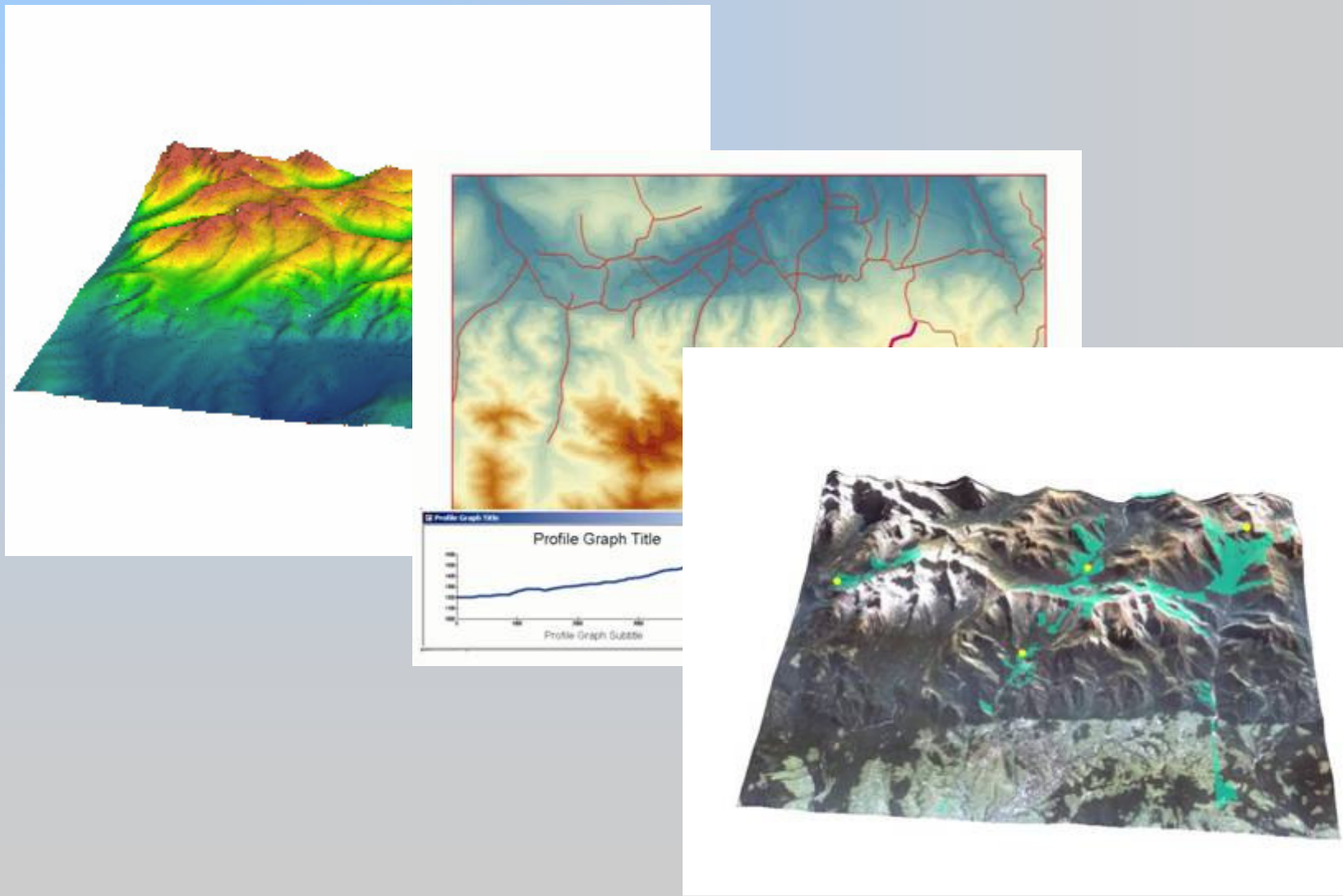
# TOPOGRAPHICAL DATABASE

- **TOPO**



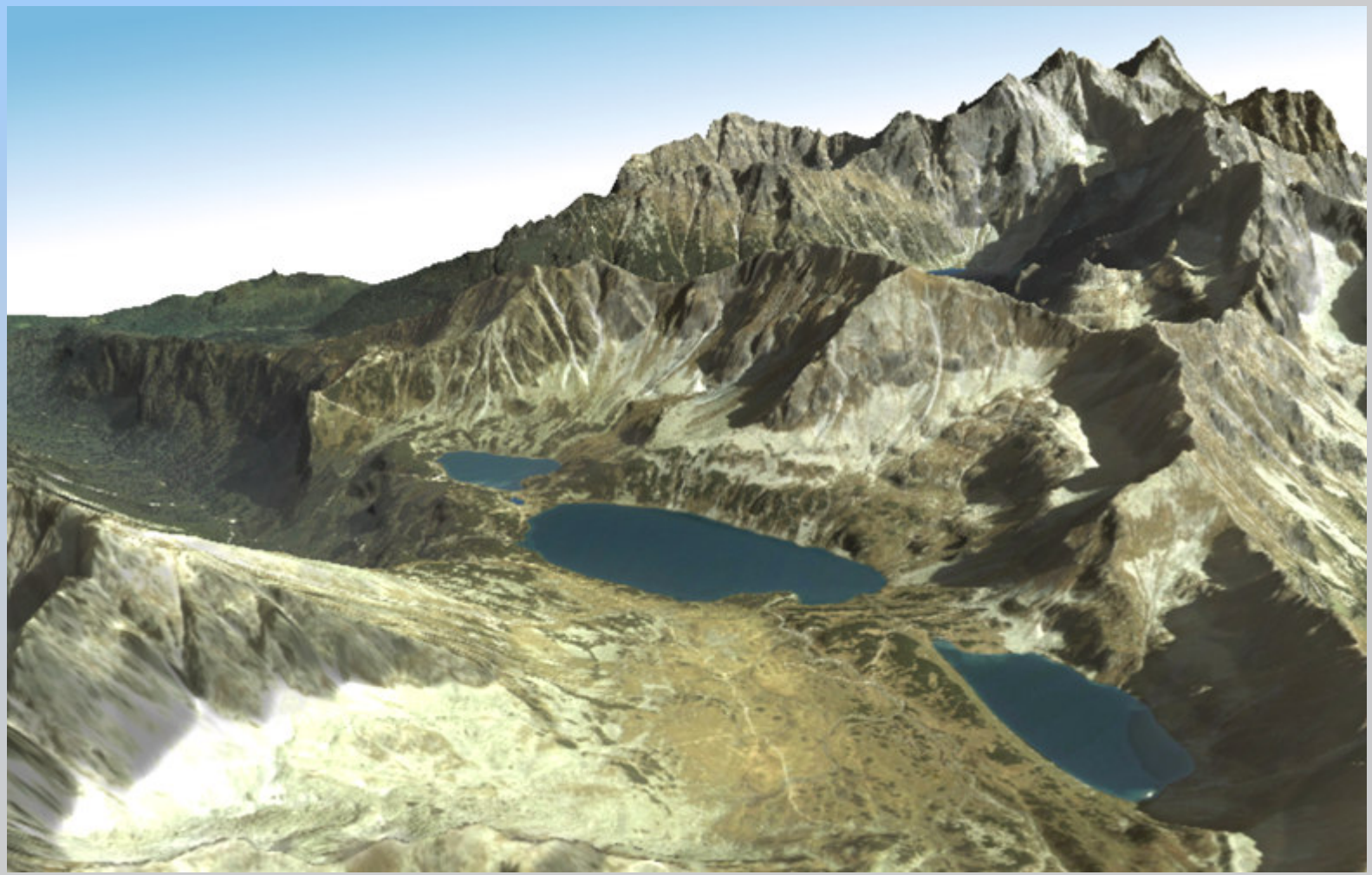
# TOPOGRAPHICAL DATABASE

- **DTM**



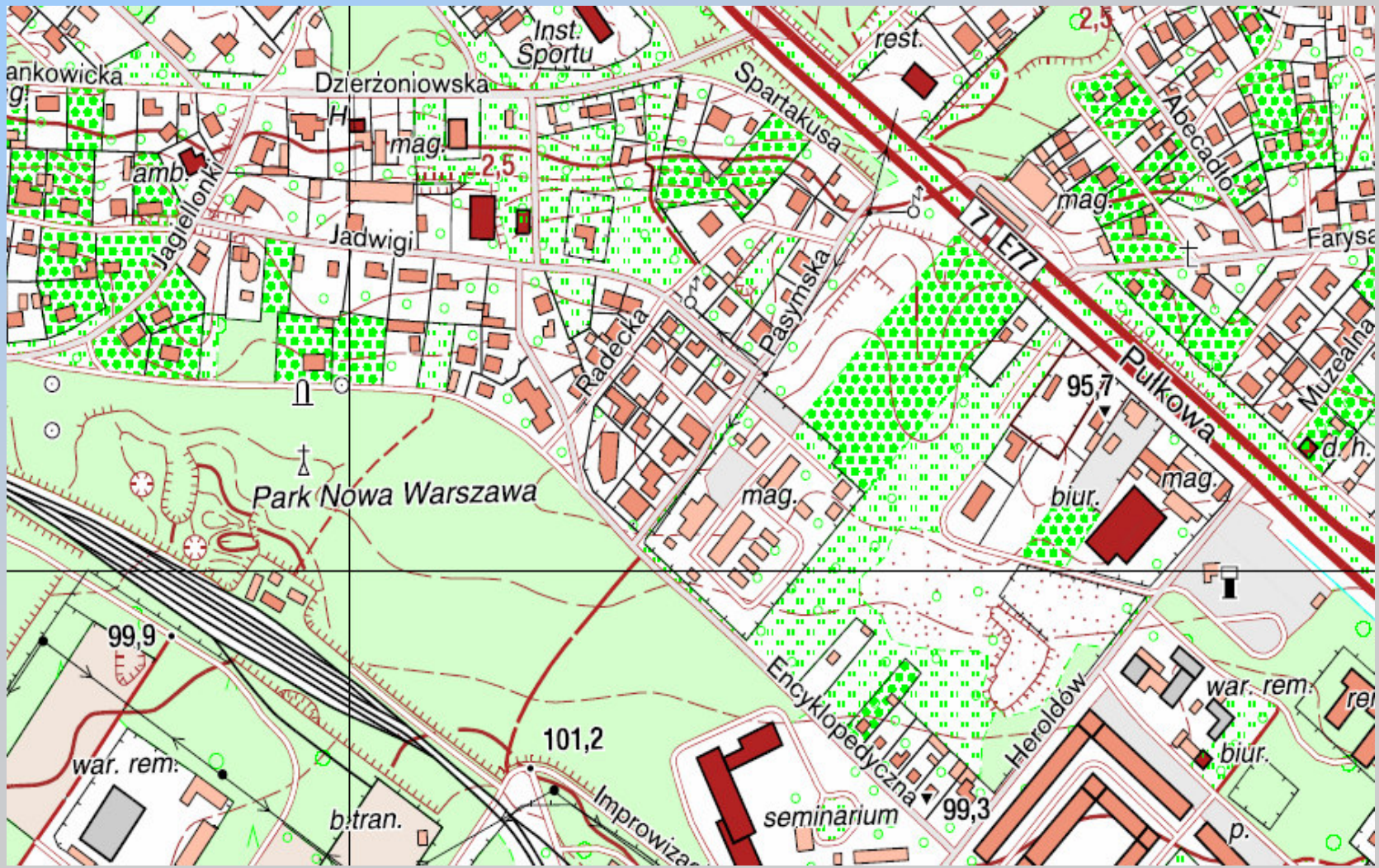
# TOPOGRAPHICAL DATABASE

- **ORTOFOTO + DTM**



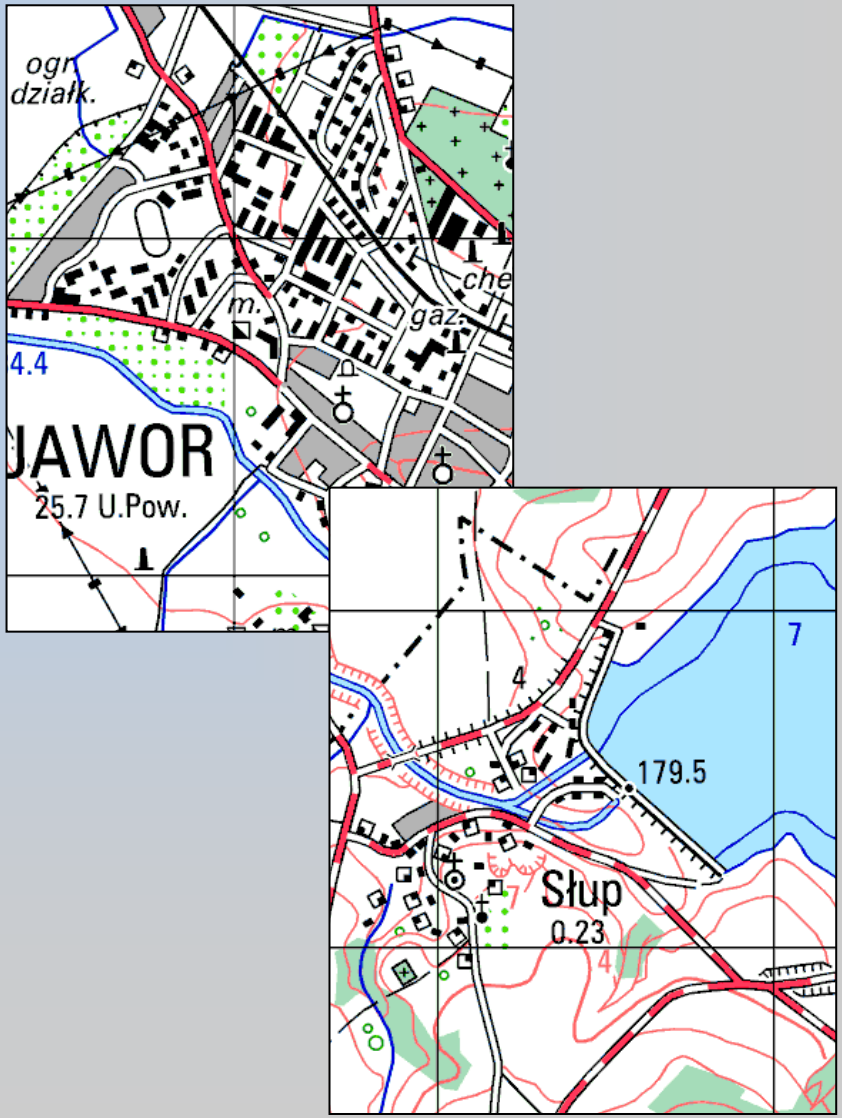
# TOPOGRAPHICAL DATABASE

- **KARTO ⇒ DCM**



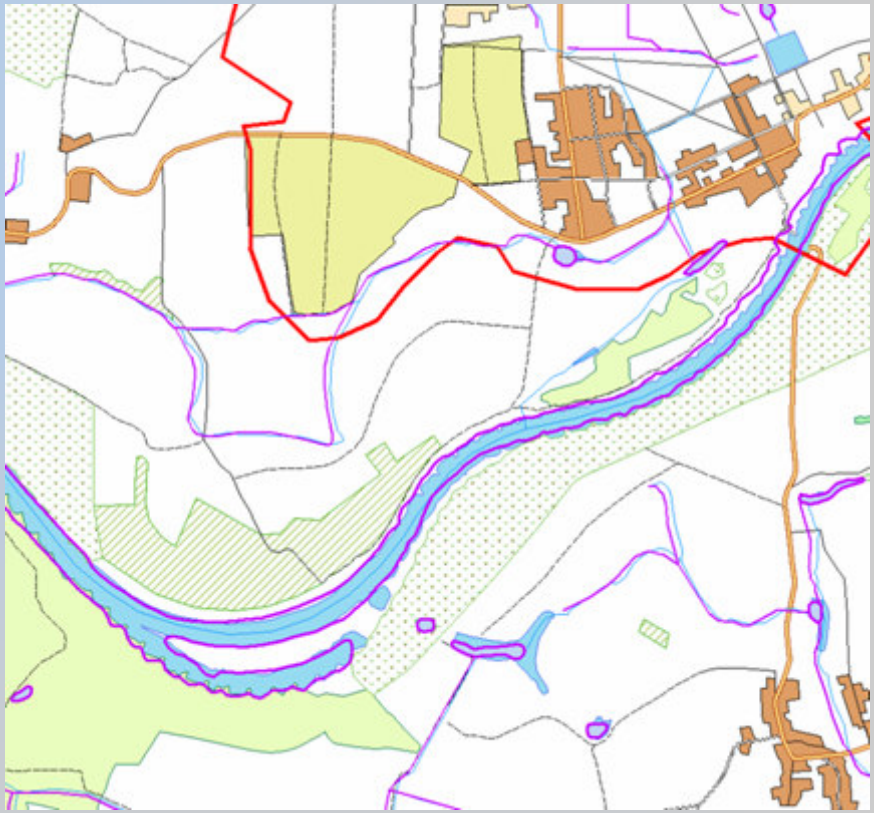
# VMAP L2

- **DLM+DCM**



# VMAP L2

- **VMap L2 – differences between the first and the second edition**



