

APPLICATION OF GIS TECHNOLOGY IN URBAN CADASTRE

APLICAREA TEHNOLOGIILOR GIS ÎN CADASTRUL DIN ZONELE URBANE

*SLAVE Camelia*¹,

e-mail: camelia_slave@yahoo.com

Abstract. *Geographic Information System is a system used to create, store, analyze and process spatial information distributed through a computerized process. GIS technology can be used in various scientific areas such as emergency management, environmental impact studies, cartography, urban planning. The aims of article is to achieve a development of a neighborhood in Bucharest from create in the beginning of the twentieth century up to now and create a database.*

Key words: *Bucharest, cadastre, database, GIS, risk management*

Rezumat. *Geographic Information System reprezintă un sistem utilizat pentru a crea, stoca, a analiza și prelucra informații distribuite spațial printr-un proces computerizat. Articolul își propune să realizeze o evoluție a unui cartier din București de la crearea lui la începutul secolului al XX -lea până în prezent și crearea unei baze de date.*

Cuvinte cheie: *București, cadastru, bază de date, GIS, managementul riscului*

INTRODUCTION

In the evolution of the human societies, the state wanted to know and to be informed about the extent of the characteristics and distribution of private and public properties, on its territory. It was necessary that these surfaces with boundaries, goods and members to be drawn and to entered in the registers (Nițu and Tomoiagă, 2015).

To ensure the security of owner's rights and to have a rigorous evidence of the property and to determine land tax, and construction tax, the state has created "Cadastru". Cadastru is an institution that has existed in various forms since ancient times.

The origin of the word - cadastru - would derive from the Latin "capitastrum" which relates to "captionis registrum", which was the family head tax (capitatio).

In terms of comparative law can distinguish two types of cadastru, one who was established in a purpose only for tax and other that has been established for

¹University of Agricultural Sciences and Veterinary Medicine Bucharest, Romania

tax purposes and legal purposes. The difference between them is based on the concept of property right and the role of the state towards proving this right.

In countries where only fiscal cadastre is not recognized the state's ability to bring proof of ownership. That means, the documents do not constitute evidence of law, but the mere finding, leaving the account owner to demonstrate this right.

In the legal cadastre, the state intervenes directly in determining proof of ownership by attaching documents to a land title, guaranteed by the state. This cadastral boundary gives the measurement results to determine value of a genuine and cadastral plan and measurements are considered accurate in cases of disagreement (Tămăioagă, 2005).

Today the evolution of multipurpose cadastre to an information referenced spatial systems is the core of the territory and the urban information systems can offer elements of georeferencing tools indispensable in the modern urban planning and management of the economic activities (Nițu and Tomoiagă, 2015).

The Cadastre and real estate advertising law (Law No 7/1996) adopted the following definition of the cadastre:

” general cadastre is a unified and mandatory evidence and systematic inventory of real estate throughout the country, in terms of quantity, quality and legal, regardless of their destination and ownership, through which the identification, registration and representation their registers and cadastral maps and plans”.

MATERIAL AND METHOD

Bucharest, the capital of Romania, is one of the most important and oldest cities in Europe, being an important cultural, historical and economic in Eastern Europe. The city is mentioned in history since 1459. Today, the city has an area of 238km², with a population of 1.93039 million inhabitants București,

Located at 44 ° 25'N, 26 ° 06'E on the banks of the Dambovită River, is the capital of Romania from 1862.

The city was first mentioned on September 20, 1459 in an historical document issued by the ruler Vlad Țepeș. That act confirmed a donation made by some small feudal. A unique map of Bucharest dated 1770 had its title in French: Plan de la Ville de Bukarest, et de L'Affaire, arrivée le 24 Jenv. 1770, auprès les Monastères de Vakarestet Kodretsan, entre les Russiennes et un Corps de Cavalerie Turque (fig. 1). The plan had west-east directions, under the title it indicated the quote "Echelled' une heure of chemin", and in the upper part of the plan, next to the title, a legend was included:

For the achievement of the cadastral database, created especially for risk management in urban areas, was selected an area in 1st District. This area is part of the Domenii Park.

Domenii Park is today one of the most beautiful and elegant districts of the capital. It has been designed for the Ministry of Agriculture and officials.

