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MODEL FOR IMPROVING SPATIAL PLANNING AREA MANAGEMENT IN LOCAL GOVERNMENT IMPLEMENTATION OF GIS TECHNOLOGY

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ABSTRACT: This paper discusses the forms of application of GIS technology in local government by improving the spatial aspect of planning control area. The research results are based on data collected in local government that are currently one of the leaders in implementing e-government in the West Balkans (Banja Luka, Bosnia and Herzegovina, Indjija, Serbia). Referred to the importance of managing space for local community development, and analyzes examples of application of these local governments. As a result of research at the end of the proposed general model of improving local government controlled area with the application of GIS for local governments of the Western Balkan.

KEYWORDS: Geographic information system, local community, spatial planning, spatial analysis

❖ INTRODUCTION

The fact is that the information technology in the work of local authorities found multiple application. There are two main areas of application information technology in local government, namely: the development of e-service e-administration and management support that is. decision-making process. Taking into account that over 80% of data to be processed with a spatial dimension to the application and development of geographic information systems (hereafter called GIS) in local government deserves the special attention of researchers.

This research work deals with exploring the development of a general model of space-planned management transition local government area of the Western Balkans (Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Macedonia and Albania).

The first part referred to the importance of spatial planning and management space for local community development. Shown some positive examples of the application of GIS practices and the role of GIS as a supportive element of the reform of local government administration.

In the second part of the proposal model is shown to improve spatial management plan of the local government area based on the application of GIS technology. The presented model is adapted to the organizational structure of local governments of the Western Balkans.

❖ THE IMPORTANCE AND CHARACTERISTICS OF SPATIAL PLANNING AREA MANAGEMENT IN LOCAL GOVERNMENT

The requirement for rapid and sustainable development of each local community has successfully planned- space management to its territory. Spatial planning of urban space management and building but takes the economic, social, environmental and other factors. All the aforementioned facts must be taken into account in the drafting and adoption of spatial planning documents.

In the area of the Western Balkans, based spatial planning document is a "space program". It is a document that must be adapted to the development strategy of the local community and other development documents. Its production is also commissioned to selected authorized institutions and organizations, and in its development must include all segments of a particular community. All the lower spatial-planning documents must be consistent with the spatial plan. Three basic components of any spatial planning documents are time, space and development. Therefore, spatial planning must be

approached with great seriousness, as incorrect or slovenly set settings can adversely affect the development of local community. This is particularly important in planning at the local level because the resources of the local level are limited, and the result of mistakes made often irreparable [1].

In addition to the spatial planning document, the second significant segment space management of local government is having built an effective system of control compliance (implementation) of the mentioned documents. The elements of this system are governed by statutory legislation. With the implementation of the said legislation in the field have a vital role of local government. All potential users of space in the territory of a particular local authority directly addressing the relevant authorities (departments) and local administration. After reviewing the request, they can be accepted or rejected. Exceptions are objects that are of public interest. Then the approval brings the state or regional level, but re-thinking local authorities is of great importance. By granting permission for the use of space controlled by the local government if the above space is used in accordance with the issued permit (decision), the work of the competent inspection.

From the above we can see that the local administration for successful spatial planning and management of their premises must have a quality and consistent spatial planning documents, an effective system for issuing permits for the use of space and control their execution in the field. Finally to support the above systems must be efficient and flexible information system that provides timely collection of relevant data and its fast processing and presentation of results, with special accent their spatial character. It is in this area is mostly found applying geographic information system.

The construction of this system is slow and time consuming process that requires a lot of investment and endurance to see the real effects of only a few years [2]. Looking at the implementation of the application of the developed countries decidedly that the CEO one of the most useful tools available to local governments in the spatial planning of local government management space.

❖ FORMS OF APPLICATION OF GIS IN LOCAL GOVERNMENT. EXAMPLE OF APPLICATION FROM CITY OF BANJA LUKA

In practice, you can find various examples of the application of GIS in local government. Since the application of GIS in local government of the Western Balkans in the early stage (initially) to have as reference samples for observation taken Banja Luka (Bosnia and Herzegovina) and the Municipality of Indjija (Republic of Serbia).

The choice of sample was applied on the basis of the degree of integration of GIS in local government work administrations.

Banja Luka is the administrative center of the largest Serbian (one of two entities in the B & H) with an area of 1239 km² and about 250,000 inhabitants. The main application of GIS in the Administrative Service of Banja Luka was in support of the issuance of permits for construction and development relational spatial analysis in decision-making.

In the development process of GIS and the City of Banja Luka in the Department of Urban Planning Administrative Service of Banja Luka was established a special department for documentation. The main task of this department is to take care of the spatial plan documentation of Banja Luka and convert the old hard copy spatial planning documents in the appropriate digital GIS formats. In addition Department shall update an existing digitize spatial planning documents and for the appropriate spatial analysis [3]. Taking care of GIS is not only a task of this department, but his functioning care and other units from its organization domain work, so for example. GIS hardware maintenance department is responsible for IT and so on.

