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P A P E R S & S T U D I E S

Workshop on GI/GIS matters for the PHARE countries

1

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Population and social conditions **3/2001/E/15**

Workshop on GI/GIS matters for the PHARE countries

Held in Luxembourg 24 Oct. 2001

The views expressed in this document are the author's and do not necessarily reflect the opinion of the European Commission

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Meeting of the Workshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

FINAL REPORT

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Colophon

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As from 1 October 2001, the R&D Divisions Ground for GIS (GfG) and Leuven Earth Observation (LEO) have merged into the new R&D Division SADL (Spatial Applications Division Leuven)

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Currently six university research units participate in SADL:

- the Institute for Urban and Regional Planning;
- the Laboratory for Soil and Water Research;
- the Laboratory for Forest, Nature and Landscape Research;
- the Institute for Social and Economic Geography;
- the Laboratory for Experimental Geomorphology and
- the PSI-VISICS research group of the department of electrical engineering

Introduction

This document presents the final deliverables related to the "Meeting of the Workshop on GI/GIS matters for Phare Countries". The main document consists of the synthesis and the evaluation of the workshop. The available working documents and presentations can be consulted at the following Internet address:

http://forum.europa.eu.int/Public/irc/dsis/giss/library

Synthesis of the workshop

1. Introduction and adoption of the agenda. *Mr. D. Rase and Mr. G. Decand* (10.00 – 10.30). Document WS/PHARE-Doc. 1.

The agenda was adopted as it stood.

Mr. Rase, chairman of the meeting, welcomed the participants.

Mr. Decand introduced the meeting. The need for GI and GIS is increasing, particularly in the fields of regional development, transport, environment and agriculture. This implies a stronger link between statistical information and geographic information. The purpose of this meeting is to increase collaboration between national mapping agencies and statistical institutes by presenting the activities and sharing experiences. The format of the meeting is a workshop, thus allowing discussion.

The main activities of unit E4 of ESTAT are in the fields of regional statistics, demographic statistics and geographic information (GISCO).

1. Regional statistics.

In the Commission, regional statistics are frequently used in combination with geographical data. A few examples were mentioned: the computation of eligibility for funding from the structural funds (objective 1) based on gross domestic product, the regional distribution of unemployment rates (objective 2), the computation of spatial distribution of GDP/inhabitant for use by DG Regional policy, DG Agriculture and DG Competition.

2. Demographic statistics

Examples of the use of demographic statistics include the computation of classic demographic parameters, migration statistics, census data. These data are collected at national, regional and local levels by the NSI and need definition of the needs related to co-ordination.

There is currently no legal basis for the NUTS classification but the Commission has made a proposal. After adoption by the Commission, the draft Regulation was sent to the Council and the Parliament, and the co-decision procedure is applied. This includes the use of the current NUTS definition and the set up of a system to modify the NUTS. For the Candidate Countries, a NUTS-like classification is currently in use, called "Statistical Regions". When a Candidate Country becomes an EU Member State, these regions will be integrated in the NUTS classification.

2. CONC/MODA, Eurostat's requirements for transmission of geographical information. *Mr. T. Carlquist* (10.30 – 11.15). Document WS/PHARE-Doc. 2.

After giving an overview of GISCO, Eurostat presented the CONC/MODA transfer format to be used by Candidate Countries for reporting changes to the local units to Eurostat.
It was agreed that the first concrete co-operation between Eurostat and the NSIs and, to a smaller degree, NMAs in the Candidate countries will be the collection of change information to local units according to the CONC/MODA format. This implies the setting up of structures in each country to be able to submit reports according to this format. Depending on the country, it involves only the NSI or it involves strengthened co-operation between the NSI and the NMA. Because Eurostat will collect population census data retroactively from the 1991 census round for the candidate countries, the CONC/MODA reports should cover the whole period from 1991 or the time of the census onwards.

Eurostat will carry out an inventory of local units and processes inside the countries to update local units. This inventory will be similar to the BOUndary study made for the Member states and it will be funded under the PHARE project.

The presentation also raised a discussion on the co-operation between GISCO and EuroGeographics, the umbrella organisation for NMAs. There is currently discussion on a Euro-global map, at scale of 1/1.000.000 covering most topographic data. This map was found of insufficient quality to be included in the GISCO database. A pilot study is performed on the production of a topographic map at scale 1/250.000 for 2-5 countries.

3. The use of geographic information in the NSIs and NMAs of the Candidate Countries. *Mrs. T. Steenberghen* (11.15 – 11.50). Documents WS/PHARE-Doc. 3a and WS/PHARE-Doc. 3b.

The presentation was based on the questionnaires filled in by the NSIs and NMAs of the candidate countries, and on the missions to Poland and Romania.

The number of years of GIS use and the number of GIS licences were considered irrelevant as indication of GIS expertise. The type of use was a better indicator. Most important in the results of the questionnaire, was the description of data sets, the property rights and the collaboration between NSI and NMA in different member states. Major differences in GIS expertise in different countries was also demonstrated, and the overall higher experience in working with GIS in mapping agencies compared to statistical institutes.

Differences in nomenclature updates procedures, scales, projection systems, datum and the use of meta-data, are reasons for concern when data will need to be integrated in Eurostat databases in the future.

Countries invited to the workshop included the candidate countries from Phare countries.

It was reminded that GISCO deals with one institute per country, not with both NSI and NMA separately. This requires collaboration between NSI and NMA.

Corrections to the preliminary analytical report on the questionnaire were provided. The report in annex D includes these updates.

The missions to Poland and Romania illustrated how better understanding of the use of GI and GIS in the NSI and NMA can be obtained. *The other Candidate Countries will be visited next year during a boundary study similar to the boundary study performed for the Member States in 1994.*

4. Report on the use of GI in the NSI in Romania. *Mrs. M. Fotin* (11.50 – 12.05). Document WS/PHARE-Doc. 5a. Report on the use of GI in the NMA in Romania. *Mrs. G. Luca* (12.35 – 13.00). Document WS/PHARE-Doc. 5b.

The first presentation included:

1. Role of the NSI in Romania
2. The use of GIS in the National Statistical Institute – Romania
3. The central database
4. GIS perspective and co-operation.

The second presentation explained recent changes in the NMA of Romania. Since the first of July 2001, the National Office of Cadastre, Geodesy and Cartography (NOCGC) was reorganised and is under the authority of the Ministry of Public Administration. Before July 2001, the NOCGC did exist, but it was linked directly to the government as a National Agency and had a subordinate Institute, but only for research. To become more efficient and to have a better co-ordination, in July 2001 according with the government policy the NOCGC was established with 42 OJCGC subordinated in every district (called JUDET) and an operational branch: the Institute of Cadastre, Geodesy, Photogrammetry and Cartography. The new role of the mapping agency was explained.

In the future, the NSI intends to use NMA data instead of commercial (ESRI) data. Overall, the reorganisation should improve the co-operation between the NSI and NOCGC in Romania.

5. Report on the use of GI in CSO and the NMA in Poland. *Mr. A. Grabos* (12.10 – 12.35). Document WS/PHARE-Doc. 4.

Geographical Information System in public statistics in Poland means standalone desktops with different GIS tools, mostly used for making thematic maps accompanying office publications. CSO does not currently have a central database for statistics with spatial and geographical data.

In the year 2000, a feasibility study for GIS application in regional statistics was made. The study result it is the concept of built up and use of GI central database on the base of the maps from NMAs. The operations will be launched in 2003.

By the end of this year, an agreement between CSO and HOGC (responsible for provided geographical and cartographic information and for creating of the land information system LIS) is going to be drawn up. The objectives of this agreement are to reform the access procedures and use of information sources, created and actualised by mentioned offices. In the frame of future co-operation, HOGC will provide database of the boundary of territorial divisions and will be responsible for updating the data.

6. Report on the use of GI in the NSI in Estonia. *Mrs. I. Nael* (14.00 – 14.25). Document WS/PHARE-Doc. 6. Report on the use of GI in the NMA in Estonia. *Mr. K. Teiter* (14.25 – 14.40). Document WS/PHARE-Doc. 6b.

The presentation of the NSI started with a short overview of the geographical characteristics of the country. NSI and NMA co-operated to produce maps after the 1995 census. A private company produced the housing maps. Today the NSI of Estonia not only produces maps by means of GIS, but also maintains the database of addresses and related data. The software used is different between urban and rural areas. However, two layers are common to both: the boundaries, and the co-ordinate system.

The NSI is working on the integration of both databases in an ORACLE SDE graphics database.

The main users of the maps are local authorities, ministries, emergency management units,…The maps are also used as starting point for agriculture census.

In Estonia the NMA is entirely financed from the state budget, and is also responsible for the cadastre and for the geodetic network. Data such as topographic data are free for state agencies. For other users, the type of intended use is determining the availability of data.

This NMA is not a classic mapping agency in the sense that the main objective is not map production. The NMA develops the standards, launches calls for tenders, and remains the owner of the data.

A seamless base map of Estonia is expected to be completed by the end of 2002.

Cadastral information, is also made available free of charge.

The decentralised approach in Estonia is also used for the production of topographic data, i.e., utilities update their maps, the building register provides updates on building data. The previous update of the topographic map took 7 years. This approach is expected to increase the speed of update.

7. Report on the use of GI in the NMA in Latvia. *Mrs. H. Sherman* (14.25 – 14.40). The use of GI in the NSI in Latvia. *Mrs. N. ZOLOTONOSA* (14.40 – 14.50). Document WS/PHARE-Doc. 7.

The paper started with a presentation of the structure of the State Land Services in Latvia, and examined some problems that the NMA faces in the current situation, such as legislation, the lack of qualified personnel, insufficient financial resources, increasing complexity of GIS technology, lack of standardisation, data management and data integrity problems,… Due to these problems, the need for a unitary GI system was acknowledged.

The GI goals of the NMA of Latvia were then explained:

- 2001: development of the basic concepts, the metadata structure and the centralised publishing system;
- 2002: development of the cadastral information system;
- 2003: development of the geodetic IS;
- 2002-2010: detail concepts for a unitary GIS.

At the statistical office, up to now, GIS was only used for visualisation. In the future time series will require GIS, using the data geo-coded by building. Statisticians will also be more involved in the creation of thematic maps by means of GIS.

The main task for the near future is to create a co-operation agreement between the NSI and the NMA to link the registers of the NSI with the maps of the NMA. There is currently a law project on this issue, allowing the NSI to use the data from the NMA free of charge and distribute them free of charge.

8. Report on the use of GI in the NMA in Lithuania. *Mrs. N. ZOLOTONOSA* (14.50 – 15.10). Report on the use of GI in the NSI in Lithuania. *Mrs. M. Malakauskiene* (15.10 – 15.20).

The Law of Geodesy and Cartography (June 2001) describes the main tasks of the NMA in Lithuania:

- Tasks of the State geodetic network, topographic and special maps;
- Role of municipalities;
- Role of ministries and state organisations.

The integrated GIS developed in Lithuania describes the rules for creation, registration, standardisation and administration of geo-data. The system also interconnects cadastres and registers that are based on geo-referenced information, and defines the main principles for interaction of different geo-data created by various organisations. Formats of data exchange and coding systems include elements of accuracy and content based on scale.

Four databases are currently considered for cartography:

- Micro: hydrography, roads, railroads, place names, geodetic network – used with orthophoto backdrop;
- Mini (recently added): some additional data, also with orthophoto backdrop;
- Midi: standard topographic map;
- Maxi: additional thematic information.

Two co-ordinate systems are currently used.

The NMA in Lithuania works on database driven cartography. Its primary task is not to produce paper maps.

The users are mainly ministries (military, environment, and others).

Depending on the type of GIS used, the GIS system can be called an open GIS.

Updates are organised per layer.

The GIS subdivision to Population Census Division of the NSI was established on 1st Sep. 2001. Its main tasks are:

- Preparation of thematic maps of Census and statistical data on different levels of administrative units;
- Analyses and dissemination of Census data and other statistical information using GIS tools;
- Internet for dissemination statistical information (thematic maps);
- Comparison of statistical data between countries using GIS tools.

For one city of Lithuania a point map was purchased. For this city, geo-referenced data are linked to address data and to register data. This database is linked through UAK (unique address code). Similar geo-referenced data sets are available for more cities, but have not been purchased by the NSI.

Data are not currently distributed on the Internet, but this is part of the plans of the NSI.

9. Report on the use of GI in NMA in the Czech Republic. Part 1: The use of GI in the NMA in the Czech Republic. ***Mr. V. Plischke. (15.30-16.05).*** **Document WS/PHARE-Doc. 9a. Part 1: The use of GI in the NSI in the Czech Republic.** ***Mr. J. Kalina. (16.05 - 16.20).*** **Document WS/PHARE-Doc. 9b.**

ZABAGED is the fundamental base of geographic data, and consists of the digital landscape model of the Czech Republic in vectorial form. The spatial component was created at the end of 2000. Completion is expected by the end of 2003, with a first update in 2005. The geo-data are topologically clean, and consist of eight categories of objects: settlements, communication, power lines, hydrography, territorial units, vegetation cover and land use, terrain relief, geodetic points.

The main use of this database is for GIS analyses in the state administrations, and for digital cartography.

Different ministries participate in the development of ZABAGED.

10. Report on the use of GI in the NSI of the Slovak Republic. ***Mrs. Z. Podmanicka. (16.20 - 16.35).*** **Document WS/PHARE-Doc. 10a.**

Basic tasks in the area of the state information system are performed by the Ministry of Education of the Slovak Republic and the Council of the Government of the Slovak Republic for Information Technology. The Automated Information System of Geodesy, Cartography and Cadastre is part of the State Information System and contains data on geodetic control, data on the real estate cadastre and primary database of geographic information system.

The primary database of the geographic information system was presented. This includes raster data (scanned) and vector data with levels of detail corresponding to different basic maps of the Slovak Republic.

The Statistical Office of the Slovak Republic co-operates mainly with:

- the authority which provides the positioning base for the spatial data set;
- the Ministry of Interior which provides data on changes in legislation on each level of territorial units;
- the Ministry of the Environment for updating and revision of Basic Residential Units.

The territorial units corresponding to Statistical Regions levels 1,2,3,4 and 5 were presented.

The regional database is expected to be completed by December 2001. Currently, GIS is used for population statistics (from the census data), regional statistics and election statistics are available. Short-term GIS developments includes intranet and Internet presentation of results.

11. Report on the use of GI in the NSI and the NMA in Slovenia. ***Mrs. D. Sabic. (16.35 – 17.05).*** **Document WS/PHARE-Doc. 11.**

The NSI of Slovenia is directly under the authority of the president of Slovenia. Since Slovenia is a small country, the institute is not further divided. Two parts have been privatised or partly privatised. The Mapping Authority of the Republic of Slovenia and the Statistical Office of the Republic of Slovenia produced the Register of Areas of Territorial units and Record of House Numbers for the use in 1981 census. They were merged in the Register of spatial units (RSU) in 1993, when the Slovenian Mapping Agency, SMA, started a project which should assure all conditions for managing and maintaining the RSU by modern information science's standards. Data from RSU are public and available to all clients for their use; only material costs are charged for issued data.

The statistical office is utilising data from the Register of spatial units and other registers for methodological and dissemination purposes. All data are disseminated free of charge to all users, and are made available (also for downloads) through the Internet. Commercial and tailor made software is used.

There is no strict formal co-operation agreement between the NSI and the NMA, but a long tradition of informal co-operation. Both institutes distribute geo-referenced data to external users.

The digitising started early in Slovenia. Originally, the idea was to realise the digitisation for all of former Yugoslavia, but there was no formal agreement on this matter. Slovenia started first, and the other countries are following.

12. Report on the use of GI in the NSI in Hungary. ***Mr. T. Beregi (17.05 – 17.15).*** **Document WS/PHARE-Doc. 12. Report on the use of GI in the NMA in Hungary.** ***Mrs. K. Tóth (17.15 – 17.50).*** **Document WS/PHARE-Doc. 12.**

The legal framework of contribution between the Hungarian Central Statistical Office and the Hungarian National Mapping Agency was regulated by the Act XLVI/1993. Besides of the mandatory collaboration the two institutions has developed effective co-operation in fields of GIS, remote sensing, and some basic issues enabling data exchange between them.

The Hungarian Central Statistical Office defines the territorial breakdown, while areas of territorial units are supplied by the NMA. For merging databases both institutions use Hungarian Central Statistical Office indexation system of the administrative territorial units; while beneath the NUTS 5 level the real estate registry numbers (geo-codes) coming from the national cadastre.

The GIS IT-system of the Hungarian Central Statistical Office operates on commercially available types of software, therefore there is no obstacle to the use of data coming from the land administration and mapping.

Since 1990 the Hungarian Central Statistical Office has been compiling geo-referenced presentation of statistical data, resulting in the MATÉRIA database, which gives wide range of statistical and other public data.

The operative body of the Hungarian NMA the Institute of Geodesy, Cartography and Remote Sensing (FÖMI) - being a committed organisation for the development of National Spatial Data Infrastructure – is deeply interested in the use of GIS data in various sectors of economy and public administration, amongst them in statistics. Following this mission news products and solutions has been offered to the HCSO.

The co-operation of Hungarian Central Statistical Office and FÖMI is marked with a number of joint projects like Remote Sensing in Urban Statistics, Vineyard and Orchard Census, Agricultural Statistical Digital Map Project, and the ABDS for the CEEC project.

The presentation demonstrated the advantage of integrated management of cadastre, mapping and remote sensing.

Conclusions and evaluation of the workshop

The main objectives of the workshop:

- Help prepare the accession countries for their integration in the ESS;
- To share experience between the NSI/NMA and EUROSTAT;
- Increase collaboration between the NSI and NMA in each country and between the Candidate Countries;

The objectives have been reached for the 9 Candidate Countries represented at the workshop.

Main conclusion concerning the extent and intensity of GI/GIS use:

- **ALL** NSI and NMA use GI/GIS (also BG, the only country not attending the workshop)
- Several small and large GI/GIS projects, in NMA and NSI
- Differences in the complexity/intensity of use between countries and between NMA/NSI
- Some very good practices of more advanced GIS use in NSI (e.g. HU, SI)

The presentations during the workshop illustrated that the intensity and complexity of GIS use is only partially understood through a questionnaire, and requires a more in-depth presentation. More GIS experience and activities were presented in the papers than was expected from the questionnaires.

Most of the Institutes want to upgrade their software and hardware to be in line with new technology. There is some expertise and interest to use geo-server technology, and increasing use of complex RDBMS systems like Oracle. A lot of simple and more complicated Intranet initiatives were presented.

The issue of co-operation between statistical institutes and mapping agencies:
The co-operation between NMA-NSI is important in several countries, however data exchange appears to be mostly unidirectional (NMA $\rightarrow$ NSI), except for Slovenia and Hungary. No co-operation agreement NSI – NMA was found in BG, RO , LT, Informal co-operation in PL , SL, and formal agreements in CZ, EE, HU , LV, SK. The importance of co-operation, be it formal or informal, was generally recognised. In Romania, the preparation of the workshop was the start of a co-operation effort.

Important data issues:

- Nomenclature updates: the process and frequency of changes in nomenclature varies between countries. More analysis is required on this issue;
- The process and frequency of data updates varies between countries and topics;
- Projection systems, datum and scales vary widely between countries;
- Metadata: 6 Institutes use CEN TC287 or ISO TC211, 8 use other metadata standards.

International programs:

Several countries mentioned their participation in international programs:

- ABDS Administrative Boundary Data Service (HU and others)
- EuroGeographics - SABE data set, GlobalMap
- MapBSR - data set for Baltic Sea catchment region
- Eurostat (definition of regional levels most important issue until now)

Future co-operation between the Candidate Countries (NSI) and Eurostat in this field:

- The candidate countries will take part in full range of co-operation with Eurostat as Member States have:
- Population Census collection for 1990/91 and 2001 rounds down to level 5 for SIRE database. For 2 remaining countries that are not in SABE (RO, BG) Eurostat should acquire communal boundaries.