The area is bounded in the North by Bucharest – Ploiești Road, in the West by the Kiseleff Boulevard (E60) and the Herastrău Park. The Kiseleff Boulevard continues with the Poligrafiei Boulevard. At the intersection of the two roads, there is

the "Press House", and at the intersection of the Boulevard Kiseleff with the Boulevard Constantin Prezan, there is the Triumph Arch. In the south, the area is bounded by Turda Street, and it intersects with Ion Mihalache Boulevard and Griviței Street (DN 7). The connection between Kiseleff and Griviței is made by the Expoziției.

A first plane is used for the study area - initially plot plan - dating from 1916. In the area files of parceling are the first references to a new urban development concept of city - garden. This new concept represent alternative for urban areas and took account of the existence of green space within neighborhood (<http://art-historia.blogspot.ro/2009/01/planurile-bucurestilor.html>).

In figure 2 is seen overlapping database created using ArcMap program 10.1, on the original plan from 1916. The database is performed by vectorization of existing buildings and streets in the area and after a thorough research in the field. For this purpose was used orthophotomap from 2012 that was downloaded free from the site A.N.C.P.I. Orthophotomap is in Stereographic Projection1970. (<http://www.pmb.ro/>)

The actual area was expanded beyond the initial area from 1916. Thoroughfares remained largely unchanged and so some of the buildings. But with the passage of time and the current trend of the city to develop it appears that the area appeared an impressive number of buildings with different functions. In all these spaces are living and operates an impressive number of people (Building of University of Agronomic Sciences and Veterinary Medicine, University Romano – Americana, Clinical Hospital CFR 2, Hospital Elias Free and not least Press House and Romexpo Exhibition Hall)(fig. 3).

The streets names were been checked with the information from two site. (<http://OpenStreetMap>, <http://geoportal.ancpi.ro/geoportal/imobile/Harta.html>).

Because in the event of an unwanted events it is necessary to know the number of people and the state of buildings.

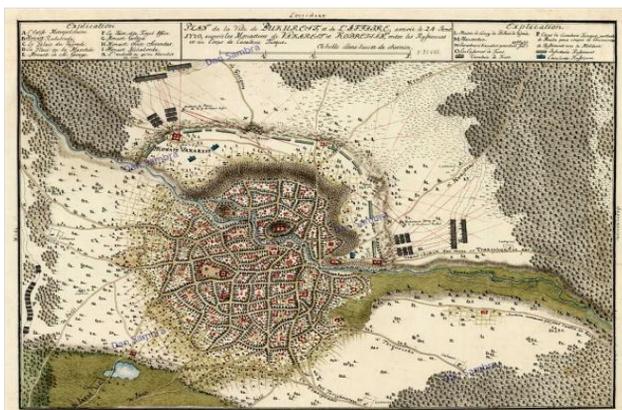


Fig. 1 Original plan of Bucharest 1770

RESULTS AND DISCUSSIONS

According to Wikipedia - the largest online encyclopaedia, a database, sometimes called the "Bank of date" is a way of storing information and data on external media (a storage device) with the possibility of further expansion and their fast retrieval.

The main feature of the database is that cadastral land entities which are represented by thematic layers and attributes of the cadastral entities are organized in relations. To establish the relationship between layers following principles shall be taken into consideration:

- Every enclosure (topographic detail category) to be represented as a single layer;
- On a cadastral layer entities to be represented by a single geometric entity type;
- Each layer is performed by one type of topology;
- In terms of logical organization cadastral information system consists of a base operated by one or more specialized cadastral applications thousand different sub-areas of interest or different levels of decision.

In the database are a total of 443 buildings that are identified by: name street, postcode, type of building, property condition, the approximate number of people which are living. For thoroughfares was stated purpose, number of lanes and means of the transport moving.



Fig. 2 Map overlapping with the original plan of the studied area parcels

The aim of the database is for risk management in to urban areas. A first aspect of the database is that it can be easily interrogated. Database query can be useful if desired identify certain features of the building, or identifying the number of people living in a particular building or street. We have created a database query for buildings which have the attribute of good construction, are represented in figure 4.

