Projects, which helped Slovenia to come closer to Europe
- IT solutions from S&T to fulfill EU requirements

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1   INTRODUCTION

S&T Slovenia had the privilege to participate in the development of important IT infrastructure projects for Slovenian government in past 10 years. In this paper we will briefly discuss the used approach and the portfolio of the application solutions that helped Slovenia in the process of joining European Community.

Aster company, who was merged in S&T in 2002, started to work on governmental projects in 1993 with the project called "Registry of Spatial Units" for the Surveying and Mapping Authority of Republic of Slovenia. This project was a renewal of an existing registry that was maintaining only attribute data without any geographical (GIS) information. The content of the registry was very important for maintaining all other registers like Central Population Registry, Registry of companies, etc. Registry contains attribute and geographical data for all spatial units and house numbers. In reality this registry is the base for the address coding system that was later on used in all other important state registers in the Republic of Slovenia.

The concept of establishing the right order of development of key parts of the agricultural information system was the most important factor for success in providing computerized support for all base registers in the field of agriculture. Linking agricultural IS with the land information system that was developed in the same period at Survey and Mapping authority was crucial to provide integrated information system. The third big and important institution that S&T had the privilege to work for is Statistical Office of Republic of Slovenia. S&T implemented the statistical data warehouse for regional database and the software for dissemination of statistical data.
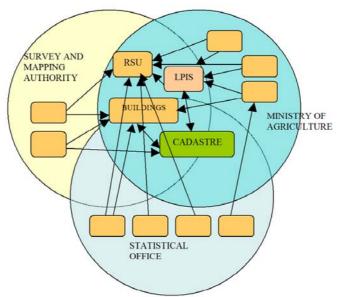

Figure 1: Integrated information system in governmental environment

2   APPLICATIONS FOR SURVEYING AND MAPPING AUTHORITY

The applications for Surveying and Mapping Authority are covering some of the base registers or cadasters that are maintained by this authority.

2.1   REGISTRY OF SPATIAL UNITS

The Registry of Spatial Units (RSU) is in production since 1995 and contains digital borders of all spatial units and also the centroids (x and y coordinates) of house numbers. The territorial units are: state, local communities, settlements, statistical districts, spatial districts (the lowest unit), cadastral communities, election units etc. The registry is serving as the main address coding system for all state level registries like Central population register, Register of companies, Telecom directory, etc. All the attribute and graphical data is stored in the Oracle database.

2.2   LAND CADASTRE - ATTRIBUTE PART

In Slovenia the Surveying and mapping authority is in charge for maintaining the cadastral database. Local branch offices are updating local databases and these changes are propagated during the night to the central cadastral database that is implemented in Oracle database. Web based application was prepared for viewing and the extraction of the cadastral data. This application is widely used in government to minimize the needs of processing paper documents in the procedures of acquiring different legal papers.

The system is also connected to the graphical part of the land cadastre and a graphical picture of the shape of the parcel is also produced.

2.3   REGISTRY OF GEOGRAPHICAL NAMES

The purpose of the Registry of Geographical Names is to centralize the maintenance of all geographical names used in map production. Each geographical name gets unique identifier regardless of the scale of the map it appears on. Up to five coordinates are recorded for each occurrence of the geographical name on the map. The scales of the maps are from 1:1.000 up to 1:1.000.000. The registry of geographical names is always used together with digital orthophoto maps or satellite images to provide good orientation when displaying image data. The geographical names are subject of standardization process. The registry is not limited only to the territory of Slovenia but contains geographical names from neighbor countries as well. As these countries use different character sets the multilingual support is essential to fulfill the requirements for proper recording of different geographical names.

2.4   CENTRAL DATABASE OF GEODETIC POINTS

The Central Database of Geodetic Points contains all necessary data about main geodetic triangulation points for state level geodetic networks. Several kinds of geodetic points are stored in the database that is used for field measurements. For each geodetic point a scanned sketch with detailed information is stored in the database. The application has only the web interface. The information from the database is presented on the top of digital orthophoto maps and digital cadastral data (parcels). The surveyor is able to get all the necessary data about the network of geodetic points before he/she starts with the field measurements.