Mapping Agencies

The most important findings concerning the use of GIS in the mapping agencies were summarised as follows:

- Wide availability of digital base maps at large scale (1/10.000 - 1/25.000) and even larger;
- Widespread use of ortophotos;
- Several NMA use GI/GIS for cadastral inventories and mapping (EE) / LIS;
- Management Land Reform was not mentioned often (the example of Slovenia illustrates that these data may be available);
- Mostly traditional production of maps, with exceptions where digital DB are very elaborate (example RO);
- Innovative approach to regionalisation of data capture was presented in Estonia;
- Good examples of handling census data (CZ, EE);
- Arrangements with Ministries and companies for updating specific layers;
- Internet/Intranet map services in several countries (example SI);
- Interesting example of vertical topological integration of data layers: ZABAGED (CZ)

Statistical institutes

The main conclusions concerning the use of GIS in the statistical institutes were summarised as follows:

- Generalised use of GIS for thematic mapping on regional and communal levels;
- Census data (population and agriculture): presentation of results (map form) and analysis with GIS is mentioned by many countries (e.g. PL);
- Building and enterprise registers used as base for transforming statistical data between old-new territorial breakdown (LV);
- Territorial subdivision including future NUTS;
- Remote Sensing for urban statistics, land use, vineyard census (HU, SI);

- Agriculture applications using land use and land cover;
- Distribution of data via Internet, e.g. election results (SK).

Recommendations

Lack of human and financial resources is a problem in many candidate countries when dealing with the use of GI and GIS. Most candidate countries want to use GI/GIS in a more advanced way and need to upgrade infrastructure. This creates an even greater need for additional resources and expertise. Some good examples were presented of Phare projects related to GI/GIS (PL, SI). This leads to the recommendation that the ***candidate countries are encouraged to stimulate joint project development and explore EU funding possibilities (e.g. Phare program)***.

The following conclusions were made:
The NSI and NMA of the represented candidate countries agreed to collect and report information on changes to the local territorial units according to the CONC/MODA format. Therefore, the countries need to set up appropriate structures in order to submit reports according to this format (this may only involve NSI or may require closer collaboration NSI/NMA).

A Boundary Study (Inventory and update processes of local units used in CC, similar to the BOUndary study conducted for the Member States) ***will be launched. This study will be funded as Phare project, starting in 2002, and will imply visits to all the Candidate Countries.***

Eurostat will investigate the possibility to publish the papers presented by CC in a monograph.

ANNEX 1 ANNOTATED AGENDA

Working document on item 1 of the agenda
WEDNESDAY 24 OCTOBER 2001
NSIs/NMAs JOINT MEETING
MORNING SESSION

1. Adoption of the agenda

[For adoption - 10 minutes]

Objectives of the workshop: to integrate the accession countries better in the co-operation between Eurostat and the NSIs as well as between NSIs and NMAs within the countries.

Knowledge will be acquired in both ways about practices in the field of GIS and statistics. The focus of the workshop will be on deviations from European practices and obstacles to include the accession countries in the ESS in the field of GI.

Working paper: Ref: WS/PHARE-Doc. 1°-°Annotated agenda

2. CONC/MODA, Eurostat's requirements for transmission of geographical information

[For information and discussion - 45 minutes]

Eurostat will present:
- Overview of GISCO and SIRE projects
- Format of transmission for the nomenclature of administrative units;
- Format of transmission for modifications to territorial units;
- Description of merger and splitting procedures.

Working paper: Ref: WS/PHARE-Doc. 2 -°Management of territorial units over time: relevanced for the accession countries. *Torbioern CARLQUIST*.°

3. The use of geographic information in the NSIs and NMAs of the Candidate Countries

[For information and discussion - 30 minutes]

Presentation based on the questionnaires filled in by the NSIs and NMAs of the candidate countries, and on the missions to Poland and Romania.

Working papers: Ref: WS/PHARE-Doc. 3a°-°Questionnaire on the use of GI and GIS in the NSIs and NMAs of the Candidate Countries; Analytical report. Ann WILLEKENS and *Thérèse STEENBERGHEN*.
Ref: WS/PHARE-Doc. 3b°-° Mission report of the visit to the NMA and NGI of Poland and Romania. *Thérèse STEENBERGHEN* and Danny VANDENBROUCKE

4. Report on the use of GI in CSO and NMA in Poland

[For information and discussion – 15 minutes]

Working papers: Ref: WS/PHARE-Doc. 4°-° Report on the use of GI in the Central Statistical Office and Head Office of Geodesy and Cartography in Poland. *Bogdan LESIAK*, Téresa LUBOWICKA and Adam GRABOS.

5. Report on the use of GI in NSI in Romania

[For information and discussion – 2x15 minutes]

Working papers: Ref: WS/PHARE-Doc. 5a°-° Report on the use of GI in the National Statistical Institute in Romania. *Mihaela FOTIN*

Working papers: Ref: WS/PHARE-Doc. 5b – Report on the use of GI in the National Office for Cadastre, Geodesy and Cartography in Romania, *Gina LUCA*

AFTERNOON SESSION

6. Report on the use of GI in NSI and NMA in Estonia

[For information and discussion – 2x15 minutes]

Working papers: Ref: WS/PHARE-Doc. 6°-° Census maps; Submitted by the Statistical Office of Estonia. *Inge NAEL* and Svetlana PAVLOVA
Ref: WS/PHARE-Doc. 6(b) °-° Report on the use of GI at NSI and NMA of Estonia. Inge NAE*L* and *Kristian TEITER*

7. Report on the use of GI in NSI and NMA in Latvia

[For information and discussion –15 minutes]

Working paper: Ref: WS/PHARE-Doc. 7 °-° Report on the use of GI in the NSI and NMA in Latvia. *Helen SHERMAN* and *Nadezda ZOLOTONOSA*.

8. Presentation of the use of GI in NSI and NMA in Lithuania

[For information and discussion – 15 minutes]

Working paper: Ref: (Slide presentation, no paper) °-° Presentation of the use of GI in the NSI and NMA in Lithuania. *Margarita MALAKAUSKIENE*

9. Report on the use of GI in NMA in the Czech Republic

[For information and discussion – 2x15 minutes]

Working paper: Ref: WS/PHARE-Doc. 9a °-° Report on the use of GI in the NSI and NMA in the Czech Republic. Part 1: The use of GI in the NMA in the Czech Republic. Vratislav PLISCHKE
Ref: WS/PHARE-Doc. 9b °-° Report on the use of GI in the NSI and NMA in the Czech Republic. Part 2: The use of GI in the NSI in the Czech Republic. *Joroslav KALINA*

10. Report on the use of GI in NSI and NMA in the Slovak Republic

[For information and discussion – 15 minutes]

Working papers: Ref: WS/PHARE-Doc. 10a°-° Report on the use of geographical information in the statistical office of the Slovak Republik. *Zuzana PODMANICKA* and Ivan MASARYK.
Ref: WS/PHARE-Doc. 10b°-° Report on the Use of Geographical Information in the Geodesy, Cartography and Cadastre Authority of the Slovak Republic. *This document will not be presented because the authour could not come.*

11. Report on the use of GI in NSI and NMA in Slovenia

[For information and discussion – 15 minutes]

Working paper: Ref: WS/PHARE-Doc. 11°-° Report on the use of GI in the NSI and NMA in the Republic of Slovenia. *Danijela SABIC*

12. Report on the use of GI in NSI and NMA in Hungary

[For information and discussion – 15 minutes]

Working paper: Ref: WS/PHARE-Doc. 12°-° Report on the use of GI in the NSI and NMA in Hungary. *Tamás BEREGI* and *Katalin TÓTH*

13. Conclusions

[For discussion – 15 minutes]

14. Any other business

[For discussion – 15 minutes]

ANNEX 2 LIST OF PARTICIPANTS

LISTE DES PARTICIPANTS - LIST OF PARTICIPANTS – TEILNEHMERLISTE

DATE: 24.10.2001 **TITRE DE LA REUNION: Workshop for Candidate Countries on GIS related matters/JMO - M5**

Code de la réunion: 34P580 728

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LISTE DES PARTICIPANTS - LIST OF PARTICIPANTS – TEILNEHMERLISTE

DATE: 24.10.2001 **TITRE DE LA REUNION: Workshop for Candidate Countries on GIS related matters/JMO - M5**

Code de la réunion: 34P580 728

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EUROPEAN COMMISSION
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Unit E-4: Regional indicators and accounts, population and geographical information system

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Original: **EN**

Workshop for Candidate Countries on Geographic Information Systems (GIS)

Joint meeting with National Statistical Offices and National Mapping Agencies

Luxembourg, October 24, 2001
JEAN MONNET Building (Room "M5")
Beginning of the meeting: 10 a.m.

Management of territorial units over time

Working document on item 2 of the agenda

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MANAGEMENT OF TERRITORIAL UNITS OVER TIME: RELEVANCE FOR THE ACCESSION COUNTRIES

Foreword

Originally, NUTS consisted of three regional levels corresponding to the existing administrative divisions. Two additional levels based on narrower administrative divisions, NUTS 4 and NUTS 5 (municipalities or the equivalent), were defined by Eurostat to meet growing demand for local information from within the Commission. Unlike the first three levels of NUTS, which vary little, NUTS 5 can undergo scores of changes every year, such as the creation of new entities, the merging or subdivision of municipalities or name changes. Statistical Regions levels 1-3 were defined ad hoc in 1998 and officially published by Eurostat in 1999. A revised version will be published late 2001. It is logical to extend "Statistical Regions" to levels 4 and 5, just as NUTS was extended.

1. Background

Eurostat has geographical (GISCO) and statistical (SIRE) information systems which permit nomenclature management and the cartographic representation of territorial units down to NUTS-5 level. If these systems are to work well, and in particular if their results are to match the reality of territorial administrative divisions, they require regular input on changes which have taken place during the preceding period.
To this end, Eurostat planned to systematise and automate the transmission of information from Member States and accession countries on changes to territorial breakdowns.
A format for coding territorial changes was adopted at the meeting of a Working Party in October 1991 (Documents E/LOC/13, E/LOC/24). This format, CONC/MODA, is described in this paper.
An existing dynamic nomenclature management system (NPS-COMEXT) was then adapted to manage NUTS. Input to this system began in the second quarter of 1996 and is continuing at present for the Member States and the EFTA countries. It is planned to extend this data collection to the accession countries.

2. SIRE and GISCO data bases (stocks)

2.1 SIRE

The Commission (Eurostat) has 2 data bases with relevance for the management of territorial units. The SIRE (Système Européen d'Informations Infra-régionales) data base contains about 30 variables from the population censuses in the Member States in 1980/81 and 1990/91. The geographical level of detail is NUTS5 (communes or similar, 98 000 units in 1991). The collection of data was done according to a table programme for collection of data from the population and housing censuses. Most of these tables concern national or regional data and are stored in the Census data base at Eurostat. The different issues related to the census data, including the tables for local units, are discussed with member states in the Working Group "Population", which holds meetings each year. As with other Working Groups, the NSIs in the accession countries are always invited to participate to this Working Group.

2.2 GISCO

GISCO, the "Geographical Information System for the Commission", is a data base with geographical information ordered in themes and layers. It includes both topographic data, such as administrative boundaries, transport networks, rivers and elevations, and thematic data with relevance for the policy of the Directorates-General of the European Commission. In particular the policies for agriculture, transport, environment, and the regional policy are well catered for by GISCO. The GISCO data base is available to the GIS experts in these and some other DG's. Eurostat makes great use of the GISCO data base by including statistical maps in its publications. These maps normally makes use of the boundaries for NUTS and Statistical Regions.
In the theme Administrative data, GISCO includes one layer "Communes" with boundaries for the individual NUTS5 units in the EU. These boundaries correspond to the statistical data in the SIRE data base and the 2 data bases can be linked via the NUTS code (levels 1-5). Currently, there are 4 temporal versions of the commune layer: 1981, 1991, 1995 and 1997. The last version includes also non-EU countries, including 8 of the 10 accession/PHARE countries. The source for the commune boundaries has been the SABE[1] data set since the 1991 version. SABE is a data set which has been assembled from national sources at EuroGeographics Association (formerly MEGRIN). EuroGeographics is an umbrella organisation for the National Mapping Agencies (NMAs) in most countries of Europe.

[1] SABE - Seamless Administrative Boundaries of Europe

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3. The NPS system (changes)

Eurostat uses an application called NPS ("New Production System") for storing and maintaining the change information. The NPS was originally developed to handle the evolution of classifications regarding external trade. It has proved apt to handle changes in territorial units, as well.

In order to work efficiently with NPS, a specific format for the input data is required. This input format is called CONC/MODA (Concordance/Modification) and consists of 2 files, one for CONC and one for MODA. All changes to local units, including dates and information on predecessors/successors, are structured in this format. In annexes 1-3 is a detailed description of the CONC/MODA format with explanations of how different cases of changes are to be treated.

Once the changes are loaded into NPS, the Community codes can be assigned to the local units. It is also possible to retrieve output tables of the NUTS classification (all levels 1-5) for any point in time. The output tables can be in plain text format or in a format for data bases.

4. Relevance for the accession countries

In this paper, the term "accession countries" refer to the 10 countries which are at the same time PHARE countries and which are invited to the workshop on GIS at Eurostat 24 October 2001[2]. This narrow set of countries is due to organisational reasons, the PHARE budget being the means of financing both this workshop and the data collection.

A first data collection for submission to Eurostat was requested by letter in 2000. The items requested were the full structure of territorial units on levels 4 and 5 and with links to the already agreed Statistical Regions on level 3. Three reference dates were requested: one date close to a population census around 1989-91, 1997, and most recent data as of 2000. Basic statistical data on land surface area and total population were requested for all the units. For an overview of which national administrative units are on each level of Statistical Regions, refer to Annex 5.

In GISCO, boundaries for administrative regions (corresponding to level 3) were integrated at an early stage in the first part of the 1990's. These boundaries were later updated and corrected when SABE was extended to more and more non-EU countries (the only accession countries not in SABE at the end of 2001 are Bulgaria and Romania). The information in GISCO was also of great help when Statistical Regions for the CECs were first defined. In 1999, when the first official publication "Statistical Regions" was produced, maps from GISCO data base showing the hierarchy and boundaries of the regions were included.

SABE version 97 (reference date 1 Jan. 1997) included several accession countries and has been extended repeatedly to included 8 of the 10 accession/PHARE countries.

Community codification of levels 4 and 5 has not been done yet for the accession countries. Several accession countries have created Community codes themselves by extending the codes agreed upon for level 3 to the next 2 levels. These coding systems have not been put into any data base at Eurostat.

5. Plans for the next few years

The SIRE data base will be updated with the results from the 2001 population census round. The collection of data from the Member states is planned to start in 2002. The basis for this data collection is the "Guidelines and table programme of the Community programme of population and housing censuses in 2001" (Eurostat 1999) which was approved by the Statistical Programme Committee at its 27th meeting in Luxembourg, 26-27 November 1997. This table programme is relevant for the accession countries as well as for the EU Member States. Of the 40 tables in the table programme, tables 38-40 concern data for local units (NUTS5).

In order to establish a time series of statistical data, a collection of census data from the preceding census in 1990/91 from the accession countries is planned. This will be carried out through a PHARE project. For the specifications of the tables and to ensure comparability with data for the Member States, the Community table programme for the 1990/91 census will be used. The variables collected for local units were defined in table 29 of this table programme.

The accession countries will be included in the management system for territorial units in a way similar to the procedures adopted for the Member states. The actions will be done in the framework of a project financed under the 2000 PHARE budget. The first action is to carry out an inventory similar to the BOUndary study made by Eurostat for EU-12 in 1994 and repeated for the 3 new member states in 1995. This study will consist of an inventory of the evolution of territorial units, the mechanisms for updating the coding systems, and the principal actors involved.

It is also foreseen that the accession countries start reporting the changes to the territorial units by using the CONC/MODA format. This reporting will start as part of a PHARE project after the BOUndary study has been completed. Because Eurostat will have data from both the 1991 and 2001 censuses, it will be necessary to include the inter-census period 1991-2001 in these reports. As is explained below, the reports in CONC/MODA format enables Eurostat to update and maintain the Community codes for units on levels 4 and 5. Only at this moment will there be Community codes defined for the local units in the accession countries.

[2] Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia

Statistical Regions on level 1-3 are updated when there is a justified demand from a country. The procedure for changing regions on the 3 upper levels is different from the CONC/MODA format, as is the procedure for changing the NUTS levels 1-3 in the member states also different from the CONC/MODA format. In each individual case, a formal letter from the NSI to Eurostat is requested. The letter should include a justification why a change is proposed, a description of the extent of the proposed change (preferably in the forms of maps and provisional classifications), and an analysis of the effects of the changes in terms of population and area. Eurostat will analyse the request and consult other services in the Commission before a formal answer is sent to the NSI. This process is formal and may take a long time if additional information regarding the proposed changes has to be demanded. The change in the classification "Statistical Regions" does not take effect before Eurostat has agreed, in writing to the NSI, on the proposal. It is very important that changes can not be done unilaterally, nor in the form of "information" from the NSI to Eurostat.
NUTS does not exist for non-EU countries. For the accession countries "Statistical Regions" were created. There is a lot of confusion regarding this, especially since some accession countries already have defined "NUTS" in their national legislation. It has to be stated repeatedly that NUTS is a statistical classification for the regional statistics in the EU member states and that it is maintained by Eurostat.
In 2001, the Commission made a proposal for a Regulation on the establishment of a common classification of NUTS[3] which is currently being in the process of adoption by the European Parliament and the Council. When this regulation takes effect, the rules for changing the NUTS classification will be more strict. This regulation does not cover the "Statistical Regions", nor the units on levels 4 and 5, but it will apply for the accession countries on the day they become members of the EU and will introduce NUTS.
The next version of SABE will be a "synthetic" version where the reference date corresponds to the date of the population census in each country. It will nevertheless be called SABE2001 in analogy with SIRE 2001. The Community codes will be included wherever possible. The integration work is done by EuroGeographics, which maintains the contacts with its members, the National Mapping Agencies in the different countries. SABE2001 will be delivered to the Commission on a country by country basis as the countries become available. It will then be integrated into the GISCO data base as a new version of the commune layer. It is hoped that all Member States and all accession countries will eventually be covered in this version of SABE.

6. Progress in reporting to Eurostat on local administrative divisions as of Oct. 2001:
A letter with the request for a list of all territorial units on levels 4 and 5 was sent from Eurostat to the NSIs of the accession countries on 9 February 2000. In addition to the list, basic data on surface area and total population for the local units were also asked for. Three reference dates were mentioned in the letter:

- Date of population census around 1989-92
- Date corresponding to SABE 97 (1 Jan 1997)
- Most recent date (1999 or 2000)

The table below shows what has been delivered to Eurostat from the different accession countries.

Country	Classification			Basic data			Link to SABE97	
	1989/92	1997	99/2000	1989/92	1997	99/2000		
Bulgaria	X	X	X	X	X	X	Yes	
Czech Republic	-	X	X	-	X	X	Different code systems	
Estonia	-	X	X	X	X	X	Yes	
Hungary	X	X	X	X	X	X	Yes	
Latvia	-	X	-	X	X	-	Yes	
Lithuania	-	Level 4	-	Level 4	Level 4	-	Yes	
Poland	X	X	-	X	X	-	Not exact	
Romania	-	-	-	-	-	-	..	
Slovenia	X	X	X	X	X	X	Yes	
Slovak Republic	-	X	-	-	X	-	Yes	
Cyprus	-	-	-	-	-	-	..	
Malta	-	X	-	-	X	X	..	

Notes:
Country - no request was sent to Turkey at this moment.
"Classification" refers to a list of local units including national coding systems for different levels and names.
"Basic data" refers to data on surface area and total population for the date mentioned. Some countries submitted data for several years for one static subdivision of the country (only one column with surface area data), hence the discrepancies between deliveries of Classification and Basic data.

[3] COM(2001)83 final, 2001/0046(COD) Proposal for a Regulation of the European Parliament and of the Council on the establishment of a common classification of Territorial Units for Statistics (NUTS)

7. Logic used in processing the change data

Significant change

Because Eurostat wishes to make comparisons over time, the debate focused on the methodological approach to exploiting the nomenclature, and in particular the criterion to be applied to identify significant change in geographical units.

The impact of changes in geographical contours on statistical data depends greatly on the subject, which means that one single criterion cannot be used for all purposes and that it may be necessary to take non-significant changes at a given time and group them subsequently (see the final report of the White Waghorn study, E/LOC/44, also called BOUndaries Project).

Because Eurostat has no information enabling it to assess the significance of a change for all applications, **any change in a territorial unit communicated by a country is considered significant unless the unit only changes name or national code**.

Community code

Each unit affected by a change in territorial boundaries, such as a merger or subdivision, will have its Community code closed on the day before the date of the change.

A closed Community code can only be reopened if the name of the unit or its national code changes without any alteration to the unit's boundaries.

A unit which has changed geographical boundaries as a result of a merger or subdivision will be given a new Community code valid as of the date of the change even if it retains the same name and the same national code.

New entities will have a new Community code.

The new Community code is created by adding a unit to the last Community code at NUTS 5 level.

See Annex 3 for further details on the management of codes during mergers and splits.

