

Importance of a real estate cadastre as the basic, reference public register in the sustainable country development

Ludmiła PIETRZAK, POLAND

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SUMMARY

The Act on spatial information, being the implementation of the environmental INSPIRE directive, introduced important, substantial and legal modifications of spatial information systems. Public administration bodies, which maintain public registers for three thematic groups listed in the Act, are obliged to commence the following services: searching for, reviewing, collecting, processing and dissemination of spatial data, using electronic media.

At the same time, the ground-breaking Regulation on National Interoperability Frameworks was issued in 2012; following this Regulation the cadastral parcel is the basic spatial object for all public spatial information systems.

All existing public registers should be mutually integrated and the real estate cadastre (the land and buildings register) is the basic spatial reference data set. This basically influences all products and spatial portals, including portals related to the environment, waters, roads, spatial planning, Natura 2000 etc. These products should be updated, reliable and they should ensure sustainable development at the country level, as well as at the level of provinces, districts and municipalities.

The paper presents SWOT analyses performed in these fields, points to issues related to integration and development of public registers, which would ensure the sustainable development and reliability of their utilisation for many public tasks.

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At the same time, on April 12, 2012 the Regulation of the Polish Government was issued on the National Interoperability Frameworks, the minimum requirements for public registers and exchange of information in electronic forms, as well as the minimum requirements for tele-information systems (Off.J. 2012, item 526). This Regulation specified:

- the National Interoperability Frameworks;
- the minimum requirements for public registers and exchange of information in electronic form;
- the minimum requirements for tele-information systems.

Following the Act on the Spatial Information Infrastructure of 2010, which is the Polish implementation of the INSPIRE directive, interoperability of data files and spatial data services is understood as the possibility to combine spatial data files and co-operation of spatial data services, without the repeated manual intervention, leading to the coherence of results and the increased added value of spatial data files and services.

Interoperability should be achieved through:

- **unification**, understood as utilisation of compatible standards, norms and procedures by various entities, which perform public tasks, or
- **exchangeability**, understood as the possibility to substitute a product, a process or services without disturbing information exchange between entities, which perform public tasks or between such entities and their customers, with achievement of all functional and non-functional requirements concerning co-operating systems, or
- **compliance**, understood as the usefulness of products, processes or services dedicated to common utilisation, under specific conditions, which ensure the achievement of important requirements, with the lack of unexpected impacts.

Following the discussed Regulation, the following types of objects have been particularly distinguished in public registers:

- an individual;
- an entity;
- a spatial object.

Following this Regulation, **the cadastral parcel and the address point** are the basic spatial reference object for public registers. These both objects have been legally defined in the Law of Geodesy and Cartography, being the basic legal act in the field of geodesy and cartography. The new legal regulation should be understood in such a way that every created public register should be based on spatial reference objects, which are the cadastral parcel and the address point.

Such regulations existing in the legal acts stress the high importance of geodesy and cartography, increase professional prestige of surveyors and cartographers. Apart from the responsibility for covering the entire country with such objects, surveyors and cartographers, at the same time, become responsible for the accuracy, uniformity, quality, reliability and timeliness of the basic spatial reference objects for other public registers.

In the context of these regulations, the following aspects should be considered:

1. **Coverage** of the country by land and buildings registers databases (EGiB)
2. **Uniformity** of the existing cadastral databases
3. Meeting **the accuracy criteria** of the existing cadastral databases
4. **Quality** of the existing cadastral databases
5. **Reliability** of the existing cadastral databases
6. **Timeliness** of the existing cadastral databases
7. **Interoperability** of the cadastral databases

1. COVERAGE OF THE COUNTRY BY LAND AND BUILDINGS REGISTERS DATABASES (EGiB)

Since the date of issue of the Regulation on the land and buildings register, operation of the Geodetic and Cartographic Service has been mainly focused on:

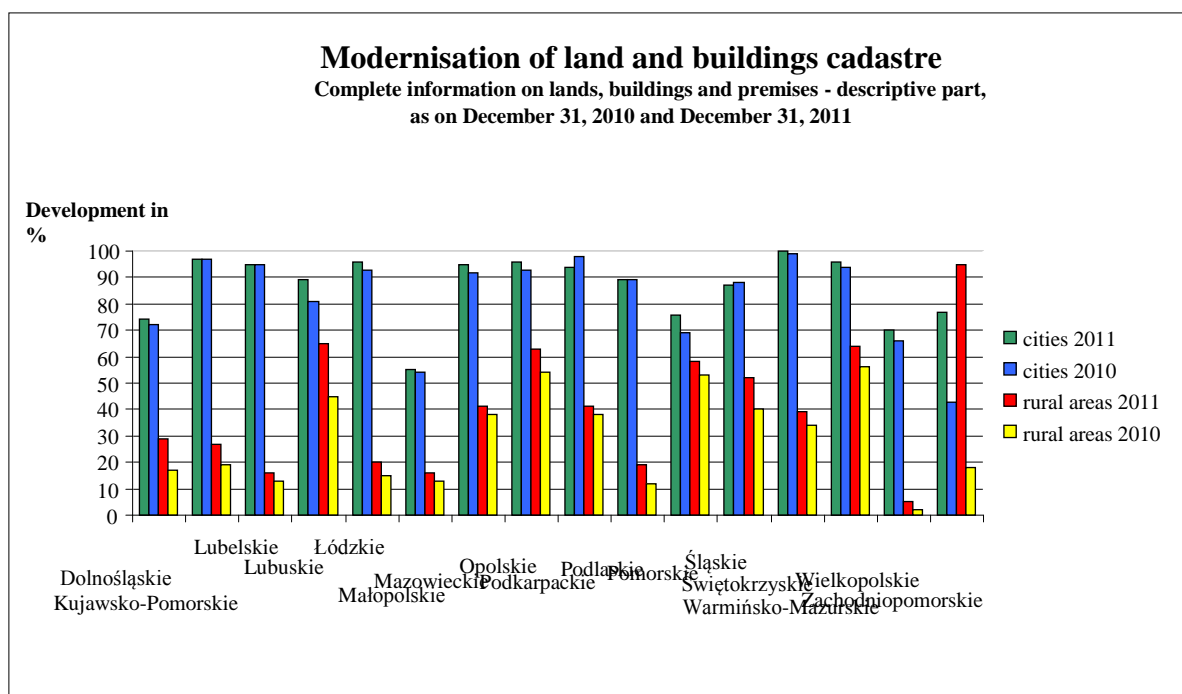
- transformation of cadastral analogue maps to the digital form,
- amendment of documentation of land and buildings registers with data concerning buildings and premises,
- improvement of the data quality in lands and buildings registers,
- standardisation of data.

Below data originating from reports submitted in the field of land and buildings registers to the Head Office of Geodesy and Cartography is presented. As it turns out from the table below, the land and buildings register contains about 36 million cadastral parcels within the area of 31 million hectares.

	List	No.	Cities	Rural areas	Total	
General data about Poland	Number of register units	3	925	2175	3100	
	Number of register districts	4	11250	42726	53976	
	Number of cadastral parcels	5	7359788	28010249	35370037	
	Number of land register units	6	4302503	10111032	14413535	
	Size in hectares	register	7	2156970	29086990	31243960
		surveyed	8	2127819	29109918	31237737
	Estimated number of buildings	9	5583598	11769519	17353117	
	Estimated number of premises	10	4523727	703155	5226882	

Source GUGiK: Report on the real estate cadastre and its modernisation, GUGiK 2011

The cadastral descriptive data files cover the entire country and they are fully implemented in the digital form. Data file which contain **descriptive information on lands, buildings and premises** cover **84%** of cities and **39%** of rural areas.



Source GUGiK: Report on the real estate cadastre and its modernisation, GUGiK 3.0 for years 2010 and 2011.

Statistical data concerning the cadastral map (**the cartographic part** of documentation of the land and buildings register) are as follows:

No.	Data file which characterises current development of the land and buildings register	Urban areas	Rural areas
1	A vector cadastral map, complete content, containing: borders of cadastral parcels, outlines of land use fields, classification complexes, outlines of buildings	91 %	60 %
2	A vector cadastral map, incomplete content, containing: borders of cadastral parcels, outlines of land use fields, classification complexes	1 %	10 %
3	A raster map, amended in the process of updating with vector data	2 %	10 %
4	Analogue map	6 %	20 %
5	TOTAL	100 %	100 %

Source GUGiK: Report on the real estate cadastre and its modernisation GUGiK3.

Basing on the above examples it may be noticed that cadastral databases for rural areas are less developed. This mainly results from higher demands for investments of urban areas, and, therefore, higher demands for the updated real estate cadastre for urban areas.