# VMAP L2

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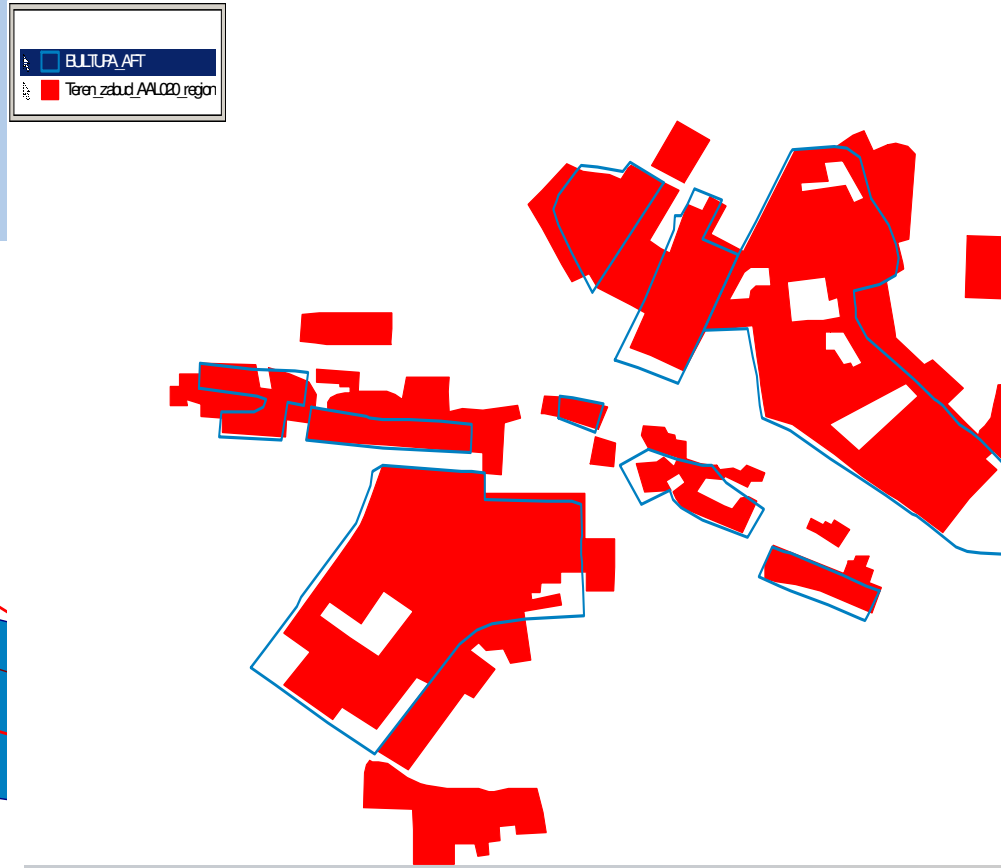
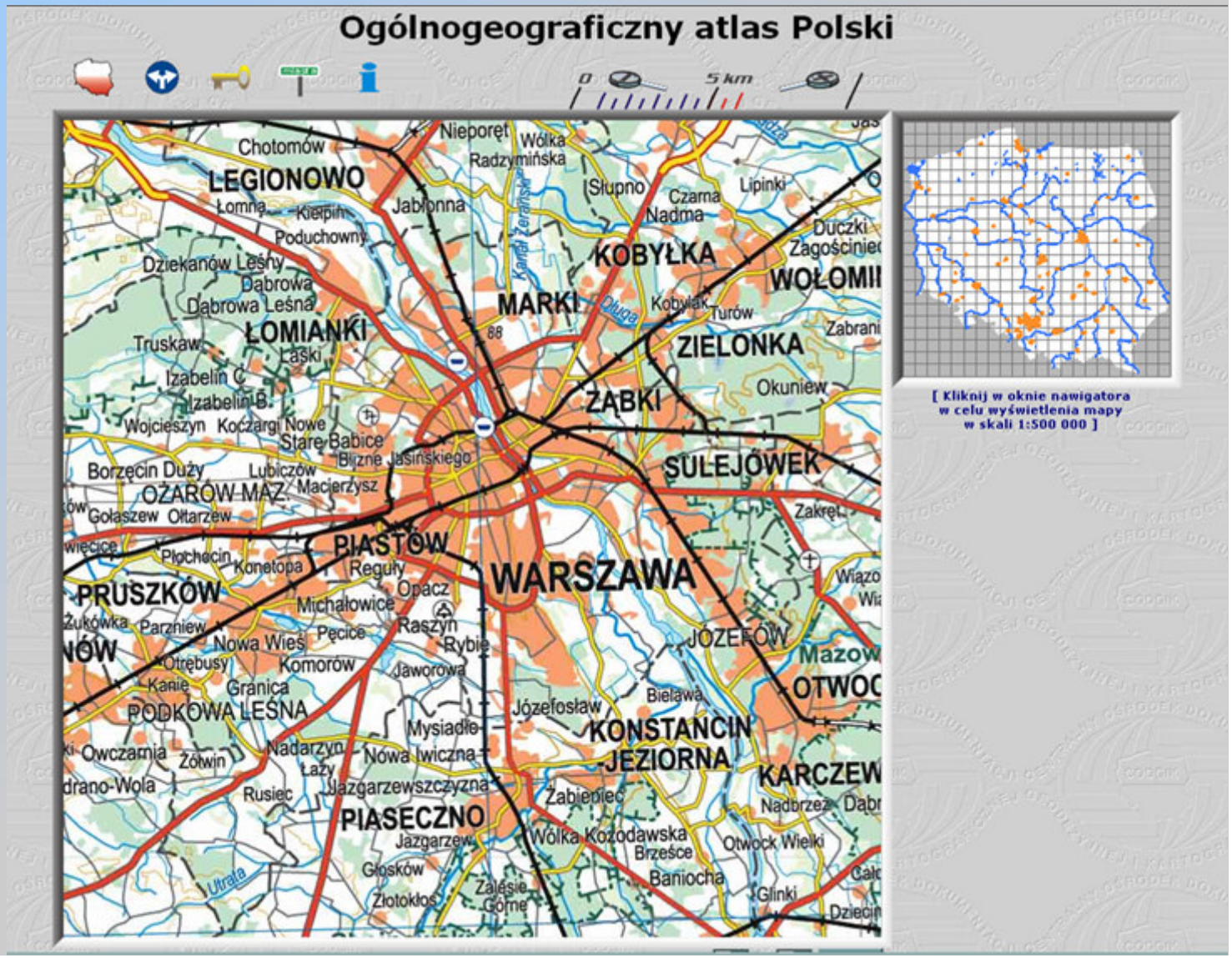


# BDO

- ★ **BDO 250**
- ★ **BDO 500**
- ★ **BDO 1000**
- ★ **BDO 4000**



## THE FIRST STEP:
## HARMONIZATION OF EXISTING TOPOGRAPHICAL DATABASES

- **TBD + VMAP L2**

  - TBD and the VMap L2 database are to be the basic source of topographic data – both, for supplying official geographical information systems, as well as systems of production of topographic and thematic maps,

  - achievement of coherence of methods of modelling of topographic objects of these two databases is of particular importance. It will allow for mutual data exchange between TBD and VMap databases

## THE FIRST STEP:
## HARMONIZATION OF EXISTING TOPOGRAPHICAL DATABASES

- **TBD + VMAP L2**

  Cartographic military and civil services have commenced co-operation in the field of data exchange between these databases (as well as in co-financing of selected works),

  **The time has come to combine both databases and to develop a coherent reference topographic database, which will be the basis for the national spatial data infrastructure.**

## THE FIRST STEP:
## HARMONIZATION OF EXISTING TOPOGRAPHICAL DATABASES

- **TBD + VMAP L2**

At the end of 2005 the group of experts, representing the civil and military cartographic services, operating on the commission of the Head Office of Geodesy and Cartography - GUGiK (Gotlib, Iwaniak, Olszewski, 2006) proposed the some activities which influence the NSDI development in Poland

