

# THE EVOLVING ROLE OF THE CADASTRE IN THE LAND ADMINISTRATION SYSTEM IN POLAND

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**Key words:** *cadastral system, land administration system - Integrated Real Estate Information System (ZSIN).*

## SUMMARY

Land Administration System - there are all activities related to the organization using the space. This process of perpetual space transformation from the state of existing in the desired state aims to ensure sustainable land development, including to ensure the spatial order.

On the process of space transformation in Poland consists the geodetic and legal actions of land management arising from the normalized national law (Real Estate Management Act) and local law (Local land-use plans).

As part of this interdisciplinary activities are used by various operators and institutions the different information sources about land objects and subjects, mainly the cadastral reference data.

From the current Real Estate Management Act (August 21, 1997) has passed 15 years, during this time the Polish cadastre evolved in meaning and technologically to the system, whose efficiency has increased significantly.

This paper describes the dynamics of change which has occurred in the Polish cadastre since 1989 (the date of current Geodesy and Cartography Act).

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## 1. INTRODUCTION

In most countries with developed market economy, the cadastral system is considered as the foundation of the State and its great value and usefulness in land administration is indisputable.

The degree of cadastre modernity, respectively, increases functioning the land market and to support land administration efficiency.

A well-functioning cadastral system adapts (evolves) to the level of the State economic development, because it works as a "pillar of society" in which, inter alia, have pointed out HENSSEN [1995], GAŹDZICKI [1995], LARSSON [1996], BENNETT AND OTHERS [2010], ENEMARK [2010a, 2010b], WILLIAMSON AND OTHERS [2010].

The role of Polish cadastre has also changed in time in connection with the emergence the new needs of society in order to effectively solve local, regional and global spatial economy issues, including the rational land management at national, regional or local level (district, municipality).

Earth is increasingly being recognized as a community of scarce, limited resources, thereby the role of cadastral systems have to evolve in response to the growing need to provide comprehensive information about the relationship between the economy and sustainable land administration. Information technology even more contributes to the cadastre development, creating a new meaning to multipurpose cadastrals.

An important task is to build and maintain the cadastral systems adapted to needs of users. This involves taking measurements of the legal cadastral objects in a fixed accuracy, in aim to their identification and division, as well as keeping cadastral records in order to secure the land market (buying, selling, mortgaging and leasing the land). This includes access to complete information about the area more and more using e-government website.

Evolution of the cadastral system development has been and still is determined by the dynamics of changes in many factors such as: data processing in the cloud (Cloud Computing) , spatial equilibrium theory, the intensity of natural and economic phenomena, the need for 3D/4D visualization in real time, the desire to standardize / normalize the data and systems interoperability.

The evolution of the system is directly related to its modernization, and this generates significant costs. Due to different organizational and structural forms of cadastral systems in different countries an important role in understanding the potential of the cadastre and the strong relationship between the cadastre and sustainable development has played International Federation of Surveyors (FIG).

FIG has taken an attempt to determine the direction in which need to develop all cadastral systems that individual states modernize them economically, the same avoiding unnecessary costs. Therefore, it seems to important the analysis of created solutions in the field of cadastre

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initiated by FIG and their impact on implementation solutions in Poland, to evaluate the stages of Polish cadastral system evolution.

## 2. INTERNATIONAL FEDERATION OF SURVEYORS – SELECTED INITIATIVES IN THE FIELD OF THE CADASTRE

International progress in the field of cadastre and land administration is the result of work the practitioners and researchers from many countries (at present more than 100 countries) affiliated to the FIG [<http://www.fig.net/>].

FIG is a non-governmental organization in existence since 1878, acting to improve all aspects of surveying and management of natural resources.

In the last twenty five years the number of initiatives (Fig. 1) highlight the significance and importance of a global economic, social and environmental policy for sustainable development ("triple bottom line") using the constantly modernized cadastral systems largely was flowing out from FIG [ENEMARK 2010b]. In this regard, FIG has established partnerships with other international organizations such as the United Nations, HABITAT, FAO, World Bank.