The process of developing GIS in Civil Service Banja Luka was accompanied by the inevitable process of restructuring the existing organizational structure and organization of work. As part of these changes in May 2007, established the Centre for permission of Banja Luka and a new organization of processing requests for the use of space.

The GIS of Administrative Service of Banja Luka integrated data on construction and use permit, the spatial-planning documents. It provides an easy and quick access to this data. Access to GIS enabled employees in the Center and other employees that it is necessary. GIS has enabled the issuance of an excerpt from the regulation plan for less than half a minute and a quick overview of all the information on each parcel in the area of Banja Luka.

Existing procedures prescribed by law are respected, while increasing the efficiency of the officers in charge of issuing permits for space management.

The main objectives of the establishment of the Centre are:

- ❖ improving the efficiency of the licensing process through: increase the efficiency of their process, eliminate unnecessary and duplicate activities, providing comprehensive information, efficient exchange of data, increase citizen participation and community in the process, merge databases, promotion of development activities and projects.
- ❖ creating a supportive environment for investment. As part of the Centre for permission investors have access to information and publications, including: spatial planning documents, information

and advice to potential investors about the possibilities and conditions of construction, the instructions on the procedure of filing the request, guide through the processes, information on all documents submitted with application form, manner and cost of their acquisition, guidance on their rights and obligations in the process of building and using an object, sub-legal acts that are regulated in areas related to construction and obtaining the necessary approvals, and other documentation and information.

Based on the functioning of the Centre makes the existence of a GIS that allows employees the necessary information in one place. As a background database of the Center is a department of the documentation, whose main task is to update and complement customize spatial database.

Department of Urban Planning City of Banja Luka in his work applied software INOVA AreaCAD-GIS. It is software that combines in itself the complete Autodesk Map 3D platform and software tools for planning, design and production of technical documentation company Inova-Geoinformatics in Banja Luka.

The program is designed as a comprehensive system of information support to reconstruction and sustainable management of real estate and customize. It is integrated into Autodesk Map 3D platform and web application that allows you to work with vector and raster graphics, and spatial and alpha-numeric databases that are used in the field of spatial planning, urban planning, surveying,

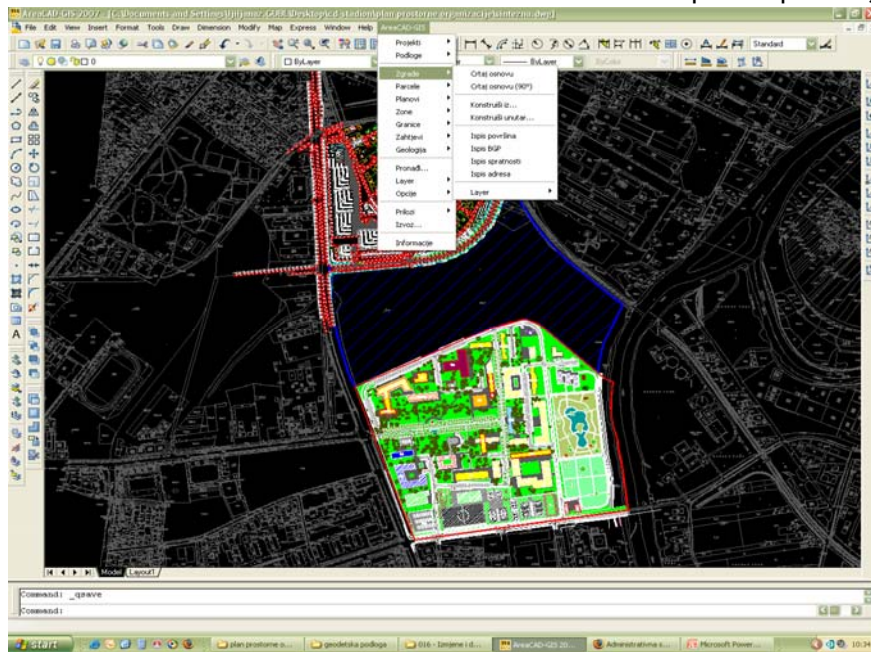


Figure 1. Display the work environment software INOVA AreaCAD-GIS [4]

