Integrated Cadastral System (ICS) of Poland Supported by the European Union

Prof. Hans KNOOP, Germany and Prof. Wojciech WILKOWSKI, Poland

Key words: Cadastral System, Cadastral Objects, Computerisation of Cadastre, Integrating Electronic Platform (IPE).

ABSTRACT

This paper contains a characteristic of the Polish real estate cadastre, defines the objects, which are subject to cadastre, and presents an estimate number of these objects.
The paper characterises the level of computerisation of the polish cadastral system, from both the descriptive and geometric standpoints.
The programme of computerisation, which is currently being implemented, has also been discussed, from the perspective of software and hardware solutions, which are applied.
The final section of the study presents a programme for an integrated cadastral system in Poland, which is based on three sub-systems:

- The real estate cadastre,
- The mortgage registers,
- The tax registry.

The proposed organisational structure of this system has been discussed, together with a proposed timeframe for its implementation.

CONTACT

Prof. Dr.-Ing.Hans Knoop
Head of Department „Surveying Geoinformation" of German Institute of Standardisation (DIN), Berlin
Technical University of Braunschweig
Hannover
GERMANY
Tel. + 49 511 57 19 73
Fax + 49 511 1 61 21 30
E-mail: hans.knoop@t-online.de ; hans.knoop@gmx.de

Prof. Dr. Wojciech Wilkowski
Head Office of Geodesy and Cartography
PL-00-926 Warsaw
POLAND
Tel. + 48 22 625 1527
Fax + 48 22 625 1527
E-mail: wwilk@gik.pw.edu.pl

Integrated Cadastral System (ICS) of Poland Supported by the European Union

Prof. Hans KNOOP, Germany and Prof. Wojciech WILKOWSKI, Poland

1. INTRODUCTION

The Polish law defines the real estate cadastre in the following way:

- A uniform, standard for the whole country, systematically updated collection of information on land, buildings and premises; their owners or other individual or legal persons who control these lands, buildings and premises.

The cadastral objects have been defined in the following way:

land plot - a unit of land, located within single, uniform limits; homogenous in legal terms; separated from the surrounding area with border lines;
building - a closed and roofed construction, together with built-in installations and technical equipment, used for permanent needs. It is adapted for housing people and/or animals; or for the storage and protection of objects;
premises - a unit, room or group of rooms, separated with fixed permanent walls within a building, designated for permanent presence of people. Together with service units is used to fulfil the housing needs of the residents.

Individual or legal persons (cadastral subjects), shown in the cadastre, are the owners of objects; and with respect to cadastral objects whose owners are unknown - the holders.

With respect to real estate belonging to the State Treasury or local government units (municipalities, counties, regions) the cadastre should contain the following information (except information on the owner):

- Beneficiary of the perpetual usufruct.
- Organisational entities which manage the real estate on a permanent basis.
- State legal persons, whom the State Treasury had entrusted with the right to execute ownership rights and other property rights with relation to its real estate.
- Public administration bodies, which manage the real estate constituting part of the assets of the State Treasury; as well as parts of the municipal, county and regional real estate assets.
- Users of land owned by the State Treasury and local self-government units.
- Persons and organisational entities which hold the land on the basis of 10-year lease contracts, recorded in the cadastre, and which result from the implementation of health annuities and retirement pensions of farmers.

2. BRIEF HISTORY OF THE CADASTRE SYSTEM IN POLAND

Historically, parts of the current area of Poland had been covered with Prussian and Austrian cadastre systems, which had been set up in the second half of the 19th century.

In the years 1918-1939 an attempt has been made to establish a uniform cadastral system in the territory of Poland, and especially to cover with it these areas where cadastre had not existed previously.

In 1938 uniform rules for land cadastre have been designed.
The registers were supposed to include the assessment of public tributes and charges due on real estate; manners for describing real estate in the mortgage registers - with whom the cadastre registers were to be linked. The registers were also expected to provide data for scientific, statistical and economic purposes. The outbreak of World War 2 made the realisation of these plans impossible.