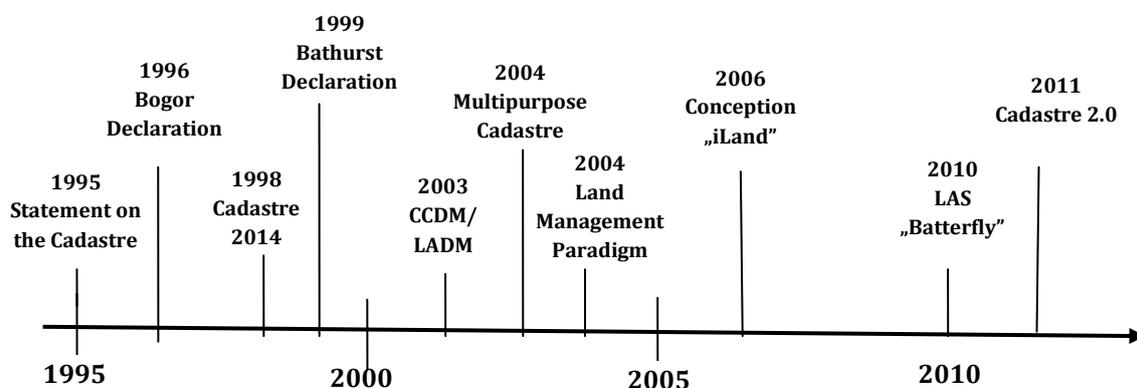


Fig. 1. FIG Initiatives and solutions related to the cadastral systems development. *Source:* own.

In recent decades, the FIG has played a leading role in the development of cadastres in LAS. Stable land administration is a key to achieving sustainable development and to supporting global program set out by adoption of the Millennium Development Goals [UN 2000].

The main FIG plans for the cadastral systems development are directly related to the challenges of governing in connection with the provision of optimal land management in the face of food scarcity, urbanization, environmental degradation, climate change, natural disasters and terrorist attacks.

Digital cadastral systems as the basis for successful management of land, in addition to serving four key functions in the land management paradigm, namely, securing property rights, giving information on real estate values and the type of land use, as well as providing comprehensive information about the state of economic development in selected areas will also guarantee universal access to data collected by them through SDI, and allow freely data processing at the level of sharing. The large-scale, digital cadastral maps with 3D/4D visualization technology will not only be informed about the type of land use, but also about

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the rights, responsibilities and restrictions for the land, through the integration of spatial and descriptive data. Currently, the key FIG task is to determine the effective procedures for the cadastral systems in order to effectively fulfill the expected objectives [ENEMARK 2010a].

### **3. INITIATIVES AND SOLUTIONS TOWARDS THE DEVELOPMENT OF THE POLISH CADASTRE SINCE 1989**

In Poland during the years 1980-1990 was highlighted the need to create a modern cadastral system, which would be part of the national land information system. The construction of land information infrastructure began with the fundamental provisions in the new law, "The Law of Geodesy and Cartography" in 1989 (GEODESY AND CARTOGRAPHY ACT 1989 – Journal of Laws 2005, No. 240, item. 2027, as amended). Cadastre has been defined as follows: "When the real estate cadastre is discussed in the act – it is always understood as a uniform, systematically updated set of information on lands, buildings and premises, on their owners and other individual or legal entities who possess those land, buildings and premises"

Article 21.1. the same Act regulate the desirability (role) of real estate cadastre by specifying the fundamental aspects of registry data use in many areas of the national economy: "Cadastral data are the basis for economic planning, spatial planning, taxes and benefits, the determination of property in land registers, public statistics, real estate management and farm registers. As a part of the state geodetic and cartographic resource, cadastre is to serve the national economy, national defense, science, culture, nature protection and the needs of citizens.

The Law of Geodesy and Cartography has announced the creation of the implementing regulations for real estate cadastre and its standardization. These regulations came into effect, as "Regulation of Regional Development and Construction Minister – 29 March 2001 on the real estate cadastre" (Journal of Laws of 2001 No. 38, item. 454).

By Regulation were determined the data exchange standards, were defined the database objects and in addition:

- a) the methods of real estate cadastre create,
- b) the methods of keeping records,
- c) a detailed scope of information covered by the cadastre and the scope of information about prices and property values,
- d) the methods and timing of district, provincial and national tables of aggregate cadastral data preparation,
- e) the types of buildings and premises which are not shown in the cadastre.

In 2001 the Council of Ministers adopted an action plan 2001-2006 for the development of information society in Poland "ePoland" (another element affecting the development of e-government, inspired on the European development plan eEurope). The document "ePoland" has contained an action plan for the development of the information society in Poland, giving the foundation to support the construction of Infrastructure for Spatial Information.

