ANALYSIS OF FINNISH CADASTRAL SYSTEM

ANALIZA SISTEMULUI CADASTRAL FINLANDEZ

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Abstract. *On a global scale, the cadastral systems must furnish actual balance sheets regarding the properties. This tendency represents a base condition in order to achieve an unitary development in territorial administration. Taking into account of the worldwide development and computerization of the cadastre domain and also knowing the importance of cadastre and real estate registration in Romania. In this context were analyzed the main features of the cadastral system in Finland.*
Key words: *cadastral system, INSPIRE, JAKO.*

Rezumat: *Pe o scară globală, sistemele cadastrale trebuie să furnizeze bilanţuri actuale cu privire la imobile. Această tendinţă reprezintă o condiţie de bază, în scopul de a realiza o dezvoltare unitară în administrarea teritoriului. Dezvoltarea şi informatizarea actuală a cadastrului la nivel mondial, trebuie să fie cunoscută şi aplicată şi în condiţiile realizării cadastrului şi publicităţii imobiliare din România. În acest context au fost analizate principalele caracteristici ale sistemului cadastral din Finlanda.*
Cuvinte cheie: *sistem cadastral, INSPIRE, JAKO.*

INTRODUCTION

In the European Union there are attempts to develop a common international cadastral system by international integration of the systems which answer the best to the requirements of potential users. This can only be accomplished based on the national systems, together with the software conceivers and developers. This approach leads to a growth in the eficiency and the performance of the informational systems, reperesenting important steps towards standardization (Petcu-Lovin, 2011).

International Federation of Surveyors published statement on the cadastre (FIG, 1995) defines the cadastre as: "*A Cadastre is normally a parcel based and up-to-date land information system containing a record of interests in the land (e.g. rights, restriction and responsibilities). It usually includes a geometric description of land parcels linked to other records describing the nature of the interests, and often the value of the parcel and its improvements*."

In Finland all cadastral information - both map data and attribute data - are registered in one integral database, started in 1998 and renewed in 2005, managed by the National Land Survey of Finland. Surveyors working at the National Land Survey and in certain municipalities are responsible for carrying out legal surveys, measuring data and registering it in the database. The system has been renewed

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and expanded in 2005 and during that time, it was modeled thoroughly with UML figures, and XML/GML schemas for data transfer were introduced (Myllymäki and Pykälä T., 2011).

MATERIAL AND METHOD

Taking into account of the worldwide development and computerization of the cadastre domain and also knowing the importance of cadastre and real estate registration in Romania, in this article I intend to show the main characteristics of the cadastral systems from Finland. On a global scale, the cadastral systems must furnish balance sheets regarding the real estates. This tendency represents a base condition in order to achieve an unitary development in territorial administration. The cadastral systems have to be flexible because the users demand an up to date record of the legal, technological and new registration methods modifications. Present paper aims to answer some questions like:

Which are the particularities of the Finnish Cadastral System?
Which are the bases institutions serving cadastre and land register?
What software use Finland for cadastral work?
Which problems occurred in the evolution of Finnish Cadastral System?

RESULTS AND DISCUSSIONS

In Finland, national the whole country was covered with the base maps in 1977. At the same time cadastral index maps were generated. Since then, the maps have continuously updated, both on the rural areas, scale 1:10.000, and urban areas, larger than 1:10.000.

The National Land Survey (NLS) started the digitalization of the cadastre in the 1970´s. The objectives were to improve the efficiency of the activities and to promote the joint use of registers. The land register was digitalized in the 1980´s by the Ministry of Justice (http://www.cadastraltemplate. org/countrydata/fi.html). *The National Land Survey (*NLS) developed JAKO cadastre, a new GIS-based cadastral information system, in 1995-1998. This object-orientated system stores attribute data and map data in the same database (Uimonen, 2002).

The new Law on the Land Information System and its Information Service came into force January 1, 2003. The law stipulates the data contents of the system, responsibilities of the parties involved and the administration of the system as well as the conditions of data delivery.

