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GEOGRAPHICAL INFORMATION SYSTEMS AND URBAN MANAGEMENT

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Abstract
GIS represents a working technique more and more useful for contemporary world both in the field of theoretical research and in very many practical activities. In fact, GIS represents a system that has more informational components, reported to geographical coordinates. Components introduction, their storing, interpretation and analysis is done by means of the computer, the result being mainly the ability to see some complex information, spatially differentiated in comparison to real geographical coordinates. Secondly, GIS techniques allow combining information of different types (figures, images, maps), hardware and software components, all being under the direct coordination and determination of the human component, in order to make analyses and correlations of great complexity
Keywords: geographical information systems, urban management

1. Introduction

As early as the late 1990's Geographical Information Systems come into a new stage. Now, GIS try to become a tool for information decision and manipulation. GIS is now directed towards Web, becoming more popular. Here are the main events that characterize this stage.

1996: Jo Wood implements the first version of Land Serf, an useful application for analyzing digital models (DEM)

1997: University of Minnesota launches Map Server 1.0, an open-source application. ESRI launches Arc View Internet Mp Server (IMS) a commercial instrument that allows GIS data processing on the Internet

1998: TerraServer appears as a common research project between Aerial Images, Microsoft, USGS and Compaq.

1999: Grass 5.0. application is launched, Maguire, Goodchild, and Rhind publishes the paper „Geographical Information Systems: Principles and Applications", 2nd edition, Longley et al. (2005). MapQuest makes over 130000000 maps. GIS Day is launched. IKONOS satellite is launched with 90cm resolution in panchromatic. Terra satellite is also launched in this year, the one that provides MODIS satellite images (Moderate Resolution Imaging Spectroradiometer), beside Aqua satellite. CSI is organized (CGIAR-CSI), that get together all GIS tele detection and research in agriculture laboratories from over the world..

2000: Tele Atlas Company takes over ETAK company. DHI Water & Environment is founded, after the merge between Danish Hydraulic Institute (DHI) and VKI – Institute for the Water Environment.

2001: Refraction Research launches PostGIS 0.1 application, an open-source application, able to support relational data base for PostgreSQL. ESRI starts the implementation of ArcGis 8.1 application. Quickbird satellite is launched, with a 62 cm resolution in panchromatic. Global Mapper Software LLC is also set up this year.

2002: ESRI company starts to offer a wide range of products available for Linux (ArcIMS 4, ArcSDE 8.2, MapObjects-Java Standard Edition, şi ArcExplorer 4 operating systems. Kodak Company takes over RSI (Research Systems, Inc.). The National Atlas of The United States of America is launched..

2003: RSI Global Services starts Kodak products commercialization, using JPEG 2000 format. USA government initiative is put into practice.

2004: ESRI launches ArcGis 9 application, including ArcGIS Engine and ArcGIS Server products. RSI together with Remote Sensing Systems (RSS) a division of Eastman Kodak Company are taken over by ITT Corporation.

2005: GRASS 6.0.0 version is launched, an application that offers a new interface and support for data base. Google launches two services: GoogleMaps, that uses new technologies for ce Web-Gis (AJAX, Asynchronous JavaScript şi XML) and GoogleEarth applications.

2006: GRASS 6.1.0 version is launched. At Lausanne, Switzerland takes place "FOSS4G2006 – Free And Open Source Software for Geoinformatics".

2007: Leica Geosystems buys ER Mapper. ESRI informed on the first public version of ArcGIS Explorer 9.2. DLR made public samples of the first images captured with the help of a radar placed on board of TerraSAR-X. ESRI made public Service Pack 3 for ArcGIS 9.2, ArcIMS 9.2 and ArcSDE 9.2. FOSS4G2007 – Free And Open Source Software for Geoinformatics" takes place, an event that was

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supported by Victory, Canada. 2007/2/CE directive of the European Council and Parliament is adopted, for establishing an Infrastructure for spatial data in the European Union, named INSPIRE.

GIS technology, Coors (2003),combines usual operations with data bases such as statistical analysis or questioning with unique advantages offered by maps for geographical observation and analysis, based on spatial data. GIS allow maps creation, information integration, landscapes viewing, difficult problems solving and efficient solutions development in a new manner, easy to use.