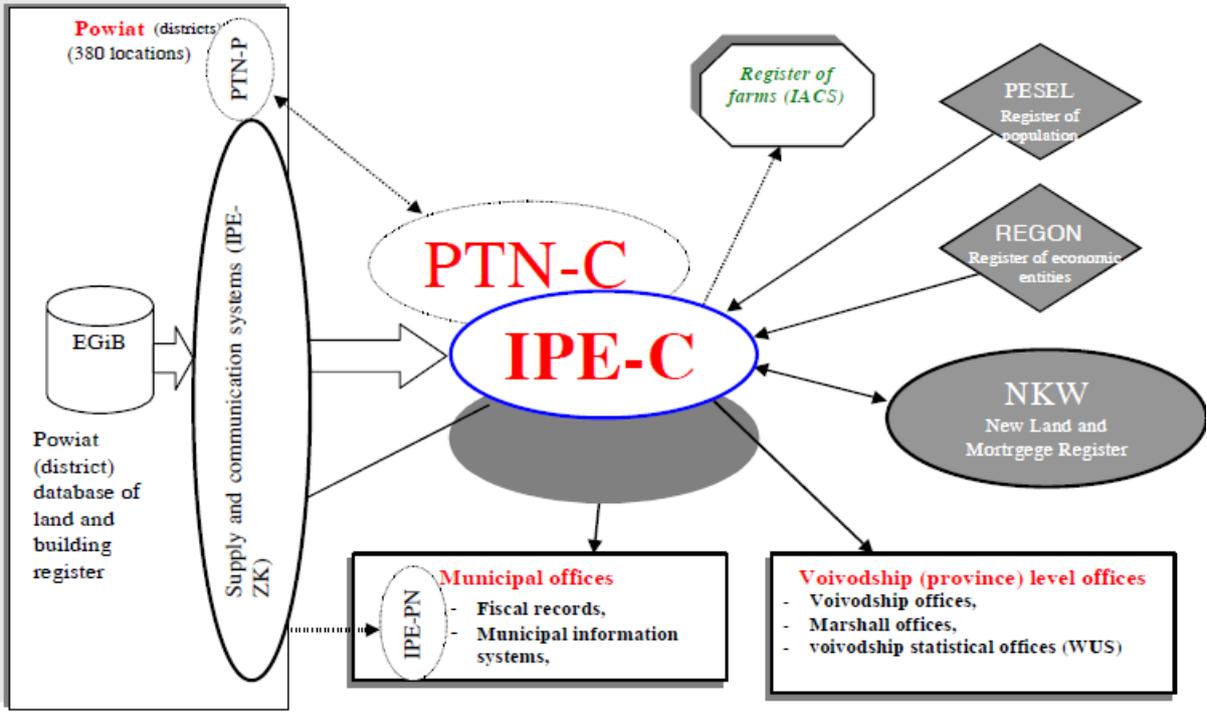
Next, in order to create a modern cadastral system, Head Office of Geodesy and Cartography initiated research projects funded among others by the European Union aid and by the World Bank – PHARE 2000 and 2001, " Building an Integrated Cadastral System – ZSK".

Formal and legal basis of those works began on nomination by the Polish Prime Minister a group for development and co-ordination of the governmental program of integrated cadastral system development, the main objective of which was to establish, among others, legal,

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organizational, financial and technical foundations for operating the cadastral system in Poland. ZSK had to functionally integrate the Real Estate Cadastre, New Land and Mortgage Register (NKW), Fiscal Cadastre, Register of Economic Entities (REGON), Population Register (PESEL), as well as in further intentions other public records through the functional specification of Integrating Electronic Platform (IPE) which was to allow the viewing and data transfer between a number of public registers. Diagram of IPE and ZSK system operations is presented in Figure 2.

- The IPE particular tasks system [KNOOP, WILKOWSKI, 2003], which had to meet:
- to ensure that courts, municipalities (community), expert team for valuation of real estates, as well as other authorised institutions, have access to updated information stored in files of the real estate cadastre (including visualisation of such data), following demands of those institutions and groups of experts,
  - to inform authorised institutions about changes in data of the real estate cadastre,
  - to deliver data, transferred by institutions obliged by law, to authorised institutions,
  - to improve quality of data in databases of the real estate cadastre, by supplying those databases with data included in land and mortgage registers, with data from population registers, official lists of economic entities as well as by defining and distribution of unified dictionaries,
  - to supply data for the needs of common valuation of real estates and recording results of valuation of real estates.



