New Regulations for Building Information Infrastructure in Poland

Jarosław BYDŁOSZ, Agnieszka BIEDA, Poland

**Key words**: spatial information infrastructure, geodesy, cartography, cadastre, INSPIRE Directive, UML, GML

**SUMMARY**

In the article legal provisions governing the new development method of spatial information infrastructure are presented. The amendments arise mainly from the Act on Spatial Information Infrastructure as well as from the provisions of the Law on Geodesy and Cartography. In accordance with provisions of these acts and the implementing rules, both those binding and those in draft form, the spatial information infrastructure in Poland shall constitute a single database. This base shall comprise the individual components defined in the relevant implementing rules. These regulations define individual databases. For this purpose, the notation of the Unified Modeling Language (UML) is used. On the other hand, the GML (Geographic Markup Language) was adopted as the basic format for interchange and sharing of data sets. In the paper, special attention was paid to the regulation defining the Polish cadastral system, as the system registering information concerning real property.
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1. STRUCTURE OF THE POLISH LAW CONCERNING GEODESY AND CARTOGRAPHY

The Law on Geodesy and Cartography provides the legal basis for the Polish geodesy (Act of Law 1989). In fact, it regulates the issues of:

– geodesy and cartography,
– the national land information system,
– ground and building cadastre (real estates cadastre)\(^1\),
– inventory and register of utilities networks,
– demarcation of real property,
– National Geodetic and Cartographic Resource\(^2\),
– license to perform geodetic and cartographic works\(^3\),
– order of real property numbers in localities.

The geodetic and cartographic law refers to a number of implementing rules concerning the aforementioned issues. One of them is the waived regulation concerning the technical standards referring to geodesy (Regulation, 1999). This Regulation defined the aforementioned standards as technical provisions or norms established in form of the so-called technical instructions. They constituted 14 annexes to the Regulation (table no. 1).

\(^1\) Until the "ground and building cadastre" in Poland is converted into the "real estates cadastre", both terms are equivalent.

\(^2\) This term comprises a collection of maps and photogrammetric and teledetective materials, registers, specifications, IT databases, geodetic data catalogues and other studies developed as a result of the geodesic and cartographic works.

\(^3\) In Poland, access to the surveyor profession is regulated by a number of professional licenses which may be obtained following an internship and after passing the state exam.
The instructions addressed all key issues associated with geodesy and surveying in Poland, i.e.:

- establishing, improvement and maintenance of the geodetic, gravimetric and magnetic control network,
- development and updating of the base map,
- development of the geodetic register of utilities networks and approval of such network location plan,
- taking photogrammetric photos of country area for the state needs,
- development and updating of topographic maps and thematic maps for the state needs,
- creating and maintaining of ground and building cadastre,
- performing the general appraisal of real property,
- maintaining the state register of the borders of the Republic of Poland and administrative borders of units of territorial administrative division of the country,
- preparing any geodetic studies for legal and design purposes,
- establishing and maintaining databases included in the national land information system,
- maintaining the National Geodetic and Cartographic Resource at the central, regional and district level.

Moreover, a range of the so-called technical guidelines is available which develop the instruction in more detail. Two instructions were also printed, prepared as an input to the draft regulation which was to amend the existing provisions:

- **O-1 / O-2** General rules on performing the geodetic and cartographic works,
- **G-2** Detailed horizontal and vertical geodetic control network and computing coordinates between the systems.

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4 Individual issues are binding only for works performed with the application of maps developed using the specific issue.
Contractors and the geodetic service in Poland use and also recommend G-5 instruction on "ground and building cadastre" of 2003. It has never constituted the formal legal regulation, however, it is recommended for application.

The aforementioned documents were developed over many years. While they were created, the entire geodetic documentation was prepared and stored in analogue (paper) version. Consequently, these regulations are no more effective. Their successors needed to be adapted to the changes occurring in the geodetic engineering. It is obviously closely associated with relying on computer techniques in contemporary geodetic works.

