

## **Land administration in post conflict Serbia**

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### **SUMMARY**

The paper shows the competencies of the Republic Geodetic Authority, its organizational structure, achieved results and prospect of future strategic plans and actions in the scope of the Mid-Term Development Program of the Republic Geodetic Authority supported by the proposed Real Estate Cadastre and Registration Project in Serbia, the loan provided by the World Bank.

## 1. COMPETENCE

Republic Geodetic Authority (RGA), is a specialized organization responsible for carrying out technical and administrative tasks related to:

- The state survey and land cadastre and registration of real estate rights, their establishment and maintenance;
- Production of the Basic State Map;
- Maintenance of the information systems (Spatial Units; address register, DSP, REC registry)
- Land classification;
- Determination of cadastral revenues;
- Land consolidation process;
- Establishment of geodetic networks and exchange of geodetic and cartographic data with the neighboring countries;
- Development and implementation of the geodetic information system;
- Maintenance of archives (technical documentation of the state survey, plans and maps),
- Other duties regulated by law.

## 2. ORGANIZATIONAL STRUCTURE

The basic structure of the RGA (Fig 2.1) has been established according to the type of work performed:

- Sector for Basic Geodetic Works;
- Real Estate Survey Sector;
- Real Estate Cadastre Sector
- Sector for Professional Supervision
- Informatics and Communication Sector
- Legal Issues Sector,

and two Departments:

- Archives Department
- Financial Affairs Departments

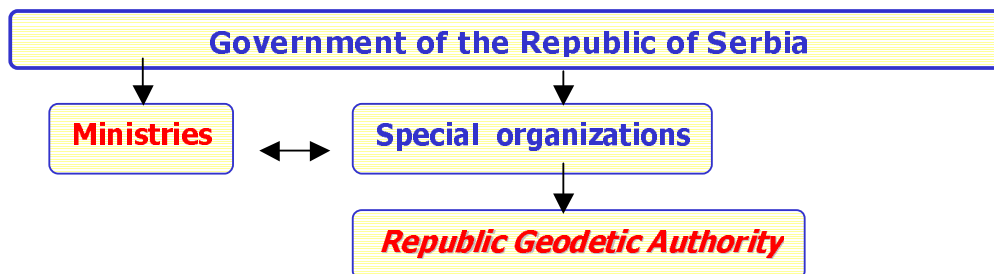


Fig. 2.1 Organizational structure of the Republic Geodetic Authority

Thus, the RGA consist of 6 sectors and 2 departments, where sectors have internal units formed as departments. The Real Estate Cadastre Sector, besides the departments established in the central office of the RGA, also comprise 10 Regional Centers (including Kosovo and Metohia) – Fig.2.2, consisting of cadastral municipalities (5,838 or 4,591 excluding Kosovo), and 7 Real Estate Cadastre Departments.

Fig. 2.2 RGA regional centers



According to the current job position structures, there are about 2,888 employees in total.

The General Director and the Deputy Director represents the Republic Geodetic Authority. The Assistant Directors are in charge of the Sectors, while the Archives Department and Financial Affairs Department are managed by the Head of Departments, who report directly to the Director.

### 3. STATE SURVEY

On the whole territory of Serbia, the survey has been conducted in the following manner:

1. 5.647 CM, surveyed in the state coordinate system, the Gauss-Kruger projection, in scales of 1:500, 1:1000, 1:1250, 1:2000, 1:2500 i 1:5000;
2. 149 CM (Vojvodina) surveys conducted the Budapest coordinate system, in stereographic projection, in scales of 1:1440 i 1:2880;
3. 42 CM (Central Serbia) in Soldner projection, in scales of 1:2500.

#### 3.1 Gauss-Kruger Projection

The Gauss-Kruger projection of meridian points has been adopted (Fig. 3.1.1). The survey for field measurement has been conducted in polar, orthogonal and aerial photogrammetric method.