After World War 2, Poland's borders have undergone significant changes. It had taken until 1956 to start a wide scope of geodesic work, tied to the establishment of uniform land cadastre.

As a result of this work, cadastral maps have been drawn with the use of various technologies:

- 34.5% of the inventoried area, total surface of 10791487 hectares, the borders of plots have been measured using direct measuring methods;
- 23.5% of the inventoried area, total surface of 7310571 hectares, the borders of plots have been measured with the use of photogrammetry,
- 42.0% of the inventoried area, total surface of 10082461, the borders of plots have been based on other studies and documents (old cadastre maps, integration/ division maps, etc.)

The said maps have been drawn in the following scales:

- 1:500 - 176740 hectares
- 1:1000 - 669435 hectares
- 1:2000 - 2877232 hectares
- 1:5000 - 22468043 hectares
- In other scales – 1993069 hectares.

3. COMPUTERISATION OF REAL ESTATE CADASTRE IN POLAND

3.1 Computerisation of the Descriptive Part

Work has started in 1975, from coding data on perforated tape, creation of reports, setting up the descriptive part of the cadastre system on single computer workstations.

This work was of local nature, and was limited to individual municipalities and later to counties. As a result, the descriptive part of cadastre has been computerised in 100%, but the tools and applications used for this process vary locally.

The Head Office of Geodesy and Cartography has conducted an inventory of software used for cadastral purposes, and found out that the cadastral offices used 22 different applications.

3.2 Computerisation of the Cartographic Part of Cadastre

The process of computerisation of cadastral maps in Poland has commenced in the beginning of the 90's.

The process has been organised along the following actions:

- Source of geodesic information designated.
- Technology for setting up a database to draw the cadastral map of land selected.
- Type of product documentation, to be received by the cadastral office, defined.

The development of technology for computerising the cadastral map in Poland had been largely influenced by the research and implementation work undertaken in 1995, within the Lodz region, at the order of the General Surveyor of Poland. Under this experiment, the following has been defined:

- Geometric database for cadastral objects.
- Format of the database, e.g. DXF.
- The manner of obtaining geometrical data on cadastral objects (such as from direct measurements, digitalisation, use of data from existing operates, etc.).
- The technology for building a numerical cadastral map.

As a result of these works, the following has been defined:

- The scope of using the existing matrix and geodesic data referring to the manner for defining the course of plot borders.
- Possibilities for data acquisition with the use of digitalisation of current cadastre maps.
- The scope of necessary supplementary measurements on site.

In 2000, the Head Office of Geodesy and Cartography conducted research on the degree of computerisation of the cartographic part of the cadastre.

As a result, it has been found out that cartographic part of the cadastre has been computerised, at the level of 25.3% for urban areas, and 5.3% for rural areas. It should be noted that the service of the cartographic part is done with over 20 types of software, based on various kinds of databases.

4. THE PROGRAM FOR MODERNISATION OF THE EXISTING REAL ESTATE CADASTRE IN POLAND

The analysis of the current computerization level of the cadastral system has shown that while its descriptive part is completely computerised, but these actions have not been accompanied by system-wide solutions.

The most important issues included:

- Diversification of the databases of the descriptive part of the cadastre.
- Variety of tools (software) used to manage the cadastre, and lack of possibility for communication between the databases of cadastre information.
- Lack of co-relation between the descriptive and cartographic part of the cadastre.
- Lack of clear identification of objects included in the descriptive and cartographic part of the cadastre.
- Lack of standards for the exchange of cadastral data.
- Lack of a system that would integrate the flow of cadastral information in the whole country.
- Very difficult conditions for preparing analyses, summaries and complex information reports - limited, at best, to the area of one municipality.

Given the current condition of the cadastre, and the experience of other European countries in this area, the modern model of the cadastre should be organised in the following manner:

- Cadastral data for both the descriptive and cartographic parts should be integrated in one database, which would be managed on county level.
- There should exist an obligation to define objects of cadastral database in a uniform manner.
- de to software diversification it is necessary to introduce the standard of exchange of cadastral data between the existing cadastral databases.