After 1989, cities of Romania have more and more often started to manage their territory, and problems related to transition and public administration reform required more financial resources than they could afford.

2. Urban management

Many of public administration aspects (health, infrastructures, planning, development, disasters management, security, environment protection, education, culture, entertainment) or private (resources and facilities control: transport, telecommunications, electricity, distribution, trade) involve geo-spatial data for which information systems provide updated means of management, Benenson et al. (2005). Geo-spatial information gives decision a wider perspective, facilitating coordination on community level or administrative unit (region, county, country, company, institution). GIS represent a modern approach for an on-going improvement of services and decisions and we should assimilate it in order to face the present trends of globalization and European integration. The ability to manage, correlate, foresee and disseminate geographical information turns GIS into an instrument for analysis.

Urban management, Laurini (2001), involves a decisional and operational activity that calls for an activity that:

- Is based on structure (human, technical and financial) informational of an organization
- Coordinates urban relevant agents
- Allows development decisions formulation and implementation, on the level of strategies
- Uses instruments on hand

Urban management activities can answer the following questions: who performs management?, what is management? And how is it done? (Figure 1).

GIS is an operational instrument irreplaceable in urban management, Leitmann (1999), that assures authenticity, actuality and the objectivity of assessments in founding, expressing and implementing decisions and urban control. GIS is a technology based on computer for cartography and entities analysis on land surface. The system is a graphic representation, a sort of map, which provides different

information about a building, Musy et al. (2004). According to the "strata" that combine different types of information get available. For example, we can find about a certain building such information as its owner, its networks (water, gas, electricity, telephone, television), the material the building is made of, the number of rooms, surface, the building year, taxes, the roads that can lead to such a building, the shortest road, public transport means stations, etc., De la Losa et al. (1999).

How management is performed	Decision level	Organizational structures
What is management	Decision	Audit Vision Policies Events planning Monitoring Assessment
How is management done	Instruments	Marketing Urban Planning Strategic Financing Advanced

FIGURE 1 - ACTIVITIES INVOLVED IN URBAN MANAGEMENT

The data used within the Geographical Information System, Longley et al. (2005), is a sum of information gathered from software applications area, from all fields of activity, such as geographical, land measuring and informatics (figure 2).

GIS using in urban management has become more and more known. In Romania, there are serious preoccupations in this sense, including building surveys applications, where data stocking in analogical format can satisfy the actual requirements of the local public administration: achieving data bases with exact information, referring to urban land inventory, rapid access to information related to buildings and their owners, managing networks of public utilities, Pilouk (1996) and Zhou et al. (2004)..

Generally, urban GIS applications have in view two distinct purposes: administrating and monitoring regions and planning urban development. Usually, in order to achieve the two purposed aims a data base is needed, that can exploited using different functions. For example, in order to achieve objectives that have in view a region administration and monitoring one can use the data base interrogation functions (type, stage, material), a permanent data actualization being necessary here. On the other hand, in applications meant for planning one can use analysis and modeling functions (best road, intervention time, affected region, etc.), Yao et al. (2006).