Numerical data for surveying field measurements, gathered using a polar and orthogonal method, exist, except for certain parts of municipalities: (Gornji Milanovac, Varvarin, Čičevac, Osečina, Ljubovija, Lučani, Krupanj, Mali Zvornik, etc.), where the numerical data had been destroyed (burnt in the Second World War).

For a number of CM, the filed measurement survey has been conducted using the aerial photogrammetric method. In most cases, until the 1980s, the graphic restitution had been

performed (without registering the detailed coordinated points), but, after the 1980s, the restitution has been done by registering coordinate detail points.

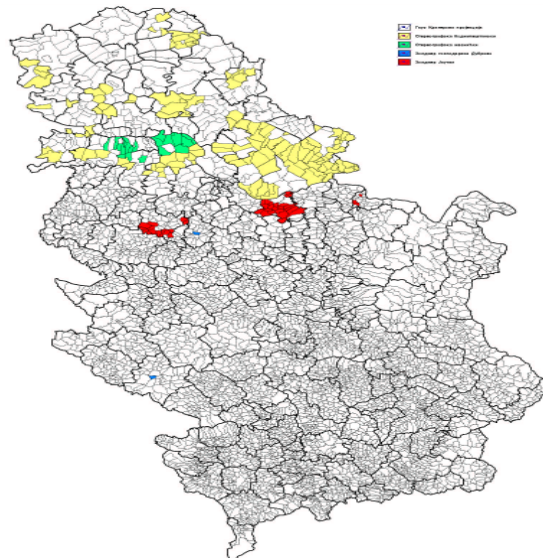


Fig. 3.1.1 The Gauss-Kruger projection cover about 5,647 CM

### 3.2 Survey in stereographic projection

In Vojvodina, the survey for 149 CM, has been conducted in stereographic projection, in the Budapest coordinate system, while for 115 CM, the graphic survey has been performed (geodetic table), and for 34 CM numerical data exist in polar or orthogonal method formats.

### 3.3 Survey in Soldner projection

In central Serbia, the existing survey, for 42 CM has been done in Soldner projection. Part of this survey has been conducted using the old graphic method (geodetic table), and the rest in numeric polar and orthogonal method formats.

## 4. FUNDING

Republic Geodetic Authority is funded from the Budget of the Republic of Serbia, according to the Budget Law, which is applied, separately, for each fiscal year.

Funding of the RGA is done according to two sources:

- Budget funding and
- Self financing (various services)

The analysis, regarding the RGA's financial operations, conducted in the past nine years, has shown, that the introduction of the Real Estate Cadastre, a unique integrated real estate

registration system, has enhanced the development of the real estate market and increased the number of registered transactions, which in turn, has produced a significant increase of RGA own fee income.

The same study also shows that, due to social changes and uncertain future investments, the year 2000, had been characterized by a significant reduction in fee income, which had in turn affected the number of real estate transactions. In this respect, the RGA had received in 2000 from the central government budget about 81% of its total fee income. The past years show obvious trend toward the self-financing of all RGA activities, in the future (Fig. 4.1 and Fig. 4.2).