The system of managing the real estate of cadastre should enable the following:

- Creation of basic and subsidiary reports, defined in the regulations on real estate cadastre.
- Data review.
- Creation of a map of any area, and its contents.
- Review of the descriptive data of objects marked on the map.
- Creation and graphic presentation of the results of synthetic analyses and summaries.
- Cooperation with other public systems.
- History and archive storage of cadastre data.

The system should enable direct access to information from databases, to all levels of self-government administration and the interested bodies of government administration, the departments of mortgage registers in district courts, tax bodies, notary offices, banks, land surveyors and property valuation experts.

Access to the cadastral information should be possible via telecommunication and Internet networks, in the client-server formula.

Access to information should guarantee security of source data, and provide the protection of personal data of the owners and holders of real property.

Collection of information from the cadastral register should be charged with a fee, on the non-profit basis.

In order to implement these concepts, the Head Office of Geodesy and Cartography has analysed the software which is currently used for the descriptive part and the cartographic part of the cadastre , from the standpoint of functionality of the existing system.

After analyzing the organisation of the cadastral systems in countries of the European Union (the Netherlands, Germany, Austria) and the visions for the 2014 Cadastre, prepared by Commission 7th of FIG, the Task Force prepared a Long-term Program for the Development of the Cadastral System. for that purpose, works aiming at creation of an integrated cadastral system were started.

5. INTEGRATED CADASTRAL SYSTEM

Within the Phare 2000/2001 Programmes the task concerning the "Development of an Integrated Cadastral System" was started. Objectives of this task were as follows:

1. Developing an integrating electronic platform for 3 existing databases: the land and building register (cadastre), land and mortgage register maintained by district courts and property tax register maintained by the local tax administration.

2. Developing the methodology of adaptation of land and building register (cadastre) to the Integrated Cadastral System.

3. Improved operation of land and mortgage registers through development and implementation of the electronic land and mortgage register software in strategic centres and software for automating operations of land and mortgage register divisions in district courts.

4. Adapting the tax system to the solutions adapted in the EU member States and reinforcing the tax administration to ensure effective property tax collection.

Within this programme, the general assumptions concerning development of the Integrated Cadastral System were prepared.

The logical diagram of the system is presented in the figure below.

The basic element of this system is the Integrating Electronic Platform (IPE). The IPE is to meet the following objectives:

- To ensure access to updated information for courts, municipalities and other institutions, which use cadastral information, according to the needs of such institutions.
- To notify interested units about changes in cadastral data.
- To make a uniform electronic data transfer channel for institutions, which transfer data to the cadastre and to supply appropriate cadastral units with required data.
- To support unification and improvement of cadastral data quality, in particular, to ensure required information from mortgage registers, population register and economic entities register for units, which maintain the register of lands and buildings (cadastre).

The said services will be continuously ensured in the period, which results from ways of operations of interested institutions.

The institution, which is responsible for maintenance of the IPE will be the Head Office of Geodesy and Cartography.

The figure presents the diagram of relations of the Integrating Electronic Platform (IPE) with cadastral systems (EGiB), mortgage registers (KW) and other systems and users.

EGiB - Cadastre
KW - The mortgage register
PESEL - The Common Electronic Population Registration System
REGON - The Register of Economic Entities
SWDE - The cadastral data exchange standard.

5.1 Organisational and Functional Structure of the IPE

The IPE will consist of:

- The centre (located at the Centre for Surveying and Cartographic Documentation - CODGiK) in Warszawa
- Supply and communication system, located at every cadastral office (EGiB)
- Access systems, maintained by institutions, authorised to access to the IPE data.

End users of access systems will use Internet browsers and they may be located at an arbitrary location, providing that a safe connection with the access system is ensured. Access systems may be located at the CODGiK or at institutions, which are authorised to access the IPE data.