2.5   DISSEMINATION SYSTEM

3   APPLICATIONS FOR MINISTRY OF AGRICULTURE, FORESTRY AND FOOD

S&T started the development of agricultural information system in 1996. At that time some of the registers maintained by Surveying and Mapping Authority were already in production. In the first phase the development of the information system was focused on development the base registries which were in subsequent phases the base for other registers.

3.1   REGISTRY OF FARMS

Registry of farms is one of the base collections of data in the Ministry of Agriculture, Forestry and Food in the Republic of Slovenia. The registry contains base data about all the farms in Slovenia, their owners (holders), addresses, general data about farm (number of animals, land in use, etc…), data about the production capabilities (LFA – less favorite areas) and other necessary data that are then needed and are common for the whole information system.

Registry of farms maintains the data according to the changes that farmers are sending on special forms. The registry is using links to the Central Population Registry, Central Tax Registry and Companies registry for checking the linking keys and also some base data. All the addresses of farms and their holders are based on the Registry of Spatial Units.

3.2   LAND USE SYSTEM

The land use system is based on the manual interpretation of digital orthophoto maps in scale 1:5000. After the interpretation the land use data are intersected with the cadastral data and the result is used in the controlling mechanisms for different registries. Special software was developed for data acquisition of land use and also for intersection of land use and cadastral data.

3.3   REGISTRY OF GRAPE AND WINE PRODUCERS

The Slovenian wine law was one of the first laws that were harmonized with the European community. The registry of grape and wine producers is based on the Registry of farms and contains data about the vineyards, the production of grape, quality of wine etc… The territorial description of a vineyard is based on the land cadastre parcels that are forming the vineyard. The registry is also connected to the land use system. The software supports the production of all necessary documents (office automation system) and is used in more than 30 local offices in those parts of Slovenia where the grape is produced. The data model for the registry is quite complex.

3.4   REGISTRY OF ORCHARDS, OLIVE GROVES AND OTHER PERMANENT CROPS

The Registry of olive groves, orchards and other permanent crops is under development in year 2001. It is based on registry of farms and land use system and is similar to the Registry of grape and wine producers. The registry contains base data about all permanent crops and will be referenced in IACS system. The software will support the automated production of all necessary documents.

3.5   GRAPHICAL DATABASE

The graphical database consists of all the graphical data that are captured in different subsystems. In the graphical database there are vector data of land use, digital cadastral maps, territorial units, house numbers (centroids), scanned maps in different scales, digital orthophoto maps, different units from registry of grape and wine producers, digital terrain model and other data.

Some of the applications are done in client/server model, some of them were developed as internet/intranet applications. All the graphical data except images are stored in Oracle database and a transition to Oracle Spatial format is in progress.

The graphical database together with attribute data was **invaluable source for different kind of analysis and reports** that were used in the negotiation process with European Community.

3.6   LESS FAVORITE AREAS (LFA)

The definition of less favorite areas was very important in the negotiations for joining the European Community. The definition is based on a digital terrain model (25 x 25 m grid) and calculation of slope and aspect. The results are then applied on different territorial units. With the availability of the digital cadastral maps this information is available on the parcel level.

3.7   IACS

The financial aids in agriculture are the most important part of the agricultural information system. In the year 2000 the new subsidies based on the EC regulation were introduced in Slovenia. In the integrated administrative control system (IACS) the subsidies use all the available data for administrative control such as land cadastre, animal identification and registration system, farms registry, less favorite areas, land use system and others. The software supports the data entry, the controlling system and the automated production of all necessary documents.

Important part of the IACS is also the web based application for the on spot control that is using also GIS data.

3.8   ANIMAL IDENTIFICATION AND REGISTRATION SYSTEM

The Republic of Slovenia on 1st of January 2001 started the new animal identification and registration system. The system is tightly connected with the farms registry and stores data about all births of animals, movements, temporary movements and deaths. Part of the system is also a automatic issue of animal passports which are obligatory for all movements in the Slovenian territory and also to EU countries. The whole system is based on EU legislation and Slovenian extensions to these rules.