**Fig. 2.** Physical architecture of IPE. Components of the Integrated Cadastral System (ZSK) are presented as ellipses. *Source:* KNOOP, WILKOWSKI, 2003.

IPE has been implemented in pilot, district units maintaining the cadastre, up to now allows to browse the content of databases due to lack of all spatial data digitization. Therefore, Polish government has continued cadastre modernization financed from Phare

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2000 and 2001 as Phare 2003 Program – “Vectorisation of cadastral maps in Poland”. Unfortunately, the vectorization results are not satisfactory at present and maps are corrected.

In 2003, the government adjusted the law on the land registry (New Land and Mortgage Register – NKW) to the needs of the Integrated Cadastral System:

- a) Law of 14 February 2003 on the Land Register Book content transmission to register structures carried out in a computer system (Journal of Laws No. 42, item. 363),
- b) Regulation of the Justice Minister of 20 September 2003 on the establishment and operation of land registers in a computer system (Journal of Laws No. 162, item. 1575),
- c) Regulation of the Justice Minister of 26 September 2003 amending Regulation of mortgages register and documents collections (Journal of Laws No. 176, item. 1721).

Have also taken various works for a pilot and commissioning of the cadastre operation:

- MATRA I Project „Cadastral Information Flow in Poland” (implemented with financial support from the Dutch government),
- MATRA II Project "Construction of the cadastral database model in Poland",
- MATRA III Project “Support for development of the central cadastral database in Mazowsze Voivodship”,
- KASKADA Project “Development of technological methods of the National Cadastral System” (was financed by the Scientific Research Committee and the GUGiK).

Each of those projects solved specified parts concerning the development and operations of the cadastral model in Poland. Technological issues closely related to IT solutions have been dominating in those projects.

Arose also the independent research idea of a Polish cadastre target model called "Cadastre 2020" based on assumptions "Cadastre 2014" [KAUFMAN, STEUDLER 1998], using already developed solutions - IPE, which have developed the researchers from an Institute of Applied Geodesy of the Warsaw University of Technology [WILKOWSKI, KARABIN 2006].

Figure 3 shows a schematic assumptions concept for Polish „Cadastre 2020”.

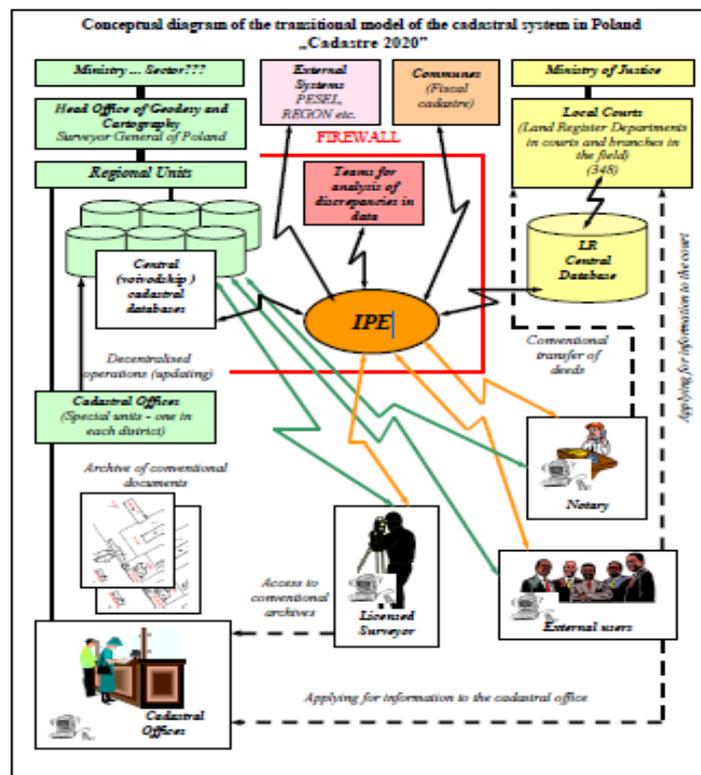


Fig. 3. Conceptual diagram of “Cadstre 2020”. Source: KARABIN 2005.

After the adoption of the European Union INSPIRE Directive in 2007, the Head Office of Geodesy and Cartography started to implement the concept of technical solutions in the construction of the National Infrastructure for Spatial Information. Its effect is realized Geoportal.gov.pl Project (Fig.4.) and already implemented cadastral node in Project GEOPORTAL 2.