2. AMENDMENTS TO THE LAW ON GEODESY AND CARTOGRAPHY

In 2007 the European Parliament passed the so-called INSPIRE Directive (Directive, 2007). Its aim was to establish the standardised spatial information infrastructure in all Member States and in EFTA countries. The infrastructure described in the Directive consists of (Gaździcki, 2008):

- data on spatial objects divided into 34 thematic groups (Table no. 2) and their metadata,
- network services which, under the application of IT and telecommunications technology enable to use the data collected,
- solutions and means providing for interoperability in organisational, technical and semantic way.

The data specified and the associated infrastructure, in accordance with the (Directive, 2007) should meet the conditions which had to revolutionise the geodesy in Poland (Geoportal):
1. The data should be acquired only once, and stored and administered as correctly and efficiently as possible by relevant institutions and services.
2. The spatial continuity of the data should be provided, so that acquisition of various resources is possible, from various sources and so that the data can be made available to many users and for various applications.
3. The spatial data should be stored at the relevant (single) level of public administration and made available to entities at all remaining levels.
4. The spatial data required for adequate space management at all public administration levels should be generally available.

Access to information should be provided concerning the type of spatial data available and the conditions of such data sharing, as well as information allowing the user to make assessment of applicability of the date for its own purposes.

In accordance with the (Constitution, 1997) sources of law in Poland include: The Constitution, acts of law, ratified international agreements and regulations. In addition, public administration authorities have a possibility to issue acts of local law, effective only within the operational area of such authorities.

Poland, as the European Union Member State is also bound to implement the Directives of the European Parliament. Such obligation arises from the (Treaty, 1992), according to which the Community Member States are obliged to cooperate in achieving the European Union objectives through ensuring full effectiveness of the EU law.
In accordance with the (Treaty, 2012) the regulations of the European Union bodies have general range, are interrelated and directly applicable in all Member States. As a result of the aforementioned provisions of the EU law, it has also become necessary to transpose the INSPIRE to the Polish law. The Member States were bound to complete the implementation by 15 May 2009, at the latest. In Poland the implementation was slightly postponed, completed through passing the Act on spatial information infrastructure by the Parliament of the Republic of Poland (Act of Law, 2010).

The subject-matter of the provisions of the Act covers:
– determining the rules for creating and using the spatial information infrastructure in Poland,
– appointing the relevant administrative bodies competent for the development and administration of elements of such infrastructure.
In order to adjust the Polish law to the INSPIRE requirements it was necessary to introduce amendments to many acts of law, inter alia, to the geodesy and cartography law. Such amendments mainly focused on establishing and maintaining the databases in the ITC system, comprising the spatial data sets of the spatial information infrastructure and the requirement to issue the implementing rules enabling the development of such databases. Such regulations should have been developed and introduced within two years following the entry into force of the Act on spatial information infrastructure, i.e. by 7 June 2012. The last regulation (concerning cadastre) is currently in press (status as of 15 October 2013).

Table no. 3 contains the specification of the latest implementing rules to the Polish Act on geodesy and cartography law (introduced after its amendment in 2010), including their corresponding regulations (if they were available) among the former technical instructions.