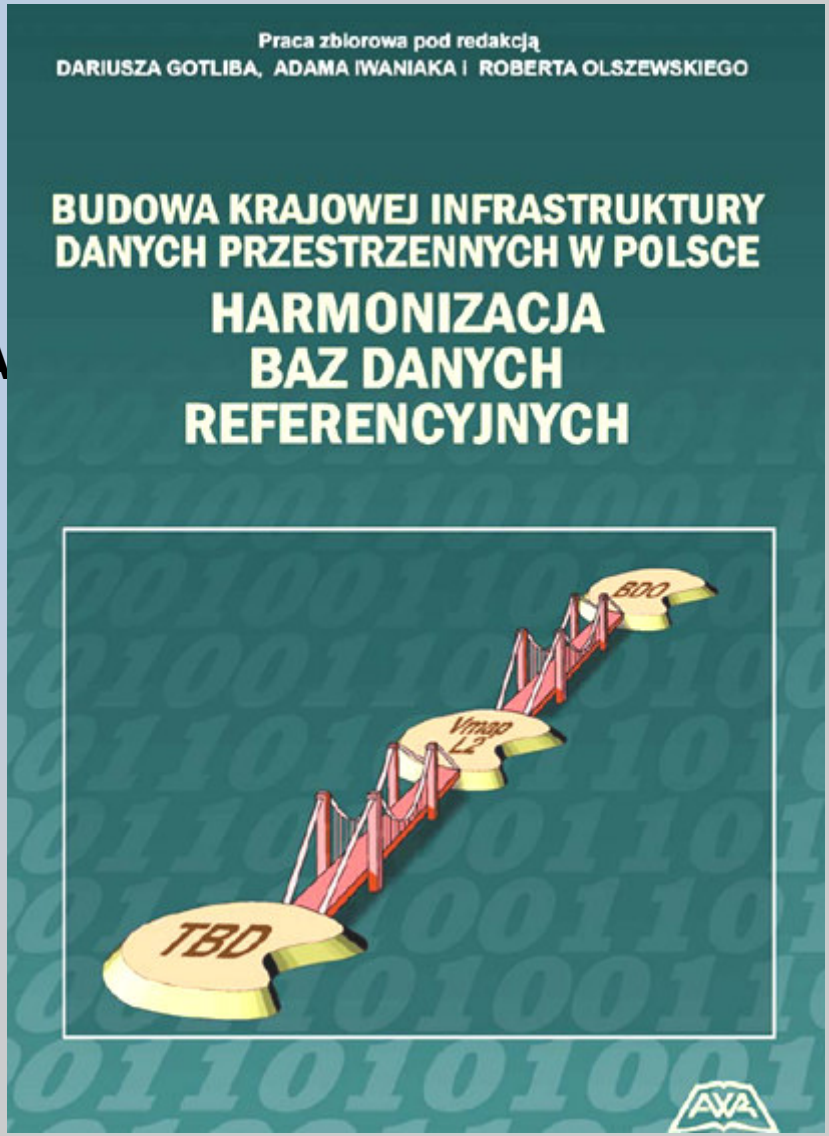
# THE FIRST STEP:
# HARMONIZATION OF EXISTING TOPOGRAPHICAL DATABASES

## CREATION OF THE NATIONAL SPATIAL DATA INFRASTRUCTURE IN POLAND

## – HARMONISATION OF REFERENCE DATABASES

**EDITED BY:**

**DARIUSZ GOTLIB, ADAM IWANIAK, ROBERT OLSZEWSKI**



# THE FIRST STEP:
# HARMONIZATION OF EXISTING TOPOGRAPHICAL DATABASES

★ **TBD and VMap harmonization**

Important modifications:

- **introduction of uniform representation of the road network** (representation in the VMap individual roadway and not an axis of the road, common classification of roads),
- **introduction in the VMap of continuous, linear representation of the river network**,
- **unification of the term "Built-up areas"** in both products,
- introduction of common lists of localities, names of water streams and water reservoirs, dictionaries of roads,
- **unification of a method of terrain relief modelling**,

# THE FIRST STEP:
# HARMONIZATION OF EXISTING TOPOGRAPHICAL DATABASES

- **TBD and VMap**

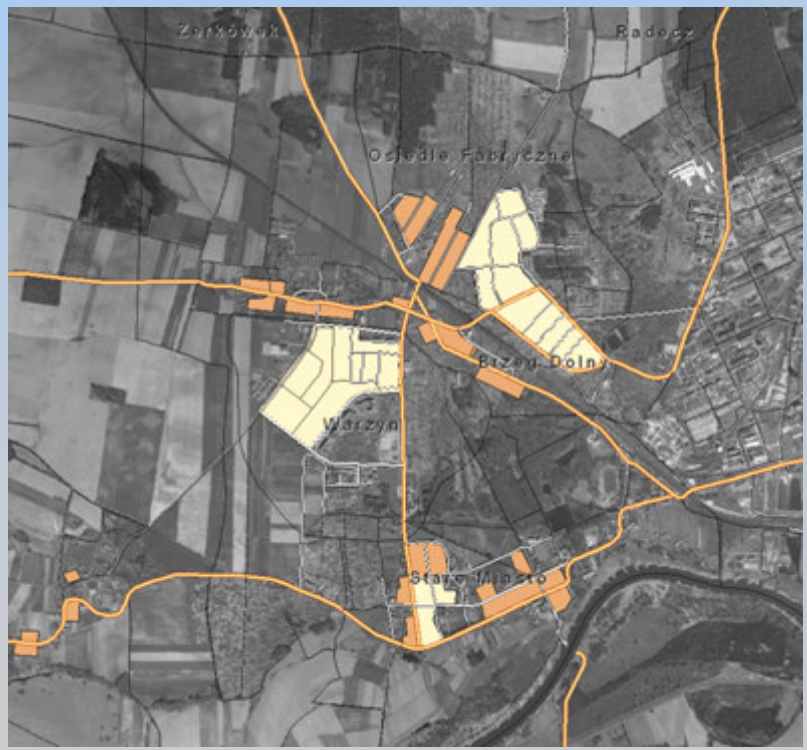
before harmonization

after harmonization

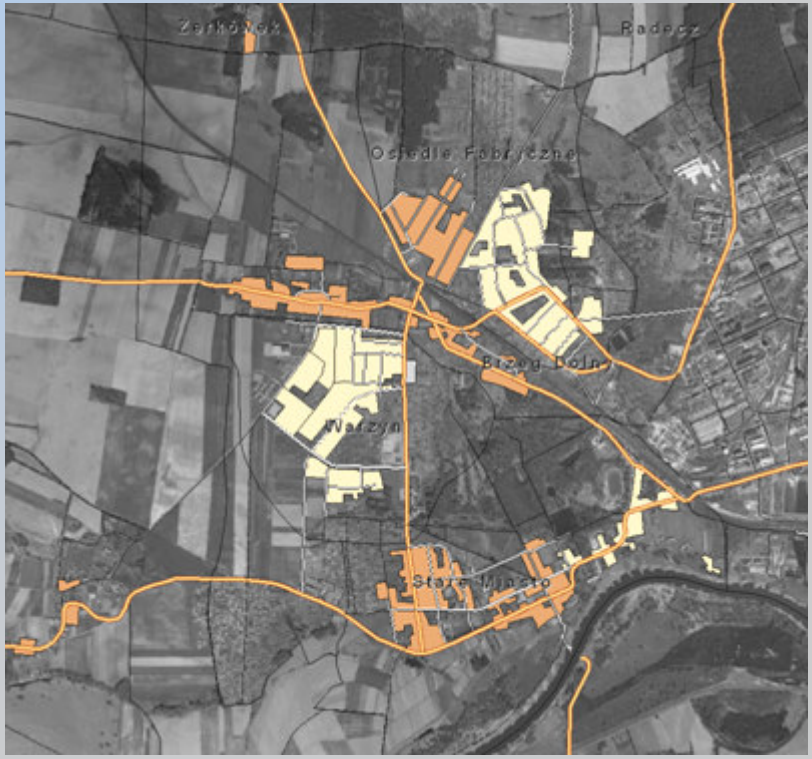
# THE FIRST STEP:
# HARMONIZATION OF EXISTING TOPOGRAPHICAL DATABASES

- **TBD and VMap model harmonization**

VMap L2




TBD



## THE SECOND STEP:
## JOINING TBD, VMAP, EGiB

- **TBD and VMap**

  At the next stage (project carried out by the Agricultural Academy in Wrocław AND Warsaw University of Technology) an attempt was made to combine the VMap L2 and TBD databases into one database, which allows to make it available for the users.

  The main goal of this projects: concept and structure of Multiresolution Topographical Database (MTDB)

## THE SECOND STEP:
## JOINING TBD, VMAP, EGiB

- **TBD and VMap**

  - Topographic data modeled in the TBD and VMap databases are characterized by various levels of conceptual generalization (corresponding to 1:10 000 and 1:50 000 scales, respectively) but they are marked by practically the same level of geometric accuracy.

