



Mazovia.
heart of Poland



Plock



Piaseczno

**Working out and implementing innovative
methods of integration of cadastre data,
base map and Topographical Database (TBD)
and modernization of services
provided by Geodetic and Cartographic Service**

Conference

"Standardisation and Integration of Geodetic and Cartographic Data"

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(27) quote: "The effective implementation of infrastructures for spatial information requires coordination by all those with an interest in the establishment of such infrastructures..... Appropriate coordination structures which extend to the various levels of government ... should therefore be established..."

(28) quote: "In order to benefit from the state of the art and actual experience of information infrastructures, it is appropriate that the measures should be supported by international standards and standards adopted by European standardisation bodies..... "

Fragments of the Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE)

www.gugik.gov.pl

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The growing demand for access to spatial data and its application in decision-making, connected with the dynamic increase in the quantity of various types of information concerning phenomena occurring above the ground, in it and below its surface, as well as technological developments, - these issues were addressed in Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing Infrastructure for Spatial Information in the European Community (INSPIRE).

The INSPIRE Directive obliges the member states to establish infrastructure for spatial information, ensuring especially:

- general availability of the spatial data sets and the related services,
- interoperability of the spatial data sets and the related services,
- sharing of spatial data sets by entities responsible for public tasks.

Efficient implementation of provisions of the Directive requires harmonisation of the collections of data, defined as a set of legal, technological and organisational actions aimed at achieving mutual cohesion of the collections and their adaptation for sharing and shared application.

These needs are addressed by the project entitled "Working out and implementing innovative methods of integration of cadastre data, base map and Topographical Database (TBD) and modernization of services provided by Geodetic and Cartographic Service", implemented by the Self-Government of Mazowieckie Voivodeship in cooperation with the Main Surveyor of Poland, Piaseczno Powiat and the City of Plock, supported financially by the Financial Mechanism of the European Economic Area.

Implementation of this project coincided with a publication in the GIM magazine of the "base" model of cadastre suggested by FIG (Lemmen, Oosterom 2006), as a basis for national cadastre models. The draft ISO 19152 standard on cadastre was issued, too (ISO 2008).

One of the most important objectives of the said project is to prepare specifications of conceptual models of georeference data, including the scope of the content of databases listed in the Regulation of the Minister of Regional Development and Construction Industry on detailed rules and modes of establishing and maintaining the national land information system (Journal of Laws No. 80 item 866), i.e.:

- database of detailed geodetic control networks,
- database of the land and buildings' register,
- database of the geodetic register of utilities network,
- database of the topographic objects included in the content of the base map,
- database of topographic objects with a numerical model of the terrain, as well as a database of the real estate price and value register and a hydrographic and environmental map.



The project assumes especially that:

- conceptual models of data will be prepared as formalised application schemes according to the methodology defined in the 19100 series ISO standards - Geographic Information and that they will take the applicable law into account,
- the application schemes will be described in the formal UML language (class diagrams) according to the profile defined in ISO/TS19103 (ISO 2005),
- data sharing will be based on the data sharing format GML 3.2 described in ISO 19136.

The results of the project will also include recommendations for changing the applicable legal provisions. The conceptual models prepared in the project, including the application schemes, will be a material contribution to the operations of the Head Office of Geodesy and Cartography related to preparation of executive¹ regulations for the amended act of 17 May 1989 - Geodetic and Cartographic Law.

The project offers detailed georeference data models based on the "General Spatial Object" concept.

The General Spatial Object is a basis for constructing a harmonised collection of spatial data included in the Infrastructure for Spatial Information (IIP). It represents any object of the real world and constitutes a generalisation of all objects characterised by a spatial location within the IIP.

Another element of the specification of the conceptual models prepared in the project is a proposal of solutions implementing the rules stipulated in the INSPIRE Directive which concern the uniqueness and invariability of identifiers of reference objects in the IIP and versioning of objects.

The specifications also provide:

- rules concerning cases, where it is impossible to enter the relevant value of a given attribute while disclosing an object's attributes in the database because of lack of sufficient information or lack of access to the source of information (the so-called "nil reason" rule),
- concept of detailed logical rules and organisational procedures of data sharing between the databases in the project,
- guidelines and recommendations for implementation of the application scheme in the environment of a relational or relational and object database and for requirements concerning management systems of the databases.

¹ The draft amendment of provisions of the Geodetic and Cartographic Law is a part of the draft act on spatial information infrastructure, which transposes the INSPIRE Directive to the Polish legal system.



The main concepts of the data model under preparation imply the following detailed rules of functioning of georeference data within the Geodetic and Cartographic Service:

- 1) databases of geodetic control networks, land and buildings register, geodetic register of utilities network and topographic objects included in the content of the base map are a basic component of georeference spatial data;
- 2) georeference databases might be updated based on documents which guarantee the relevant quality and reliability of data or else by updating the content of one database according to the content of another base, including generalisation procedures;
- 3) databases which are updated based on the same document or the same set of documents, cooperate with each other through information systems designed for their management and the information and data included in the databases are made available through INSPIRE services;
- 4) databases of geodetic control networks, land and buildings register, geodetic register of utilities network and topographic objects included in the content of the base map are a basis for regular updating of the topographic objects database (TBD);
- 5) other public registers can be used for regular updating of the TBD, and especially: the national register of geographic names, the national register of borders and areas of territorial division units, register of serial numeration of properties;
- 6) the TBD is regularly updated through differential protocols supported by generalisation processes;
- 7) periodical updates of the TBD are based on information included in the current orthophoto map supplemented by research results and potential measurements of the terrain;
- 8) elimination of unnecessarily redundant data;
- 9) information from georeference collections are made available to other systems and also other recipients of information not only through network services and the information flow itself, but also through projection of the collection or its part as a classical cartographic publication;
- 10) the cartographic projection is carried out in accordance to the rules described in the specifications of cartographic models.

After completion of experts' works concerning a uniform data model, further works related to pilot implementation of the model will be carried out within the project "Working out and implementing innovative methods of integration of cadastre data, base map and Topographical Database (TBD) and modernization of services provided by Geodetic and Cartographic Service".



The project provides preparation, testing and implementation in selected areas of the Mazowieckie Voivodeship of organisation mechanisms and information tools allowing efficient implementation of the rule of interoperability of spatial data collections and services, including rules and procedures of updating the topographic objects database collected at the voivodeship level using collections of data prepared at the powiat level of the geodetic and cartographic service.

Further actions within the project are:

- 1) preparation and implementation of the communication and information system equipped with mechanisms allowing:
 - management of geodetic data and source materials at the powiat level,
 - online services for citizens and companies,
 - offering data for updating of the topographic objects database kept at the voivodeship level,
- 2) preparation and implementation of the communication and information system equipped with mechanisms allowing management and updating of the topographic objects databases collected at the voivodeship level.

Upon the project's completion, all of its results may be applied nationwide. Copyright to the results of the designing works will belong to the Main Surveyor of Poland.

At every stage of the project's implementation, its actions include training for the entire Geodetic and Cartographic Service organised in a direct form and through e-learning courses available at www.geointegracja.pl, too. This is the project's official website.



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