8. Description of the NUTS management system

The NUTS management system enables changes in territorial units to be monitored over time.

It can be displayed on-screen (see Annex 4):

- All Community codes with their national codes and the associated labels and their validity intervals.
- Links between units. It is possible to track the units which merged or split to give rise to a new unit.
- It is also possible to create output files for use with other software. They will typically contain:
  - ⇒ the NUTS in force on a specific date (from 31/12/1991 on) for one or several countries;
  - ⇒ "predecessor"/"successor" links with or without validity dates.

9. Conclusion and requests to Candidate countries

The procedures used for inputting data on territorial changes to the management system were at the beginning different from one Member State to the other. In fact, the logic used and the information provided varied considerably from one country to another. With the CONC/MODA format the management of territorial units over time has been facilitated and resources have been saved. The Candidate countries should also comply with the CONC/MODA format.

In order to be able to monitor changes in NUTS, Eurostat will ask the Candidate countries to send in lists of territorial changes which took place between 1/1/1991 (or date of population census if it was earlier) and 1/1/2002 according to the CONC/MODA format in a digital file. This will done in the framework of a project for statistical cooperation financed by the 2000 PHARE budget. In the same project an inventory similar to the BOUndary study will be performed as well as a retroactive collection of Population Census data from the 1990/91 census round.

Annex 1: Format of transmission for the nomenclature of administrative units

Description	Characters	Position
Declaring country	2	1-2
National code[1]	10	3-12
Label of the administrative unit	60	13-72
Reference date	6	73-78

[1] The national code should also indicate the higher-level regions in the hierarchy to which the particular region belongs.

Annex 2: Format of transmission for modifications to territorial units

1. Modification of units (MODA)

Description	Characters	Position
Declaring country	2	1-2
'MODA'	4	3-6
Year of change	4	7-10
National code of territorial unit [2]	10	11-20
Month of change	2	21-22
Day of change	2	23-24
Type of modification [3]	1	25-25
Label of the administrative unit	60	26-85
NUTS code of affected NUTS III/IV unit [1,4]	7	86-92
National code of affected NUTS III/IV unit [1,4]	7	93-99
Label of affected NUTS III/IV unit [4]	60	100-159

[1] Only if the link between NUTS code and national code is available.

[2] The national code should also indicate the higher-level regions in the hierarchy to which the particular region belongs.

[3] Modification of territory: '**A**': Add '**D**': Delete
Non-territorial change: '**M**': Modification of label or national code

[4] Relates to the codes and label of the changed NUTS region. Should only be filled in if the NUTS III or NUTS IV structure is affected by the change of NUTS V.

Directions for use:

Depending on the change, the national code and label of unit varies

Add	use the new national code and label ("after change")
Delete	use the old national code and label ("before change")
Modification of label	use the old national code ("before change") and the NEW label
Modification of national code	use the old national code and the old label ("before change") with one record in the CONC file.

2. Codification of concordance between the old and new units of territorial structure (CONC)

Description	Characters	Positions
Declaring country	2	1-2
'CONC'	4	3-6
Year of change	4	7-10
National code of the unit before change	11	11-21
National code of the unit after change	11	22-32
Month of change	2	33-34
Day of change	2	35-36
National Code of affected NUTS III/IV unit [1]	7	37-43
Label of affected NUTS III/IV unit [1]	60	44-103

[1] Relates to code and label of the receiving NUTS region. Should only be filled in if the NUTS III or NUTS IV structure is affected by the change of NUTS V.

Examples of utilisation of files 'CONC' and 'MODA'.

- **Merge:**

The communes of LUXEMBOURG (11001) and NIEDERANVEN (11005) have been merged to LUXEMBOURG (1100A) with new code.
The modifications in the file MODA are as follows:

country	MODA	year	national code	month	day	'D'/ 'A'/ 'M'	label	NUTS3 code	NUTS3 national code	NUTS3 label
LU	MODA	1992	11001	10	28	D	LUXEMBOURG			
LU	MODA	1992	1100A	10	28	A	LUXEMBOURG			
LU	MODA	1992	11005	10	28	D	NIEDERANVEN			

In the second file CONC the changes of the communes have to be described respectively as follows:

country	CONC	year	national code before change	national code after change	month	day	NUTS3 code	NUTS3 label
LU	CONC	1992	11001	1100A	10	28		
LU	CONC	1992	11005	1100A	10	28		

Explanation of the CONC file in the 'merge' case: The lines 'CONC' indicate the history of successor and predecessor of the territorial units. In this example the "new" commune of LUXEMBOURG (successor having a new code) is made up of the "old" communes of LUXEMBOURG and NIEDERANVEN (predecessors).
N.B no information is required on the NUTS III/IV variables, as it is assumed to be unchanged.

- **Split:**

The commune of LUXEMBOURG (11001) is divided in LUXEMBOURG (1100A) and KIRCHBERG (11415), for the latter a new code is assigned.
The modifications in the file MODA are as follows:

country	MODA	year	national code	month	day	'D'/ 'A'/ 'M'	label	NUTS3 code	NUTS3 national code	NUTS3 label
LU	MODA	1992	11001	10	28	D	LUXEMBOURG			
LU	MODA	1992	1100A	10	28	A	LUXEMBOURG			
LU	MODA	1992	11415	10	28	A	KIRCHBERG			

In the second file CONC the changes of the communes have to be described respectively as follows:

country	CONC	year	national code before change	national code after change	month	day	NUTS3 code	NUTS3 label
LU	CONC	1992	11001	1100A	10	28		
LU	CONC	1992	11001	11415	10	28		

N.B no information is required on the NUTS III/IV variables, as it is assumed to be unchanged.
Explanation of the CONC file in the 'split' case: The lines 'CONC' indicate the history of successor and predecessor of the territorial units. In this example the commune of LUXEMBOURG remains with a new code. The second line indicates that a part of the commune of LUXEMBOURG (predecessor) moved to the new commune of KIRCHBERG (successor).

- **Redefinition of structure (Split and Merge):**

The communes of LUXEMBOURG and NIEDERANVEN are split into three new communes:
- LUXEMBOURG changed national code and keeps its name;
- One part of LUXEMBOURG and one part of NIEDERANVEN make a new commune KIRCH-DEL (11420);
- NIEDERANVEN changed national code and keeps its name.

The modifications in the file MODA are as follows:

country	MODA	year	national code	month	day	'D'/ 'A'/ 'M'	label	NUTS3 code	NUTS3 national code	NUTS3 label
LU	MODA	1992	11001	10	28	D	LUXEMBOURG			
LU	MODA	1992	1100A	10	28	A	LUXEMBOURG			
LU	MODA	1992	11005	10	28	D	NIEDERANVEN			
LU	MODA	1992	1100B	10	28	A	NIEDERANVEN			
LU	MODA	1992	11420	10	28	A	KIRCH-DEL			

In the second file CONC the changes of the communes have to be described respectively as follows:

country	CONC	year	national code before change	national code after change	month	day	NUTS3 code	NUTS3 label
LU	CONC	1992	11001	1100A	10	28		
LU	CONC	1992	11001	11420	10	28		
LU	CONC	1992	11005	11420	10	28		
LU	CONC	1992	11005	1100B	10	28		

N.B. no information is required on the NUTS III/IV variables, as it is assumed to be unchanged.
Explanation of the CONC file in the "redefinition" case: The lines 'CONC' indicate the history of successor and predecessor of the territorial units. In this example the communes of LUXEMBOURG (line one) and NIEDERANVEN (line four) remain with a new code. The lines two and three indicate that a part of the commune of LUXEMBOURG (predecessor) moved to the new commune of KIRCH-DEL (successor) (line two) and as well there was a transfer of territory from NIEDERANVEN to KIRCH-DEL (line three).

- **Modification of name:**

LUXEMBOURG is renamed to CAPITALE.
The modifications in the file MODA are as follows:

country	'MODA'	year	national code	month	day	'D'/ 'A'/ 'M'	label	NUTS3 code	NUTS3 national code	NUTS3 label
LU	MODA	1992	11001	10	28	M	CAPITALE			

No CONC file is necessary since the territory and the code remain the same.

- **Modification of national code:**

LUXEMBOURG changed its national code from 11001 to 1100A.
The modifications in the file MODA are as follows:

country	'MODA'	year	national code	month	day	'D'/ 'A'/ 'M'	label	NUTS3 code	NUTS3 national code	NUTS3 label
LU	MODA	1992	11001	10	28	M	CAPITALE			

In the second file CONC the changes of the communes have to be described respectively as follows:

country	CONC	Year	national code before change	national code after change	month	day	NUTS3 code	NUTS3 label
LU	CONC	1992	11001	1100A	10	28		

N.B no information is required on the NUTS III/IV variables, as it is assumed to be unchanged.

- **Small territorial transfer where upper levels are affected:**

A minor exchange of territory between LUXEMBOURG (11001) and STRASSEN (12001) has taken place, LUXEMBOURG and STRASSEN being parts of different NUTS IV regions. Two different plots of land were transferred in opposite directions across the NUTS IV boundary.
The modifications in the file MODA are as follows:

country	'MODA'	year	national code	month	day	'D'/ 'A'/ 'M'	label
LU	MODA	1992	11001	10	28	D	LUXEMBOURG
LU	MODA	1992	40001	10	28	A	LUXEMBOURG
LU	MODA	1992	12001	10	28	D	STRASSEN
LU	MODA	1992	41001	10	28	A	STRASSEN

NUTS3 code	national code of NUTS III or IV	label of NUTS III or IV
LU00011	11	LUXEMBOURG
	40	LUXEMBOURG
LU00012	12	STRASSEN
	41	STRASSEN

Explanation of the MODA file: The additional columns for the NUTS III/IV regions indicate those regions where a change in the territorial boundary and area has taken place. In detail, line one and three show that the predecessor regions, LUXEMBOURG and STRASSEN have changed. They were opened or assigned with new codes but identical name (line two and four). New NUTS codes are assigned by EUROSTAT and are not known by the NSI in the Member State!
In the second file CONC the changes of the communes have to be described respectively as follows:

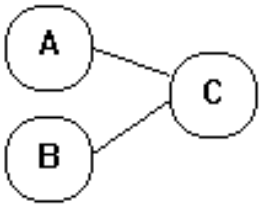
country	CONC	year	national code before change	national code after change	month	day	national code of NUTS III or IV	label of NUTS III or IV
LU	CONC	1992	11001	40001	10	28	40	LUXEMBOURG
LU	CONC	1992	11001	41001	10	28	41	STRASSEN
LU	CONC	1992	12001	41001	10	28	41	STRASSEN
LU	CONC	1992	12001	40001	10	28	40	LUXEMBOURG

Explanation of the CONC file: The lines 'CONC' indicate the history of successor and predecessor of the territorial units. In this example the communes of LUXEMBOURG (line one) and STRASSEN (line three) remain with a new code. Lines two and four indicate that a part of the commune of LUXEMBOURG (predecessor) moved to the commune of STRASSEN (successor) (line two), while a move of territory took place from STRASSEN to LUXEMBOURG (line four). The additional columns for the NUTS III/IV changes reflect the affected regions with their new codes and/or names.
Here we assume that national codes change after the transfer of territory. It is probably more normal in member states NOT to change codes after small transfers. The NUTS codes, however, should always change whenever the territory has changed. Small transfers should always be reported, not only when upper levels in the hierarchy are affected.

ANNEX 3 DESCRIPTION OF MERGER AND SPLITTING PROCEDURES

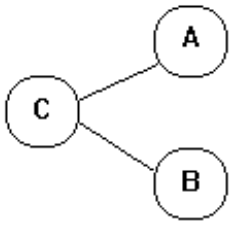
The examples below describe the procedures applied when territorial units change. The procedures are an example of the way our current software system treats these changes. They illustrate the procedure in the current change management system.

Merger



1. Closure
   Close A's and B's codcoms
   If C exists, close C's codcom
2. Opening
   Create a new codcom for C
3. Links :
   Match A's codcom with C's new codcom
   Match B's codcom with C's new codcom
4. Codnat
   Match C's new codcom with its codnat
5. Label
   Match C's new codcom with its label

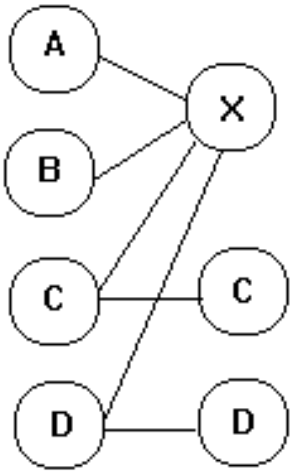
Splitting



1. Closure
   Close C's codcom
   If A exists, close A's codcom
   If B exists, close B's codcom
2. Opening
   Create a new codcom for A
   Create a new codcom for B
3. Links :
   Match C's codcom with A's new codcom
   Match C's codcom with B's new codcom
4. Codnat
   Match A's new codcom with its codnat
   Match B's new codcom with its codnat
5. Label
   Match A's new codcom with its label
   Match B's new codcom with its label

Merger and splitting

1. Closure
   Close A's, B's, C's and D's codcom
   If X exists, close X's codcom
2. Opening
   Create :
   a new codcom for X
   a new codcom for C
   a new codcom for D
3. Links
   Match:
   A's codcom with X's new codcom
   B's codcom with X's new codcom
   C's codcom with X's new codcom
   D's codcom with X's new codcom
   C's codcom with its new codcom
   D's codcom with its new codcom
4. Codnat
   Match:
   X's new codcom with its codnat
   C's new codcom with its codnat
   D's new codcom with its codnat
5. Label
   Match:
   X's new codcom with its label
   C's new codcom de C with its label
   D's new codcom with its label

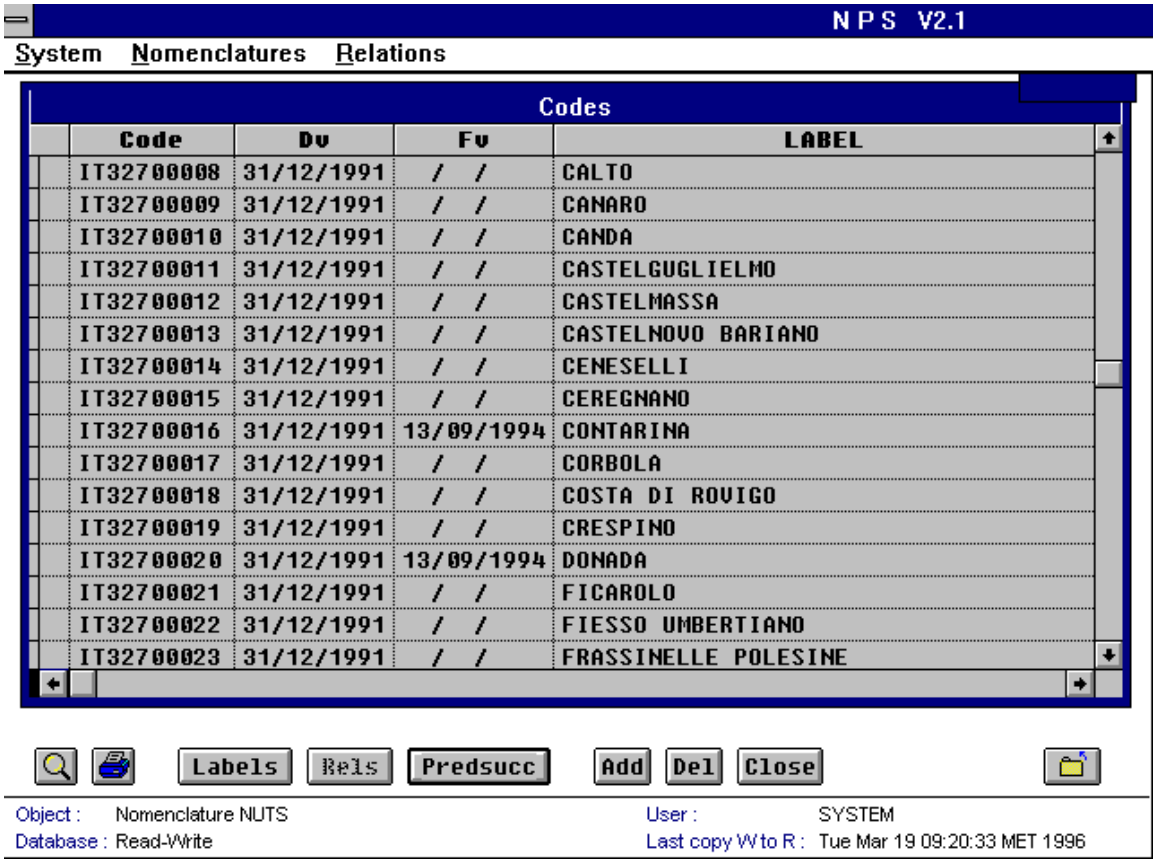


ANNEX 4
THE NUTS MANAGEMENT SYSTEM

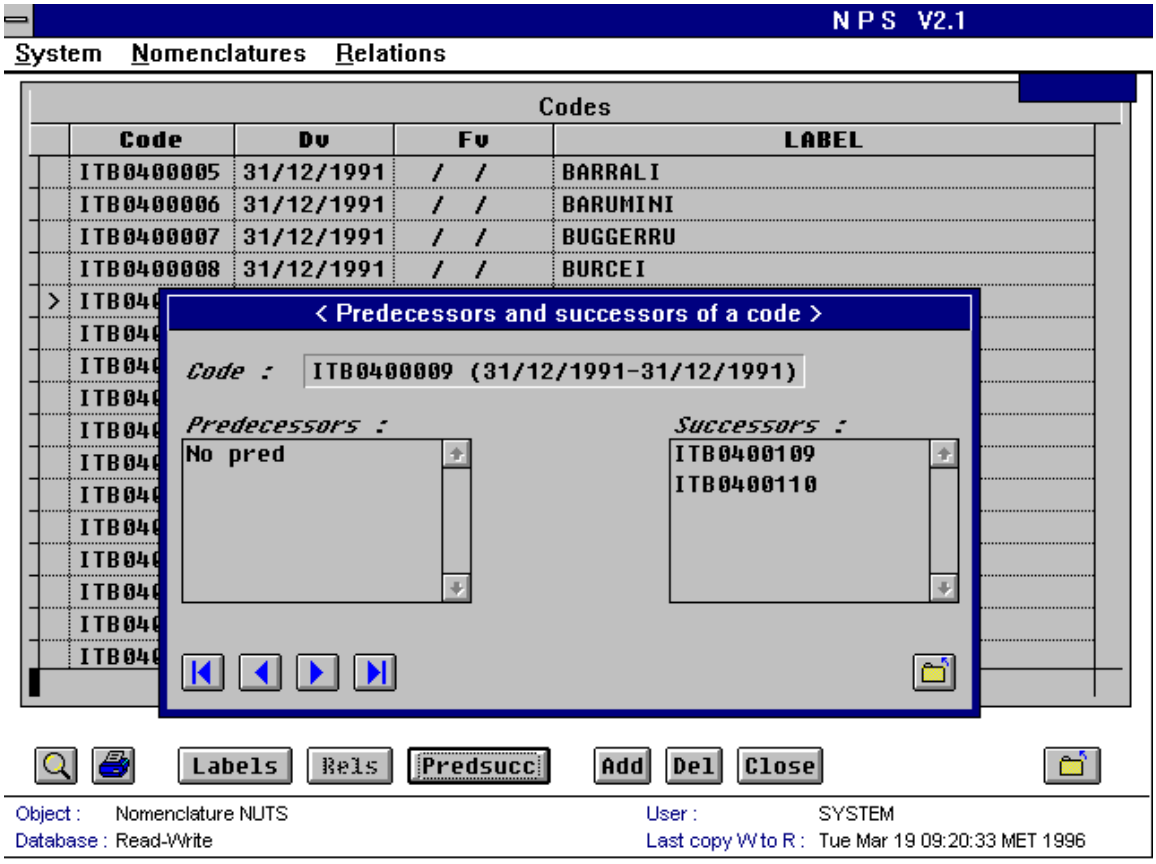
Description of the data input to the system

For each country, an original NUTS valid on 31/12/1991 is input to the management system.
The system is then fed with different files:
- the Community codes to be closed with their closure dates (at the same time as the Community code, the national code and the label of the unit in question are automatically closed by the system);
- the Community codes to be created with their validity intervals;
- the label and national code associated with each of the Community codes;
- the predecessor-successor links between units.