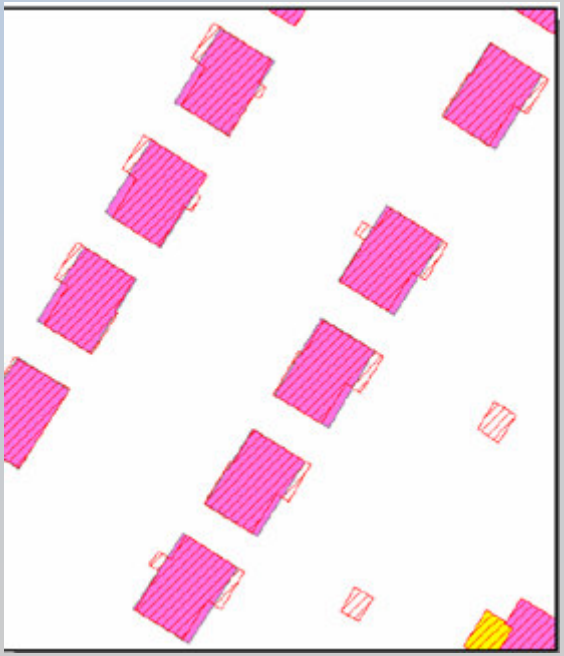
  - The new integrated database will contain all objects presented in the VMap L2 and TBD databases, together with their geometric representations, which enable analyses and cartographic presentations at various levels of generalization,

# THE SECOND STEP:
# JOINING TBD, VMAP, EGiB

## ✶ TBD and cadastral data

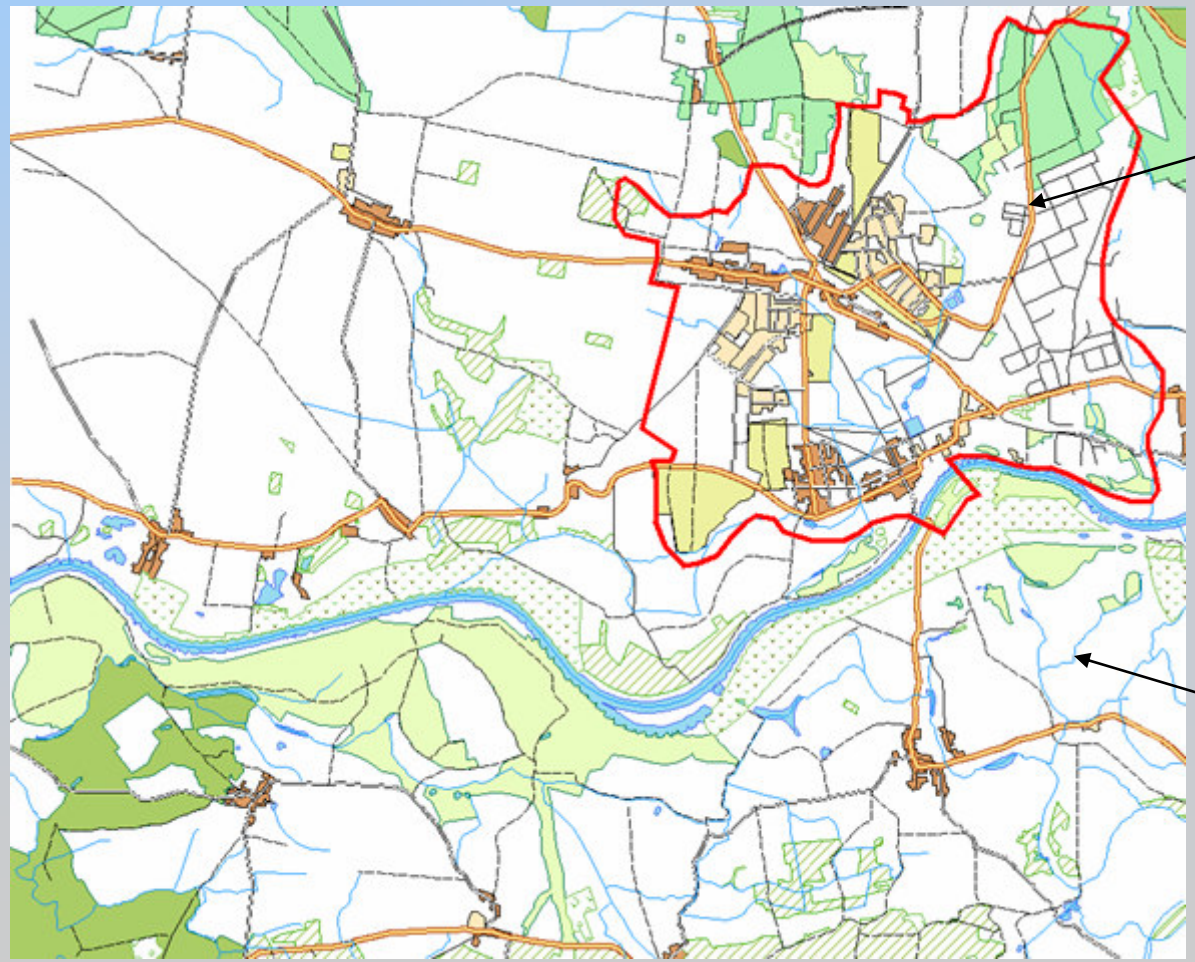
Proposed ideas should also influence on modification of the structure of existing cadastral data model; however this may become extremely difficult in practice due to the formal-and-organizational purposes.

However, without introduction of these changes, utilisation of data from the cadastral resources is practically limited to acquisition of information concerning buildings: geometry (which has to be generalize before importing to the TBD) and building function classification.