<table>
<thead>
<tr>
<th>Date</th>
<th>Subject</th>
<th>Instruction replaced</th>
</tr>
</thead>
<tbody>
<tr>
<td>(in press)</td>
<td>amending the regulation concerning the ground and building cadastre</td>
<td>G-5</td>
</tr>
<tr>
<td>5.09.2013</td>
<td>organisation and rules on keeping the National Geodetic and Cartographic Resource</td>
<td>O-4</td>
</tr>
<tr>
<td>12.02.2013</td>
<td>database of the geodetic register of utilities networks, database of topographic objects and the base map</td>
<td>K-1 G-7</td>
</tr>
<tr>
<td>17.01.2013</td>
<td>integrated real property information system</td>
<td>-</td>
</tr>
<tr>
<td>15.10.2012</td>
<td>state system of spatial references</td>
<td>-</td>
</tr>
<tr>
<td>12.09.2012</td>
<td>soil classification of land</td>
<td>-</td>
</tr>
<tr>
<td>15.10.2012</td>
<td>state system of spatial references</td>
<td>O-2</td>
</tr>
<tr>
<td>14.02.2012</td>
<td>state register of geographical names</td>
<td>-</td>
</tr>
<tr>
<td>10.01.2012</td>
<td>state register of boundaries and area of units of territorial administrative division of the country</td>
<td>-</td>
</tr>
<tr>
<td>9.01.2012</td>
<td>register of localities, streets and addresses</td>
<td>-</td>
</tr>
<tr>
<td>22.12.2011</td>
<td>types of geodetic and cartographic materials subject to protection in accordance with the provisions on protection of classified information</td>
<td>-</td>
</tr>
<tr>
<td>17.11.2011</td>
<td>database of topographic objects as well as databases of general geographic objects as well as standard cartographic studies</td>
<td>K-2 K-3</td>
</tr>
<tr>
<td>17.11.2011</td>
<td>technical standards for performing the geodetic mapping and topographic surveys, as well as processing and submission of results of such surveys to the National Geodetic and Cartographic Resource</td>
<td>G-3 G-4 O-1 O-3</td>
</tr>
<tr>
<td>3.11.2011</td>
<td>databases concerning air and satellite imaging, orthoimagery and numeric terrain model</td>
<td>-</td>
</tr>
<tr>
<td>3.10.2011</td>
<td>cartographic types of thematic and special studies</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3. The latest implementing rules to the Polish geodesy and cartography law (source: own study).

TS number – Session title e.g. TS 1A – Standards, and paper no
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3. DATABASES CREATED IN POLAND ON THE BASIS OF APPLICABLE LEGAL REGULATIONS

Based on the aforementioned regulations, databases are to be created in Poland which should contain spatial data concerning (Act of Law 1989):

- state register of the basic geodetic, gravimetric and magnetic control networks,
- ground and building cadastre (real estates cadastre),
- geodetic register of utilities networks,
- state register of borders and area of units of territorial administrative division of the country,
- state register of geographical names,
- register of localities, streets and addresses,
- register of prices and values for real estates,
- topographic features at the level of detail ensuring the development of standard cartographic studies in scales 1: 10 000 ÷ 1: 100 000 (area of cities and condensed rural areas developed and allocated for development in scales 1: 500 ÷ 1: 5 000), including cartographic elaboration of numeric model of land relief
- general geographic features at the level of detail ensuring the development of standard cartographic studies in scales 1: 250 000 and smaller, including cartographic elaboration of numeric model of terrain relief,
- detailed geodetic control network,
- air and satellite imaging, orthoimagery and numeric terrain model.

Obviously, all data sets listed above should be harmonised with each other. For all data collected in the aforementioned data sets and all associated services, metadata should be created. The aforementioned databases are updated and kept in the manner ensuring interoperability of the data sets and associated services contained therein.

The data sets specified in the (Act of Law 1989) are created on the basis of conceptual data models attached to the regulations recently introduced. The individual regulations contain the conceptual data models for the corresponding databases. Such data models are developed with the application of UML notation, in accordance with the data modelling methodology described in ISO standards of 19100 series, related to geographic information. In accordance with the provisions of the regulations defining the individual databases constituting the spatial information infrastructure in Poland, GML (Geographic Markup Language) was adopted as the basic format for exchange and sharing of the data sets. The application schemes of individual databases recorded in GML notation are integrated with individual implementing rules.

4. THE POLISH CADAstral SYSTEM

The underlying database of property in the spatial information system is the ground and building cadastre (real estates cadastre). The functioning of the Polish real estates cadastre is regulated by the law on geodesy and cartography. Detailed guidelines concerning maintaining of the cadastre are contained in the Regulation of the Minister of Regional Development and Construction of 29 March 2001 (Regulation, 2001).