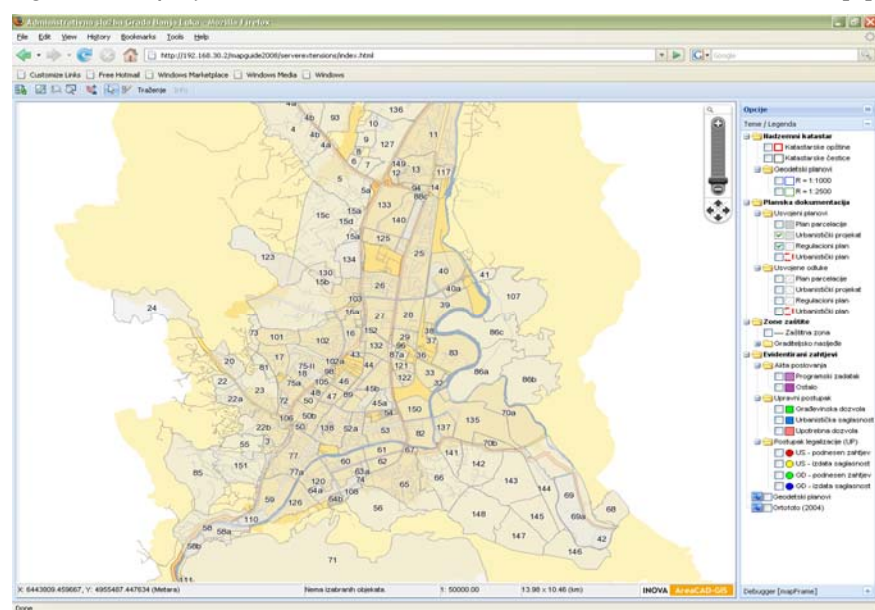


Figure 2. Web-application to display GIS data [4]

right of Web-application is a menu to choose which layers they want to be shown. Web-application offers the possibility of the data from all databases in the existing GIS.

infrastructure design and architectural design. The above platform is built upon the original software solutions from companies INOVA Banja Luka, which allows the use of sources and resources that are available in the city of Banja Luka. Thus, for example, the surface regulation plans of Banja Luka GIS associated with the relational database in which data are placed on all building permits issued. This updated software provides monitoring and analysis of real estate and resources with which manages the city and linking with external information systems, for example, Electrical Distribution, Public water supply and others.

Figure 1 shows the operating environment software INOVA AreaCAD-GIS mode to update the regulatory plans.

Besides the standard tools of Autodesk Map 3D software is supplemented by dedicated tools, which are located in the main menu of the program. To view the results using the web-application, which is able to display data that is updated with the following amended Autodesk Map 3D platform (Figure 2.).

Using the aforementioned web applications provided better visibility of spatial-planning documentation, more accurate and faster search, the ability to search by cadastral particles and obtaining large quantities of information.

In terms of management and monitoring of cases in the field of physical planning, implementation of these applications resulted in the reduction of the average number: working hours to be spent on the processing of cases, working days in which the object is waiting for processing, and working days for citizens in gathering the necessary attachments to the application.

For the use of GIS, ie. its software, it is necessary to provide the necessary hardware resources that can support the demanding GIS software. Thus, in the existing computer LAN network extended to 5 computers, four A3 printers, plotters, and the server. Computers are located in the newly formed Department of Centre for Documentation and licensing. Computer graphics work stations running Linux.

Control, urban plans and other spatial-planning documentation, which is digitized, is located in a spatial database on the server. It is regularly updated in the department for documentation. Access to this spatial databases have only authorized workers. They can be divided into two groups: the servants who have the right to update information contained in the database and officials who have access to data in a format where the changes are not permitted, but only display and print data. In addition to spatial databases, important information is stored in MS SQL server database and file as they complement the digitized maps and plans.

Communication with the server is performed by a client - server model. GIS software by the user sends the request to the database server. Server processes the request and if available the required data in accordance with the privileges of the user, puts him at the disposal of the requested data or perform specific actions based on existing data, for example. change the owner and certain forms of plot (Figure 3).

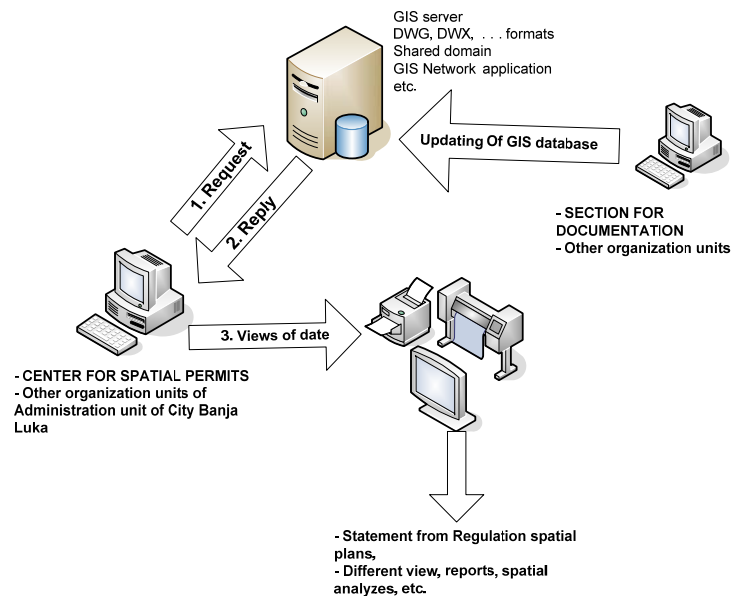


Figure 3. Scheme of application of GIS systems in the Administrative Service of Banja Luka

❖ EXAMPLE OF APPLICATION FROM THE MUNICIPALITY OF INDJIJA

Indjija is located in the Republic of Serbia, the area of the municipality is 384 km², and has about 53,000 inhabitants. Information introducing technology in the work of the Municipal Administrative Service, and putting customer orientation and transparency as a priority the development of the local municipal administration has reorganized the management of existing old municipal administration and establish a modern flexible municipal administration. Taking advantage of technology informative the local government has developed a series of municipal electronic services to citizens and potential investors. A significant contribution to the establishment of user-oriented administration is the application of GIS. GIS-based services have found application in a significant number of activities of the municipal administration Indjija.