# THE SECOND STEP:
# JOINING TBD, VMAP, EGiB

- **TBD and VMap joining – first examples**



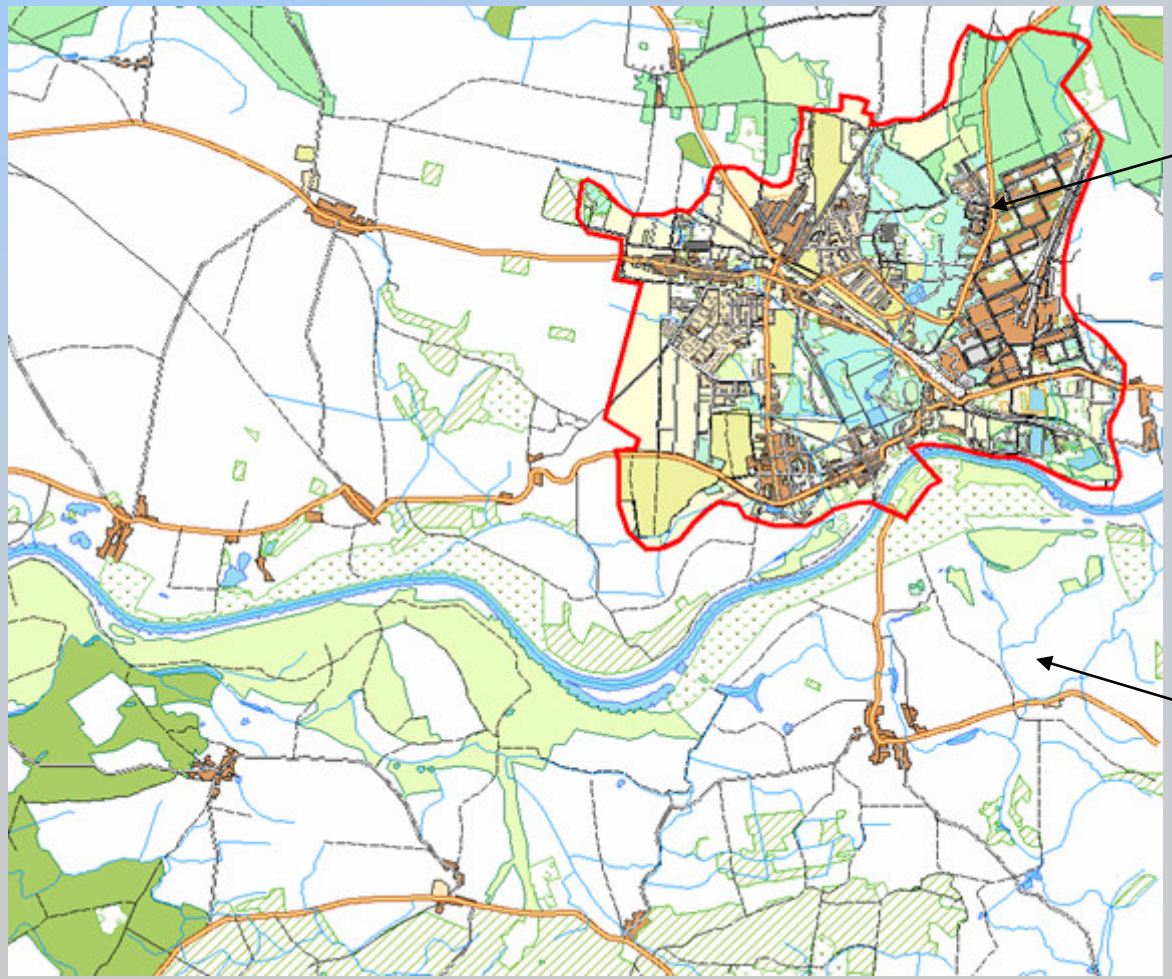
TBD data

1st level of detail

VMap data

# THE SECOND STEP:
# JOINING TBD, VMAP, EGiB

- **TBD and VMap joining – first examples**



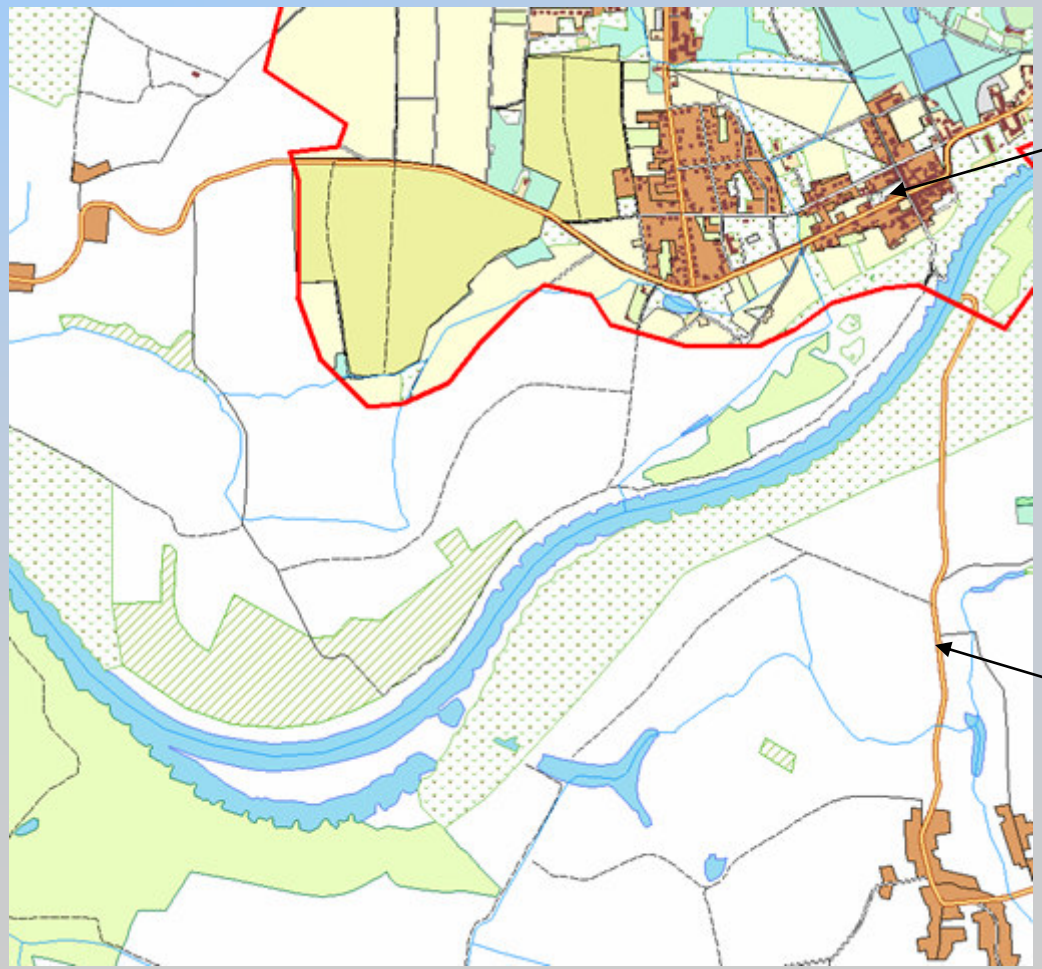
TBD data

2nd level of detail

VMap data

# THE SECOND STEP:
# JOINING TBD, VMAP, EGiB

- **TBD and VMap joining – first examples**



TBD data

2nd level of detail

VMap data

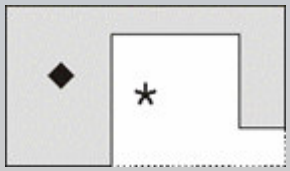
# THE THIRD STEP:
# DEVELOPING OF EXISTING DATA MODEL

## ✶ Towards MRDB structure

Among various proposal of developing of existing data model the most interesting are:

1) Storing of more then one geometric representations of the object in one database:

e.g. not only the boundaries of such objects as “The airport”, „The underground station”, „Building” but also characteristic points of these objects (e.g. crossing the runways in the airport or points represents the entrance to underground facilities, buildings entrance etc)



# THE THIRD STEP:
# DEVELOPING OF EXISTING DATA MODEL

- **Towards MRDB structure**

Besides the defined polygon, objects of the class “Locality” in the MTBD will have point representation. **Such a point will not be automatically generated**, but it will be placed in a representative location of the „Locality”, which will have the real, conceptual meaning. Depending on the type of the locality, such a point will be placed, for example, in the main crossroad in the given locality; in the place where the central square of that locality is located or in the place where the city hall is located etc.