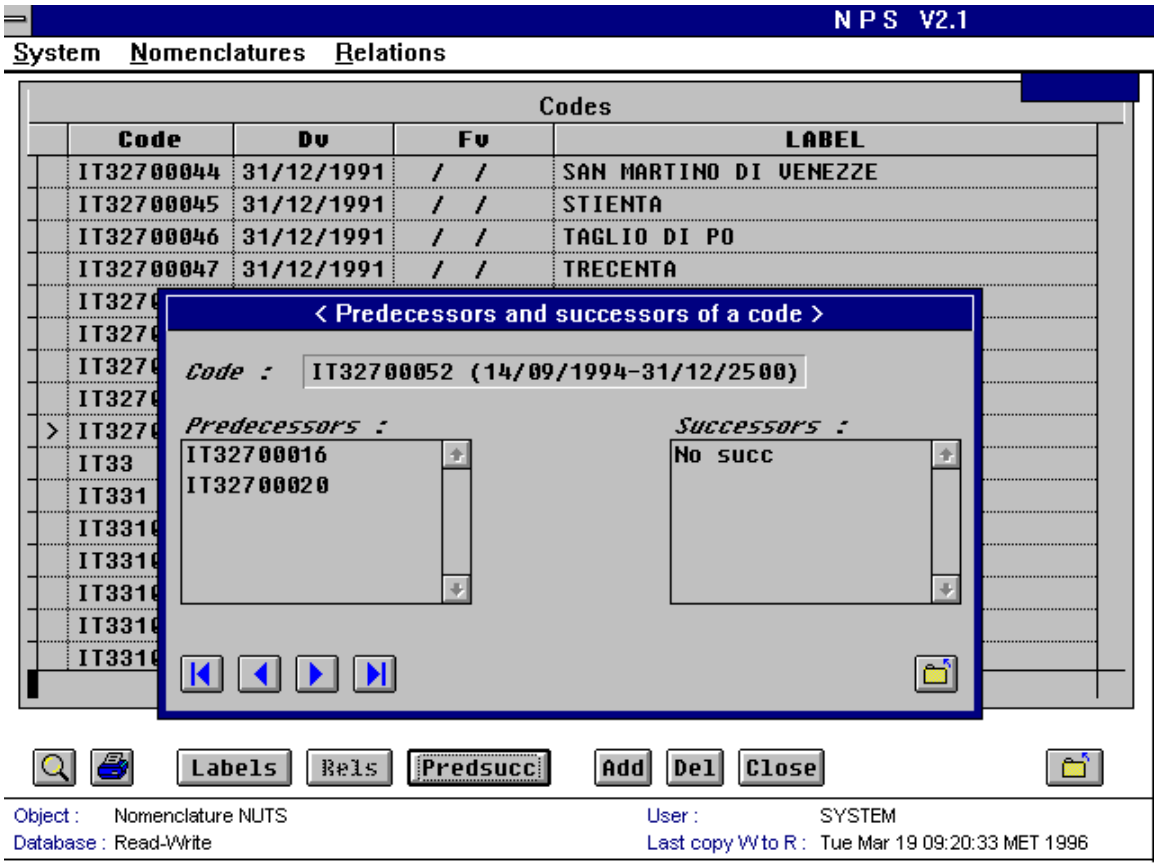
Screen display:
- all Community codes with their validity interval and associated label.



- a split municipality:



- merged municipalities



Annex 5: Correspondence between the regional levels and the national administrative units in the CEC

	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5
Bulgaria	BULGARIA	RAJON ZA PLANIRANE PLANNING REGION (6)	OBLASTI (28)	OBSHTINI (255)	NASELENI MESTA (5338)
Czech Republic	CESKA REPUBLIKA	GROUPS OF KRAJE (8)	KRAJE (14)	OKRESY (77)	OBCE (6 251 in year 2000)
Estonia	EESTI	EESTI	GROUPS OF MAAKOND (5)	MAAKOND (15)	VALD+ALEV+LINN (254)
Hungary	MAGYARORSZAG	TERVEZESI-STATISZTIKAI REGIO (7)	MEGYEK + BUDAPEST (20)	STATISZTIKAI KISTERSEG (150)	TELEPULES (3135)
Lithuania	LIETUVA	LIETUVA	APSKRITIS (10)	SAVIVALDYBES (56)	SENIUNIJA (446)
Latvia	LATVIJA	LATVIJA	REGIONS (5)	RAJONI + PILSETAS (33)	PAGAST+ PILSETAS (560)
Poland	POLSKA	WOJEWODZTWA (16)	PODREGIONY (44)	POWIATY (373)	GMINY+MIASTA (2486)
Romania	ROMANIA	REGIONS (8)	JUDET + BUCURESTI (42)		COMMUNES+MUNICIPIU+ORAJSE (2948 in year 1998)
Slovenia	SLOVENIJA	SLOVENIJA	STATISTICNE REGIJE (12)	UPRAVNE ENOTE (LOCAL GOVERNMENT UNITS; 58)	OBCINAH (192 since 1 Jan 1999)
Slovak Republic	SLOVENSKA REPUBLIKA	ZOSKUPENIA KRAJOV (4)	KRAJE (8)	OKRESY (79)	OBCE A MESTA (2920 in year 1999)

Source: Statistical Regions in the EFTA countries and the Candidate Countries, Eurostat, forthcoming

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EUROPEAN COMMISSION
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES

Directorate E: Social and regional statistics and geographical information system
Unit E-4: Regional indicators and accounts, population and geographical information system

Document: **n° WS/PHARE- 3a**
Original: **EN**

Meeting of the Workshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Questionnaire on the use of GI and GIS in the NSIs and NMAs of the Candidate Countries; Analytical report

Working document concerning item 3 of the agenda of the meeting

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QUESTIONNAIRE ON THE USE OF GI AND GIS IN THE NSIS AND NMAS OF THE CANDIDATE COUNTRIES; ANALYTICAL REPORT

T. Steenberghen, A. Willekens

Foreword

This report summarises the response to the questionnaire sent within the framework of the "Preparation of a Workshop on GIS" to NSIs and NMAs of the Candidate Countries. The response to the questionnaire was very good, as illustrated in the table below. We thank all the institutes involved.

Country	NSI		NMA	
	Questionnaire send	Response	Questionnaire send	Response
Bulgaria	✓	✓	✓	
Czech R.	✓	✓	✓	✓
Estonia	✓	✓	✓	✓
Hungary	✓	✓	✓	✓
Latvia	✓	✓	✓	✓
Lithuania	✓	✓	✓	✓
Poland	✓	✓	✓	✓
Romania	✓	✓	✓	visit
Slovak Republic	✓	✓	✓	✓
Slovenia	✓	✓	✓	✓

The mission report of the visit to the NMA and NSI of Poland and Romania, made in the same framework is presented as a separate paper.

The evaluation of GIS expertise in the institutes is based on the following information:
- Number of years of GIS use;
- Utilisation of GIS in the organisation;
- Formal collaboration between institutes;
- Number of data sets and property rights;
- Number of GIS licences.

Summary of the findings

The expertise appears to differ more per country than between the NSI and the NMA of each country. When classified as in the table below, the following clusters appear:
- Most expertise (5, 4): HU-NSI, HU-NMA, SL-NMA, CZ-NMA, LT-NMA, SK-NMA, SL-NMA, SL-NSI.
- Rather good expertise (3): CZ-NSI, EE-NSI, EE-NMA, LV-NMA, PL-NMA.
- Some expertise (2): LT-NSI, RO-NMA
- Very little use of GIS (1): BG-NSI, LV-NSI, RO-NSI, SK-NSI

	Years	Utilization	Formal collaboration	Data sets	Licenses	Property rights	Conclusion
BG-NSI	4	2	0	7	5	IR	1
CZ-NMA	1	3	1	5		CP	4
CZ-NSI	7	4 (incl. SDE)	1	3	36	CR	3
EE-NMA	6	5	1	6		FP, CP	3

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EE-NSI	6	4	1	3	11	FP, CP	3
HU-NMA	3	4	1	8	127	CP	5
HU-NSI	7	6	1	8	67	No	5
LT-NMA	4	5	0	6	20	CP, No	4
LT-NSI	4	5	1	6	3	CP	2
LV-NMA	1	5	1	12	46	FP, CP	3
LV-NSI	1	6	1	2	4	FP, CP	1
PL-NMA	10	1	0	5	5	CP	3
PL-NSI	7	1	0	1	14	FP	1
RO-NMA		3	1	8	13	No	2
RO-NSI	5	4	0	7	4	No	1
SK-NMA	11	4 (incl. SDE)	1	2	8	CP	4
SK-NSI	11	4	1	1	4	IR	1
SL-NMA	5	3	1	11	30	CP, CR	5
SL-NSI	11	4	0	10	7	FP	4

Access of most data sets: FP = Free Public access, CP = Commercial Public access, CR = Commercial Restricted access, IR = Internal Restricted access. No = Not owner of the data.

In Romania and Hungary, property rights may be a problem for providing GI data to Eurostat, because both NSI and NMA use commercial data in Romania, and the NSI in Hungary.

Some findings indicate a need for more in depth analysis:

- The process of change in nomenclature varies between countries. The questionnaire could not provide a full explanation of the change of nomenclature procedures, but even at the level of “who is in charge of changes in nomenclature?” the answers vary.
- Similarly, the update frequencies vary strongly, not only per country, but also per data set.
- Projection systems and scales vary widely between countries.

The lack of use of metadata, and almost no use international metadata standards is a reason for concern.

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ANNEX 1
SUMMARY OF THE QUESTIONNAIRE RESPONSES

BULGARIA

NSI

Organisation details

Main activities: Censuses, registers and general statistics
GIS used since 1997.
No formal co-operation with the National Mapping Agency, nor with other institutes.

GIS hardware and software environment

Software	Platform	Number of licenses
ArcView	Windows	2
ArcInfo	Unix	2
MapInfo	Windows	1

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Municipality boundaries	-	Administrative level	Yes Link = administrative /territorial code	Owner of data Internal restricted	Agency for cadastre When necessary
Settlements	-	Administrative level	Yes Link = administrative /territorial code	Owner of data Internal restricted	Agency for cadastre When necessary
Roads	-	-	No	Owner of data Internal restricted	No
Railways	-	-	No	Owner of data Internal restricted	No
Census districts	-	Census districts	Yes, streets Link = administrative /territorial code Classificator = addresses in settlements	Owner of data Internal restricted	Yes
Thematic data					
Protected areas	1:750.000	Administrative level Tiles	Yes, but no descriptive database available	Owner of data Internal restricted	Yes When possible
Point sources of air emissions	-	Administrative level Tiles	Yes, but no descriptive database available	Owner of data Internal restricted available	Yes When possible

All data sets are in longitude/latitude projection (spheroid = krasovski).
No metadata available.

Conclusion

Limited and isolated GIS-experience.
GI & GIS used for thematic mapping and data analyses.

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NMA

Organisation details

GIS hardware and software environment

Digital geographic data

Conclusion

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http://europa.eu.int/comm/eurostat/

CZECH REPUBLIC

NSI

Organisation details

Main activities: Censuses, registers, and general statistics
GIS used since 1994.
Formal co-operation with the National Mapping Agency and TERPLAN.
National Statistical Institute is responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
ArcView 3.2	Windows	**21**
ArcInfo	Unix	2
ArcSDE	UNIX	1
3D Analyst		3
ArcPress		4
Spatial Analyst		4
TIFF/LZW		1

Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
NUTS regions (NUTS 1,2,3,4,5)	-	Administrative level	Yes Link = code number of admin. unit	Commercial restricted	Czech statistical office Occasionally
Urban regions	-	Administrative level	Yes Link = code number of admin. unit	Commercial restricted	Czech statistical office Occasionally
Census districts	-	Administrative level	Yes Link = code number of admin. unit	Commercial restricted	Czech statistical office Occasionally

NUTS region data set is in S42 projection. Metadata available for internal use only.

Conclusion

Rather well developed GIS-expertise. Intensive use of GI for data analyses, cartographic production, data modelling and on-line publications (ArcSDE!).

NMA

Organisation details

Main activities: Cadastre, production of geographic information
GIS used since 2000.
Formal co-operation with the National Statistical Institute and the Military Organisations.
National Statistical Institute is responsible for Nomenclature of spatial data.

Project of the Czech Office for Surveying, Mapping and Cadastre named FUNDAMENTAL BASE OF GEOGRAPHIC DATA (ZABAGED) represents a continuation of activity in creation, editing and maintenance of medium scale base maps of the total area of the Czech Republic. This project should offer uniform spatial base to all GIS that are being formed by public administration, academic and private sectors as well as in many further branches that are demanding spatial information support.

GIS hardware and software environment

Software	Platform	Number of licenses
Confidential MGE MGDM (Intergraph)	NT	-
MAGIS (**Czech product**)	NT	-
MGE Map Finisher (intergraph)	NT	-

Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
SABE Czech Republic	1:50.000 30m	Administrative level	Yes to cadastre data Link = codes of units	Owner of data Commercial public	Every 5 years
3D contours DEM	1:10.000 2m	Map sheets	No	Owner of data Commercial public	Every 6 years
ZABAGED1 (***vector***) (hydrography, infrastructure)	1:10.000 8m	Map sheets	Yes Link = numerical codes	Owner of data Commercial public	Every 6 years
ZABAGED2 (***grid***) (hydrography)	-	Map sheets	No	Owner of data Commercial public	Every 6 years
Base Map of the Czech Republic	1:10.000	Map sheets	-	-	-

Data set SABE is in UTM-projection (datum: WGS-84, spheroid: int.).
ZABAGED1, ZABAGED2 and 3D contours are in national oblique conical conformal projection.
The metadata is available for internal and public use and is built up according to the CEN TC287 standards.

Conclusion

Intensive use of GIS since 2000.
GI & GIS used for thematic mapping, data modelling and data analyses.

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ESTONIA

NSI

Organisation details

Main activities: Censuses, general statistics
GIS used since 1995.
Formal co-operation with the National Mapping Agency and Regio Ltd. (Private Mapping Company).
National Statistical Institute is responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
MapInfo ¨Pro 5.5	NT	3
ArcView 3.2	NT	3
MicroStation SE	NT	2
GeoMedia	NT	3

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Administrative boundaries for Estonia	1:50.000	Administrative level	Yes, Population census, Anonymous database, regional statistics, general statistics Link = code of administrative unit	Owner of data Free public Commercial public	No
Thematic data					
Population census maps of Rural areas (incl. infrastructure, land cover, hydrography for whole Estonia and centroids of buildings for rural areas)	1:50.000	Tiles	Yes, population census, anonymous database Link = xy-id	Owner of data Free public Commercial public	No
Population census maps of urban areas (incl. infrastructure, land cover, hydrography and centroids of buildings for urban areas)	1:5.000 1:2.000	County level	Yes, population census, anonymous database Link = xy-id	Owner of data Free public Commercial public	No

All data sets are in Lambert Conformal Conic projection (datum: EUREF-Est 92 (ETRS-89); spheroid: Ellipsoid GRS-80).
Metadata is available for internal use only.

Conclusion

Rather well developed GIS-expertise . Intensive use of GIS for population census analyses.

NMA

Organisation details

Main activities: Cadastre, Production of Geographic Information
GIS used since 1995.

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Formal co-operation with the National Statistical Institute and with the University of Tartu, the Ministry of Agriculture, the Ministry of Environment and utility companies.
NSI **AND NMA** are responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
Intergraph product family (Geomedia 4.0, Geomedia Pro 4.0, Geomedia Web Enterprise)	NT	-
Bentley product family (MicroStation 95 , MicroStationJ, Geographics)	NT	-

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Land register	1:10.000	-	Yes Link = Admin. Unit ID	Owner of data Free public	Yes Depending of decisions in county and governmental level
Estonian topographic database (Estonian Basic map)	1:10.000	Tiles	No	Owner of data Commercial public	Yes
Estonian basic map	1:50.000	Tiles	No	Owner of data Commercial public	Different companies are updating the different data layers
Thematic data					
Estonian soil map	1:10.000	Tiles	No	Owner of data Commercial public	-
Land cadastre / Land register	1:10.000 1:2.000	-	Yes Link = parcel number	Owner of data Free public	Yes Constant
Land transaction and valuation register	1:10.000	-	No	Owner of data Restricted public	Yes Constant

All data sets except Estonian Base Map are in Lambert Conformal Conic projection (Lambert-Est) (Datum: ETRS-89; spheroid: GRS-80). The Estonian Base Map is in Transverse Mercator Baltic projection (Datum: ETRS-89; spheroid: GRS-80).
The metadata is available for public use

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Conclusion

Rather well developed GIS-expertise. Use of GIS for analyses of cadastral data. GIS also used for thematic mapping, data analyses and on-line publications.

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HUNGARY

NSI

Organisation details

Main activities: Censuses, Registers, General statistics
GIS used since 1994.
Formal co-operation with the National Mapping Agency and the Ministry of Agriculture and Rural Development.
National Statistical Institute is responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
ArcView GIS 3.2 ArcView Spatial Analyst 2.0a ArcView Network Analyst 1.0b ArcView 3D Analyst	NT	**46** 7 1 1
Autodesk MapGuide 4 MapObject 2.0	NT	 1 7
ArcInfo 8	NT	4

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Hungarian administrative boundaries with 10m resolution (MKH10) (settlement boundaries)	1:50.000 10m resolution	Administrative level	Yes, all types of data e.g. population, industry, health, tourism, public services Link = settlement name or code	Owner: Institute of geodesy, cartography and remote sensing. Thematic maps based on this data set can only be disseminated on paper.	Institute of geodesy, cartography and remote sensing. Every 6 months
National geographical information system database 2 (OTAB2) (administrative boundaries)	1:500.000 to 1:1.000.000	Administrative level	Yes, all types of data e.g. population, industry, health, tourism, public services Link = settlement name or code	Owner = Infograph Information Systems Ltd.	Infograph Information Systems Ltd. Every year
National geographical information system database 1 (OTAB1) (Rivers, canals, lakes, etc.)	1:250.000 – 1:500.000	Administrative level	No	Owner = Infograph Information Systems Ltd. Maps based on this data set can only be disseminated on paper.	Infograph Information Systems Ltd. Every year

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Hungarian Road database (KOZUT100)	1:100.000	Administrative level	Yes	Owner = Infograph Information Systems Ltd. Internal use only	Owner = Infograph Information Systems Ltd. Every 4 months
National geographical information system database 1 (OTAB1) (Roads, railways, etc.)	1:250.000 to 1:500.000	Administrative level	No	Owner = Infograph Information Systems Ltd. Maps based on this data set can only be disseminated on paper.	Infograph Information Systems Ltd. Every year
1:4000 scaled digital map of Budapest (infrastructure +) (BP4000)	1:4.000	Administrative level	Yes, data connected to addresses	Owner = Infograph Information Systems Ltd.	Infograph Information Systems Ltd. Every year
Thematic data					
Factories, other major engineering structures (OTAB1)	1:250.000 to 1:500.000	Administrative level	No	Owner = Infograph Information Systems Ltd. Maps based on this data set can only be disseminated on paper.	Infograph Information Systems Ltd. Every year

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Corine Landcover database	1:100.000	Administrative level	No	Owner: Institute of geodesy, cartography and remote sensing. No commercial use	Institute of geodesy, cartography and remote sensing. About every 10 years

All data sets are in Uniform National Projection system (Hungarian abbreviation “EOV”).
The metadata is available for public use.

Conclusion

Very well developed GIS-expertise. Intensive use of GI and GIS for thematic mapping, data analyses and on-line publications.