GEOPORTAL 2 serves as broker, which provides users geospatial data and services by searching for the requested information. One of the requirements of the developed solution is to ensure interoperability understood as possibility of cooperation infrastructure nodes regardless of the hardware platform and software system through the adoption that the implementation of the infrastructure nodes is in accordance with recognized international standards (ISO standards and recommendations OGC) and with evolving national standards [www.geoportal.gov.pl].

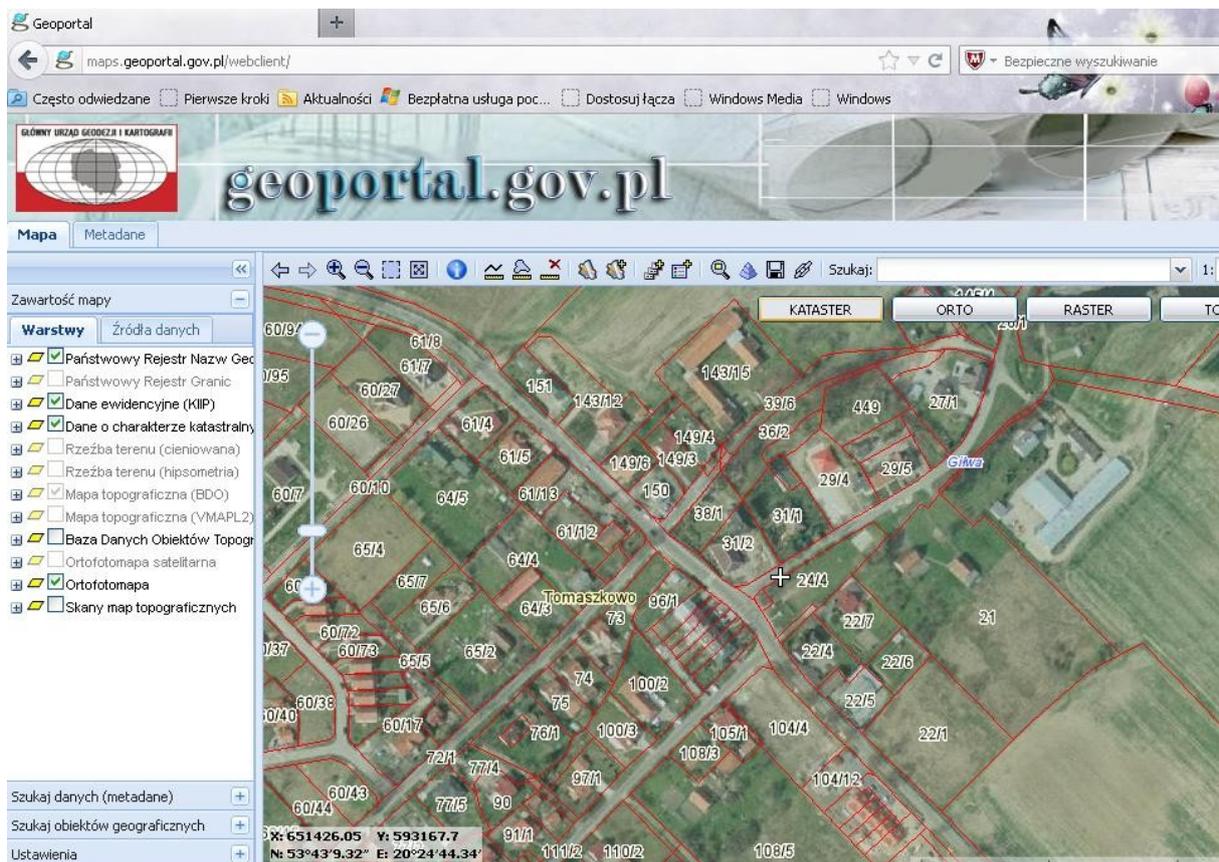


Fig. 4. Open Window website GEOPORTAL.gov.pl. Source: <http://maps.geoportals.gov.pl/webclient/>