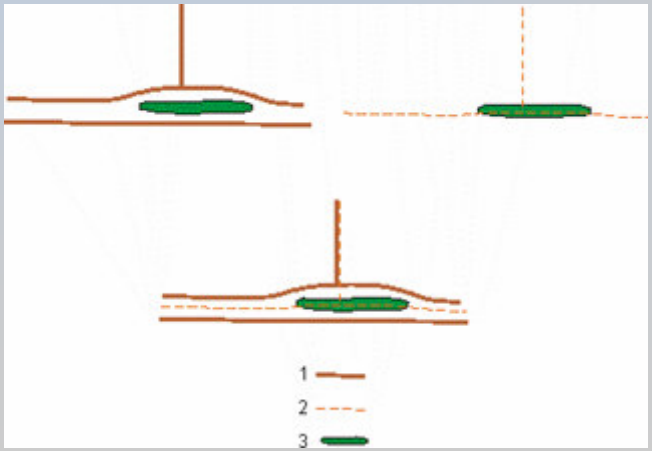
This will allow to automate procedures of generalization, and first of all, to maintain the repeatability of generalization.

# THE THIRD STEP:
# DEVELOPING OF EXISTING DATA MODEL

## ✶ Towards MRDB structure

Storing objects which represent roadway in the MTDB in the uniform way as well as objects which represent axes of two-pavement roads.

One should remember that they are different objects in the conceptual sense, they have different attributes and rules of representation in the database, however, they are highly mutually related.



# THE THIRD STEP:
# DEVELOPING OF EXISTING DATA MODEL

- **Towards MRDB structure**

2) Simultaneous storing of information concerning buildings and built-up areas in the database. In the case of successive changes of the scale level (derivative products) buildings located within densely built-up areas may be automatically removed and other buildings, e.g. classified as public buildings, may remain unchanged.

Hierarchic classification of built-up area, which allows for simple aggregation in generalization process.

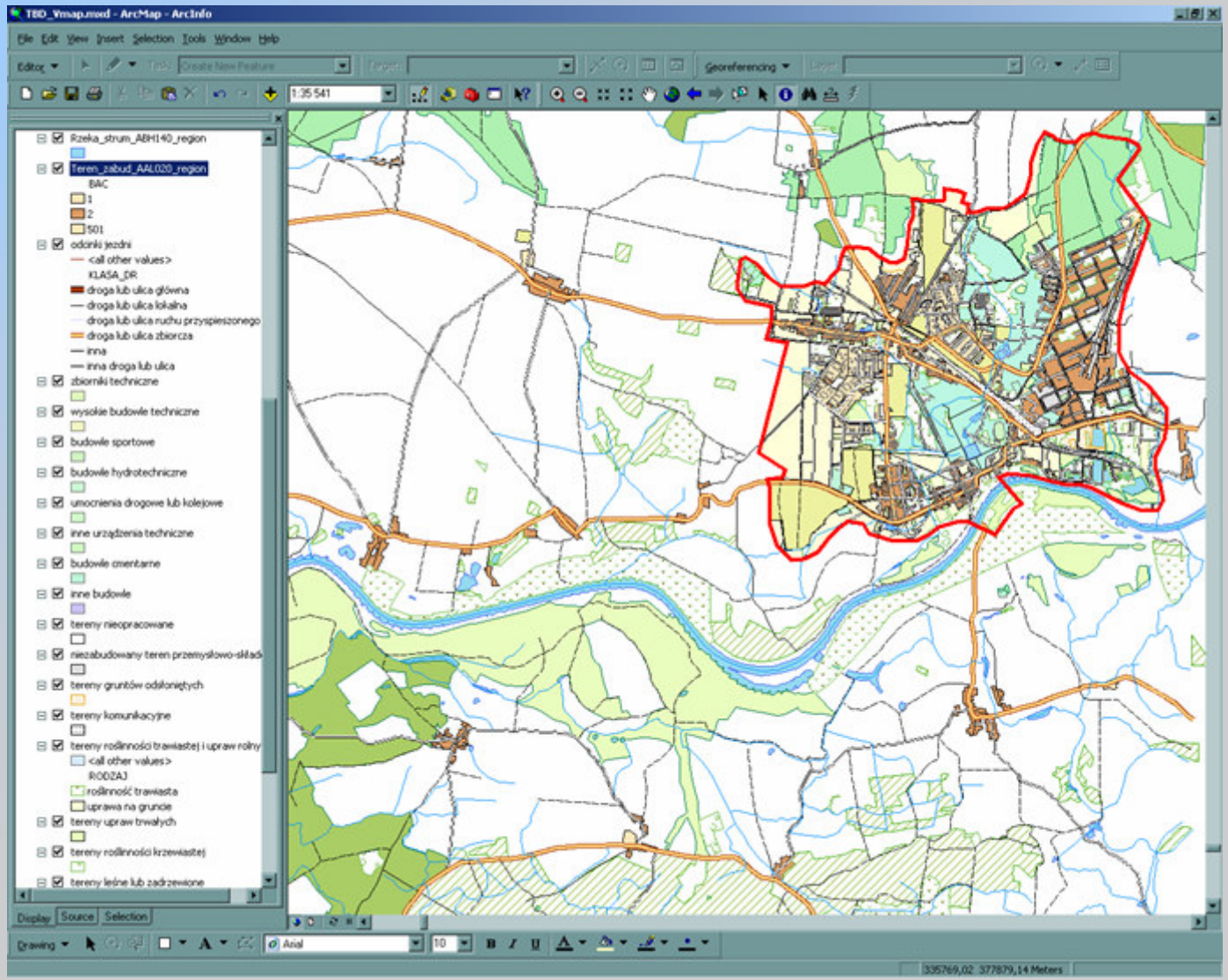
3) Extension of the hierarchy of object classes, which allows for storing data in one database, at various levels of generalisation.

## SUMMARY

- The necessity to develop a TBD database structure according to MRDB idea, common for TBD, VMap L2 and BDO databases,
- Initial experiments prove that it would be possible to maintain the considerable part of the TBD database structure as the basis for a uniform, reference topographic database,
- The proposed solution will allow for combination of development of civil topographic databases and maps with military topographic databases and maps. Both services will be able to base their works on one, common MTBD database. Moreover, it would be the basis for making derivative databases and maps,
- Final results of the project are planned at the beginning of 2007.

# TOWARDS MULTIRESOLUTION TOPOGRAPHICAL DATABASE IN POLAND

The semi-final result:



**THANKS YOU FOR YOUR ATTENTION**