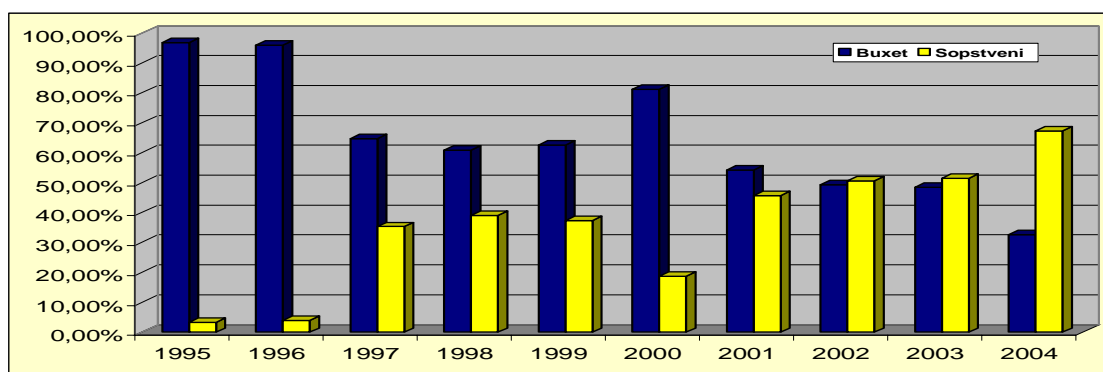


Fig. 4.1 The ratio of the RS budget versus RGA' own fee income

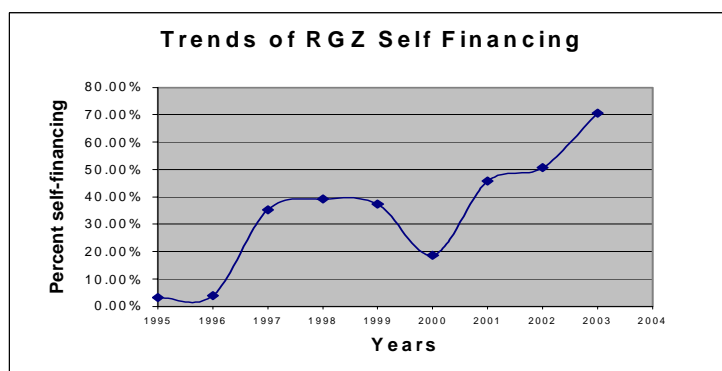


Fig. 4.2 Trends of RGZ self Financing

## 5. ACHIEVEMENTS

### 5.1 Establishment of the Real Estate Cadastre

In 1988, the Republic of Serbia, decided to introduce a uniform Real Estate Cadastre Registration System throughout the whole territory of Serbia, that is, to develop a new evidence of the real estate cadastre system and property rights

The Real Estate Cadastre is a modern, efficient and reliable property registration system, established in digital form. It includes data regarding cadastral parcels, buildings, apartments and business premises as separate parts of buildings and other building objects, location, shape, area, methods of use, definition of land quality, cadastral class, cadastral revenues, real rights on real estate and holders of property rights as well as data regarding restrictions and limitations.

The Real Estate Cadastre has adopted the principles of priority, regulations, by-laws, public openness, reliability, uniformity of unique registration and obligation, which consists of the original working plan, set of certificates and cadastral documentation.

The quality of a property registration system is among other things, a prerequisite for each European countries to join the European Union and requires the following:

- The country has to establish a transparent real estate market with prosperity and
- That citizens and legal entities enjoy security, that is, guaranteed ownership rights.

The Republic of Serbia is currently using the following real estate registration systems (Fig. 5.1.1):

- Land cadastre (K3)
- Land Books and Book of Deeds (3K)
- Real Estate Cadastre (KH)

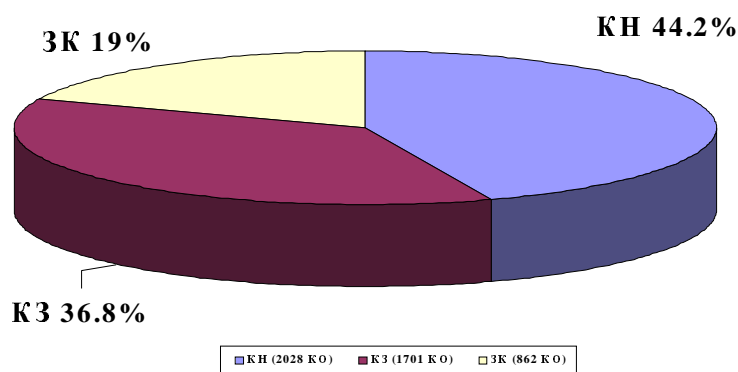


Fig. 5.1.1 The real estate registration systems in Serbia

The Real Estate Cadastre (REC), since its beginnings and until the 31<sup>st</sup> of December 2003, had been introduced into 2,028 cadastral municipalities, or 44.2 % of the total number of cadastral municipalities.