NMA

Organisation details

Main activities: Production of Geographic Information, Research, and land administration
GIS used since **1988**.
Formal co-operation with the National Statistical Institute.
National Statistical Institute is responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
ArcView 3.2 ArcView 3.0a	NT	**15** 1
ArcInfo 7.1 ArcInfo 8.0	UNIX	3 2
Erdas Imagine Essential Professional Orthobase 8.4	NT	 **28** 8 3
Bentley Microstation J 7.0 - Geographics 7.0 - Descartes 7.0 - Descartes 4.0 Microstation SE 5.0 Bentley Geooutlook	NT	8 3 10 4 5 3
MapInfo Prof. 6.5 5.5	1 1	NT
ArcView **Internet Map server** Bentley Model Server Discovery	1 1	NT
Different Hungarian GIS software	UNIX/NT	30

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Administrative boundaries MKH1 MKH2 MKH20 MKH200	 1m/1:5.000 2m/1:10.000 20m/1:100.000 200m/1:1.000.000	Administrative level	Yes, any data e.g. population, area, housing Link = statistical code	Owner of the data Commercial public	Institute of geodesy, cartography and remote sensing. Every 6 months
DEM grid	100m/ 1:100.000 for the whole territory of Hungary 5m/1:10.000 grid for 10% of the country	Tiles	Yes, metadata Link = edge co-ordinates of tile	Owner of the data Commercial public	No
DEM vector	1:10.000 in vector forma for 50% of the country	Tiles	Link = edge co-ordinates of tile	Owner of the data Commercial public	No

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Hydrography Layer of the topographic map	1:100.000 The scanned files of tiles are ready for whole country, vectorisation under way 1:10.000 The scanned files of tiles are ready for whole country, vectorisation under way	Tiles	No	Owner of the data Commercial public	Entrepreneurs upon supervision of the Institute of geodesy, cartography and remote sensing. Every 20 years average
Infrastructure Layer of topographic maps Railways Roads- in three categories in separate layers Electricity network Pipelines	1:100.000	Tiles	No	Owner of the data Commercial public	Entrepreneurs upon supervision of the Institute of geodesy, cartography and remote sensing.
Thematic data					

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Industrial themes Layer of topographic maps Factories Open cast mines Mines	1:100.000 1:10.000	Tiles	No	Owner of the data Commercial public	Entrepreneurs upon supervision of the Institute of geodesy, cartography and remote sensing. Every 20 years average
Corine Landcover database	1:100.000 1:50.000	Tiles	Yes, metadata Link = code of polygons	Owner of the data Commercial public	Institute of geodesy, cartography and remote sensing. About every 10 years

All data sets are in Uniform National Projection system (Hungarian abbreviation “EOV”) (Datum: HD-72, spheroid: IUGG GRS 67).
The metadata is available for public use and is built up according to the Digital Base Map Standards, based on IOS TC211 and CEN TC287.

Conclusion

Very well developed GIS-expertise. Owner of several data sets. Intensive use of GI and GIS for thematic mapping, data modelling, data analyses and on-line publications.

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LATVIA

NSI

Organisation details

Main activities: Censuses, Registers, and General statistics
GIS used since 2000.
Formal co-operation with the National Mapping Agency and the Land Cadaster.
National Statistical Institute is responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
ArcView GIS 3.2	NT	4

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Administrative boundaries compatible NUTS level 1,4,5 (1. NUTS level 1 is equal NUTS level 2 in Latvia's case; 2. as in Latvia the administrative territorial reform is going on there is no legally defined boundaries of NUTS 3. for the present statistical regions are created in CSB on this level)	1:500.000	Administrative level	Yes, population census data Link = code of administrative territory	Owner of data Free public	Envirotech Every year
Cities The capital city and cities under state jurisdiction (total 7 cities)	1:500.000	Administrative level	Yes, population census data Link = code of administrative territory	Owner of data Free public	Envirotech Every year

All data sets are in Transverse Mercator projection (Datum: GRS-80; spheroid: GRS-80).
No metadata available for the data sets

Conclusion

Very little GIS-expertise. GI and GIS used for thematic mapping and data analyses.

NMA

Organisation details

Main activities: Registers, Cadastre, and Production of Geographic Information.
Use of GIS planned for the end of 2001.
Formal co-operation with the National Statistical Institute.
The National Mapping Agency is responsible for Nomenclature of spatial data.
There is formal co-operation on GI/GIS issues with other institutes.

GIS hardware and software environment

Software	Platform	Number of licenses
Microstation GeoGraphic (Bentley)	NT	16
GeoMedia V.4.0 (Intergraph)	NT	3 1 office 2 region
ArcView V.3.2a ESRI	NT	12 4 office 8 region

Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Administrative border	1:25.000	Administrative level	No	Owner of data Free public	Yes When necessary
districts, parishes, republic cities.	1:50.000	Tiles	No	Owner of data Free public	Yes When necessary
Altimetry ital elevation model	For 1:10.000 orthophoto 20 m grid	Tiles	No	Owner of data Commercial public	Yes Every 6 years
Contour lines	1:50.000	Tiles	No	Owner of data Commercial public	Yes When necessary
Hydrography he topographic map	1:10.000	Administrative level Tiles	No	Commercial public	Yes Every 6 years
anals, water bodies	1:50.000	Tiles	No	Owner of data Commercial public	Yes When necessary
: road, railways, ...	1:50.000	Tiles	Yes Link to road characteristics	Owner of data Commercial public	Yes When necessary
Buildings	1:50.000	Tiles Others	No	Commercial public	Yes When necessary
nplified topographic map	1:10.000	Tiles Administrative level	No	Commercial public	Yes Every 6 years

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Thematic data					
nplified topographic map	1:10.000	Tiles Administrative level	No	Commercial public	Yes Every 6 years
pelines, oil pipelines	1:50.000	Tiles	Yes Link to voltage (power lines)	Owner of data Commercial restricted	Yes When necessary
Land resources nplified topographic map	1:10.000	Administrative level Tiles	No	Commercial public	Yes Every 6 years

All data sets are in Transverse Mercator projection (Horizontal Datum: WGS-1984, Vertical Datum: Baltic System = Kronstadt Gauge; spheroid: WGS – 84; parameters: Central meridian 24`00` E, Scale Factor 0.9996)

Metadata (Internal standard, description of cartographic data coding of objects) are available for internal use and for the public.

Conclusion

GIS-expertise present, GIS used for Data capture, Data visualisation, Data analysis, Cartographic production and Thematic mapping. Use of GIS starting end of 2001. Owner of several data sets.

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LITHUANIA

NSI

Organisation details

Main activities: Censuses, Registers, and General statistics
GIS used since 1997.
Formal co-operation with the 'State Land Cadastre and Register' Institute but not with the National Mapping Agency.

GIS hardware and software environment

Software	Platform	Number of licenses
ArcView 3.2	NT	-
Map Object	NT	-
NT ArcInfo	NT	-

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Counties		Administrative level	Yes Link = county code	Owner of data Commercial public	No
District municipality	1/200.000	Administrative level	Yes Link = district code	Owner of data Commercial public	No
Rivers	1/200.000	**Sampling plots**	No	Owner of data Commercial public	No
Lakes	1/200.000	**Sampling plots**	No	Owner of data Commercial public	No
Roads	1/200.000	Administrative level	No	Owner of data Commercial public	No
Railways	1/200.000	Administrative level	No	Owner of data Commercial public	No
Thematic data					

All data sets are in LKS 94 projection (spheroid : GRS-80).
The metadata is available for public use and is built up according to the ISO TC211 standards.

Conclusion

Limited GIS-expertise. Owner of several data sets. GI and GIS used for thematic mapping, data modelling, data analyses and on-line publications.

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NMA

Organisation details

Main activity: production of geographic information.
GIS used since 1996.
No formal co-operation or task division with the National Statistical Institute.
National Mapping Agency is responsible for Nomenclature of spatial data.
No formal co-operation with the 'State Land Cadastre and Register' Institute.

GIS hardware and software environment

Software	Platform	Number of licenses
Arc/Info		12
ArcView		8

Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Administrative boundaries	1:50.000	Tiles	No	Owner of data Commercial public	Yes
SABE	1:1.000.000	Administrative level Aggregation of other level data	No	Owner of data Commercial public	
Altimetry	1:50.000	Tiles	No	Owner of data Commercial public	Yes
GBD200	1:200.000	Tiles	No	No GIS-centres	No
Hydrography	1:50.000	Tiles	No	Owner of data Commercial public	Yes Every 5 years
Infrastructure	1:50.000	Tiles	No	Owner of data Commercial public	Yes Every 5 years

Data set LTDBK5000 is in TM projection (axial meridian Lo=24 degree, mo = 0.9996, datum: ETRS co-ordinate system, spheroid: GRS80 ellipsoid)
Data set GDB200 is in TM projection (axial meridian Lo=24 degree, mo = 0.9998, datum: LKS-94 local co-ordinate system, spheroid: GRS80 ellipsoid)
Data set SABE is in UTM-projection (axial meridians Lo=21 and 27 degrees, mo = 0.9998, WGS-84 co-ordinate system, spheroid: WGS84 ellipsoid).
Internal Metadata are available in text form.

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Conclusion

Intensive use of GIS since 1996.
GIS used for data capture and editing, data visualisation, data analysis, cartographic production and thematic mapping

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POLAND

NSI

Organisation details

Main activities: Censuses, Registers, and General statistics
GIS used since 1994.
No formal co-operation with the National Mapping Agency but intention to establish institutional co-operation with the Head Office of Geodesy and Cartography this year.
National Statistical Institute is responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
AVISO	NT	7
MapInfo	NT	7

Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Administrative boundaries	-	Administrative level	-	For internal use	MapInfo Poland
Administrative boundaries	-	Administrative level	-	For internal use	NMA
Thematic data					

Conclusion

Little GIS-experience. GIS only used for data visualisation.

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NMA

Organisation details

Main activities: cadastre, topographic and thematic maps.
GIS used since the eighties.
Informal co-operation with the NSI, currently in the process of being formalised.
National Statistical Institute is responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
Microstation	NT	2
MapInfo 5.0 Professional	NT	1
MapInfo 6.0	NT	2

Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Administrative boundaries	1:50.000	Administrative level	Yes	Owner of data Commercial public	Yes Every year
Hydrography	1:50.000	Administrative level	No	Owner of data Commercial public	No
Topographic map	1:10.000	Administrative level	No	Owner of data Commercial public	No
Thematic data					
Environment	1:50.000	Administrative level	No	Owner of data Commercial public	No
Nature resources	1:50.000	Administrative level	No	Owner of data Commercial public	No

The data sets Hydrography, Environment and Nature resources are in Gauss-Krüger (6°) projection (Datum "1942", Spheroid : Krasowski's ellipsoid, Parameters a=6378137.00000 m, f=1: 298.257222101).

The data sets Hydrography, Environment, Nature resources and the topographic maps are in Gauss-Krüger (12°) projection (Datum: EUREF-89, Spheroid : GRS'80, Parameters a=6378245.0000 m, f=1: 298.3).

The Administrative boundaries are in Gauss-Krüger projection (Datum: EUREF-89, Spheroid : GRS'80, Parameters a=6378137.0000 m, b=6356752.3141 m, 1/298.257223563).

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Conclusion

Long tradition of GIS use.
Rather well developed GIS-expertise, mostly for data visualisation.

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ROMANIA

NSI

Organisation details

Main activities: General statistics
GIS used since 1996.
No formal co-operation with the National Mapping Agency nor with other institutes.

GIS hardware and software environment

Software	Platform	Number of licenses
ArcView	PC	3
ArcInfo	PC	1

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Counties – 41 strata, one for each county	1:1.000.000	Administrative level	Yes Link = unique key for each locality	Not owner	Yes When necessary
Commune boundaries	1:1.000.000	Administrative level	Yes Link = unique key for each locality	Not owner	Yes When necessary
Water courses & lakes	1:1.000.000	Administrative level	Yes	Not owner	No
Main courses	1:1.000.000	Administrative level	Yes	Not owner	No
European roads	1:1.000.000	Administrative level	No	Not owner	No
Railways	1:1.000.000	Administrative level	No	Not owner	No
Thematic data					
Soil erosion	1:1.000.000	Administrative level	No	Not owner	No

The county, commune, water & lakes, road, railway data sets are all in Stereo 70 projection (Spheroid: Krasowski)

Conclusion

Little GIS-experience. Use of GI and GIS for thematic mapping and data analyses

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NMA

Organisation details

GIS used in organisation.
No formal co-operation on GI/GIS issues with the National Statistical Institute.
Formal co-operation on GI/GIS issues with DTM.
GIS used for data capture and editing, cartographic production and thematic mapping.

GIS hardware and software environment

Software	Platform	Number of licenses
Microstation	NT	8
Autodesk Map	NT	5

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Administrative boundaries	1:500.000 1:25.000	Administrative level	Yes Key = SIRUTA	Internal restricted	Yes When changes occur
Cadastral parcels	Variable, large scale		Yes Key = parcel-ID	Internal restricted	No
Altimetry, Contour lines	1:25.000		No	Internal restricted	No
Hydrography, River network and lakes	1:25.000	Watershed level	No	Internal restricted	No
Hydrography, River network and lakes	1:500.000	Watershed level	No	Internal restricted	No
Roads and railway infrastructure	1:25.000		No	Internal restricted	No
Roads and railway infrastructure	1:500.000		No	Internal restricted	No
Control points	NA	Sampling plots	No	Internal restricted	No

Conclusion

Well developed GIS expertise.
Use of GIS for data capture and editing, cartographic production, data visualisation and data analysis.
Very restricted use of data sets

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SLOVAK REPUBLIC

NSI

Organisation details

Main activities: Censuses, Registers, and General statistics
GIS used since 1990.
Formal co-operation with the National Mapping Agency.
National Statistical Institute is responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
ArcView	NT	2
ArcISM	UNIX	1
SDE	UNIX	1

Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Administrative boundaries	1:50.000	Administrative level	Yes Link = code of area	Owner of data Internal restricted	Geodesy, Cartography and Cadastre Authority of the Slovak Republic Yearly
Thematic data					

The administrative boundaries data set is in Krovak's conform conic projection (spheroid: Bessel's ellipsoid)
The metadata is available for internal use only and is built up according to the CEN TC287 standards.

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Conclusion

Important GIS-expertise. GI and GIS used for data analyses and on-line publications.

NMA

Organisation details

Main activities: cadastre, production of geographic information.
GIS used since 1990.
Formal co-operation on GI/GIS issues with the National Statistical Institute, including division of tasks.
Formal co-operations in solving the projects of common interest with other state bodies, in particular with the SR Ministry of Agriculture, SR Ministry of Justice, SR Ministry of the Interior, SR Ministry of Transport, Posts and Telecommunications, SR Ministry of Environment and SR Statistical Office for Standardisation, Metrology and Testing.

GIS hardware and software environment

Software	Platform	Number of licenses
ArcGIS 8.1	NT	2
ArcView 3.2	NT	5
Arc SDE 8.1	NT	1

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Administrative boundaries. Seamless vector map 1:50 000 (SVM50) The spatial object-oriented database, which was created by vectorising the scanned print bases of the Basic map of the Slovak Republic 1:50 000 in the ArcInfo and ArcSDE environment. Individual features have been separated into 52 levels.	1:50.000	layers: boundary, settlements, roads, railroads, cableways, hydrography, land cover, contour lines, geographical names. f other level data.	Yes. Each layer is linked to its own attributes	When owner of data: Commercial public. When not owner of data: copyright, the digital products are distributed by agreement with customers. Customers are forbidden copying and supplying to third parties.	Yes Irregular, approximately every 5 years.
Basic Map SR 1:10 000 in raster form, which was created by scanning the print bases of the Basic map of the Slovak Republic 1:10 000.	1:10.000	5 Layers	No	When owner of data: commercial public. When not owner of data: copyright, the digital products are distributed by agreement with customers. Customers are forbidden copying and supplying to third parties.	When needed

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Internal metadata available.
Formal metadata standard: CEN TC287.
The SVM 50 and the ZM 10 R data set is in Krovák's conformable conical projection in general position (Datum: Unified Trigonometric Cadastral Network (S-JTSK), Bessel´s ellipsoid, Parameters a = 6 377 397.155 08 m and f = 1:299.152 812 853 where "a" is the length of main semiaxis and "f" is the flattening).

Conclusion

Very well developed GIS expertise.
Use of metadata standards and differentiated accessibility procedures.
GIS used for data capture and editing, data visualisation, data analysis, cartographic production. Multi-user accesses to databases.

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SLOVENIA

NSI

Organisation details

Main activities: Censuses, **Registers**, and General statistics, Production of Geographic Information
GIS used since 1990.
No formal co-operation with the National Mapping Agency, or other institutes. Long tradition of informal co-operation.
NMA is responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
Imagine 8.4	UNIX	2
ArcInfo 6.1.2	UNIX	1
MapInfo 6.0	NT	4

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Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
NUTS regions (all levels from NUTS0 to NUTS5 plus SKTE6 to SKTE9)	1:5.000	Administrative level	Yes	Owner = NMA Free for public sector, otherwise commercial	NMA Daily
DEM (grid)	100mx100m	-	No	Owner = NMA Free for public sector, otherwise commercial	No
Water bodies	1:5.000	Tiles	No	Owner = Ministry of Environment and Spatial Planning	No
Roads	1:5.000	Whole country	-	Owner = Ministry of Environment and Spatial Planning	Ministry of Environment and Spatial Planning
Railways	1:5.000	-	-	Slovene railways	No
Register of digitised house numbers	-	Whole country	Yes Link = codes of roads, cities, admin. Units	Owner = NMA Free for public sector, otherwise commercial	NMA Daily
Thematic data					
Dump site locations	-	-	-	Owner = Ministry of Environment and Spatial	Ministry of Environment and Spatial Occasionally
Locations of gravel pits	-	-	-	Owner = Ministry of Environment and Spatial	-
Business register	-	-	Yes Link = co-ordinates of house number	Owner of the data Free public	NSI Daily
LU/LC GIS of Slovenia	In conformance to the satellite imagery used	Tiles	No	Owner of the data Free public	NS 4 years

All data sets are in Gauss_Krueger projection (datum: Bessel; spheroid: Bessel).

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Metadata is available for public use and is built up according to the CEN TC287 standards.

Conclusion

Very well developed GIS-expertise. Owner of few data sets. Use of GI and GIS for thematic mapping and for data analyses

NMA

Organisation details

Main activities: **Registers**, Cadastre
GIS used since 1996.
Formal co-operation with National Statistical Institute and with GEODETIC Institute.
NMA is responsible for Nomenclature of spatial data.

GIS hardware and software environment

Software	Platform	Number of licenses
ArcInfo 7	UNIX	2
ArcInfo 2.1	NT	3
ArcView 2.1, 3.0 SDE 3.0 MapObject 1.2 IMS	NT	**25**
Spatial Units Applications	NT	Unlimited
AGIS	NT	Unlimited

Digital geographic data

Data set	Scale	Data storage	Link to descriptive data	Accessibility	Updating
Topographic data					
Register of spatial units	1:5.000 1:25.000	Administrative level	Yes Link = ID-number	Owner of data Commercial public	SMA Daily
Digital terrain model	GRID 25x25m GRID 100x100m	Administrative level Tiles	No	Owner of data Commercial public	Private companies 6 years
Hydrography Basic topographic maps National topographic maps General maps (images)	1:5.000 1:25.000 1:50.000 1:250.000	Tiles	No	Owner of data Commercial public	SMA (not 1:5.000) 3-8 years
Hydrography Generalised cartographic database (vector)	1:25.000	Tiles	Yes	Owner of data Commercial public	SMA 6 years

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Infrastructure Basic topographic maps National topographic maps General maps (images)	1:5.000 1:25.000 1:50.000 1:250.000	Tiles	No	Owner of data Commercial public	SMA (not 1:5.000) 3-8 years
Infrastructure Generalised cartographic database High accuracy topographic database (vector)	1:25.000 1:5.000	Tiles (Gen. Cart. Database) Administrative level (high accuracy topographic database)	Yes	Owner of data Commercial public	SMA 6 years
Register of geographical names	1:5.000 1:25.000 1:250.000	Tiles	Yes Link = ID-number	Owner of data Commercial public	SMA Daily
Digital ortophoto maps (image)	Image: 0.5 m pixel size Prints: 1:5.000	Tiles	-	Owner of data Commercial public	SMA 6 years
Cadastral maps (scanograms) (image)	200 or 300 dots per inch	Administrative level	No	Owner of data Commercial public	No
Digital cadastral maps Database of buildings	-	Administrative level	Yes, all type of data: parcel number, area, cadastral culture and class, owner (first, second name and address)	Owner of data Commercial public Commercial restricted	SMA Daily

Conclusion

Very well developed GIS-expertise. Owner of several data sets. Intensive use of GI and GIS for cartographic production, data analyses and for on-line publications.

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Original: **EN**

Meeting of the Workshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Mission report of the visit to the NMA and NGI of Poland and Romania

Working document concerning item 3 of the agenda of the meeting

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Mission report of the visit to the NMA and NGI of Poland and Romania

T. Steenberghen, D. Vandenbroucke

Foreword

This report combines the findings of two missions – for which we want to thank the NSIs and NMAs of both Poland and Romania - made within the framework of the "Preparation of a Workshop on GIS". The purpose of the missions was to gain in-depth understanding of the use of GIS in mapping agencies and statistical institutes of candidate countries. Meetings and interviews during the missions were based on a checklist of issues to be considered. These issues were aimed at more detailed information than the questionnaire which was sent to all the statistical institutes and mapping agencies of the 10 countries involved. The results of these questionnaires are presented in a separate working paper: "Questionnaire on the use of GI and GIS in the NSIs and NMAs of the Candidate Countries; Analytical report".