In the municipal administration of Indjija, in terms of application of GIS, we can single out two classes and to [5]:

- ❖ Department of Urban Planning and Communal and Housing Services and Environmental Protection
- ❖ Department of Information Technology (IT), geographic information system (GIS) and communications

In addition to administrative and other tasks in the immediate implementation of laws and regulations whose implementation was entrusted to the municipality directly in the field of urban planning, communal housing areas and environmental protection, the Department of Urbanism, Communal and Housing Services and Environmental Protection is responsible for the implementation process of development of spatial planning documents and updating spatial data from these areas in spatial databases, GIS. Application of GIS has found an important role in the performance of daily activities within this department, especially in issuing approval for the issuance of permits for the use of space, making space-planning documents, and various spatial analyses.

For the improvement, maintenance, updating the existing information infrastructure with special emphasis on the GIS, the responsibility of the Department of Information Technology (IT), geographic information system (GIS) and communications. This department performs the following tasks [52]: planning, organizing and implementing information technology (IT) and geographic information system (GIS) Municipal, controls the operation of automatic data processing and take measures to improve and increase the efficiency of information system, proposed by automating tasks in public companies and institutions, and other activities.

In the process of issuing permits and spatial planning in the municipality of Indjija use GIS and found a double application, as an effective tool for accessing and browsing the spatial-planning documentation in resolving the request for the use of space as a tool that allows access and retrieval of spatial planning documents to all interested citizens who have Internet access, via the official web portal Municipality India.

The establishment of GIS and spatial connection with alpha-numeric data bases, the official who processes the request for the use of space, this complex task can be done for significantly less time, with the processing of much larger amounts of data, which is regularly updated. GIS software allows quick search of spatial-planning documents. On the basis of result area analysis, with reduced possibility of error, we can issue a decision or give an opinion whether to accept or reject the request of investors for the use of space.

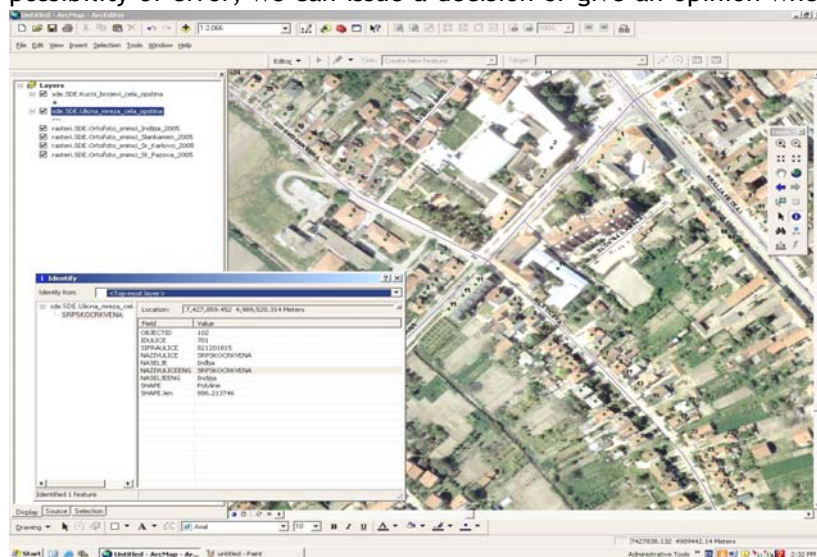


Figure 4. Operating environment software "ArcMap" in the GIS system of the municipality Indjija [6]

orthographic Indjija municipality, with the overlay layer, a network of streets and displayed alpha-numeric data for a particular street.

Another significant application of GIS in the Municipality of Indjija is putting space-planning documents to the public, all interested citizens. Through the official Internet portal, Indjija has allowed all interested citizens of the Spatial Plan search Indjija municipality, the general urban plan,