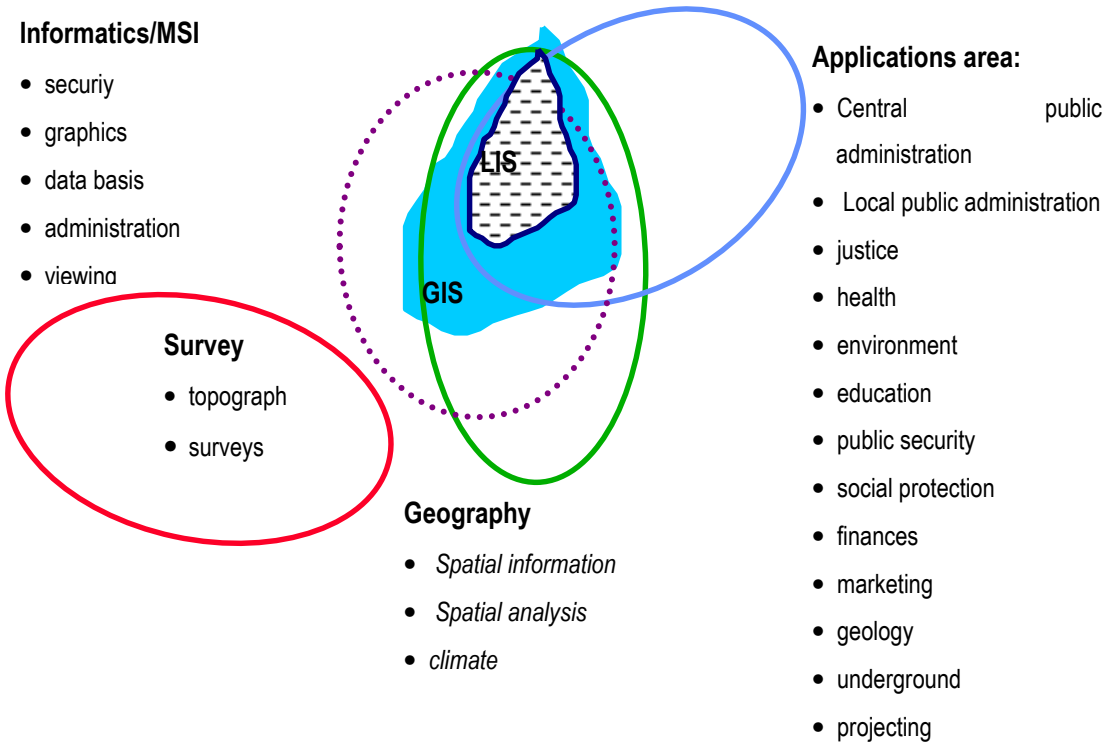
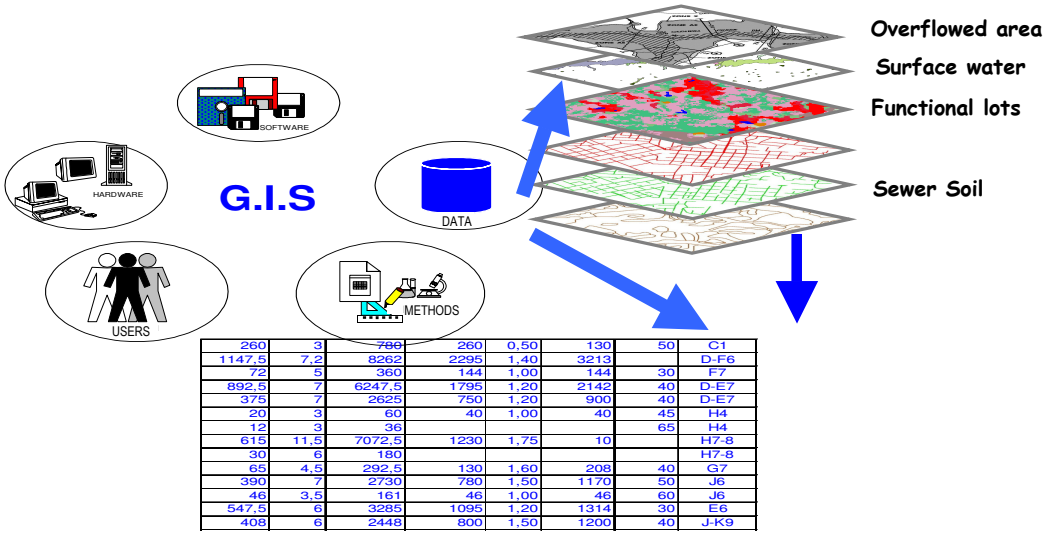


FIGURE 2. DATA GATHERING WITHIN GIS

The data necessary in urban GIS applications and diverse and numerous and they involve important costs for their gathering and updating. We should also mention the fact that, when administrating a region, there are more institutions that use the same categories of data, beside those adequate activities (for instance, the data concerning buildings and owners are necessary to survey operators, authorities concerned with taxes, urbanism services, public utilities suppliers, etc, data concerning roads are necessary for people and goods transport companies, mail, firemen units, police units, etc). This situation calls for all institutions collaboration, for one hand for proving data availability, on the other hand for using the same geographical reference (more precisely, the same digital map, on which each institution can complete with specific data in its activity field), Laurini (2001).