Harta amplasamentului clădirilor în funcție de tip clădire, stradă și număr poștal

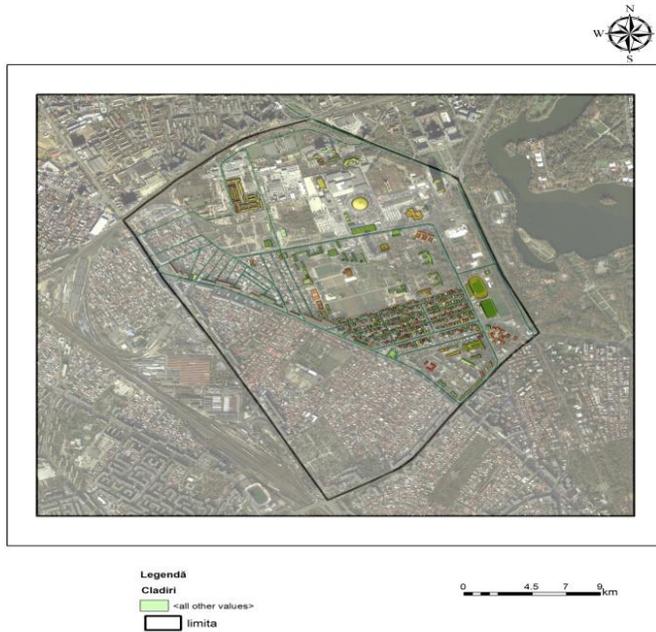


Fig. 3 The site map of buildings by type, street and postal number

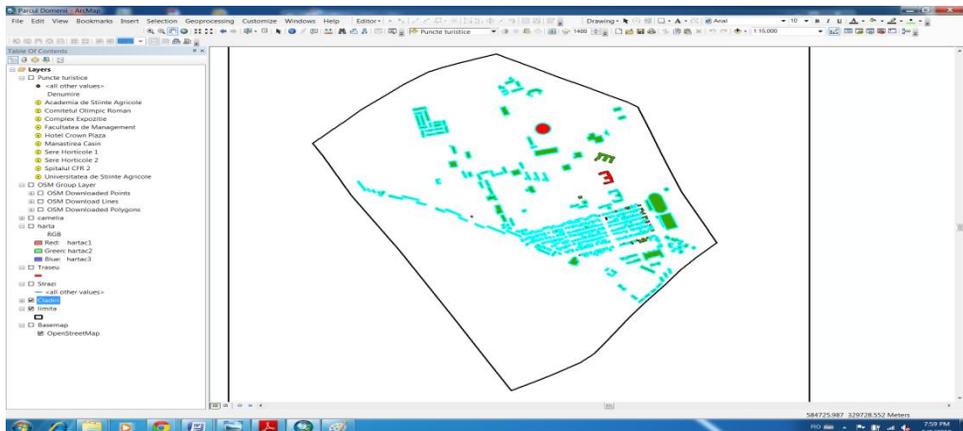


Fig. 4 The database buildings after interrogation

CONCLUSIONS

Large urban areas are dependent on the existence of water resources, food and energy, and any natural or artificial disaster can radically change people's lives. Urban risk management involves:

- Urgent alerts by various means;
- Short intervention time;
- Means of mitigation and recovery situation;
- Risk management in urban areas involve identifying methods to reduce this vulnerability, which can be managed with data base and geospatial technologies. Must be identified some areas that are suitable for setting up field hospitals for people injuries, setting up tents for people whose homes had been destroyed. Have identified areas that lend themselves to the creation of strategic food warehouses and areas where intervention teams to act.

For the risk management in urban areas following activities are required:

- The vulnerability assessment of the urban architectural system and natural and built heritage;
- The vulnerability assessment of construction and socio - economic activities, population / value chain of vulnerability;
- Mapping the vulnerability of each specific element exposed to a hazard/specific vulnerability maps;
- Overlapping maps of vulnerability of more hazard exposed elements/vulnerability global maps;
- Financial real damages evaluation multi - hazard vulnerability assessment of all elements under exposed. The critical evaluation of the risk scale by implementation of the concept of risk class accepted/to establish a risk scenario where multi - hazard - documentation on hazard risk reduction.

The database created can be used to determine blocks or buildings that present a high seismic risk and correlate these data with the number of people that can be affected. Dates on the condition of the building may be needed for proposing their expertise and compliance with seismic risk classes.

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