Fig. 5.1.2 shows the number of cadastral municipalities, where the Real Estate Cadastre had been introduced sorted by years, from the 1<sup>st</sup> of January, 1992 to the 31<sup>st</sup> of December, 2003. Once the amendments to the Law on State Survey, Cadastre and Registration of Real Rights, had been passed in May 2002, there was a significant increase in the number of cadastral municipalities, where the real estate registration was performed.

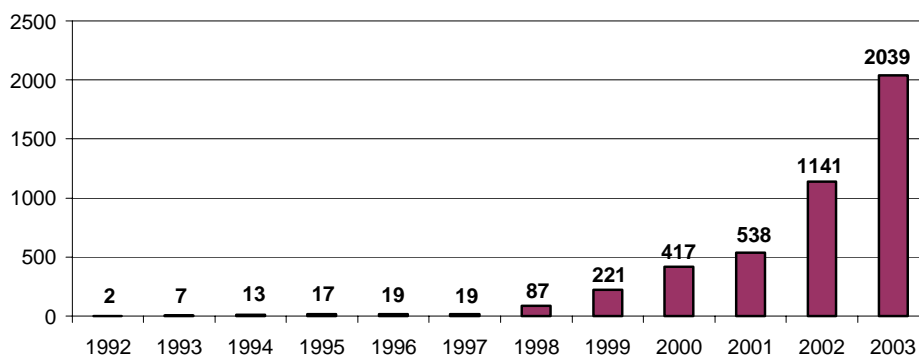


Fig. 5.1.2 Number of CM where the REC has been established-sorted by years

Since July 2002, the RGA has been involved in the process of registering public enterprises in the cadastre. The works are related to the establishment of the REC for the part of the cadastral municipality (comprising enterprise's real estates), in cadastral municipalities where no land books exist. Registration of public enterprises planned for auction privatization is significant activity for the Republic Geodetic Authority. The RGA organizational units consider this extra activity with priority and involve as much as possible of their internal resources.

By the 6<sup>th</sup> of February 2004, the Government of the Republic of Serbia had received the following documentation:

- a total of 1,729 reports regarding the tendering process for public enterprises, out of which 3000 cases have been processed;
- for 896 public enterprises, the real estate cadastre have been established and registration of property rights for 1,151 part of the cadastral municipality;
- for 833 public enterprises a complete report concerning the current state of registration in the land cadastre and the land book has been submitted.

After the adoption of the Law on Planning and Construction, on the 5<sup>th</sup> of June, 2003, and after reaching an agreement with the representatives of the Ministry of Urban Planning and

Construction, all the organizational units within the municipalities received instructions for handling requests regarding legalization of illegal buildings and issuing copies of the cadastre plans to the municipalities.

Activities, regarding the legalization of illegal buildings, the local cadastral offices perform in a timely manner, according to the requests submitted by the citizens. At present, they are recording changes of the cadastral plans, i.e. registering illegal buildings, according to the survey measurements, performed by the geodetic organizations. Distributing copies of the cadastre plans with marked objects, is the last operation in the mentioned process.

On request of the municipality, the local real estate cadastre offices issue copies of the cadastre plans.

## **5.2 Basic Geodetic works and survey**

Conceptual project concerning the location of the permanent network stations (AGROS), as an integral part of the European network of permanent stations EUPOS), has been completed. The Project has been done according to the guidelines and standards set by the EUPOS network. Prior to positioning the permanent stations, the selected locations were visited and technical possibilities of the selected objects assessed for placing GPS antennas. This activity included a visit to about 15 selected locations. For four selected locations (Indija, Srbobran, Žitište, Novi Sad), the bases for GPS antennas had been built and 4 permanent stations positioned and included in the network. It was done in cooperation with the Faculty of Technical Sciences from Novi Sad.