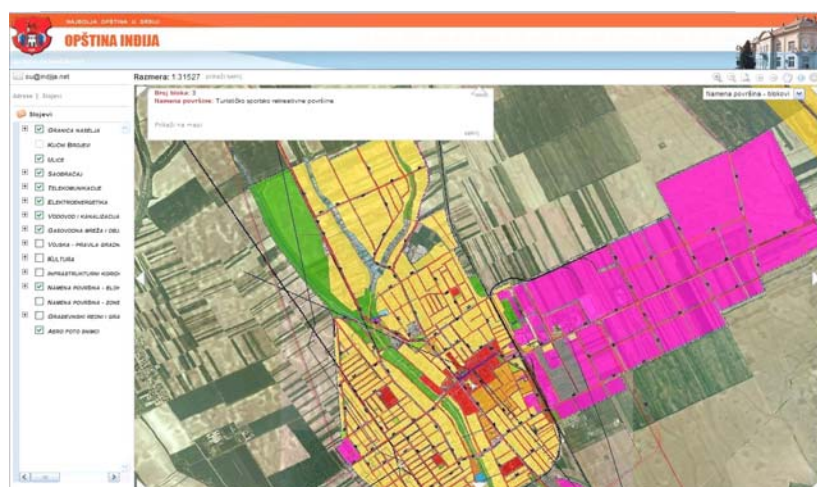


Figure 5. Master Plan of the Municipality of the municipality's website Indjija

the terminals. This ensures that all citizens and potential investors to obtain the necessary information on available space resources of the municipality and the planned development.

Of the other important e-services based on GIS data, extracting the "System 48". This GIS-based e-service enables citizens within 48 hours after application of a communal problem gets its information or the manner of his otklanjanu solve this problem if not removed within 48 hours. A citizen can be in person, by phone or electric utility report the existence of problems in accountable local government. Through the information system "System 48" received information is submitted to the relevant utility company, whose team comes to the spot. If possible within 48 hours logged in the problem is eliminated.

Otherwise, run the appropriate procedures for permanent removal of the causes of reported problems. All of the above activities are given to the public through the web site. Every seven days the management directors of municipal utility companies to discuss the operation of the service based on the spatial analysis of regulated intervention for the previous period and take measures for its improvement. Indjija is the first to apply this system in Europe. Management of Municipal visited Baltimore (Maryland, USA), where they met with the functioning of this system. In cooperation with the firm Mega Computer Engineering, based on experiences from Baltimore, these systems began operating in June, 2004.

Shown in Figure 6 is a desktop search mention application. In the upper part of the set criteria (e.g. problems with the transport

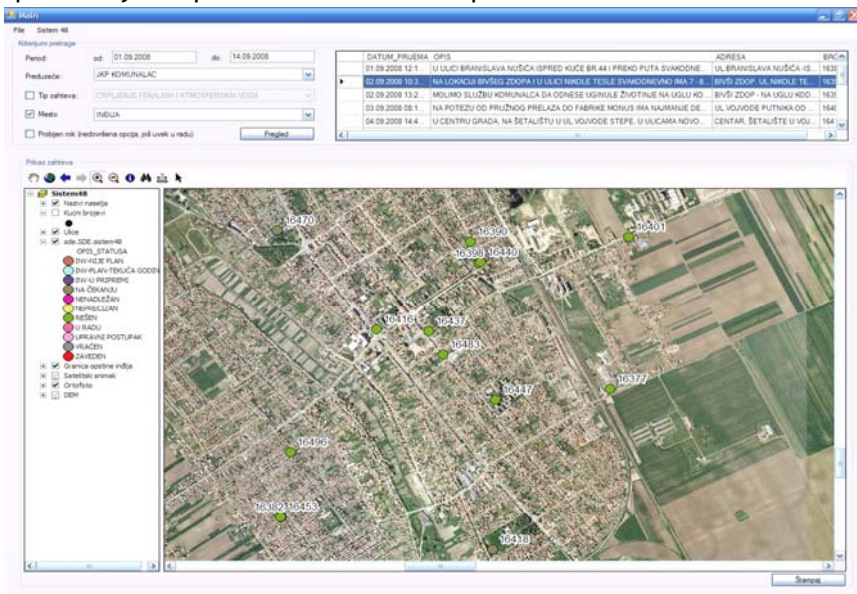


Figure 6. Operating Environment for System 48 applications for search

of waste), and the lower part gives the spatial layout view recorded requests that belong to this group.

The benefits of introducing this service to all stakeholders of the local community, as follows:

- ❖ People - do not have to come to the municipality to report utility problems, get the answer to their request within 48 hours and more efficient to address their demands;
- ❖ Public companies - have a better, more modern and functional relationship to its citizens, the easier it considered the scope of the problems of citizens, easier monitoring activities done, formed the basis of information (database) and the development of effective plans and programs for the coming year;
- ❖ Local governments - easier to control the operation of public enterprises and services, regular full summary reports, better coordination with public companies, the better the possibility of short-term and long-term planning, budgeting help and saving resources.

It is important to mention the GIS-based application for the calculation of compensation for the use of urban construction land. Incomes from fees for the use of urban construction land are important source of financing for each of the municipal budget. It is therefore very important for each of the municipal government to organize an effective collection of revenue sources. This is a very complex activity because it has a large number of users of urban construction land, and I calculation is very complicated with many parameters. The calculation is made in that first identifies the location of building land for which it is billing. Then determines the distance of land from the city center, determined the availability of utility lines (water, gas, electricity, etc..), Distance from school, access to the main road and so on. Based on previous analysis of the position is determined by a series of interdependent coefficients, which are admitted to the complex formulas. By calculating the formula gives a finite amount of compensation for the use of urban construction land. As you can see, I was calculating and determining the coefficients requires insight into the spatial-planning documentation and manually perform complex spatial analysis for each plot in order to obtain the necessary coefficients for the calculation. All this requires a significant commitment of financial, material and human resources, and loss of significant amounts of time on complex calculations.