The land and buildings register are regularly modernised, according to financial possibilities. The completely modernised databases concerning lands, buildings and premises have been developed for

- 84% of rural areas
- 39% of urban areas.

Financial means for modernisation of documentation of land and buildings registers are still very low comparing to the existing demands.

Below data concerning financial means which could be used in Poland for improvements of the cadastre in the period 2007-2011, is presented.

2007	2008	2009	2010	2011
84,012,118 zł	91,543,224 zł	89,509,927 zł	78,996,749 zł	85,744,251 zł

Source GUGiK: : Report on the real estate cadastre and its modernisation GUGiK3.

Province (voivodship) (TERYT code for provinces)	From the state budget [zł]	From the district own funds [zł]	From other funds [zł]	Total financial inputs incurred on modernisation within the reporting year [zł]
Poland	25,047,237	39,998,076	20,698,938	85,744,251

Source GUGiK: Financial inputs on EGIB modernisation in 2011

2. UNIFORMITY OF THE EXISTING CADASTRAL DATABASES

The land and buildings registers are maintained in Poland by 438 administration bodies, including:

- 378 starosts (heads) of districts and mayors of cities with rights of districts,
- 60 mayors or presidents of cities.

following the same legal acts; however it cannot be stated that they are maintained in a uniform way. Plurality of administrative bodies, which maintain the land and buildings registers, as well as diversity of IT systems are the main weaknesses. At the national level a unified and integrated system for maintaining the documentation of land and buildings registers. More than ten systems are used to maintain the descriptive parts; the same refers to the graphical parts. The systems for descriptive and graphical parts are seldom integrated. In majority of cases two separate systems are used for the descriptive and the graphical parts. Those two systems are often developed and delivered by various software developers. The scope of collected data also differs for particular systems. Therefore data exchange between the systems is difficult, although the legally issued standard of data exchange (SWDE) exists. This results from two facts:

- the legally issued SWDE standard contains many defects, which could be modified only after modification of the legal regulation (at present, such modifications are the subjects of legislative works),
- software developers apply modified SWDE standards, which are incompatible with legally issued standards; this results in situation when entities, which maintain databases using purchased software tools, depend on software developers.

At the national level the high demand exists for introduction of unified software tools for maintaining the land and buildings register, which is a very important public register. Introduction of the unified system is a difficult task which will result in strong resistance, mainly caused by the great number of software developers who will intend to protect their own businesses. The modified draft regulation will not solve problems related to data exchange between the numerous systems. Such a standard exists for many years and it is often not respected by software manufacturers.

The Act on Spatial Information Infrastructure introduced modifications to the Law of Geodesy and Cartography, resulting, among others, in development of the Integrated Real Estate Information System (ZSIN).

The ZSIN system, which was assumed to be an integrated system, is created and maintained by the Surveyor General of Poland, in cooperation with heads of districts, voivodships and marshals of provinces, as well as with other bodies.

This system is to ensure:

- maintenance of the central repository of backup files with land and buildings register data;
- monitoring - at the national and voivodship levels - the coherence and the quality of land and buildings register data;
- data exchange in the form of electronic documents, between the land and buildings register and other public registers;
- verification of the compliance of land and buildings register data with data included in property registers and other public registers;
- dissemination of integrated land and buildings register data to administrative bodies, among others for the needs of economic planning, spatial planning, the environment, for fiscal purposes, for state inspections, fighting against corruption and internal security.
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As it may be seen, as many other registers, the ZSIN system is based on the land and buildings register. The lack of an integrated system for maintenance of the documentation for the land and buildings registers may be the obstacle for the commissioning of the ZSIN system, the assumptions of which are developed in the legal act concerning the ZSIN system. The lack of the integrated system also generates serious problems and costs for entrepreneurs, who - in the name of heads of districts - modernise the documentation of the land and buildings register, according to the public procurement law.

3. MEETING THE ACCURACY CRITERIA OF THE EXISTING CADASTRAL DATABASES

Accuracy requirements concerning objects, which are elements of the land and buildings register, are specified in the *Regulation on the land and buildings register* and in the *Regulation on technical standards of topographic surveys and development and dissemination of results of such surveys to the state geodetic and cartographic resources*.

Following the above regulations, geodetic topographic surveys are performed in such a way that location of a topographic point, considering the closest points of a horizontal network and a measurement network is specified with the accuracy not lower than:

- 0.10 m - in the case of terrain details of the I group;
- 0.30 m - in the case of terrain details of the II group;
- 0.50 m - in the case of terrain details of the III group.