	National Statistical Institute (NSI)		National Mapping Agency (NMA)	
Poland	CSO	Central Statistical Office	HOGC	Head Office of Geodesy and Cartography
Romania	INSSE	National Institute for Statistics and Economic Studies	NOCGC	National Office of Cadastre Geodesy and Cartography

Table 1: NSIs and NMAs in Poland and Romania

1. Main differences and similarities between the statistical institutes and the mapping agencies in Poland and in Romania

The extent and the intensity of the use of GI and GIS are different in both countries. In Poland, different institutes have a lot of experience and/or knowledge about the use of GI and GIS. The Head Office of Geodesy and Cartography is using different GIS software packages. The Institute of Geodesy and Cartography used to have privileged access to high - resolution Russian satellite images and developed expertise in remote sensing and GIS. The Central Statistical Office used EU-funding (Phare 98 project) to perform a needs assessment and (Phare 2000) to develop a central unit in charge of central services and data bases for GIS, while 7 standalone desktop GIS stations are already operational at CSO for data dissemination, and agriculture and environment statistics. The Romanian institutes started using GIS later, and the use of GIS is rather limited and suffers from limited financial and human resources. However, taking into account these constraints, the NOCGC is carrying out some interesting GIS projects, mainly for local authorities, while they also defined as one of the main objectives to build a complete digital data base based on the existing topographic maps. The NSI is still focusing on statistical mapping but has the ambition to go further and use GI / GIS to prepare censuses.

1.1. NSI

In both countries, the statistical institutes use GI/GIS in the traditional way, i.e. for statistical mapping, to be published in their respective yearbooks. The only overlays performed are visual overlays of statistical data with topographic map elements in Romania, and also with other layers such as soils and crops in Poland. The Polish Central Statistical Office has plans for more elaborate analyses such as the combination of the new census data with information from other GI sources such as crop data derived from satellite imagery.

In Romania, the NSI relies on a commercial supplier (ESRI-Romania) for their basic administrative boundary data base. The quality of these data is uncertain. The current version was released in 1996 to the NSI, probably based on an even older situation and many errors were detected. In Romania errors were eliminated as best as possible based on own knowledge, but not as a consequence of standardised Quality Control procedure. The NSI did not really focus on this issue since the data are only used for statistical mapping at a small scale. Also the problem of the updates of the basic data sets seems to be unresolved. This is done by the NSI itself based on information from local authorities. In Poland, the procedure to make changes to administrative boundaries is clearly defined. The Head Office of Geodesy and Cartography adapts the boundary maps, and the official nomenclature of administrative boundaries. The Central Statistical Office is responsible for the codes and the link with statistical data. Digital boundary maps are provided by the Head Office of Geodesy and Cartography to the Central Statistical Office for internal use. Up to now, the collaboration for data exchange between both institutes was informal. Formal data exchange procedures are currently being prepared.

For both Poland and Romania, besides the typical demography – population data and their application, the agricultural and environmental information seems to be of utmost importance. This condition is similar to the one in the European Commission, where DG AGRI, DG ENV and the Environmental Agency are extensive users of GI and GIS.

A more detailed analysis of the way the administrative data are subdivided and the nomenclature is used, is required before making a comparison. Romania is using administrative boundaries that are comparable to the NUTS 1, 2, 3 and 5 levels. In Poland as well, the statistical units have been brought in line with the NUTS levels used by Eurostat. Here, the NUTS 4 level ("Powiats") play an important role. On the other hand Romania seems to have made a subdivision for their most detailed NUTS 5 level which define the build-up areas and makes a possible link to the localities data. It consists in a typology of the urban areas.

The main users of GI data are the Ministries (they are also linked to them formally). Both in Poland and Romania the number of external users of GI seems to be rather limited (more internal use).

1.2. NMA

Both the NMA of Romania and Poland are huge and traditional mapping organisations.[4] They have an administrative structure more than a data - oriented structure. In both countries local entities or representatives are responsible for data gathering, field control and the like. The departments are more oriented towards data issues in Poland than is the case for Romania (e.g. committee for standardisation issues). Overall they are still much oriented towards traditional mapping, although the Romanians focus since some time on data base production, not with the major aim to publish paper maps, but for specific GIS projects. The aim is to end up with a digital version of the traditional topographic maps.

The NMA of Romania went through an important period of restructuring. Also in Romania, there exist within another Ministry another department dealing with topographic data (Military Department of Topography - DTM). In Romania the construction of the cadastral data base take an important part of the activities.

In Poland, the duty of the Surveyor General of Poland (supported by the Head Office of Geodesy and Cartography) includes a number of tasks which are not generally part of a mapping agency's responsibilities. Such special duties include:

- the elaboration of principles concerning technical and organisational preparations for a cadastre and the co-operation in its creation;
- the initiation of scientific and research and development work concerning organisational and technical standards and the use of information technology;
- the grant of professional entitlements (licenses) in geodesy and cartography;
- the elaboration of principles of consultation concerning the location of planned networks (systems) of land technical utilities.

Also important is the mapping agency's responsibility in managing matters connected with geographic onomastics including the national register of geographical names. The results of performing these tasks is a vast expertise in different aspects of GI and GIS.

[4] They are not comparable with some of the big NMAs like IGN-France or the Ordnance Survey, nevertheless they are important parts of their respective Ministries.

The NMA of Romania works more 'on demand' for local authorities and other users. These users want complete integrated data bases for land planning purposes. Therefore they do not use thematic and statistical data, but topographic information, parcel boundaries, etc. Also, the focus on the links (key) to other data bases is weak. The NMA of Romania is not a user itself, as is (to some extent) the case for Poland.

There is a better tradition of collaboration between the NSI and the NMA in Poland than there is in Romania. This is an important asset for the Polish NSI to start implementing the GIS goals set forth in the needs assessment study.

There is no cost recovery policy in Romania, while there is one in Poland.

2. Important issues to consider concerning GI and GIS in Poland

2.1. The use of GIS at CSO

With the further implementation of the Phare '98 project, other uses will evolve.

Currently GIS is used:

- as maintenance instrument of administrative data bases. This is mainly a task of the Head Office of Geodesy and Cartography.. However, the data collection and aggregation of those boundary maps is based on CSO's territorial register. Address information is included in CSO data. These data are updated, and are related to the territorial units. Some of the maps used by CSO are provided by the MapInfo supplier, and are used without major changes. The regulation on new Powiats, that will enter in effect on January 2002 will require updates of these maps;
- for arithmetical manipulations and to generate statistical aggregate data from geographical details. This happens to a limited extent in the Agriculture and Environment Statistics Division;
- for the production of map based presentations, which is currently the main use;
- for easier user access to the data. This is currently not implemented. This need for use of digital maps for data access by the users will be considered in the new agreement currently in preparation.

2.2. Geographical units and nomenclature

This issue is the responsibility of the Head Office of Geodesy and Cartography. Software for maintenance and update of the nomenclature data base was developed in the past. The boundaries are updated separately in GIS. The need for update of the nomenclature software may result in the use of GIS for both the boundary maintenance and the nomenclature maintenance, but currently, both are used separately.

2.3. The issue of data ownership

Data exchange between NSI and NMA

The commercial and statutory role of the organisation that owns the data is an issue related to the wider utilisation of geodata that hasn't been resolved. Aside from the boundary map and the maps used for agricultural statistics, no other digital maps are received from other institutions. When new digital data will become available from other institutions, the individual department of CSO dealing with these statistics will examine the conditions for use. The GIS centre in Łódź will focus on the technical conditions, CSO Warsaw on the organisational issues. Due to the small scale of use of digital map data by CSO, gentlemen agreements were sufficient so far. With increased use and complexity of use, legal arrangements will be made, when necessary.

CSO has a license from the Head Office of Geodesy and Cartography for unrestricted internal use. This does not include privileges for distribution in digital form (except .pdf). An agreement is currently being prepared on this issue.

Cost Recovery

General indicators are made accessible free of charge. Other data can be acquired by external users, when they pay for a subscription. A similar approach will be worked out for geodata.

Legal basis for protecting ownership of data

With commercial data suppliers, there have been cases where they searched customers and pre-closed on the market before CSO. Sometimes the data sold with profit are based on the official statistics. So far, CSO has not placed any restriction as to the scope of utilisation of the official statistics.

2.4. GI characteristics of boundaries

This is essentially the responsibility of the Head Office of Geodesy and Cartography.

The boundary data are at a 1/50.000 scale, and exceptionally at 1/10.000. The regional data are disseminated based on the administrative division, at a scale of 1/100.000. Aside from the standard administrative levels, 2 centers have a pilot application where statistics for cities are published at 1/10.000 and 1/20.000.

Versions of boundaries: New towns (settlements) are created through formal approval by the Council of Minister. This results in annual changes in the boundaries of Gminas.

A 3 level structure started in 1999. Since then there have been no changes of the units. After two years, there will be an evaluation. The number of Voivodships will stay. In January 2002 the number of Powiats will change.
When substantial changes occur (such as in 1999), time series are recalculated. Most time series go back to 1995 but demographic recalculations to 1990.

Changes to spatial statistical units

The data exchange system has not been finalized. Currently the boundary maps used by CSO are not systematically the boundary maps from the Head Office of Geodesy and Cartography.

2.5. Organisational framework

There is an agreement on national scale that regulates the interaction Voivodship-CSO.

There is local co-operation between the NMA and the NSI, but this is not on paper. Informal co-operation at voivodship level varies. Good examples are Poznan, Łódź, Krakow, Wroclaw.

3. Important issues to consider concerning GI and GIS in Romania

3.1 The use of GIS at INSSE
The use of GI and GIS at the INSSE is still in a preliminary phase. GIS is mainly used for statistical mapping.
Statistical mapping is based on data coming from the different thematic departments who give their data in different formats to the GIS service of the INSSE (spreadsheets, etc.). This service is linking this information to their basic administrative layer to produce choropleth maps, pie-chart maps, etc.
The statistical data are not integrated in one comprehensive data base system as is the case in EUROSTAT for the REGIO and SIRE data bases.
The GIS service acts thus as a central service to their potential clients (departments). This situation is comparable to DG AGRI where the GIS service is also mainly a central service.
Aggregation of statistical data from a detailed to a more generalised level is not often done.

3.2 Geographical units and nomenclature
The INSSE is not dealing with spatial data gathering, but relies completely on the data that were obtained from their provider ESRI. Errors were eliminated, but there is no activity to document these

changes. This makes it difficult to track changes over time. Luckily, the administrative data that are used most by the INSSE do not often change and the nomenclature is fixed with the use of the SIRUTA codes. Since the NOCGC is building all its data layers starting from the topographic maps which were mainly printed in the eighties, and since changes were also carried out by the NOCGC itself, one can say that the administrative data bases in the NSI and the NMA of Romania are similar but not identical. It would be interesting to compare both.

3.3 The issue of data ownership

Up to now there was no data exchange between the NMA and the NSI. This could be an important point to be considered for the future. The data base developed by the NOCGC is owned by the NOCGC, so it should be possible to use this as a starting point. It is also clear that both institutes could benefit from collaboration with the DTM, the third institute playing a role of data gathering and (probably) data use. There could be a division of tasks where the NOCGC concentrates on the gathering and updating of the spatial data, while the INSSE could focus on the updates of the nomenclature (SIRUTA coding).

Since the INSSE did receive the data free from ESRI for internal use only, these data are not owned by the INSSE and there is no cost recovery policy. The data from the NOCGC could be distributed amongst users, but also there, there is no cost recovery policy yet. The specific projects for the end users (like the local authorities) are financially covered by the users themselves (this is the case for the more detailed data bases).

3.4 GI characteristics of boundaries of the NMA data base

Since the administrative data base of the INSSE is a snapshot at a specific time, and can't be used broader than the INSSE itself in the future, the administrative data base of the NOCGC could be used as the starting point. Another reason is that the higher level of detail than in the NSI data base. The administrative boundaries are at scale 1/50.000, as is the case for the roads and railways, the river network, etc. The elevation contour lines are at scale 1/25.000 with a contour interval of 20 meter. At the same time a version at scale level of 1/500.000 does exist.

The data are in several formats DWG, DGN, DXF and ASCII, so conversion to other systems should not pose major problems (INSSE is working with ESRI products, while the NOCGC is working with MicroStation, Intergraph and AutoDesk products).

3.5 Organisational framework

One of the positive impacts of the mission to Romania, is that it may have accelerated the collaboration between the NSI and the NMA. Of course this collaboration is not formal, neither is there already a form of data exchange. But this could follow. Maybe one way to this would be the collaboration within a Phare project. This could help both parties in defining a co-ordinated effort with the practical objective of solving the problem of the one and integrated administrative data base. The example of Poland shows also that via very specific projects, one can obtain concrete results.

ANNEX 1
MINUTES OF THE MEETING WITH THE NMA OF POLAND

OUR REFERENCE /TS/322015/MNPL23082001.DOC
LEUVEN, 2001-12-26

CONCERNING Minutes of the visit on 23/08/2001 to the Head Office of Geodesy and Cartography, mission for "Preparation of the workshop on statistics and GIS, Eurostat 24/10/2001"

PARTICIPANTS Mr. Krzysztof Maczewski, vice president of the Head Office of Geodesy and Cartography of Poland.
Mrs. Thérèse Steenberghen, consultant for EUROSTAT and project leader for the preparation of the workshop.
Mrs. Ewa Malanowicz, Independent Post for European Integration Matters.
Mrs. Teresa Lubowicka, Chief Specialist Department of Real Estate Cadastre.
Mrs. Teresa Dąbrowska Department of State Geodetic and Cartographic Resources.
Prof. Dr. Andrzej Ciolkosz, Dr. Elzbieta Bielecka, Institute of Geodesy and Cartography.
Mr. Bogdan Lesiak, Mrs. Ewa Szustak, Observers Central Statistical Office.
Mr. Jerzy Karpiuk interpreter.
Mrs. Stanisława Suchowera - Chief Specialist Department of Cartography, Photogrammetry and Spatial Information Systems.

Agenda

1. Welcome and adoption of agenda
2. Introduction about the purpose of the visit
3. Overview of the geodesy and cartography services
4. Discussion
5. Conclusions, suggestions for the report
6. Visit of the institute

1. Welcome and adoption of agenda (Mr. Krzysztof Maczewski)

Mr. Krzysztof Maczewski, vice president of the Head Office of Geodesy and Cartography of Poland, introduces and welcomes the participants to the meeting.

The agenda is approved.

2. Introduction about the purpose of the visit (Mrs. Thérèse Steenberghen)

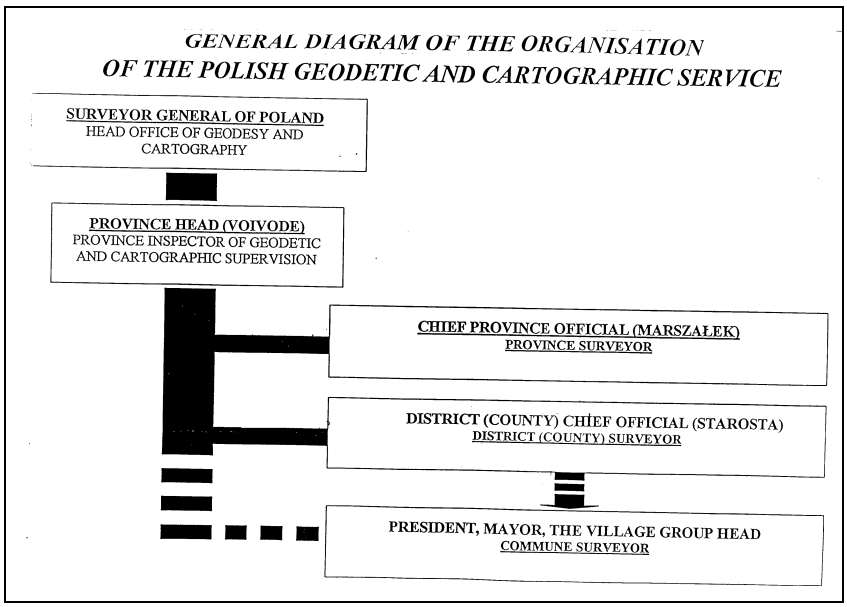
Mrs. Thérèse Steenberghen thanks Mr. Maczewski and the participants for the reception and the arrangement for interpreter service. She explains the purpose of the meeting based on the checklist of issues to be considered during the visit:

- The use of GIS at the Head Office of Geodesy and Cartography;
- Geographical units and nomenclature in Poland;

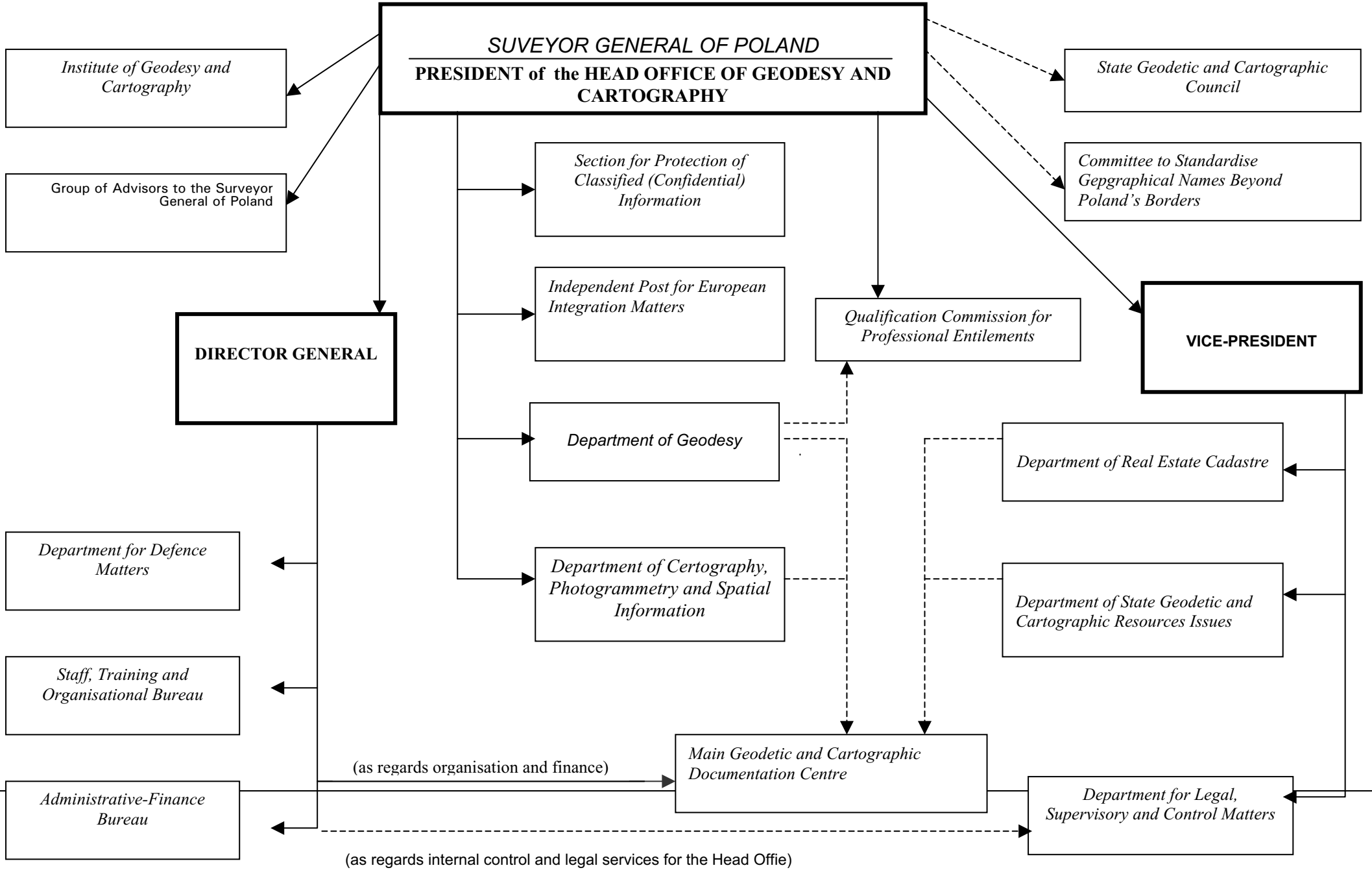
- Issues of data ownership of geo-data;
- GI characteristics of boundaries;
- Process by changes in spatial statistical units (nomenclature and boundaries);
- Data dictionaries;
- Potential sources of information;
- Institutional framework;
- Organisational framework.

3. Overview of the geodesy and cartography services

3.1. Organisational structure of the Head Office of geodesy and cartography (Mr. Krzysztof Maczews



The Head Office receives the data from the province inspector of geodetic and cartographic supervision. These data are provided by the province surveyor and the district (county) surveyor. Remark: the district (county) surveyor is associated with the local government.