To make this process much more efficient and effective, Indjija used the existing GIS and available human resources with which possesses in the field, and has developed software that is based on spatial analysis in GIS for the calculation of compensation for the use of urban construction land. As the operator selects one or more parcels for which the calculation is done, run the complex spatial analysis and calculation. Calculation is done to save in the correct digital format or printed. At the

same time generate a form of the decision and submit its invoice to the tax payer. On Figure 7 shows the final calculation of building rent in the working environment this program.

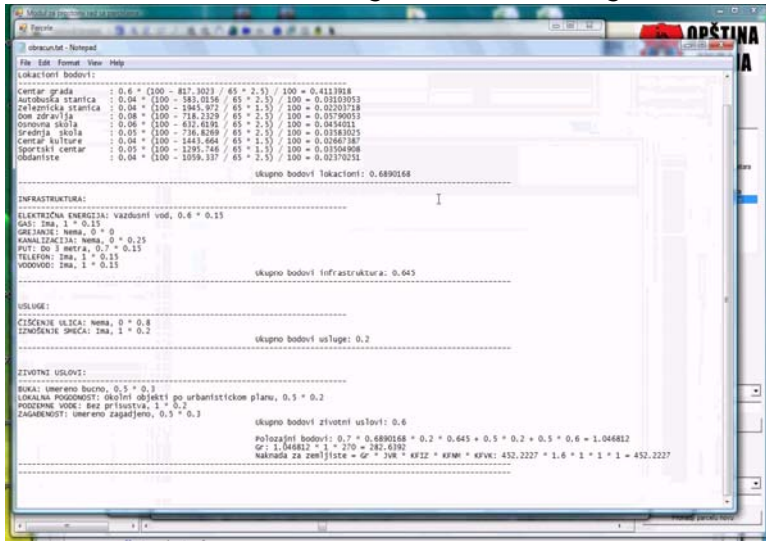


Figure 7. Construction of rent adjustment in the application for its calculation

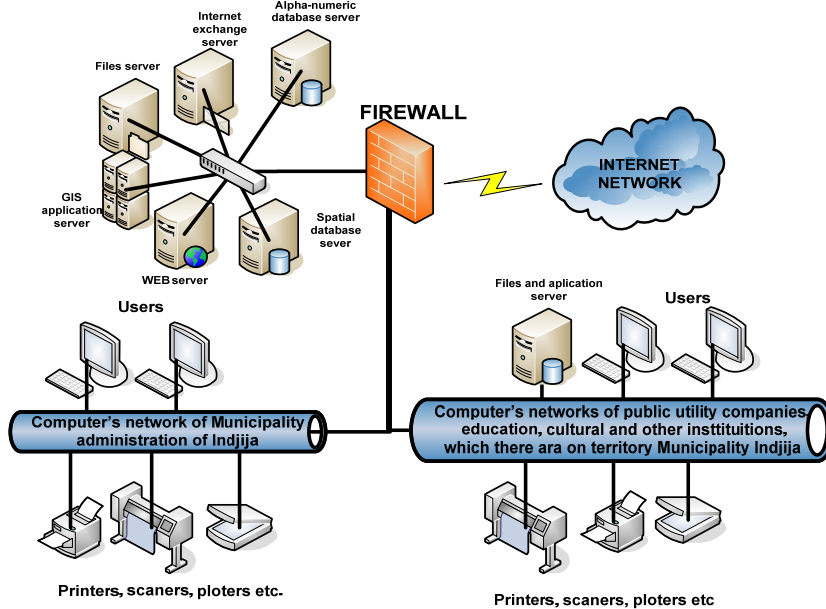


Figure 8. Scheme of infrastructure GIS in Indjija

software ArcPAD Manufacturers of GPS devices. In Figure 8 shows the scheme of GIS infrastructure in the municipality of Indjija.

❖ SPACE MODEL TO IMPROVE MANAGMENT OF LOCAL GOVERNMENT AND GIS

Comparing two mention concept development and application of GIS in local government,. concept from the City of Banja Luka, where the development and implementation of GIS related to the process of improving the licensing process and the concept of the Municipality of Indjija where GIS plays a significant role in the development of new e-services e-government, could build a general model to improve management of local government area with the application of GIS technology in the socio-political and economic conditions currently prevailing in the West Balkans.

Model to improve spatial planning administration area of local government (hereinafter referred to as Model) for local governments of the Western Balkans with the support of GIS technology consists of the following activities:

1. development of spatial planning documents,
2. acquisition data fields,
3. spatial analysis and presentation of results of processing,
4. select optimum alternatives, making decisions,
5. implementation of decisions and monitoring activities,
6. update existing spatial planning documents and making corrective and preventive decisions.