The majority of objects of the cadastral documentation are included in the I group, including terrain details, which are explicitly identifiable in the field, which preserve permanent shapes and locations, in particular:

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- symbols and border points,
- geodetic marks,
- constructions and building installations, including technical infrastructure elements, which are directly accessible for surveys.

The graphical part of the cadastral documentation, maintained in the vector form for 91% of urban areas and 60% of rural areas, does not reflect the level of achieving the accuracy criteria by the graphical cadastral documentation, concerning the spatial location of particular objects. Those databases are the result of many public procurements, implemented for various purposes (as, for the, so-called, LPIS system) - inspection of subsidies for farmers. Therefore, many databases have been created as a result of vectorisation of existing analogue databases and not as a result of modernisation works, with consideration of accuracy criteria concerning the spatial locations of cadastral objects. Undoubtedly the exchange of such objects is required in the course of modernisation of cadastral documentation, what could lead to such situation when those objects would meet the accuracy criteria, specified in regulations. Without the deep analyses of the existing databases and the resources stored at Geodetic and Cartographic Documentation Centres it is very difficult to estimate the percentage of databases, which are maintained in the vector form and which meet the accuracy criteria.

4. QUALITY OF THE EXISTING CADASTRAL DATABASES

The quality of the existing databases is related to the achievement of uniformity and quality criteria. The high accuracy should not be expected for databases, which are not uniformly maintained and which do not meet the accuracy criteria. It should be also mentioned that all modernisation works, performed recently, which are often covered by the EU funds, pay much attention to the accuracy criteria. Projects concerning modernisation of the land and buildings register documentations are well prepared; they are focused on the accuracy of locations of spatial cadastral objects and on the achievement of legal requirements concerning cadastral objects. Legal status of real estate is also settled in this process.

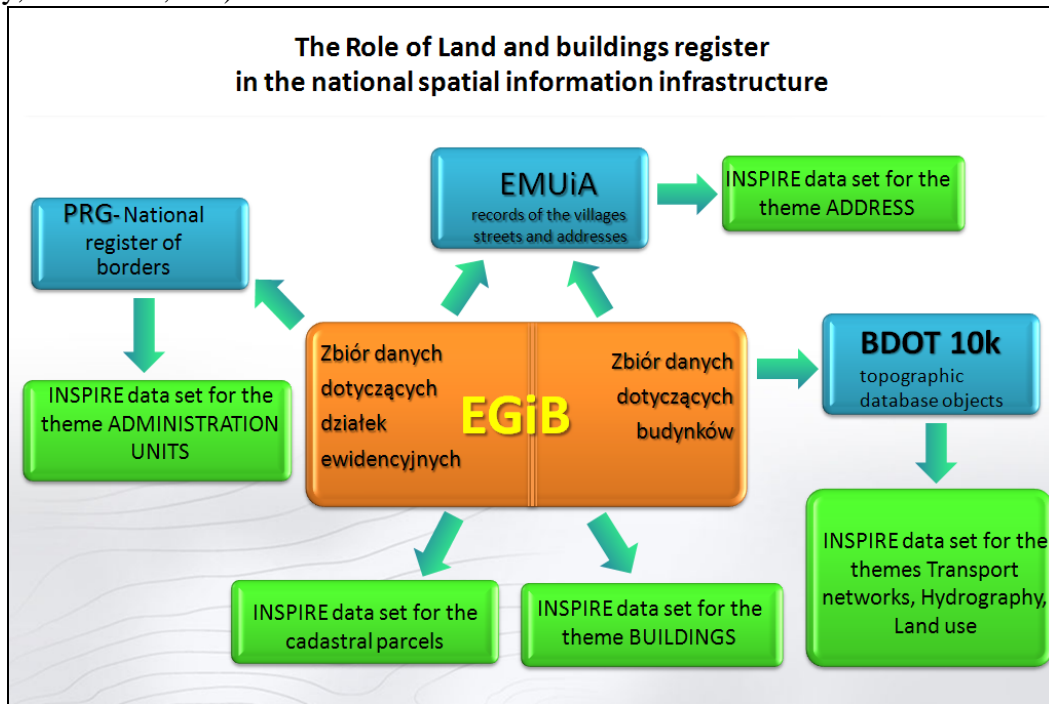
5. RELIABILITY OF THE EXISTING CADASTRAL DATABASES

It is difficult to explicitly answer the question whether databases of the land and buildings register documentation are reliable. This documentation includes subject and object data.