An amendment of the Cadastre Act has been issued changed and it will come into force on June 1, 2005. Then there will no more exist distributed Cadastres but the cadastral part of the Land Information System will be the only official Cadastre in Finland.

The basic property units that are the register units in the Cadastre are surveyed and registered in the nationwide Land Information System that includes also a cadastral index map and information about titles and mortgages. The Land Information System consists of (Viitanen, 2003):

- the Land Register includes the Register of Ownership, Mortgages and special rights;

- the Cadastre (Real Estate Register) includes information of the real property units, how the land is divided, what the process has been, and also information on easements and special rights; the register also includes maps and other official cadastral survey documents.

The whole country is covered with one uniform cadastral index map. The database is centralized and seamless. These object-orientated databases consist of the map and attribute data. The cadastral index map consists of boundary points, boundary lines and parcels (http://www.cadastraltemplate.org/countrydata/fi.html).

The main objects in the Cadastre include basic property units, parcels, boundaries and right-of use units. Transactions are also recorded in the register. Also information on ceased units is preserved. The Official Purchase Price Register is integrated into the cadastre. Since the beginning of 2010 The National Land Survey has been responsible for registering titles and mortgages but this particular database is separated from other registers and will be renewed (Myllymäki and Pykälä T., 2011).

Nowadays, the quality of Cadastral Systems data is quite good and numerical system is useful. NLS is responsible for administration and developing of Cadastral System and mostly for updating of cadastre. Starting from 2010, NLS is also responsable for updating of Land Register. Municipalities and other producers of cadastral data are responsible for updating their own data (Rummukainen, 2009).

1. Institution of cadastre and organizational matters

National Land Survey of Finland (NLS) is a governmental authority which is responsible for the administration of the cadastre and carrying out cadastral surveys; is subordinated the Finnish Ministry of Agriculture and Forestry.

National Land Survey of Finland (NLS) is also responsible for topographic mapping and the topographic database. From the beginning of 2010 there are 12 survey offices in the country, 79 cities take care of the cadastral surveys and mapping in their urban areas. On May 1, 2012 the National Land Survey opened its topographic datasets for free use (http://www.cadastraltemplate.org/countrydata/fi.html).

National Land Survey of Finland (NLS) is responsible for practical mapping work, data gathering, production of general maps, product distribution and general promotion of the shared use of mapping material and other geographic information.

Another significant institution is the **Population Register Centre**, which is responsible of the Building Register; under the Ministry of Interior.

The Finnish Geodetic Institute (FGI) is responsible for coordinate systems, the measuring and updating the highest-level permanent control point network, and sectoral research in the field of public mapping.

2. Programul JAKO, utilizat pentru evidența cadastrală

National Land Survey of Finland (NLS) introduced a new GIS-based cadastral information system (*JAKO Cadastre*) in 1998. The JAKO Cadastre is a multi-purpose cadastral system in which the attribute and map data on the cadastral unit are stored in the same database. Development was carried out using Smallworld GIS as the development tool. The JAKO cadastre consists of applications for providing a cadastral information service and conducting legal land surveys.

Experience with JAKO cadastre has been very good. Following the introduction of JAKO cadastre, the NLS developed new applications using the same platform – giving birth to the JAKO FAMILY.

The first new member of this family was JAKO Topographic Data System (JAKO/TDS) which which was introduced in 2000. It was followed by JAKO Market Price Register on Cadastral Units (JAKO/KHR), introduced in spring 2001. Next member was JAKO Valuation and Land Consolidation (JAKO/VLC) and finally, JAKO Map Site, which will replaced NLS Map Site and serve internet users by distributing topographic and cadastral data (Uimonen, 2002).

The JAKO Topographic Data System of *National Land Survey of Finland* (NLS) is used to produce and maintain a topographic map covering the whole country. The TDS database contains both real-world and cartographic features. The real-world features include, for instance, shore lines, road lines and buildings; the cartographic features include, for instance, tree symbols indicating forest vegetation and legend texts (Vitikainen, 2003).