One of the activities in 2003, has been the establishment of the, NVT-2 network state, with the aim of revitalizing it. The work has been performed in collaboration with the army of SCG. The preparation of field documentation for establishing the state of the benchmarks and formation of the raster image maps archives (topographic map scale 1:25,000, 1:50,000 and 1:200,000), with the benchmark position, had been performed by the RGA.

Another activity, in collaboration with the Army of SCG, has been the development of the digital topographic mass model. At the moment, data analysis is being carried out, as well as a data preparation for forming the digital model terrain in order to define the shortwave components of the undulations.

The work regarding the cadastral survey comprised the completion of the field works and surveying of the changes in the expropriated zone, for the needs of AD"TELEKOM", as well as the data migration from the DELTA system onto PC computers for more cadastral municipalities.



### 5.3 Mid-term Plans for renovation of the survey

In December 2003, the Government of the Republic of Serbia had adopted the Mid-term Plan for the Republic Geodetic Authority, for the period of 1<sup>st</sup> of January 2004 - 31<sup>st</sup> of December 2008. This program envisages the renovation of the survey as follows:

- for 19 CM urban type, total area of 33.725ha (existing survey in Gauss-Kruger projection, large degrees of change and inadequate scale plans);
- for 8 CM urban type, total area of 52.082ha (existing survey done in stereographic projection, large degrees of change and inadequate scale plans);
- for 42 CM urban type, total area of 55.948 ha (existing survey in Soldner projection )

### 5.4 Cadastral plans in Serbia

The whole territory of the Republic of Serbia is displayed in 75.672 cadastral plans. Table.1 shows the total number of plans according to scale.

The condition of analogue cadastre plans differs significantly, due to a number of factors such as: the degree of performed survey, adequate plan scales, accurately executed changes, the maintenance of the performed survey, etc., while certain plans are fairly dirty and physically damaged etc.

Most analogue plans, of different periods, have been scanned (in TIFF4 format, resolution 400dpi) and have geo-referenced scanned sheets. Although, the scanning and geo-referencing of plans is done, the maintenance of raster plans has not been done.

Table 1: Total number of plans in Serbia sorted by scale.

Scale	1:500	1:1000	1:1250	1:1440	1:2000	1:2500	1:2880	1:5000	Total
Total number of plans	1931	9547	9	115	79	59209	3365	1417	75.672
Number of plans in DGP	284	318	0	0	0	776	0	4	1.382
Number of plans currently being processed DGP	592	1166	0	0	0	1523	67	11	3.359
Number of plans to be developed in DGP	1055	8063	9	115	79	56910	3298	1402	70.931

Local cadastre offices of Kragujevac and Novi Sad, have performed scanning and geo-referencing of plans and digitalization of lots numbers, for the entire CM on its territory. In addition, the raster plans and surveying documentation of land cadastre or real estate cadastre have been put on the Internet, for the benefit of public utility services.

At the moment, the whole territory of the Republic of Serbia has 196 CM, covered in digital plans, and the development of digital geodetic plans, for 48 CM, is underway.