The land and buildings register (the real estate cadastre) is (at the national level) the uniform and systematically updated set of information concerning lands, buildings and premises, their owners and other individuals and legal entities, possessing those lands, buildings and premises; data included in the land and buildings register is the basis for economic planning, spatial planning, calculation of taxes and benefits, marking properties in property registers, for the public statistics and real estate management.

According to the Act on property and mortgage registers, data from the real estate cadastre is the basis for marking a property in the property register. At the same time, data from the land and buildings register is the basis for the national spatial information infrastructure. The land and buildings register is also permanently updated, including 100% of the descriptive part of the documentation of the land and buildings register. It should be assumed that cadastral data

included in the descriptive part of the land and buildings register is reliable, since they reflect the documentation which was the basis for making entries in cadastral registers. What refers to the cartographic part of the cadastral documentation, reliability of cadastral data should be considered as data of limited reliability, due to the above mentioned reasons (the accuracy, quality, timeliness, etc.).



Source GUGiK - Land and buildings register and the integrated real estate information system

6. TIMELINESS OF THE EXISTING CADASTRAL DATABASES

According to the Regulation on cadastral, the **documentation of the land and buildings** register is updated through introduction of documented changes to the cadastral databases.

This documentation is updated in order to:

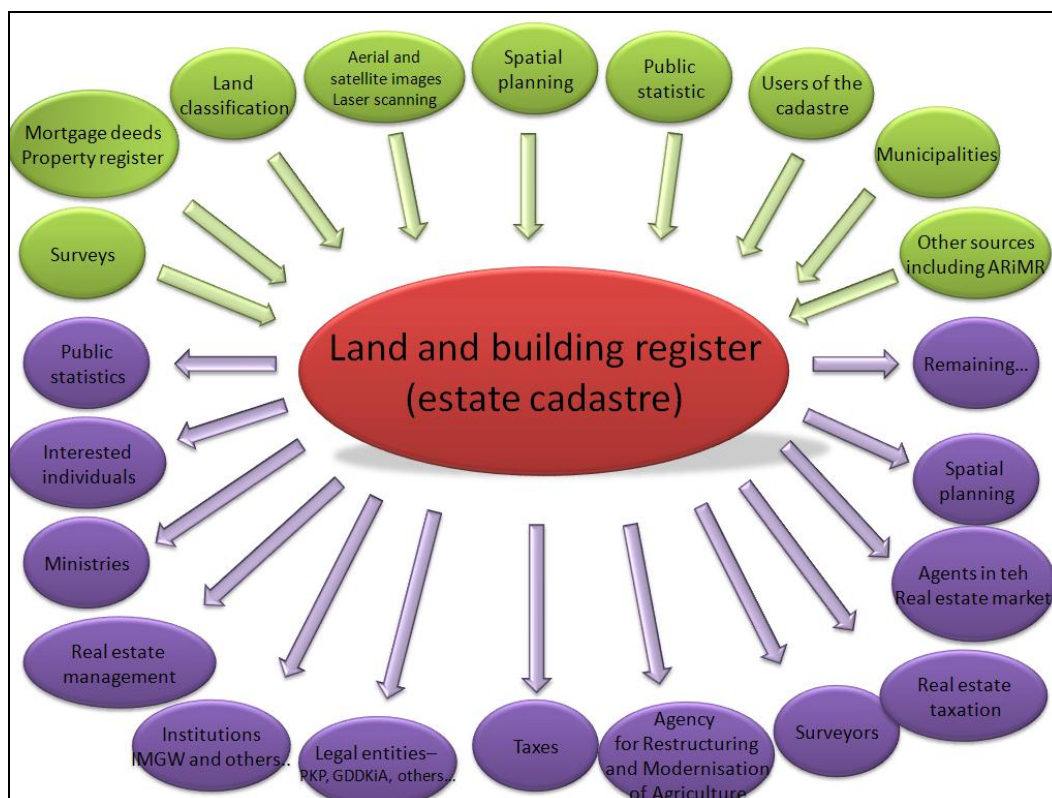
- disclose new legal and real status,
- eliminate erroneous data, which are incompliant with the real status,
- substitute data which does not meet the accuracy criteria and standards, with data which is compliant with standards and accuracy requirements.