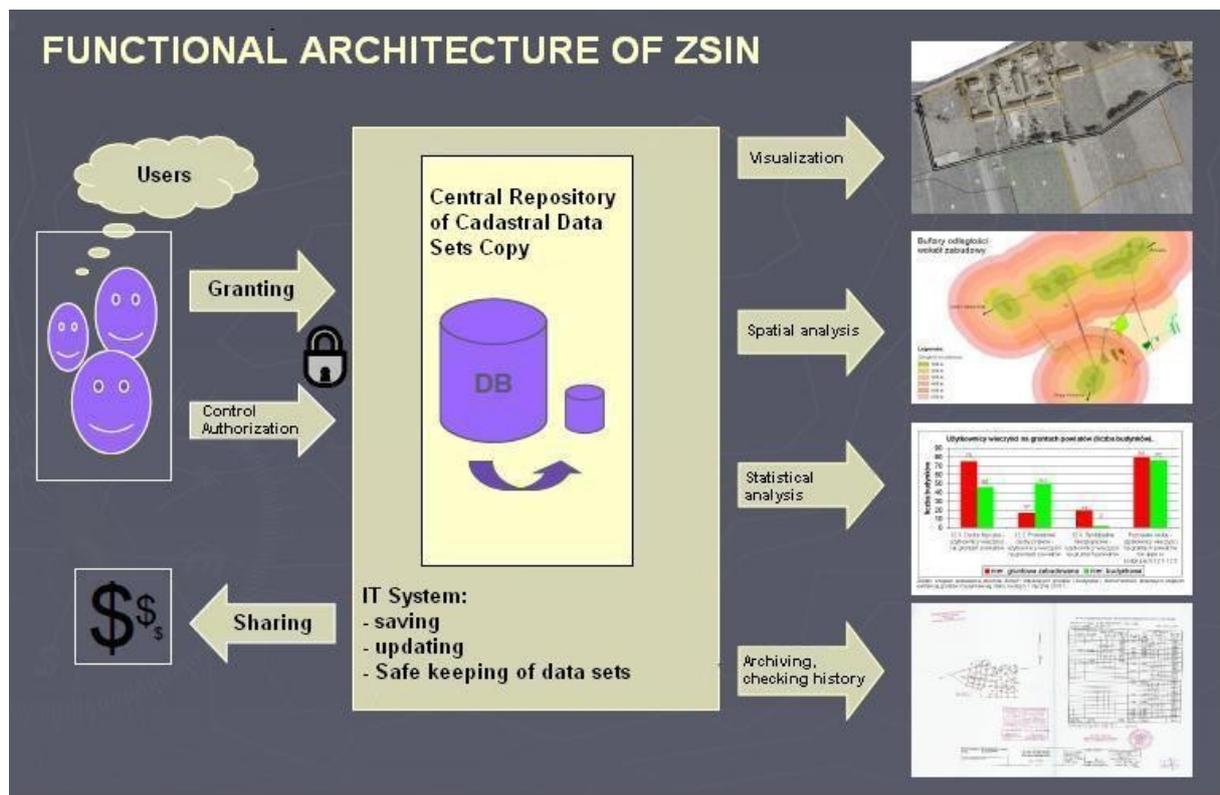
After the implementation of Geoportals technical solutions, GUGiK developed the legal basis for its functioning – the Law of 4 March 2010 on Spatial Information Infrastructure (IIP), (Journal of Laws No. 76 item. 489 of May 7, 2010), which legally incorporated real estate cadastre for system of spatial information infrastructure, by requiring on administration leading public registers (the registers including collections data associated with those listed in the Annex to this Act themes), including real estate cadastre obligation to provide technical solutions to ensure the interoperability of data sets and services, and harmonization of spatial data sets.

IIP Act, interfering with the normative provisions the GEODESY AND CARTOGRAPHY ACT, stressed the importance of the real estate cadastre information aspect, emphasizing its multi-purpose character in the context of spatial information register.

In 2010, the government returned to the guidelines of ZSK and "Cadastre 2020" in the project - **Integrated Real Estate Information System (ZSIN)** – Fig.5., whose legal basis will be included in the Regulation of the Council of Ministers on ZSIN. Draft regulation was approved by the Council of Ministers Committee of the digitization in August 1, 2012 year. The draft will be sent to the Council of Ministers Permanent Committee, which will decide on its recommendation to the Council of Ministers [<http://bip.msw.gov.pl>].