A Geographical Information System components are a combination of software and hardware, data and models used as well as informatics systems users (figure 3).

Achieving a Geographical Information System represents a great using time process, but this is a minor disadvantage if we take into consideration the fact that the preliminary results are at once used. Moreover, the costs related to such processes are very important.



260	3	~~780~~	260	0,50	130	50	C1
1147,5	7,2	8262	2295	1,40	3213		D-F6
72	5	360	144	1,00	144	30	F7
892,5	7	6247,5	1795	1,20	2142	40	D-E7
375	7	2625	750	1,20	900	40	D-E7
20	3	60	40	1,00	40	45	H4
12	3	36				65	H4
615	11,5	7072,5	1230	1,75	10		H7-8
30	6	180					H7-8
65	4,5	292,5	130	1,60	208	40	G7
390	7	2730	780	1,50	1170	50	J6
46	3,5	161	46	1,00	46	60	J6
547,5	6	3285	1095	1,20	1314	30	E6
408	6	2448	800	1,50	1200	40	J-K9

FIGURE 3. COMPONENTS OF A GEOGRAPHICAL INFORMATION SYSTEM

Thus, GIS is a very useful instrument, assisting the staff in taking decisions (figure 4).

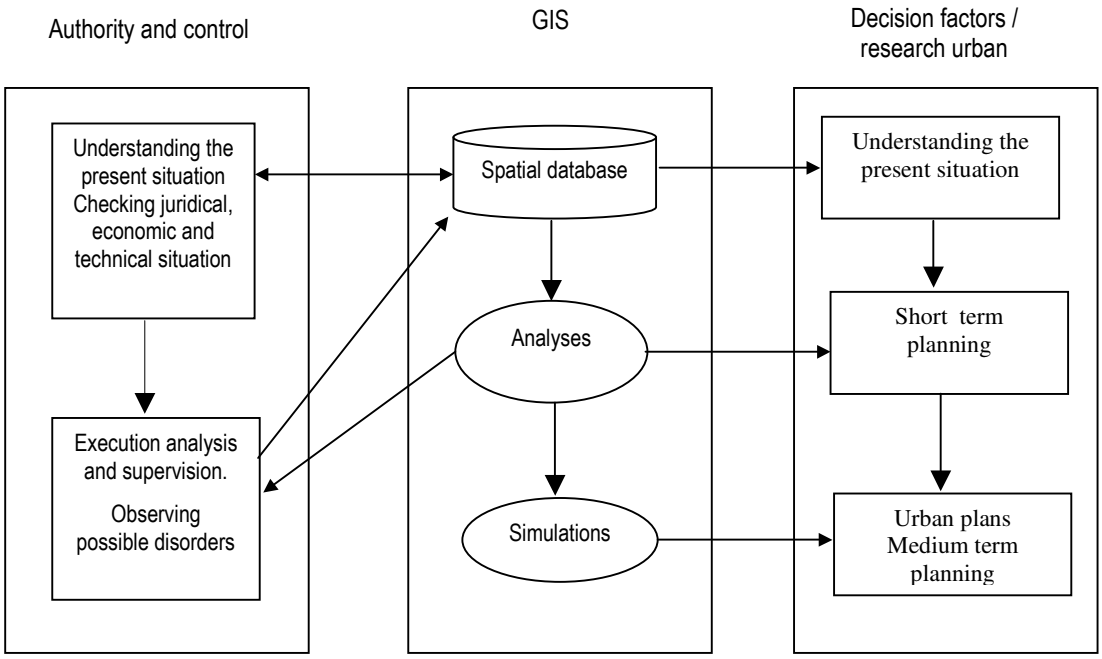


FIGURE 4. GIS ACTIVITY AS A MANAGEMENT INSTRUMENT

For a total achievement and a successful implementation GIS systems, Zhou et al. (2004), are based on partnerships among all institutions involved in the social-economic and political life: county councils, town halls, development agencies, banks, universities, NGO's, local interest companies

6. Conclusions

At present, using a great volume of information calls for achieving a proper way of managing, attentively elaborated, suited totally to data structures. Thus, information used in public utilities networks administration can be divided in two categories: spatial information and descriptive information. Such types of data can be integrated in the same information managing system, by creating a Geographical Information System (GIS).

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