AIMCS (Animal Identification and Movement Control Scheme) system is an animal identification and registration (I&R) solution that can provide the most accurate cattle related data in the state. To achieve that, data entry and basic reporting functionality was developed in a way, that data can be entered and viewed virtually anywhere. This is done through web interface (users need only web browser) and a special PDA application. In order to minimize percentage of errors at entering data and to simplify system management, an advanced business rules engine is provided.

Security is an important issue. For that fine grained logical and geographical privileges can be set for each user or his/hers organization.

Advanced (pre-defined and ad-hoc) reporting is a key to retrieve valuable information from database. System provides solutions for both types of reporting needs.

Apart from movement tracking (where, when and why location of an animal was changed), animal's health status is also crucial. Combination of these data is essential for controlling disease outbreaks. System allows storing of both types of data as well as appropriate reporting for that.

Based on data, which is received on daily basis, farms should be evaluated according to risk factors defined by government's I&R unit. This is called risk analysis and is one of key factors when system is evaluated by European Union inspections. To support this, an advanced module for defining, running and viewing results of risk analyses is provided.

In some states multilingual and multi-character support is needed either from legal or general acceptance perspective. AIMCS system supports on-line changing of user's preferred language and character set.

To achieve connectivity to other information systems XML, comma-separated text and Oracle replication mechanisms are available.
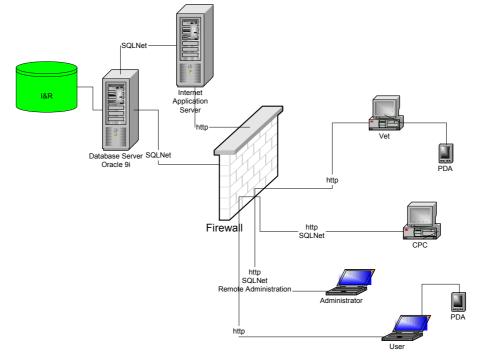

Figure 2: Basic structure of the system is shown on the following figure

4 SOLUTIONS FOR STATISTICAL OFFICE

S&T was together with some other partners involved in the development of the database of regional data for the Republic of Slovenia. The regional database contains data from different statistical sources and is linked to the Registry of Spatial Units. For the purpose of the statistical data warehouse a special "geo-dimension" was developed to enable monitoring of statistical data in different time periods regardless of changes in the territorial units which are changing all the time. This phenomenon is known as slowly changing dimension in the data warehouse.

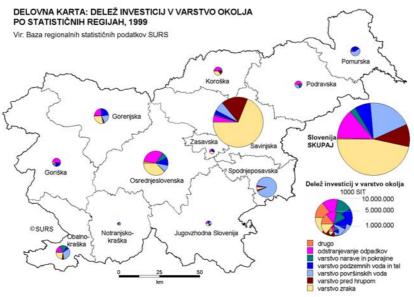Below are some pictures produced from regional database.

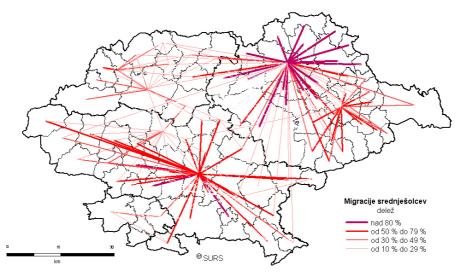Figure 3: Investments in protection of environment

Figure 4: Daily movements of schoolboys in one region

The second project where S&T was involved was the IT support for data dissemination process for statistical data. This project, funded by PHARE, enabled statistical office to automate the process of preparing and dissemination of statistical data on the web.
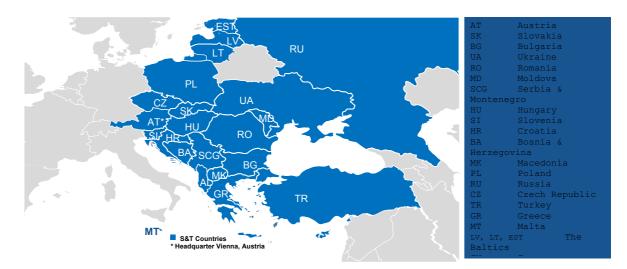
5 CONCLUSION

The above projects were the most important contribution of S&T that helped Slovenia to come closer to Europe. There are many other projects on which S&T was working in past 5 years. Some of them should be mentioned at least in the conclusion.