Development of spatial planning documents

The existence of spatial planning documents is the basis for space management of local government. To create these documents local administration has hired a company license for spatial planning and design in accordance with the law on public procurement. During the process of drafting these documents to the selected contractor of the local government is making available the necessary information, provides the necessary comments and suggestions of citizens to collect drafted document spatial planning. Spatial planning documents adopted by the Assembly Local Government, thus they become the official documents for the management of the municipality of Trebinje area.

To create high-quality space-planning documents it has to establishment of good cooperation between local government and the contractor, is an important quality tender document. The said document is a basic document for the selection of optimum bidder. Besides the basic elements of public procurement, it is important to define the exact format required to deliver specified documents. For the purposes of GIS is defined by the digital data format (. Tab. mid. shp. Dem etc.), Data model documentation, the minimum accuracy, and more.

Prior to the adoption of spatial planning documentation assembly, it is necessary to ensure transparency in the whole process of its construction. You must assured the draft spatial planning documents put to the public and allow all interested citizens to give their suggestions, comments or opinions. Each proposal citizens have to take into account when making proposals and documentation. GIS allows the spatial drafted planning documents put to the public through Internet portals. Important role in this process have a license centers, in local government who established the center, because they can get all the necessary information and interpretations concerning the draft spatial planning documents.

Adopted an official spatial-planning documents should be placed on local government web portal. In this way, all citizens at home can review documents listed, compared with the current situation and get the requested information. Often referred to Web applications have possibilities certain spatial analysis (e.g., surface measurements, calculating the shortest path between two points, etc.).

Data collection from the field

To make quality decisions regarding the management of local government area is necessary for spatial analysis to provide timely and accurate data regarding the observed problem. To collect the data necessary to develop a system that significantly increases the existing processes do not work. It is necessary to use existing and develop new systems of data collection. What data sources will be used depends on the given problem, available resources, the required accuracy, etc.

The data field can be collected for the hiring of skilled workers, metering stations, supervisory cameras and sensors, telephone calls, e-mails, direct contact with citizens and the like. For storing the collected data is necessary to create the appropriate database. When collecting data it is important to record their meta-data for example. source, creation date, creator information, etc.

For GIS, it is important that before you begin to develop this system defines data model to be used. Data model should be developed in accordance with applicable international standards such as, in accordance with a series of standards of ISO 19100. Special attention should be paid to the definition of meta-data given model date local government.

Significantly to define the appropriate procedures that define the processes in this activity. Procedures should define which data is collected, who is accountable for what activities, who can access what data, what methods should be used and so on. Classified information is required and the safety aspect. It is to define a class of data that is collected, and the importance of these data for local governments, measures to be done for their protection of the integrity of data, and measures for preservation and archiving of data.

About all completed activities should have a record that responsible. notes, reports, etc.

Spatial analysis and presentation of results of processing

Perform spatial analysis is a complex process that requires a lot of time and often significant commitment of resources. Application of GIS is important to speed up the execution of spatial analysis.

To perform simple spatial analysis it is possible to use standard GIS software capabilities, and for complex spatial analysis is necessary in the GIS software to develop a separate program modules. The same applies to the presentation of the results of processing data.

By investing in the development earmarked program module in the GIS software to perform spatial analysis of the long-term flame significantly reduce processing costs and get to information relevant to decision making related to management of local government area. Local government can develop its human resources capacity or enter into a business and strategic partnership with the company, which deals with software and programming engineering. You will choose the first option depends on the volume, value of work, the importance of local government and local government development strategies. When it comes to local government small and medium size are worth more involvement of foreign companies or consultants, while the larger local government investment in education pays employees for engaging programming or programmers.

Selecting the best alternatives, making decisions

The successful management of local government area depends on the timely response to inputs from the environment, it is get the right decision at the right time. To be made the right decision should be timely and quality to information processed and presented in an appropriate way management of local government. To information obtained on the basis of existing conflicts determined use of space, and determined consequences and causes of conflict the development of specific local communities. Determined over a possible alternative responses. The alternatives are evaluated according to defined criteria and the selection of the best alternatives to make appropriate decisions.

As part of these activities has an important role found and GIS Namely, for the selection of alternatives should most favorable fulfilling their assessment, i.e. with the greater likelihood the most favorable scenario predicted for the local community. It is a complex process where the input using a large number of data that are often correlated with each other. GIS allows the creation of appropriate simulation models, which are based on the input of appropriate parameters can be obtained, i.e. show possible consequences of certain decisions. For example, when making decisions about most favorable sanitary landfill site based on the parameters can be added to identify the best location for that location, i.e. assess the risks show the consequences of pollution of underground water in case of damage and waste, etc.

In this case, GIS has a role Decision support system, DSS, decision support systems. Making agreeing model requires additional investments in the development of GIS, but when it comes to decisions that have negative consequences for the living environment of local communities, it is necessary. For the development of these models can be engaged foreign firm or consultant or engage internal capacity if there is sufficient local government.