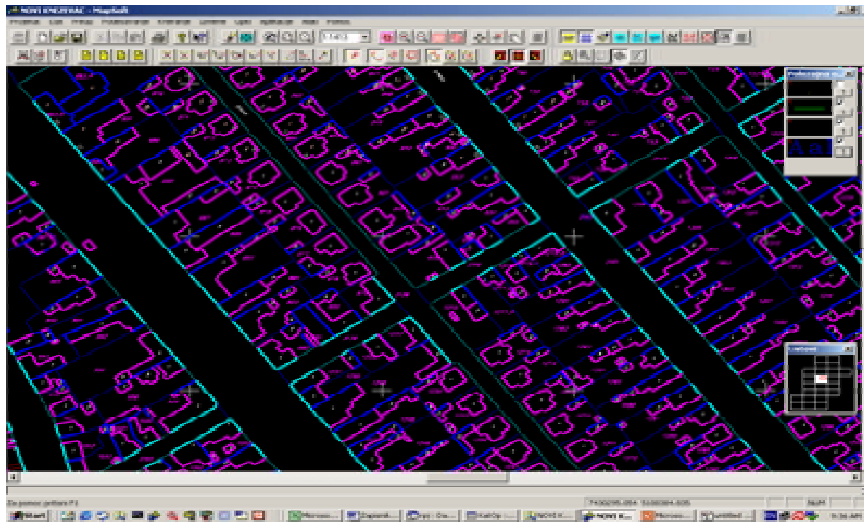


Fig. 5.4.1 Typical digital geodetic plan

The Mid-Term Development Plan of the Republic Geodetic Authority, for the period 1<sup>st</sup> of January 2004 - 31<sup>st</sup> of December 2008, envisages the conversion of all analogue plans into digital formats, that is, development of digital geodetic plans for the whole territory of the Republic of Serbia

## 6. COOPERATION WITH THE WORLD BANK

The Republic Geodetic Authority in collaboration with the World Bank is developing and implementing the “Project for Developing and Modernizing the Real Estate Cadastre in the Republic of Serbia.” The main objective of the Project is to increase the confidence and lower transaction costs by building a more efficient property registration and cadastre system, with the purpose of contributing to the development of effective real property markets and agricultural development.

The Project involves many stakeholders, including academic institutions, the private sector, real estate support professionals and other civil society groups.

During the Appraisal Mission, it was agreed, that the total project cost is US\$ 30 million out of which US\$ 22 million represents the WB loan, while added financing of US\$ 8 million represent the Government of the Republic of Serbia. Besides these funds, other international donors are:

- Japanese Government: US\$ 382.400 - (donation for project preparation );
- GTZ - Germany: 1 milion € for 2 years 2 godine (technical assistance);
- SIDA - Sweden: 700.000 € for 1 year (training);
- Norwegian Government: 2 miliona € for 5 years – 950,000 € in 2004. - (scanning center establishment)
- EU- CARDS Program: 8.5 miliona € for 2 years, during 2005 and 2006.) – (REC registration digital cadastre, technical assistance) parallel financing.

These funds will be used in the following manner:

- Development of an integrated information system for property registration and cadastre system including cadastral data and plans;
- Establishment of the digital cadastre database (DCD) with essential hardware and software applications, for 48 local cadastre offices,
- Development of Real Estate Cadastre and DCD with updated cadastre plans in digital form, for 48 urban municipalities;
- Technical assistance for improvement of the legislation system, with the aim of facilitating the development of real estate cadastre and providing more efficient services for real estate registration through: public campaigns, training and project management

## **7. Information Technology**

### **7.1 Existing Information Systems at the RGA**

The Republic Geodetic Authority currently uses the following information systems:

- Real Estate Cadastre (REC) - J.E. ver.5, GeodIS\_KN
- Address Registry (AR)
- Spatial Units (SU)
- Digital Surveying Plan (DSP)

with the following technical characteristics, Fig. 7.1.1:

#### **REC:**

##### Main functions:

- Maintenance of existing cadastral data
- Converting existing data and establishing of the REC
- Update and maintenance of REC data
- History of the land and land property
- Reporting

Technical information:

- Local databases FoxPro 2.5 and MS Access
- Alpha-numerical application
- Platforms: DOS/Novell and Windows

Implementation:

- J.E. in all Cadastre offices, GeodIS\_KN installed at KO Rakovica

**AR:**

Main functions:

- Initial input and maintenance of alphanumerical and graphical data (street names, house numbers)
- Update and maintenance
- Reporting

Technical information:

- Local database MS Access 97
- Front end application developed with Visual Studio
- Geo Media Map Objects
- Platform: Windows

Implementation:

- In all Cadastre Offices

**SU:**

Main functions:

- Spatial units (boundaries) database (country, regions, towns, municipalities, cadastre units, statistical units, etc.)