S&T has developed a system for maintaining school districts and school population prediction for the Ministry of Education and Sport. In last two years S&T has been developing the state-of-the-art Tactical Information System for Command and Control of Slovenian Armed Forces that is NATO compliant.
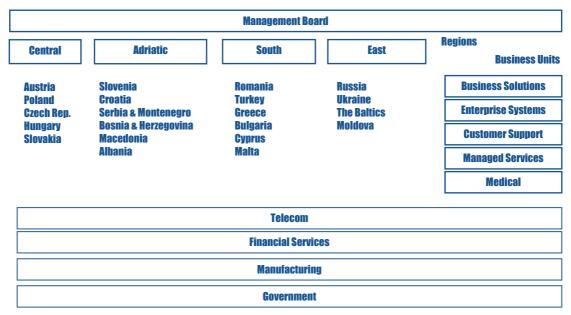
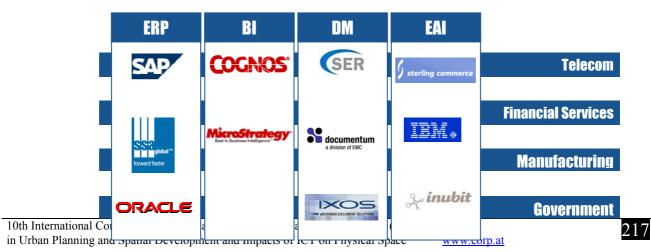## S&T System Integration & Technology Distribution AG

S&T presence in CEE

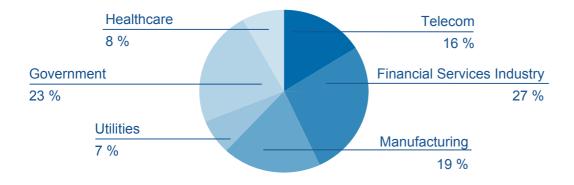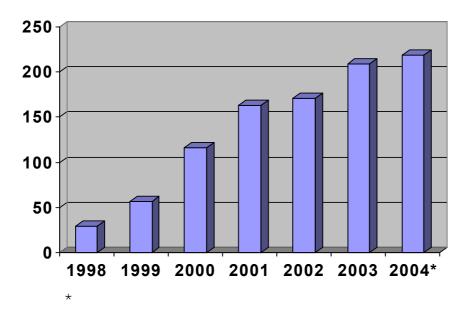21 countries, 54 service locations, 1 300 employees


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AT       Austria
SK       Slovakia
BG       Bulgaria
UA       Ukraine
RO       Romania
MD       Moldova
SCG      Serbia &
Montenegro
HU       Hungary
SI       Slovenia
HR       Croatia
BA       Bosnia &
Herzegovina
MK       Macedonia
PL       Poland
RU       Russia
CZ       Czech Republic
TR       Turkey
GR       Greece
MT       Malta
LV, LT, EST          The
Baltics
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Organization

Management Board				
Central	**Adriatic**	**South**	**East**	Regions
Austria	Slovenia	Romania	Russia	Business Units
Poland	Croatia	Turkey	Ukraine	Business Solutions
Czech Rep.	Serbia & Montenegro	Greece	The Baltics	Enterprise Systems
Hungary	Bosnia & Herzegovina	Bulgaria	Moldova	Customer Support
Slovakia	Macedonia	Cyprus		Managed Services
	Albania	Malta		Medical

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Sales per Industries (2003)

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Government
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27 %

Utilities
7 %

Manufacturing
19 %

Growth (Total Revenues in Mio €)

*

The S&T Share: + 165 % in 2004

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Source: www.comdirect.de 18.01.2005