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**Fig. 5.** Diagram of ZSIN functional architecture. *Source:* own translation from [http://wingik.slask.eu/files/INFOOSRODEK/2010-paz/ZSIoN\\_Ustron%20-22%20pazdziernika%202010a.pdf](http://wingik.slask.eu/files/INFOOSRODEK/2010-paz/ZSIoN_Ustron%20-22%20pazdziernika%202010a.pdf)

The ZSIN will be based on the following assumptions:

- 1) exchange of data between the real estate cadastre and other public records in electronic form,
- 2) the software enabling automatically generate notifications of changes to the cadastre, the automatic generation of data update,
- 3) access to cadastral data users will take place over the Internet,
- 4) procedures for data conversion and cadastral database updates will be implemented by a set of applications,
- 5) data integration will be carried out by integrating Electronic Platform (IPE),
- 6) data network will consist of LAN and WAN,
- 7) for the transformation of the source database of real estate cadastre in modern cadastral database should be installed application that integrates the descriptive part and mapping. The basic elements of the ZSIN economic model that organizational, technical and information infrastructure.

In addition to government action to create ZSIN, already operate GIS Web services in several districts Centres leading real estate cadastre (Fig. 6). These services have implemented on their own since 2005. They provide descriptive data, raster and vector data of real estate cadastre for viewing, processing (modified) and their analysis by Internet service WMS / WFS using software such as iGeoMap [Izdebski 2005, 2007]. To the cadastral data access via the Internet is possible through the domain [www.e-podgik.pl](http://www.e-podgik.pl).

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**Fig. 6.** Map of functioning services iGeoMap. *Source:* GEO-SYSTEM 20.08.2012. [<http://www.e-podgik.pl/>].

For full functionality iGeoMap report surveying introduced in October 2007. Authors iGeoMap system assumes that the data published in this system can be used in the future by a modified version of the service [geoportal.gov.pl](http://geoportal.gov.pl), which provides access to central level multi-purpose cadastre information from district collected servers via WMS/WFS [Izdebski 2009].

The Head Office of Geodesy and Cartography further plans towards the development of the Polish cadastre [GÓZDŹ 2010] will focus on:

- creating integrated service portals to enable access to the metadata and cadastral data in the created national infrastructure for spatial information,
- realization of the cadastre tasks as administration tasks performed under its structures, including the importance of cadastral information timeliness and accuracy,
- forecasting, modeling, and respond to the new needs of users (for example, registration of property rights, taking into account the position above or below the surface of the earth - the so-called 3D cadastre),
- optimization of the duration and cost of real estate registration procedures,
- development and implementation of indicators to ensure monitoring of the cadastre operation together with obtaining feedback.

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#### 4. CONCLUSIONS

Presented above initiatives and solutions in the field of Polish real estate cadastre development and GUGiK intentions lead to the following conclusions:

- 1) Assumptions of Integrated Real Estate Information System – ZSIN (future cadastral system in land administration system), built in Poland, based on solutions developed by the FIG in 1989 - Cadastre 2014 (there are progressively modernization of the system).
- 2) The potential for real estate cadastre is evolving in the direction of FIG paradigm - iLand in LAS (Land Administration System).
- 3) The model of reality being in the construction, based on European standards ISO, is in line with the guidelines of the Economic Commission for Europe [UN-ECE 1996] on Land Administration, under which Poland has been granted PHARE funds for the construction of the Integrated Cadastral System. (ZSK).
- 4) Plans to modernize Polish real estate cadastre coincide with FIG plans for the cadastre development towards meeting the Millennium Development Goals.
- 5) An incomplete database of buildings and premises, and not fully modernized cadastral maps to vector maps make it impossible to take decisive steps to create a uniform system of spatial data and property rights.
- 6) The Polish government should focus on action and the necessary funds to modernize real estate cadastre, as well as standardizing and harmonizing data from real estate records to quickly run ZSIN. The government should limit the financing of new cadastral concepts and IT solutions that have already reached a sufficient level of maturity for use.

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## **BIOGRAPHICAL NOTES**

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Practical experience: cadastre, land management, land administration, real estate valuation.

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She graduated (M.Sc.) UWM in Olsztyn in Land Management in 2003. From 2003 to 2006 she worked in a District Office in Olsztyn, Poland, in the Cadastre Department. Obtained her Ph.D. with a dissertation “Assessment of development opportunities for real estate cadastre including the dynamics of solutions and visions for cadastral models in conditions of globalization” at the University of Warmia and Mazury in Olsztyn (UWM) in 2011. Current position: full-time research worker, lecturer at the UWM (Department of Real Estate Resources).

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