Technical information:

- GeoMedia, MS Access, AutoCAD
- Platform: Windows

Implementation:

- Work in progress (80% done)

**DSP:**

Main functions:

- Scanned and digitized analog plans
- Upon transformation from analog to digital forms, all plans gone through the inspection procedures. If successful, analog plans are archived and the new digital plans become official

Technical information:

- MapSoft 2000 Professional, dbf databases
- Platform: Windows

Implementation:

- In all Cadastre Offices

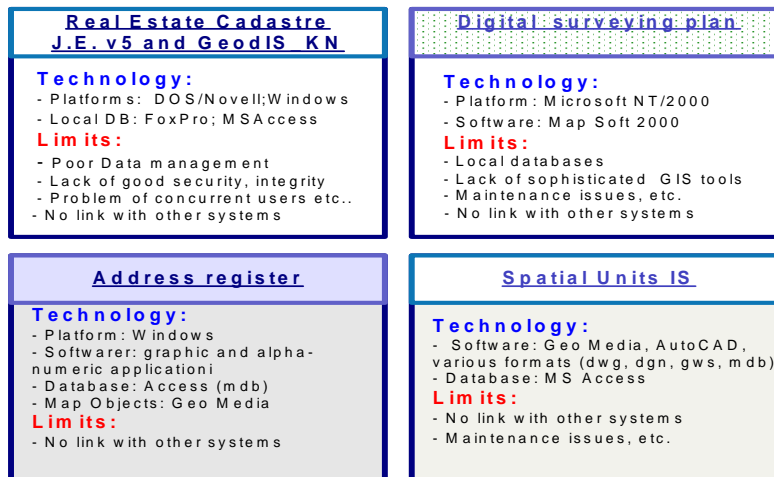


Fig. 7.1.1 Existing Information Systems at the RGA

## 7.2 Further Development of the Information Technologies

With regard to the IT and Information Management plans, two key issues are planned for detail design and implementation:

- The IT part comprises LAN and WAN conceptual and detail project design and implementation as well as the information system improvements in accordance with the current technologies and future trends
- The IM part requires detail design of strategic documents, guidelines and business plans.