Cadastral Information System structure which was conducted through the JAKO-Hardware Architecture (National Land Survey of Finland) is shown in Figure 1 (Vitikainen, 2003).

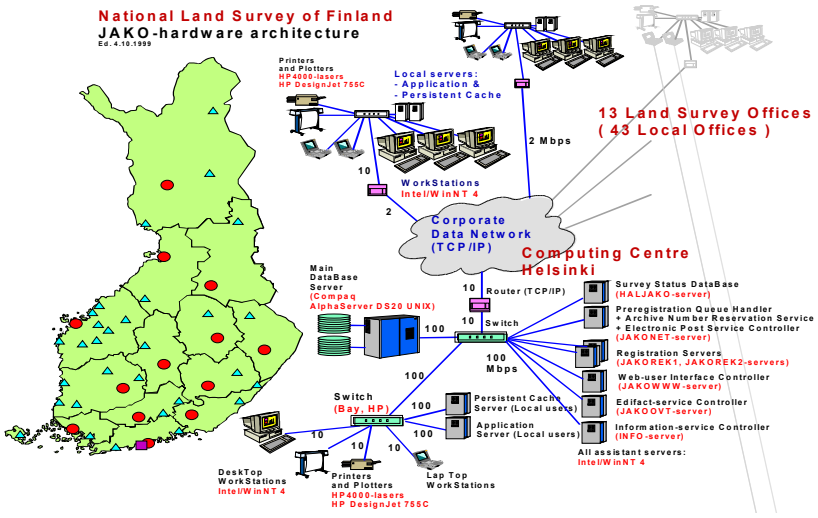

Fig. 1 - JAKO Cadastru (Vitikainen, 2003)

3. Deficiencies and problems with the old system

Basic units of the Land Information System are of real estates, common holds, public roads and transfers of parts. A basic unit is identified by its identifier (city district number/village number, block number/building group number, basic unit number etc.).

The contents of Finnish Cadastral System have developed into wide and versatile data, but it is disjointed and disconnected too. In Finland the rights to the land come into existence by judicial deed, by administrative decision or by law. Only easements and other rights which have prescribed by legal cadastral survey come into existence by registering the data to the Cadastral System.

The main failings with data of real estates are:

- There is data of real estates in multiple registers of diverse authorities in Finland. The registers are partly overlapping and there are no links between these registers, while some of them are only on paper (Rummukainen, 2009).

Therefore, Finland's basic information systems, each with its own register are: the Personal Information System, various information systems covering enterprises, corporations and foundations, the Building Information System, and the Land Information System.

- Because of excessively detailed legislation the data can lie scattered in many registers. Part of the data may be in the Cadastral System and part of it is in another registers.

- Not all the rights to land which are established by judicial deeds can be registered to the Cadastral System.

- There is no obligation to register all the rights that could be registered to the Cadastral System. Regardless of non-registering, these rights can be binding to outsiders, too (Rummukainen, 2009).

CONCLUSIONS

1. Because of excessively detailed Finnish legislation the data can lie scattered in many registers, and there is no obligation to register all the rights that could be registered to the Cadastral System; only easements and other rights which have prescribed by legal cadastral survey come into existence by registering the data to the Cadastral System.

2. In Finland all land is divided into basic property units that are the register units in the Cadastre. All the basic property units are surveyed and registered in the nationwide Land Information System that includes also a cadastral index map and information about titles and mortgages. The Land Information System consists of: *the Cadastre and the Land Register.*

3. In Finland, the whole country was covered with the base maps in 1977 which were continuously updated, while in Romania, until now, maps were only partially realized and were not updated.

4. Digital maps and relational database, updating of changes relating to the real estate, the property and the owners are a few aspects that Romania should borrow from Finland.

5. With all disfunctionalities mentioned above, it can be said that Finland cadastral system can be a model for countries that want to improve their own cadastral system.

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