SUVEYOR GENERAL OF POLAND
PRESIDENT of the HEAD OFFICE OF GEODESY AND CARTOGRAPHY
Institute of Geodesy and Cartography
Group of Advisors to the Surveyor General of Poland
State Geodetic and Cartographic Council
Committee to Standardise Gepgraphical Names Beyond Poland's Borders
Section for Protection of Classified (Confidential) Information
Independent Post for European Integration Matters
Qualification Commission for Professional Entilements
DIRECTOR GENERAL
VICE-PRESIDENT
Department of Geodesy
Department of Real Estate Cadastre
Department for Defence Matters
Department of Certography, Photogrammetry and Spatial Information
Department of State Geodetic and Cartographic Resources Issues
Staff, Training and Organisational Bureau
(as regards organisation and finance)
Main Geodetic and Cartographic Documentation Centre
Administrative-Finance Bureau
Department for Legal, Supervisory and Control Matters
(as regards internal control and legal services for the Head Offie)

Under the terms of the amended Act of the 17 May 1989 “Geodetic and Cartographic Law”, after introduction of the reform of state administration in Poland, as of 1 January 1999 the **geodetic and cartographic service** comprises:

organs of geodetic and cartographic supervision:

- Surveyor General of Poland,
- province heads (voivodes) performing tasks with the assistance of province inspectors of geodetic and cartographic supervision,

bodies of geodetic and cartographic administration:

- Chief province officials (marszałek) performing their tasks with the assistance of province surveyors,
- chief county (powiat) officials performing their tasks with the assistance of county surveyors.

The Surveyor General of Poland is the central body of government administration appropriate for issues of geodesy and cartography, who performs his tasks with the assistance of the Head Office of Geodesy and Cartography (please find attached the diagram of the structure of our office in my e-mail). The Surveyor General is supervised by the minister appropriate for matters of architecture and construction. As the result of reorganisation, as of 20 June 2000, issues of geodesy and cartography are situated in the government administration section: architecture and construction in the newly created Ministry of Regional Development and Construction. In this manner, the Surveyor General of Poland earlier subordinated to the Minister of Internal Affairs and Administration is presently supervised by the Minister of Regional Development and Construction.

The Surveyor General of Poland performs tasks defined in the Act of the 17 May 1989 “Geodetic and Cartographic Law”:

1. supervises how the national policy in geodesy and cartography is implemented,
2. performs the function of a body of superior ranking in the comprehension

   of the administrative procedures code in relation to province inspectors of geodesy and cartography supervision, and also monitors and supervises their activities,
3. manages the central geodetic and cartographic resources and makes use of the finances of the Central Management Fund of Geodetic and Cartographic Resources, establishes basic geodetic, gravimetric and cartographic networks,
4. elaborates principles concerning technical and organisational preparations for a cadastre and co-operates in its creation,
5. manages the national register of borders and areas of the Republic of Poland and of individual provinces,
6. initiates scientific and research and development work concerning organisational and technical standards and the use of information technology, photogrammetric and satellite methods in geodesy and cartography, and in the national land information system,
7. grants professional entitlements (licenses) in geodesy and cartography, manages a register of entitled persons and operates in conjunction with self-governing bodies and professional organisations of surveyors and cartographers,
8. drafts guidelines concerning general (mass) assessment of real estate values and supervises how this is performed,
9. co-operates with bodies of geodetic and cartographic administration when making:
   - topographic maps,
   - thematic maps,
   - photogrammetric elaboration and
   - taking photogrammetric aerial photographs of the country’s surface,
10. manages matters connected with geographic onomastics including the national register of geographical names,

11. elaborates principles of consultation concerning the location of planned networks (systems) of land technical utilities.

National Register of boundaries and surface area of land

The national register of boundaries and of the surface area of land is a central resource in Poland, maintained by the Head Office of Geodesy and Cartography. The data are provided by the Province Surveyor, and are based on the register of real property.
The division into provinces and other administrative units is decided by the Council of Ministers, by virtue of a request by a local authority. Physical registration of the boundaries is the task o the cartographic services of the Head Office.

Official names are decided by resolution of the Council of Ministers. The Head Office is currently revising the official list of names. A demonstration is foreseen during the visit of the Head Office.

The register is integrated with the register used by CSO and includes all the surface units and the statistical identification number given by CSO.

The State Boundaries are co-ordinated with neighbour countries by the border service. The permanent representative of Poland is Teresa Lubowicka.

Real estate survey

The Head Office of Geodesy and Cartography is in charge of the following tasks concerning real estate survey:

- maintenance and update of the real estate survey;
- geodetic and cartographic cadastral work;
- maintenance of state of official register of boundaries;
- evaluation of real estate values;
- information about expected evolution of the value of real estate.

Cartography, photogrammetry and spatial information systems

The Head Office of Geodesy and Cartography is in charge of the following tasks concerning cartography, photogrammetry and spatial information systems:

- specification of standard for preparation of thematic and topographic maps;
- ordering preparation of thematic and photogrammetric maps.

The Head Office of Geodesy and Cartography is in charge of the following tasks concerning geodesy:

- specification of technical and legal standards in geodesy and cartography;
- supervision of geodetic and cartographic works;
- condition of control networks;
- granting professional rights and titles to surveyors;
- legal matters.

Centre of cartographic documentation

In charge of the implementation of cartographic work.

Geodesy

In general, this centre is responsible for the tasks to be performed by the General Surveyor, more specifically, the production of topographic and thematic maps, the maintenance of the control database of topographic pictures, and of the register of territorial divisions.

Institute of Geodesy and cartography (Mr. Andrzej Ciolkosz)

The Institute of Geodesy and Cartography is no longer supervised by the General Surveyor of Poland.

The institute has 50 years of experience dealing with topographic and thematic maps using aerial photography and satellite images. Experience is very important, because for many years the institute had access to Russian satellite images, with much high resolution than American images. Example of an application: the update of the CORINE land use maps (1992). The planned update snapshot Europe 2000 for Poland includes +/- 30 land use forms.

Most work is currently performed with high-resolution satellite and air photography.

The institute needs to earn money.

Some of the products:

- For some communes, very detailed maps (1/10.000) are produced.
- For the entire country:
  - 1/100000 base maps from topographic maps;
  - crop conditions: every 10 d, information is send to CSO on crop conditions, (accuracy 1km);
  - information on soil and land use;
  - hydrography;
  - DEM;
  - protected areas (6-7 layers) at 1/500.000.

Mostly raster data, also vector data.

Publication of geodetic and cartographic data.

Software used: ARC/INFO, ArcView, Intergraph, ERDAS, MapInfo, previously own software.

Department of Cartography, Photogrammetry and Spatial Information Systems (Mrs. Stanisława Suchowera)

The main tasks of this department are:

- publication of the topographic maps (1/10.000);
- publication of thematic maps (example: environmental and hydrographic maps at 1/50.000).

Use of GIS: creation of the national database of general geographic data for the 1/250.000 maps. Examples of layers:

- administrative division;
- settlements;
- anthropogenic objects;
- hydrography;
- shape of terrain;
- transport;
- land use;
- protected areas;
- geographic names.

Both raster and vector data are produced.

Purpose and users of the database:

- general surveyor for the implementation of his statutory tasks, such as contributions to international exchange of information on Poland;
- as a basis for new additions of administrative and economic maps (1/250.000);
- tasks of the central and provincial administrations;
- contractors, scientific institutes, …;
- when more detailed data are needed than those generally available on the maps, that can be obtained on request.

The design of the new spatial database was formally approved. The development of this database is currently in progress. Expected date for completion: end of 2003.

Software used: arc/info.

State register of boundaries (Mrs. Teresa Lubowicka)

The maps of the National Boundary Register vary in accuracy. The state boundary is at the accuracy of geodetic measurements, or based on digitalisation of the topographic maps (1/10.000 and up). Currently, this work is being carried out at provincial level, based on data provided by the provinces. The provincial boundaries are planned to be completed by the end of 2001, and to be published in January 2002.

The formal surface area of the territorial divisions is collected based on the land register. These areas are approved by CSO and are official surface numbers.

This department is in charge of:

- pricing for different activities;
- data protection (copyright).

The prices are not fixed; they are based on relevant legal regulations.

Agreement on data exchange between the Head Office of Geodesy and Cartography of Poland and CSO (Mr. B.Lesiak)

Data protection arrangements are in progress. The co-operation with CSO is good, and informal. An agreement on data exchange and public statistics is close to finalisation and will formalise the data exchange procedure. This agreement includes:

- CSO provides the state territorial register and other data such as census data;
- the Head Office of Geodesy and Cartography of Poland provides the boundary maps to CSO for internal use;
- specific maps, such as the new map of the Baltic Catchment Area recently provided by the Head Office of Geodesy and Cartography of Poland to CSO.

4. Discussion

Data-ownership of geodata

The Head Office of Geodesy and Cartography works with private companies for data collection. In those cases, public procurements, tenders, technical standards, quality control and acceptance, distribution of results, … are done by the Office of Geodesy and Cartography. The contractors are obliged to submit the results of their work to geodetic centres.

Cost recovery of geodata

Companies must pay fees to use the data of the Office of Geodesy and Cartography. These fees are used to fund geodetic and cartographic resources, only for the special purpose of maintenance of geodetic and cartographic resources.

Institutional and organisational framework

Not all the data are available at the central level. Some specific data are available at province level. Different provinces have (own) different data and thematic maps.

There are some specific co-operations in place or in progress such as with the regional departments of infrastructure, and with protection of historic monuments. Such co-operation also happens at provincial level.

The General Surveyor prepared a proposition to make one GIS with the data from the entire country, and submitted this proposition to the Minister for Regional Development. The idea is to develop one centre that makes the information available for the entire country. This centre has the right to gather and sell aerial photographs, register territorial boundaries, register persons having geodetic and cartographic rights, these tasks are currently performed by the Head Office of Geodesy and Cartography.

The Real Estate Survey is organised in 373 district offices.

5. Conclusions

The minutes of the meeting will be send to Mrs. Ewa Malanowicz for revision.

The corrected version will be distributed to all the participants for approval.

This corrected version will serve as basis for the report, to be presented on the workshop on statistics and GIS, Eurostat 24/10/2001, and be added in appendix to the final report of the project.

6. Visit of the institute (Mrs. Grayn Twardowska (Director) and Mr. Slawomir Ranosz, Z-Ca Director)

Presentation of the Main Documentation Geodetic and Cartographic Centre.

This Centre has been active in the maintenance of central geodetic and cartographic resources since 1991.
Examples of the most common maps are provided (cf. 8).

Brief summary of the use if GI:

- Production of environmental maps;
- Topographic maps are prepared using digital technology. Since 2.000 pilot objects are digitally mapped. The production of vector topographic maps is in progress.
  Maps are published in raster form (through scanning of existing maps) since 1994.
- First and second class control networks. Gravimetric and magnetic control networks.
- Aerial photography (photogrammetric products) since the fifties.
- State register of boundaries: the boundaries are in MapInfo. Accuracy of the boundaries has improved this year, and is still under examination.
- Database of geographical names.

Demonstration of the revision of the official list of names for administrative units.

The names of towns, localities and physiographic elements (total approx. 17.000) have been collected from topographic maps.
Attributes include: name, local name, type (part of town, village,…), official approval status, description, population, location (centre or boundary of unit),…

This is done using own developed software, developed in 1995. This software needs to be updated in order to resolve some constraints in terms of contents and of compatibility.

Data are obtained from local authorities. The geographic co-ordinates where obtained through scanning of maps. The names are located on the map at the centre of the location.

The resulting list of names will be included in the topographic database, and be accepted as the official list of names after control by the Committee in charge of the official names.

Demonstration of the State Boundary Register.

This demonstration illustrates the establishment of a template for the boundary register f provinces districts and communes. The boundary data are based on field measurements (1:5.000). Separate tables are produced:

- Nodes: where 3 boundaries connect, table of co-ordinates, ID;
- Indirect points: number of lines between nodes, line Ids (conform with Ids used by CSO), start and en node.
- Land register: geodetic area per unit (this is the official surface area, can not be changed unless there is a change in administrative boundary).

The state boundaries are in Map Info. The map includes: boundaries and surface.

Thematic maps:

- 4 types of communes: without town, with both rural and urban area, with only urban area, town district (only in Warsaw);
- map of the difference between the official surface and the surface computed from the map (detect boundaries where there may be some doubts about accuracy);
- register maps from specific data collected in the field.

THESE DATA ARE INCLUDED IN THE SABE DATABASE.

Summary of the procedure for boundary changes: the boundaries are maintained by the General Surveyor. The District Head delivers the boundaries to the Provincial unit inspector. The inspector provides the data to the central office.

Scanning unit.

Mostly cadastral maps. Some cities have digital cadastral maps.

DTM pilot project.

7. Action points

- Minutes of the meeting (Mrs. Thérèse Steenberghen)
- Revision of the minutes (Mrs. Ewa Malanowicz)
- Correction of minutes (Mrs. Thérèse Steenberghen)
- Distribution of minutes to participants (Mrs. Ewa Malanowicz)
- Approval of the minutes (participants)
- Mission report to be presented during the workshop (Mrs. Thérèse Steenberghen)
- Fill in questionnaire (Mrs. Ewa Malanowicz)

8. Documentation received

Documents

Diagram of the organisation of the Polish Geodetic and Cartographic Service.

Organistional Diagram of the Head Office of Geodesy and Cartography.

Description of the geodetic and cartographic service (organsiation and main tasks) under the terms of the amended Act of the 17 May 1989 “Geodetic and Cartographic Law”, after introduction of the reform of state administration in Poland, as of 1 January 1999.

GUGiK, Polish official cartographic publications, Warsaw 2000/2001, Brochure.

CODGiK, Centralny Ośrodek Dockumentacji Geodezyjnej I Kartograficznej, Warsaw 2001. Brochure.

Maps

Topographic map 1:50.000, example of Zakopane (M-34-100B), 1998.

Topographic map 1:10.000, example of KrakÓw (M-34-64-D-d-2), 1997.

Administrative boundaries 1:750.000, 1999. Including booklet with names of administrative units and location indication.

Hydrography 1:50.000, example of Oborniki ŚL. 1997.

Geologic map 1:50.000, example of ŁÓdź. 1993.

Aerial photography

Orthophoto map 1:1.000, example of Czestochowa-Jasna Góra. 1996.

Misc.

Screendumps with the attributes of the State Register of Boundaries.

ANNEX 2
MINUTES OF THE MEETING WITH THE NSI OF POLAND

OUR REFERENCE LEUVEN,	/TS/322015/MNPL24082001.DOC
CONCERNING	Minutes of the visit on 24/08/2001 to the Central Statistical Office, mission for „Preparation of the workshop on statistics and GIS, Eurostat 24/10/2001"
PARTICIPANTS	Mr. Tomasz Pawlak, Head of POLSTAT Unit (BOI). Mrs. Thérèse Steenberghen, consultant for EUROSTAT and project leader for the preparation of the workshop. Mrs. Halina Dmochowska, Director, Analysis and Aggregate Statistics Division, GUS DAOZ. Mr. Bogdan Lesiak, Chief Specialist, Computing Service Bureau, Computing Technology Development Section BOI. Mrs. A. Stegawska, GI specialist, Computing Service Bureau. Mr. T. Kopczyński, Head of the Section, Computing Service Bureau. Mr. A. Graboś, Programmer, COID Ĺódź. Mr. R. Jabłoński, Programmer, COID Ĺódź. Mr. Victor Pierre Morales, BIE, INSEE (France). Mrs. U. Paleczna, Head of the section in Data Dissemination Division Mr. Kleszcz Department of Data Access and Availability on Public Internet Server. Mrs. Ewa Malanowicz, Mrs. Teresa Lubowicka, observers from the Head Office of Geodesy and Cartography of Poland. Mr. Krzysztof Kowalski, Director of the Standards, Registers and Information Technology Division. Mrs. Barbara Zdun,Head of the Section, GUS SRI. Mrs. Alina Sobieszak, GI specialist, Demographic Statistics Division. Mr. DariuszMiziolek, statistics specialist, GUS DROŚ Agriculture and Environment Statistics Division. Mr. Kazimierz Dziubinski, GI specialist, GUS DRIOŚ Agriculture and Environment Statistics Division. Mr. Marian Grzesiak, Deputy Director, GUS DROŚ Agriculture and Environment Statistics Division. Mrs. HenrykaWanke, Deputy Director, GUS ROŚ Agriculture and Environment Statistics Division. Mrs. Ewa Szustak, GT specialist, GUS DAIOZ. Mrs. Barbara Prażmo, Deputy Director, GIUS DAOZ. interpreter.

Agenda

9.30

Opening of the meeting, presentation of participants and approval of the agenda.

10.15

Presentation of the CSO pilot GIS applications, being accessible for the users via Internet (Mrs. U. Paleczna).

10.45

Pilot GIS applications used in the CSO printed publications (Mrs. Barbara Prażmo, Mrs. U. Paleczna, Mrs. Alina Sobieszak, Mrs.Henryka Wanke).

Problems with direct connections between GIS applications and CSO computerised publishing systems a well as CSO web server. Principal areas of the future CSO GIS applications: National Population and Housing Census in 2002 and Agricultural Census in 2002.

11.45

Presentation and discussion on the preliminary selected future CSO GIS architecture (Mr. Bogdan Lesiak, Mr. Tomasz Pawlak,

Presentation and discussion on the preliminary selected future CSO GIS architecture based on the Eurostat's GISCO as a sample, i.e. central professional GIS server being accessible for statistician-analysts equipped with desktop GIS workstations via CSO Intranet, advantages and disadvantages of such solution.

12.15

Overview of the issues to be considered during the mission to Poland.

Opening of the meeting, presentation of participants and approval of the agenda (Mr. T. Pawlak)

Mr. Tomasz Pawlak, Head of POLSTAT Unit, introduces and welcomes the participants to the meeting.
The agenda is approved.

A round table is organised. Each participant mentions his/her function in the department they represent, and their importance in the development of GIS in CSO Poland.

- Mrs. Halina Dmochowska, Analysis and Aggregate Statistics Division.
  This department is in charge of the regional statistical data, co-ordinates the activities of other departments and the statistics at Voivodship level. An intervention on the issue of regional statistics is included during the discussion at the end of the meeting.
- Mr. Bogdan Lesiak, Computing Service Bureau.
  In charge of the construction and service of the GIS and IT for CSO.
- Mrs. A. Stegawska, Computing Service Bureau.
  In charge of the technical networking issues, including GIS.
- Mr. T. Kopczyński, Computing Service Bureau.
  In charge of the technical infrastructure, computer networks and information database service.
- Mr. A. Graboś and Mr. R. Jabłoński, COID Łódź.
  This unit is in charge of the installation of a central station where the central services and database will be stationed.
- Mr. Victor Pierre Morales. In the framework of a twinning agreement in the field of regional statistics between GUS and INSEE, Mr. Pierre Morales was dedicated to CSO. This agreement covers the institution building component of the regional statistics project and the investment component to develop a system for regional statistics including registers, local database, creation of GIS.
- Mrs. U. Paleczna. Data Dissemination Division. This department is in charge of the use of GIS in the preparation of publications, as well as to improve data access through the internet.
- Mr. Krzysztof Kowalski. The Standards, Registers and Information Technology Division is in charge of business registers, territorial registers and regional registers.
  Mrs. Barbara Zdun co-ordinates issues related to the territorial register.
- Mrs. Alina Sobieszak, GI specialist, Demographic Statistics Division.

- Mr. DariuszMiziolek, Mr. Kazimierz Dziubinski use GIS for agriculture statistics.
- Mr. Marian Grzesiak, and Mrs. Henryka Wanke represent the same Division, but from the Environmental Protection and Forestry field.
- Mrs. Ewa Szustak, is involved with the project „Phare'1998: Special Preparatory Programme (SPP) for Structural Funds in Poland".
- Mrs. Barbara Prażmo is deputy-director of Mrs. Halina Dmochowska. Her work is focused on regional statistics.

Mrs. Dmochowska mentions the special preparatory programme for Structural Funds („Phare'1998: Special Preparatory Programme (SPP) for Structural Funds in Poland). The objective of the project is to create a basis for statistics in terms of structural funds evaluation. Within this project the Feasibility Study was prepared -concerning GISThe most important conslusions of this study, as of today, are presented in two reports (Główny Urząd Statystyczny, 2001 and Backer Lars H. (Statistics Sweden), 2001). Two essential conclusions of this feasibility study are mentioned:

- The GIS needs to link the numerical maps with many other statistical data sources;
- The final product of GIS should not be the computer screen; the results need to be transported to different users, be accessible on the server, and be used by the publishing house as well as incorporated into desktop use.