The IPE will have a copy of data of all cadastral systems, which are currently in operation. It is assumed that cadastral data will be transferred to the IPE according to daily cycles. Communication of EgiB with the IPE centre will be performed by means of the system of

supply and communication. EGiB will transfer data to the system of supply and communication in the SWDE format (the cadastral data exchange standard), so it will be allowed to connect a particular EGiB system to the IPE, if it can transfer data in this format. The main objective to use a copy of data is to make external users independent from availability of local EGiB systems. This will release EGiB systems from the necessity to maintain continuous readiness to ensure current data.

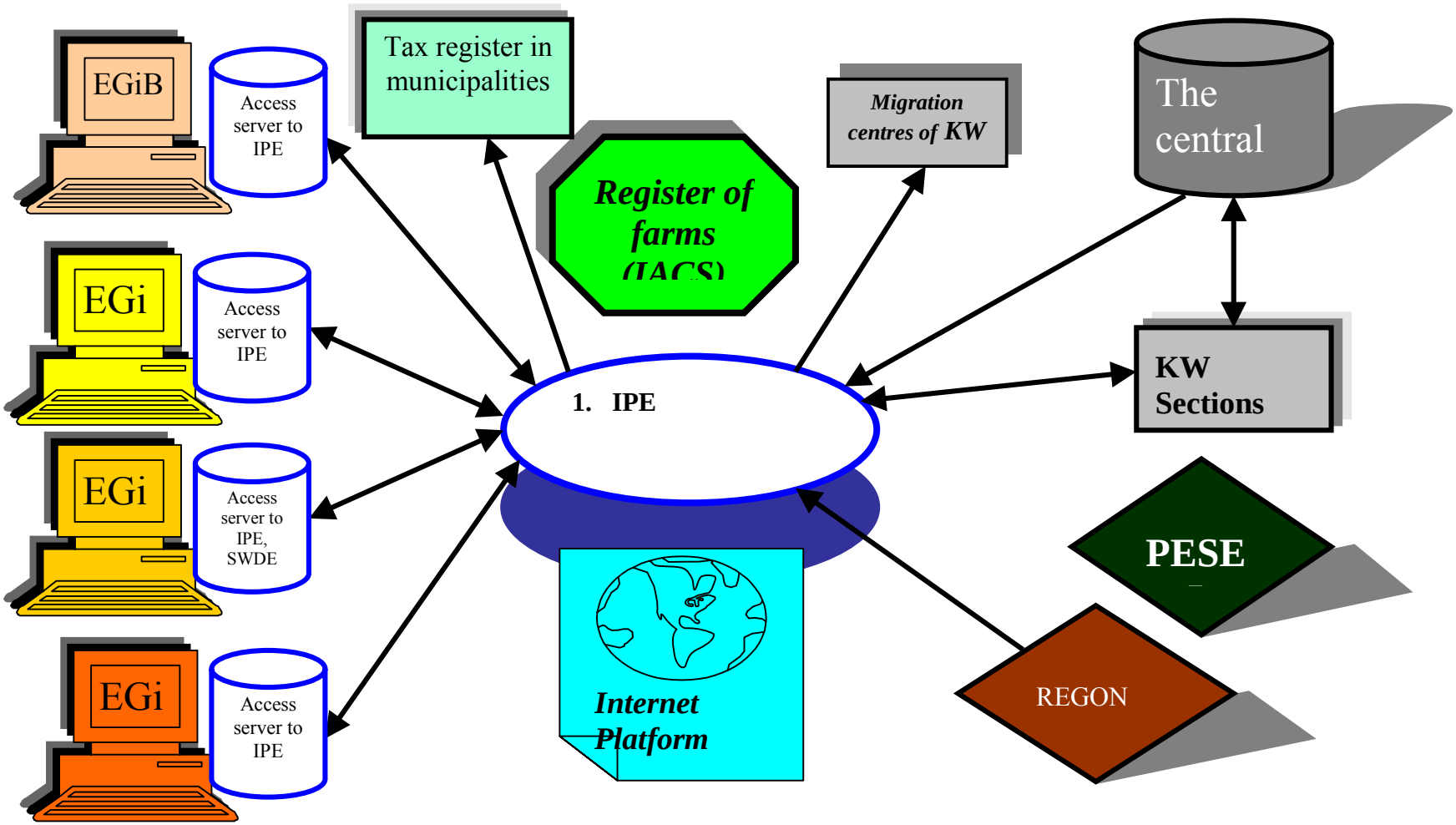
In a case of break in communication with a certain EGiB systems, the IPE will ensure continuous access for external systems to the newest version of data.