Pursuant to the Regulation of the Minister of Regional Development and Construction
(Regulation 2001), the main objects of the Polish cadastral system include parcels, buildings and premises. In accordance with the aforementioned regulation a registered parcel of land is a continuous area of land, located within single precinct, uniform in legal terms, apportioned from the surroundings by means of demarcation lines. In accordance with the regulation and the acts indicated therein, a building is a construction facility permanently attached to the land, apportioned from the space by means of construction dividers, including foundations and a roof. Buildings are roofing facilities equipped with installations and technical appliances provided in order to satisfy human needs. Premises shall mean independent residential premises or premises of other designation. Independent residential premises constitute a room or a set of rooms, divided by means of fixed walls, designed for permanent stay of people, which, including any auxiliary rooms, are provided in order to satisfy human needs.

The conceptual model of cadastral data is specified in the Regulation of the Minister of Administration and Digitisation, amending the Regulation concerning the ground and building cadastre (Draft, 2013) . Similar to other legal acts, the application scheme of ground and building cadastre data is recorded in the UML. The catalogue of objects contains definitions and descriptions of the types of objects presented in the application model, their attributes and interrelations between types of objects, occurring in one or many models of spatial data (application schemes).

The cadastral model included in the draft regulations (status as of 15.10.2013) consists of sixteen diagrams defining the conceptual model and three diagrams of the application model of the Basic Model UML. The diagrams describing the cadastral system are grouped in the following eight conceptual packages: General Object, Objects, Parties, Rights To Properties, Address, Boundary Point, Lease and Legal Basis. The overall model of the Polish cadastral system consists of 73 classes. The application scheme of the Basic Model UML refers to the association of the cadastral system with the spatial information infrastructure and graphic representation.

All objects included in the cadastral database hold attributes concerning the date of their establishment and archiving, specifying the life cycle of the object as well as the dates of creating and archiving the successive versions of the object, and the identifier of spatial information infrastructure. Such attributes are inherited from the abstract class: EGB_GeneralObject (Figure 1).
Fig. 1. The generalization relationship between classes of Polish cadastral schema and abstract class EGB_GeneralObject (source: own work based draft version of regulation of 13.05.2013).

The class EGB_Change is the realization of new object’s creation or changing at least one of its attributes or relationships. The EGB_Change indicates EGB_LegalDocument or EGB_TechnicalDocumentation. Practically, it means, that EGB_Change is basis for introducing changes resulting from legal or technical documents into the cadastral database. All these classes belong to Legal Basis package. The diagram of connections between classes EGB_GeneralObject, EGB_Change, EGB_LegalDocument and EGB_TechnicalDocumentation (packages “General Object” and “Legal Basis”) is presented in the figure 2.
Fig. 2. Schema of connections between classes EGB_GeneralObject, EGB_Change, EGB_LegalDocument and EGB_TechnicalDocumentation (source: own work based draft version of regulation of 13.05.2013).

DISCUSSION

The changes associated with the development of the spatial information infrastructure are somewhat revolutionary. Instead of information resources collected mainly in traditional form, collection of information in the databases is introduced, simultaneously defining the structure of such databases using the UML notation. At the same time, introduction of the GML as the format for information exchange and sharing is quite a challenging step. Implementation of the technological concepts and solutions (UML, GML) to the legal approach results in problems related to their understanding among persons previously handling the specific information resources. In the regulations launching such new solutions, transitional provisions usually occur. They usually allow for maintaining the former performance rules over a maximum period of three years.

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Regulation of the Minister of Interior and Administration of 24 March 1999 concerning the...
technical standards related to geodesy, cartography and the national land information system (Journal of Laws No. 30, item 297),
The Act of 4 March 2010 on the infrastructure for spatial information (Journal of Laws of 2010, No. 76, item 489)
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