The majority of bodies which maintain the documentation of the land and buildings register updates this documentation immediately after receiving appropriate documents. Such updating usually concerns the descriptive part of the cadastral documentation. The cartographic part is permanently updated for analogue maps, it is has not been computerised and if it is not maintained in the digital form. If it is maintained in the digital form, it is permanently updated in the case of utilisation of integrated systems for maintaining the cadastral documentation, since the permanent updating is usually forced by such systems. In the case when integrated systems are missing, data from the descriptive and the graphical parts of the cadastral documentation is often incompliant. Besides, the lack of complete and

legally binding computerisation of the cadastral documents does not allow for keeping it updated on official and legally accepted portals, such as GEOPORTAL. Data acquired once has not been accepted by the bodies which maintain the cadastral documents to the resources, and therefore, it has not been updated by those bodies. Thus, there is no possibility to update this data, until it is modernised.

7. INTEROPERABILITY OF THE CADASTRAL DATABASES

Databases are updated and maintained in such a way that **the interoperability** of data files stored in these databases and related services are ensured, as it is understood by the act of March 4, 2010 on the spatial information infrastructures. In order to meet the criteria of the database interoperability, the databases must be integrated. According to the Regulation on the national interoperability frameworks, the land and buildings register is the basic public register, which objects, such as the cadastral parcel and the address point, are the reference objects for other public registers. The real estate cadastre acquires data from many sources. Data from this cadastre is also the basis for activity performed in many branches and sectors, as well as for many public registers.



Complex modernisation of the cadastral documentation, as the basic public register, should be urgently performed. The cadastral register may be the basis for the spatial information infrastructure only when it is computerised and meets the legal requirements.

The only possible way to achieve the full functionality of the land and buildings register, which would become the updated, reliable and interoperable register, meeting the technical requirements of the public register, is to perform its complex modernisation.

The basic obstacle for modernisation works is connected with:

- insufficient amount of funds
- legal and technical difficulties (e.g. cadastre after partitioning of the country)
- source data of poor quality, concerning the register of land and buildings, which exist in various parts of the country.

Data included in public registers, also in the documentation of the land and buildings registers, is not fully interoperable and integrated. Integration of this data requires time and funds.



- objects are not integrated in particular databases - these databases were created in various time, basing on various source data, technical conditions, projects, demands etc.,
- spatial objects (such as rivers, roads) has changed their natural routes with respect to periods when the cadastral documentation was developed,
- objects were generalised at the database level; their geometric descriptions were changed, what results in creation of an object which spatial description varies from the original.

The following elements are required for integrating the land and buildings register with other public registers and for ensuring their interoperability:

- organisational changes
- time
- funds

According to the report of GUGiK, due to insufficient funds, which may be used by district authorities, as well as the wide scope of tasks which should be solved by these authorities, the date of completion of the process of modernisation of the land and buildings register for the entire country may be delayed without the financial support from the state or from the EU funds. This will have the negative impact on those sectors of economy which utilise data from the cadastral databases.

REFERENCES

1. Sprawozdanie o katastrze nieruchomości oraz jego modernizacji, *Report on the real estate cadastre and its modernisation* – GUGiK 2012
2. Sprawozdanie z oceny realizacji zadań dotyczących modernizacji ewidencji gruntów i budynków w roku 2011 *Report on evaluation of tasks related to modernisation of the land and buildings registers in 2011*
3. Ewidencja gruntów i budynków oraz zintegrowany system informacji o nieruchomościach – prezentacja - *Land and buildings register and an integrated real estate information system, presentation*, Witold Radzio –GUGiK
4. Rola, waga i miejsce ewidencji gruntów i budynków w rejestrach publicznych w świetle nowych i ustanawianych przepisów prawnych *The role, importance and place of the land and buildings registers in public registers, with respect to new and approved legal regulations* – Podlaskie Forum GIS 2012 – Pietrzak Ludmiła, Hopfer Andrzej, Cegielski Stanisław
5. www.sejm.gov.pl – Ustawy i Rozporządzenia *Acts and Regulations*

CONTACTS

Dr eng. Ludmiła Pietrzak
Polish Association of Surveyors
ul. Czackiego 3/5
00-043 Warszawa
POLAND
e-mail: milka.pietrzak@gmail.com
website: www.sgp.geodezja.org.pl