The IPE will ensure an interactive access to selected information for external users, according to authorisation of particular users.

According to external users' requests, submitted by the access system, the IPE will make data from the copy of EGiB in the IPE available, together with processed data collected from NKW (digital mortgage registers), what will allow to compare their coherence with EGiB data. Data will be compared on-line. Results obtained will be sent back to the system, which was the sender of the request. The access system will, among others, authorise the end user and specify the scope of information available for this user.

At the present stage, it is not foreseen to make data directly available for units, which do not belong to governmental or local government sectors. However, it is foreseen to ensure and interface to systems, which will be developed in the future, in order to ensure public access to EGiB data.

Due to current practical activities as well as the existing legal regulations, the IPE will use the SWDE format for exchange of data with other systems. However, considering the world trends of data exchange between systems, the IPE will be ready to exchange data in XML format, with the use of GML, version 2.


EGiB
Access server to IPE
EGi
Access server to IPE
EGi
Access server to IPE, SWDE
EGi
Access server to IPE
Tax register in municipalities
Register of farms (IACS)
Migration centres of KW
The central
1. IPE
KW Sections
PESE
REGON
Internet Platform

5.2.1 Making EGiB Data Available to a Municipality

The IPE will ensure periodic updating of data of IPE-PN systems, by mean transferring all data required by a municipality or this part of data which has been modified after the last transfer of data. Such transfer of data will be sufficient for the IPE-PN system to generate appropriate notifications.

5.2.2 Access to Data from Mortgage Registers

All requirements of the IPE users, related to access to mortgage registers will be met by on-line queries submitted to the NKW system.

Notifications originating from the NKW system (generated according to the NKW initiatives) will be transferred to an appropriate section of EGiB and they will be archived within a specified period, after getting confirmation of reception.

The migration centre, which performs transcription (migration) of a paper mortgage register to an electronic form, checks the conformity of data from the register with respect to marking a real estate with the EGiB data.

5.2.3 Notifications concerning Modifications of EGiB Data

The IPE will monitor modifications of EGiB data and, in the case when specified changes occur, it will generate appropriate notifications, which will be directed to interested institutions. In particular, notifications will be sent to departments of mortgage registers and to public statistics entities. Notifications will be sent in the electronic or written form, depending of facilities of the receiving entity.

5.2.4 Co-operation with PESEL and REGON Systems

The IPE will support EGiB systems in verification of data with PESEL and REGON systems. Verification of data will be performed in on-line mode.

5.2.5 The Agency for Restructuring and Modernisation of Agriculture

In order to create and maintain the national system of registration of farms and cattle (IACS), the Agency for Restructuring and Modernisation of Agriculture must have the access to the database of register of lands and buildings, without the right to make the data available to the third parties.

5.2.6 Public Statistics

In the case when address features of real estates are changed as well as buildings are added or deleted, the territorially appropriate public statistics entity is notified.

5.3 Implementation of the IPE

The designed system is developed with the intention to fully apply it at the national level. The proposed pilot study, which will limit commissioning of the system to several EGiB systems, aims at testing applied solutions. Introduction of considerable functional changes before the system is commissioned at the national level, is not assumed, with the exception of changes resulting from obvious mistakes, which may be noticed within the pilot phase.

Within the pilot period, as well as during the commissioning of the system, some limitations or modifications of the system operations may occur, which will result from the fact that the entire territory of Poland is not fully covered by the system or that communicating systems IPE are not fully adapted with the IPE. In particular, the strategy of successive commissioning of the NKW systems by courts and the IPE-PN systems by municipalities, will be assumed.