Implementation of decisions and monitoring activities

The realization of the decisions in the field is no less important than the decision making process. Besides the process of implementation of decisions by local government area of management it is important to emphasize the importance of monitoring activities on enforcement of judgments. Monitoring quality activities are obtained on the basis of relevant information that is correct decisions and the elimination of perceived shortcomings, and eventual prevention of future conflicts. What methods of monitoring will depend on the nature used activities that are supervised. In this process an important role of the procedures that should govern the process of monitoring. These procedures required for each type of activity over which the monitor should define the parameters that should be observed, the expertise of the person who can supervise and who appoints people to monitor.

The monitoring process and results is necessary to make agreeably records. The data from the input data records for data processing in GIS. GIS allows the benchmarking results of the monitoring results to look out the decision. The obtained results may be present using appropriate charts, tables or the like.

Update existing space-planning documents and making corrective and preventive measures

Adoption of corrective and preventive measures is fined step cycle management area of local government. Corrective measures are taken in cases of when has already created a departure from the planned use of space. These measures should be avoided, but the most important is to respond as soon as the discrepancy observed. If you have registered certain phenomena which indicate the occurrence of some future need bring preventive measures to eliminate the cause thereof.

Based on the review of corrective and preventive measures, monitoring results, and to information about new conditions in the field it is necessary to initiate a process of revision of the existing spatial planning documents. Revision of the spatial-planning documentation should be done periodically, depending on the period referred to above documentation. These audits are very important because, among other things, this document grounds on which to perform space management of local government.

GIS has the capabilities benchmarking situation before and after the expiration of the period. The results are checked against the decisions taken, corrective and preventive measures and other

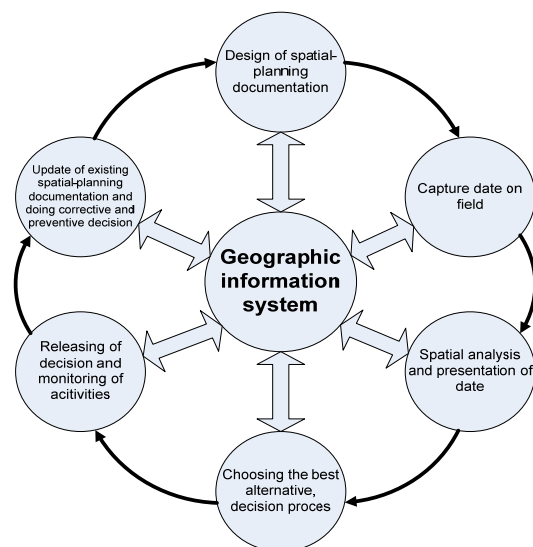


Figure 9. The general model of space-plane improving management of local government area

information from the field. The results are documented and placed on review committees for audit documentation. GIS data should be regularly updated.

In Figure 9 is shown general management model to improve local government area with the application of GIS technology. The aforementioned model can be applied in other local governments that are structurally similar local government organizations of the Western Balkan. The model can be expanded or further developed.

❖ CONCLUSION

For effective case of local administration management space is necessary to provide effective information that provide system fast and high-quality processing of large amounts of spatial information. For the aforementioned business development of geographic information system proved to be an adequate solution.

The development of geographic information system of local administration is a long-term process that requires significant investment in hardware, software, data, personnel and reorganization of existing processes. It allows you to connect attribute and simple data, and performing various spatial analyses the same.

The forms of implementation of GIS and its application methods vary from one local government. In this paper, examples are listed referent GIS application for the Western Balkans (Banja Luka, Bosnia and Herzegovina and Indjija Municipality, Republic of Serbia). While in the city of Banja Luka, the dominant use of GIS to analyze the request for the use of space, in the municipality of India dominant application of GIS as a base for the development of e-services and performance of various spatial analysis.

As a result of the performed analysis derived a general model for spatial planning and space management of local government implementation of GIS technology. Mentioned model are presented activities in the development and application of GIS and the constant improvement of management system of local government area through the promotion of the above systems.

This model can be applied in any local governments of similar size and complexity of administrative services. Depending on your needs, mention activities may merge or divide into smaller, depending on the specific conditions of development of GIS.

Today, the introduction of GIS in local government work not as an alternative, but as a necessity. The local government GIS has found a double application:

- ❖ as a quality tool for the processing of spatial aspects of development problems and issues of local communities and
- ❖ the infrastructure that ensures the development of effective electronic customer service e-government.
- ❖ The introduction of GIS in the administration of local government and the establishment of GIS portals have the following positive effects:
- ❖ provide conditions for the implementation of European standards for the creation of effective and user-oriented e-government,
- ❖ increase the efficiency and effectiveness of space-planning area of local government management,
- ❖ increase the quality and efficiency of the process of making important decisions for the management and development of local communities through providing quality and timely information in a GIS.

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