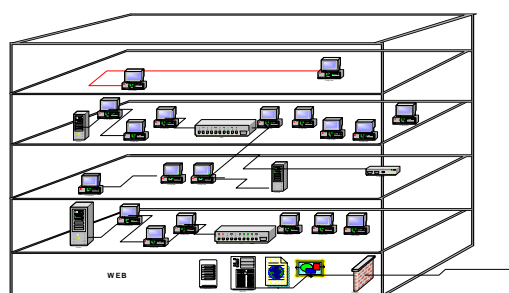


Fig. 7.2.1 Local Area Network at the RGA

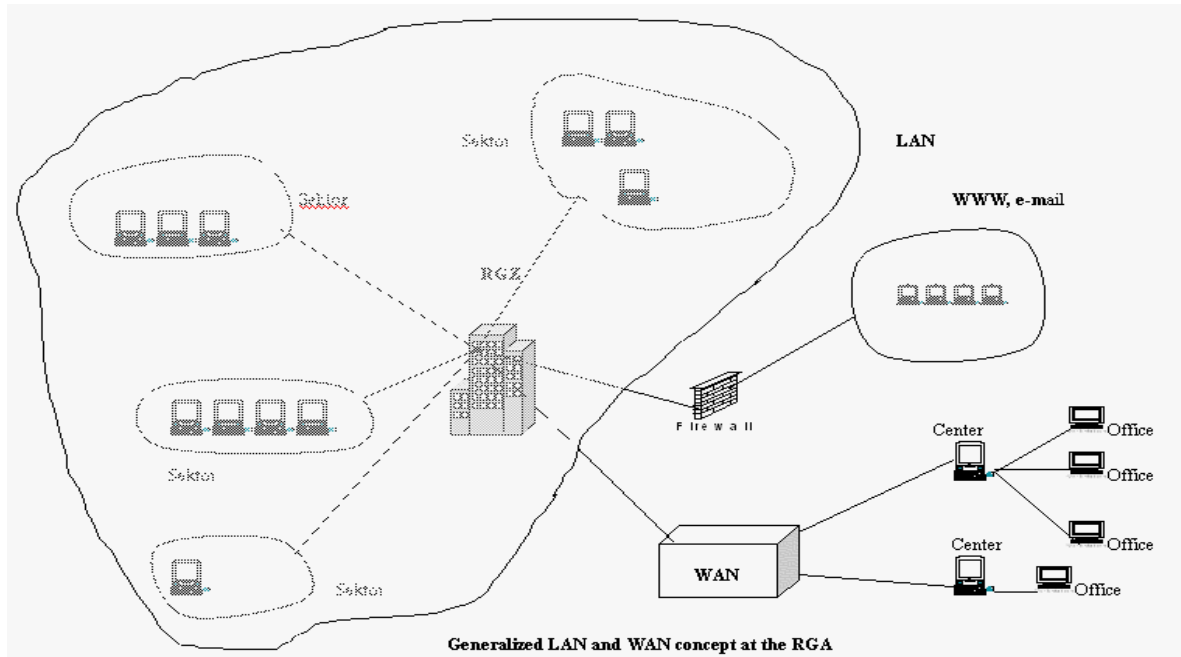


Fig. 7.2.2 RGA organizational units throughout the country (WAN)

Having this in mind, the following strategic actions and documents have been planned for development in the scope of the Mid Term Plan (MTP) and the proposed Real Estate Cadastre and Registration Project in Serbia, supported by the World Bank:

- New data model development – integration of alpha-numerical and graphical models defined in section 3.1 into a uniform Digital Geodetic Database (DGDB)
- New application development (replacement existing technologies detailed in 3.1), using the best commercial GIS technologies
- Information management strategy
- Information management policies and standards
- Electronic document management system (EDMS) implementation, with several sub-components (Enterprise content management system, Records management system, Digital asset management system, Digital imaging system, Geographic information system)
- Information management delivery strategies
- Information audit methodology
- Metadata standards
- Several documents to further define: disaster recovery plan, records management procedures, implementation guide for a document management system
- IT / IS strategy model

The Principles for IM need also to be defined as the high level statements of the fundamental values that guide IT/IM decision making. Conceptually, it looks like the following example:

- Business oriented
- Value added
- Access to information
- Ease of use
- Standard based
- Data is an asset with that has value for the RGZ and is managed accordingly

The intent of those plans is to develop a “roadmap” of the major architectural steps to move from the current state to a future state that will enable the Customer Focus and Information/Knowledge Management Vision. The future state is effectively the long term information and technology strategy. The roadmap provides the RGZ with a practical way to move forward to achieve its objectives of:

- Increased functionality
- Reduced costs
- Effective and efficiency
- Preparedness for future initiatives

In summary, the RGZ conceptual approach of data, information and processes, is the framework of the following key architectures:

- Strategy and principles
- Application architecture
- Data architecture
- Technical architecture
- Communication architecture

RGZ Mead Term Plan, supported by the proposed Real Estate Cadastre and Registration Project in Serbia, supported by the World Bank, will provide substantial official and financial support to realize the strategic goals discussed in this article.

## **8. CONCLUSION**

Thanks to the efforts and involvement of the employees, outstanding results have been achieved during 2003, and the planned assignments for the development of the Real Estate Cadastre have been carried out.

With the aim of successfully continuing with the implementation of the RGA Mid-Term Plan, for the period 2004-2008, as well as the implementation of the World Bank Project, for the same period, and in order to provide high-quality services and more efficient work of the RGA, in the forthcoming period, the following needs to be done:

- to replace the existing information technologies with modern ones;
- to keep professional staff, enhance the financial situation of the employees and upgrade the status and attitude towards geodetic experts on the whole and enable funding for planned projects of the Republic Geodetic Authority, in the upcoming period;
- to enhance cooperation with the local self-governing organizations and
- to enhance cooperation with the geodetic organizations.

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