6. SUMMARY

Implementation of the idea of the Integrated Cadastral System, discussed in the paper, will enable to:

- Develop an interface linking data bases of land and building register with land and mortgage register and property tax register, including prepared changes of legislation on organisation and operation of the ICS, in particular statutory regulation of the operation principles of the ICS and amendments to the Law on land surveying and cartography with its executive acts, concerning operation of the land and building register and linking this register with other subsystems and public registers.

- Develop principles of the mass real estate appraisal.

- To eliminate existing discrepancies between land and building register and land and mortgage register, to facilitate implementation of the common land and mortgage register.

- To improve the accessibility to real estate database, thus creating foundations for rational real estate management and implementation of *ad valorem* tax.

- To commission the computerised mortgage register systems, what will shorten time of proceedings by the land and mortgage register divisions and allow to eliminate existing backlog.

- To facilitate the access to real estate data, collected in the existing data bases and in consequence, to stimulate real estate trade and improve its safety and facilitate access to mortgage credit and mortgage banks' growth.

- To modernise the property tax register.

REFERENCES

Hopfer A., Wilkowski W.: Directions of Development of the Cadastral System in Poland. Second International Conference on Land Management, 8-10 January, 2001. Anglia Polytechnic University.

Hopfer A., Wilkowski W.: The Polish Cadastre, IACS and EU Accession Requirements, FIG Working Week 2001, 6-11 May, Seoul, Korea, Conference Proceedings

Hopfer A., Mączewski K., Wilkowski W.: Reforming of the Polish Cadastre creating a cadastral system – 11-16 June,2001, Gävle, Sweden. International Symposium on "Reforming and Benchmarking Cadastres: Measuring the Success", FIG Commission 7 "Cadastre and Land Management"

BIOGRAPHICAL NOTES

Hans Knoop studied Geodesy at Hannover University and finished the respective administration preparatory exams in Germany. He was a member of the Cadastral-and-Surveying Administration of the State of Lower Saxony in different directing positions in State Survey Office, Cadastral Office of Hannover and the Ministry of Interior (1964-2000). His main activities have been concentrated in developing new technologies (e.g,. Dissertation "Electronic Tacheometry", Dr.-Ing 1970) especially in LIS and GIS including legal and administrative aspects. Professor at Technical University of Braunschweig (since 1976).
Since 1975 Head of Division "Surveying Geoinformation" of German Institute for Standardisation (DIN), Berlin and Head of the German Delegation CEN/TC 287 (cince 1990) and ISO/TC 211 (since 1994). Member of ISO/TC 211 – PT19122. Representative of ISPRS to ISO/TC 211. Many activities in FIG on international and national level (Com.3, Task Force on Standards). International expert for GIS and Land Management for several organisations and governments. Appointed Honorary Professor of Wuhan Technical University of Surveying and Mapping (WTUSM), China, Honorary Advisor of Hong Kong Institution of Engineering Surveyors, Numerous international and national publications. Expert of Twinning Project (no. PL2000/IB/JH/01) Phare 2000 in Poland.

Wojciech Wilkowski is the professor at the Warsaw University of Technology, at the Faculty of Geodesy and Cartography – the Institute of Applied Geodesy. HE is the Head of the Laboratory of Cadastre and Land Management.
He is the member of the Polish Society of Valuation of Real Property, the Association of Development of Rural Areas, the Polish Association of Real Property Experts, the Association of the Polish Surveyors and the Royal Institution of Chartered Surveyors.
HE is the author of 180 publication on the following topics: rural and forest information systems, computer-aided land consolidation, real estate valuation, environmental protection, land reclamation and soil conservation, thematic cartography, photogrammetric methods applied to inventory of stands, surveying for forest land management, limitation of real estates of the State Forests, cadastre of lands and buildings, land information systems, multi-criteria methods of evaluation of the influence of construction of motorways on farms.