Mrs. Paleczna was engaged at CSO to increase the GIS expertise, and to develop more applications in geostatistics.

The cooperation with Statistics Sweden resulted in acknowledgement and recognition in the tender specifications for the provision of training. Also important in this project is the development of a local database. CSO anticipates that the final version of the tender specifications for the GIS development will ensure compatibility with Eurostat's approach. This is the purpose of this workshop and should be improved by the current visit.

Presentation of the CSO pilot GIS applications, being accessible for the users via Internet (Mrs. U. Paleczna)

The maps currently available on the internet are not produced in GIS. They are scanned existing maps. Examples: temperatures, Voivodships.

Some statistical offices of the Voivodships have their own website with maps. These maps aren't produced with GIS.

Desktop mapping

The data are transferred to Ĺódź, where the maps will be made.

GIS applications used in the cso printed publications (Mrs. Barbara PRAZMO, Mrs. U. Paleczna, Mrs. Alina Sobieszak, Mrs. HENRYKA Wanke)

Those applications have no pilot character but it is daily practise within the editorial plan.

Data dissemination Division (Mrs. U. Paleczna)

The current GIS maps are produced on a stand alone workstation with MapInfo, and are used to produce maps for publications.

A number of CSO publications, which include maps, are reviewed (Mrs. Prażmo): (see Documentation received):

- Annual statistical yearbook of Poland. The maps in the national yearbook are produced in Correldraw.
- Annual yearbook of Voivodships. Each publication has a mandatory part on Voivodships and Powiats. The statistical offices of the Voivodships further have case specific descriptors.
  There are 16 Voivodships in Poland, they correspond to NUTS2 level. The+/- 400 (exact. 373 Powiats) correspond to NUTS4, and the +/- 2.500 Gmina's to NUTS 5. based on combinations of NUTS4 and NUTS5 - NUTS3 has no equvivalent in administrative division of the country. Level NUTS3 was created only for statistical and regional policy purposes. Statistics at NUTS 2, 4 and 5 are available on the CSO website.
- The statistical publications at Powiat level are bi-annual.
- The statistical publications at Gmina level are evrey 3 to 4 years.
- A number of publications are cross-sectional, example GDP per Voivodship '95 – '98.

- There are also quarterly publications on socio-economic data of the Voivodships.

Special publications for the Phare '98 project:

- Recalculation of data since 1995 in the REGIO database format,

Not all the publications are based on the administrative structures, example: special publications on border regions (based also on administrative sources).

Due to the cost of producing coloured maps, the number of maps in the statistical publications is limited.

„Portrait of the Regions" is a planned new publication. If the funds of (we are still not sure the sources of finacing)allow it, this publication will include photographs, charts and maps.

Automatic map preparation is one of goals for the project.

The thematic departments dealing with statistics and the publications departments use standalone GIS workstations for the purpose of on-screen map production. The maps are then sent to the publishing house. The incorporation of text and graphic, in order to publish both in an integrated form, has not been dealt with yet.

Demographic Statistics Division (Mrs. Alina Sobieszak)

The main targets for 2002 are:

- General population and housing census,
- General census of agriculture.

These new censuses will be incorporated with the previous census data. The aim is to widely use GIS tools. This requires that the PHARE' 2000 programme will be far enough advanced, and that GIS will be operational in the divisions concerned.

Agriculture and environment statistics (Mrs. Henryka Wanke, Mr. DariuszMiziolek

This division has one stand alone MapInfo station at its disposal.

Agriculture

The crop results are overlaid with soil and land use maps. Similarly, the grassland and crop indices are overlaid with soil and land use maps. The crop data are in digital form. The soil map is in paper form and will be transferred into a numeric form in the future.

The 2002 agriculture census will, for the first time, have the same coverage as the population and housing census. This will allow to pinpoint the rural area.

With GIS the comparison between the soil maps and the agricultural use of the land, as obtained from the census, will be analysed and published. Other examples of maps that will allow proper analysis of the agricultural production:

- the flood map expected from the Institute of Cartography and Geodesy,
- employment related to agriculture (census data in relation to agricultural production, …).

Through the evaluation of the current situation, new management tools will be provided for agriculture. The results of the agricultural division will be presented to the authorities and to other users.

Environment

The Centre for Environmental Protection was set up in 1991, with the mission to monitor the state of the environment in Poland.

The use of GIS by this department is to feed data into the database in order to publish and analyse environmental conditions. Previously, the data were available at NUTS 1 and NUTS2 levels. Today, the inspections are performed at NUTS5 level.

The exchange of information in electronic form is not perceived as a problem. The economic barrier for publications (mostly in paper form) is a problem. Annual evaluations include (black and white) graphics, produced in correldraw. GIS should help to broaden the access to environmental data. Currently, a CD-Rom version is being prepared.

Presentation and discussion on the preliminary selected future CSO GIS architecture (Mr. Bogdan Lesiak, Mr. Tomasz Pawlak)

The future plan is to have a team of GIS specialists in Łódź. The set up of this GIS centre starts in 2001. This team will be in charge of the central GIS server, running Arc/Info software. Tasks include the system administration as well as the development of basic GIS applications including thematic maps and distribution. Data will be distributed to desktop GIS stations in the different thematic divisions as well as to the regional statistical offices. Data needed by Eurostat will be transferred to the central system, where they will be controlled by specialists. The team in Łódź will be essentially IT based (including digital mapping), while the thematic expertise will remain more in the CSO offices in Warsaw. Applications, presentations and transfers for publications will remain in the divisions of CSO in Warsaw.

The structure of the system is presented in „Szustak Ewa, Bogdan, Lesiak" (see documentation received). Requirements in terms of WAN capacity have improved and are expected to be sufficient for the decentralized approach.

Conclusion: the central idea is to have local applications, and a central GI data server.

The issue of regional statistics (Mrs. Halina Dmochowska)

In Poland, as in other countries, different functions determine the needs for regional statistics. The regional statistics are best defined by their nature:

- Analytical,

- Regional,
- Monitoring function,
- Evaluation,
- Scientific purposes outside the regional policy,
- Regional decision support (at different regional levels).

The users of the regional statistics include:

- Ministry of the E nvironment,
- Ministry of Regional Development and Construction,
- Minsitry of Administration and Internal Affairs,
- Ministry of Labor,
- Ministry of Finance (monitoring of regional aid),
- Polish Agency for Regional Development (a semi-commercial partner),
- Regional statistical offices).

Mrs. Halina Dmochowska summarises the efforts made for the regional statistics to meet the EU demands (see also Dmochowska, June 2001).

Conclusions

- establish basic legal framework for regional policy and regional statistics
- developing cooperation between main partners
- most of necessary adjustments in methodology implemented or under implementation
- time series since 1995 in new territorial division
- working system of dissemination and publications
- identified areas yet not fully adjusted as well as other 'bottlenecks"

above are priority for regional statistics in PHARE 2000 project

Mrs. Thérèse Steenberghen assures that the current project is dealing with the use of GIS, and does not interfere with other efforts dealing with regional statistics.

Conclusion: Overview of the issues to be considered during the mission to Poland

The use of GIS at CSO

With the further implementation of the Phare ’98 project, other uses will evolve.

The use of GIS:

- as maintenance instrument of administrative databases is mainly a task of the Head Office of Geodesy and Cartography.. However, the data collection and aggregation of those boundary maps is based on CSO’s territorial register. Address information is included in CSO data. These data are updated, and are related to the territorial units. Some of the maps used by CSO are provided by the MapInfo supplier, and are used without major changes. The regulation on new Powiats, that will enter in effect on January 2002 will require updates of these maps;
- for arithmetical manipulations and to generate statistical aggregate data from geographical details: happens to a limited extend in the Agriculture and Environment Statistics Division;
- at CSO, the production of map based presentations is currently the main use;
- for easier user access to the data: currently not implemented. (there is no convenant or license) between CSO and the Head Office of Geodesy and Cartography does not foresee distribution other than in pdf format. This new need for use of the digital maps for data access by the users will be considered in the new agreement currently in preparation.

Geographical units and nomenclature

e change of names is the responsibility of the Head Office of Geodesy and Cartography, the change of codes of administrative boundaries is the responsibility of CSO.

The issue of data ownership

The commercial and statutory role of the organisation that owns the data is an issue related to the wider utilisation of geodata that hasn't been resolved. Aside from the boundary map and the maps used for agricultural statistics, no other digital maps are received from other institutions. When new digital data will become available from other institutions, the individual department of CSO dealing with these statistics will examine the conditions for use. The GIS centre in Ĺódź will focus on the technical conditions, CSO Warsaw on the organisational issues. Due to the small scale of use of digital map data by CSO, gentlemen agreements were sufficient so far. With increased use and complexity of use, legal arrangements will be made, when necessary. CSO has a license from the Head Office of Geodesy and Cartography for unrestricted internal use. This does not include privileges for distribution in digital form (except .pdf). An agreement is currently being prepared on this issue.

Cost Recovery. General indicators are made accessible free of charge. Other data can be acquired by external users, when they pay for a subscription. A similar approach will be worked out for geodata.

Legal basis for protecting ownership of data. With commercial data suppliers, there have been cases where they searched customers and pre-closed on the market before CSO. Sometimes the data sold with profit are based on the official statistics. So far, CSO has not placed any restriction as to the scope of utilisation of the official statistics.

GI characteristics of boundaries

Mostly an issue of the Head Office of Geodesy and Cartography.

The boundary data are at a 1/50.000 scale, and exceptionally at 1/10.000.

The regional data are disseminated based on the administrative division, at a scale of 1/100.000.

Aside from the standard administrative levels, 2 centres have a pilot application where statistics for cities are published at 1/10.000 and 1/20.000.

Versions of boundaries: New towns (settlements) are created through formal approval by the Council of Minister. This results in annual changes in the boundaries of Gminas.

A 3 level structure started in 1999. Since there have been no changes of the units. After two years, there will be an evaluation. The number of Voivodships will stay. In January 2002 the number of Powiats will change.
When substantial changes occur (such as in 1999), time series are recalculated. Most time series go back to 1995. Demographic recalculations to 1990.

Organisational framework

There is an agreement on national scale that regulates the interaction Voivodship-CSO.
There is local co-operation between the NMA and the NSI, but this is not on paper. Informal co-operation at voivodship level varies. Good examples: Poznan, Ĺódź, Krakow, Wroclaw

Action points

- Minutes of the meeting (Mrs. Thérèse Steenberghen)
- Revision of the minutes (Mr. Bogdan Lesiak, Mrs. Ewa Szustak)
- Correction of minutes (Mrs. Thérèse Steenberghen)
- Distribution of minutes to participants (Mr. Bogdan Lesiak, Mrs. Ewa Szustak)
- Approval of the minutes (participants)
- Mission report to be presented during the workshop (Mrs. Thérèse Steenberghen)

Documentation received

Books and reports

Backer Lars H. (Statistics Sweden), 2001. *GIS for CSO-Poland*; Expert Report within the Phare'1998: Special Preparatory Programme (SPP) for Structural Funds in Poland, Non-

Twinning part executed under the contract with GTZ GmbH Germany), Expertise in view of the Phare 2000 investment. 41 pp.

CSO, 2001. Editorial title-plan of the Central Statistical Office. 44 pp.

CSO, 2001. Editorial title-plan of regional statistical offices. 60 pp.

CSO, 2001. Publications' catalogue of the Central Statistical Office of Poland.

CSO, 2000. Statistical Yearbook of the Regions – Poland. Warsaw, 11/2000.313 pp. + map.

CSO, 2000 Silesian Voivodship in numbers.28 pp.

Dmochowska H., *Meeting the demand, conveying needs; Experience of Poland*. In: International Conference „Regional Statistics", Ostrava 4-5 June 2001.

Główny Urząd Statystyczny, 2001. Feasibility Study Of Options For GIS Application In Regional Statistics In Poland. 22 pp. (2)

Szustak Ewa, Bogdan, Lesiak, Construction and service of the geographical database for the needs of the opfficial statistics in Poland. Includes the scheme of GIS infrastrcuture in CSO elaborated in „Feasibility study of options for GIS application in regional statistics in Poland".

Maps

Stan rozwoju upraw, Dekada 26, 11-20 wrzesnia, 2000. (2 samples)

Condition of cultivation development, 26th decade of the year, from 11 to 20, september, 2000 (2 samples)

Stan rozwoju upraw, Dekada 25, 1-10 wrzesnia, 2000. (2 samples)

Condition of cultivation development, 25th decade of the year, from 1 to 10, september, 2000 (2 samples)

Porównanie stanu rozwoju upraw wg województw, Dekada 26, 11-20 wrzesnia, 2000. (2 samples)

Comparison of condition of cultivation development by voivodships, 26th decade of the year, from 11 to 20, september, 2000 (2 samples)

Porównanie stanu rozwoju upraw wg województw, Dekada 25, 1-10 wrzesnia, 2000. (2 samples)

Comparison of condition of cultivation development by voivodships, 25th decade of the year, from 1 to 10, september, 2000 (2 samples)Rozkład Zachmurzenia W Polsce, Dekada 26, 11-20 wrzesnia, 2000.

Disposition of cloudy days in Poland, 26th decade of the year, from 11 to 20, september, 2000 (2 samples)

Rozkład Zachmurzenia W Polsce, Dekada 25, 1-10 wrzesnia, 2000.

Disposition of cloudy days in Poland, 25th decade of the year, from 1 to 10, september, 2000 (2 samples)

Misc.

Organization chart of CSO.

Organization chart of The Analysis and Aggregate Statistics Division.

CSO. ABC of the Central Statistical Office. Brochure.

CSO. 12/2000. Poland in figures. Brochure.

„Gmina-Where basic needs are met", „Powiat-Where equal opportunities are guaranteed", „Voivodship-Where regional development strategy is created". 1p. description per administrative unit, including definition, responsibilities, brief history.

CD-ROM

CSO, 2001. Concise Statistical Yearbook of Poland.

ANNEX 3
MINUTES OF THE MEETING WITH THE NSI AND THE NMA OF ROMANIA

26 July – 31 July 2001

1. Visit to the NIS

The NIS responded to the questionnaire. During the visit we could concentrate on additional questions and clarify certain elements of the questionnaire, and see some of the practical GIS use / applications.

1.1.

Meeting with the General Director of the NIS (27/07/01)
Meeting with the Head of the GIS department and the Director of the Census Division (27/07/01)
Visit to the GIS department (27 and 30/07/01).

1.2 Organogram and persons met during the visit

Person	Mr. Dan Ghergut	General Director of GD for National and Regional Statistical System (NRSS)
	Mr. Radu Halus	Advisor of the President
	Mr. Stefan Tricã	Director Census
	Mrs. Tatiana Barsanescu	Deputy Director Co-operation and European Integration
	Mrs. Mihaela Fotin	Head of GIS service

There are 4 general departments within the NIS:

1- National Accounts: macro-economical indicators and dissemination

2- Co-ordination of the National and Regional Statistical System

3- Social Statistics

4- Informatics

In addition, there exist some horizontal departments and bodies: the cabinet of the President, the Council for the co-ordination of the statistical activities with representatives of the main Ministries, the academic world, media, trade unions, etc.

The main activities / subgroups are: population and demography, environment, trade services, transport, industry, agriculture, housing and census.

Additional information with regard to contact- and information points:

Mailaddress of the GIS service: GIS@insse.ro

Mailaddress Mr. Trica: Trica@insse.ro

Census mailaddress: Rec2002@insse.ro

Web site: http://www.insse.ro:
For the time being, it contains only general information on the NIS, their publications and statistical data. The most important tables from the statistical yearbook, as well as press releases with data on inflation rate, foreign trade, monthly wages, main evolution of the macro-economic indicators, etc are published on the site. There are plans to publish at least some general maps (see yearbook) on the web site, but it is not yet know how, nor when. Putting data on the Internet confronts the NIS also with the issue of data pricing. Until now, the more detailed

data are sold to end-users. Putting more data on the web could affect this. Therefore, there is some hesitation since financial resources are already limited.

1.3 Meeting with the General Director of the NRSS (27/07/01)

The objectives for the Workshop were explained as well as the methodology used for preparation it (questionnaire and visits to two of the Candidate Countries).

Mr. Ghergut underlined the willingness of the NIS to collaborate with the EC, EUROSTAT and promised to contact and convince the NMA to collaborate as well.

It was discussed and decided that:

- The questionnaire filled in by the GIS service could be further detailed with the Head of the GIS service during the meeting with the latter.
- The NIS will receive beginning of August the official invitation and agenda for the workshop of October 24. The NIS will participate in the workshop and come to the Working Group Meeting.
- The NIS wants to prepare a presentation for the workshop, but it should be clarified which topics to elaborate. GfG agreed to help during the preparation by defining one or a few specific topics that could be interesting to tackle more in detail during the workshop and which are of particular importance for the NIS Romania. Ground for GIS will keep in touch with the technical staff in order to follow up the preparation of- and the participation to the workshop.
- It was asked who should pay for the NMA's in order to particpate to the workshop. GfG referred to the letter that will be send in the course of August.
- The NIS underlined the importance to translate the collaboration between EUROSTAT and the NIS's/NMA's on GIS and statistics into some concrete projects. It was stressed that it is not obvious for the NIS of Romania to mobilize enough budgets for doing so. If the workshop could result in proposals or ideas, this would be very positive.
- This mission could be a start point for collaboration between the NIS and the NMA.

1.4 Discussion with the head of the GIS service and visit of the GIS service (27and 30/07/01)

1.4.1 Clarifications to the questionnaire

- Amongst the activities, it should be also indicated censuses. The reason why it was not indicated is the fact that within the Census project, GIS is not yet used because of lack of resources (e.g. when managing the census data). So it means that only for statistical purposes, GIS has been used so far.
- The ArcView licenses in use, are the basic modules, version 3.0, while version 3.2 was only tested. ARC/INFO is pcARC/INFO version 3.5. The latter is used for editing work, for building coverages and editing tables. It is difficult to convince the higher hierarchy to upgrade.
- For the data sets on hydrography, the key is not as indicated 'tipe', but rather 'nume', a unique number for every river segment, as well as for the lakes. This follows not a real nomenclature as is the case for the administrative data.
- The European roads data sets consists of E-roads and secondary roads for the territory of Romania. It does not consist - as could be concluded from the questionnaire - of EU wide data.
- The data set on soil erosion is in reality a layer with the pedoclimatic microzones, besides that there are also ecoregions, i.e. the major geographical regions of the

country. These are often used as reference in publications (it is one of the maps published in the statistical yearbook).

- The rivers, roads and other topographic data are only used as kind of backdrop for statistical mapping and not for analysis as indicated in the questionnaire.

1.4.2 The central database

The NIS is using a central database with some topographic layers and centrally the administrative boundaries of the country.

The paper "Harta Digitala a Romaniei" in format ARC/INFO is a paper of 7 pages that can be seen as the data manual of the data received from ESRI. Some other useful information registered in this document:

- The complete database consists of 52 coverages in ARC/INFO format, subdivided in 11 themes.
- The data are stored in meters, scale level is 1/1.000.000
- Some statistical data are included from the year 1992, while data related to the soils are from 1993, delivered by ICPA

Ownership of the data. All the data used by the NIS were received for free from GeoSystems, the official distributor of ESRI Romania. The idea behind was to promote the use of spatial data and GIS software at a time that GIS was only starting in Romania. The spatial and related statistical data were given in 1996, but are probably older (see above for the statistical data included). GeoSystems is not responsible for updates.[5] The data sets can be used for internal use only.

Updates are only carried out by the NIS for the administrative boundaries whenever necessary. This means that for changes of the boundaries (new boundaries, replacements), for changes of the names/codes of administrative regions or communes, when merging two administrative units, etc., NIS is deleting arcs, adding or changing arcs, changing names/codes in the database themselves. NIS states that this occurs not often. Who is deciding on changes of administrative boundaries? E.g. communes can change their name or their boundary! It must be stressed that the database as delivered by ESRI contained several errors, that more detailed data do exist, but that resources are lacking to rebuild a new version of the database. That is the main reason why the NIS modified the database itself. On of the problems is that the source maps that are at the basis of the database are not known and nor are they available for verification.

For the administrative boundaries, a coverage exist for each of the 42 counties (NUTS level 3, also called Judete).

The SIRUTA key is used as primary key for linking the spatial dat with statistical data. It is a kind of hierarchical key reflecting the different levels. So the code for a lower level includes the reference to a higher level. (e.g. 110001, 110002, …)

In addition to the administrative data, a data set on localities is available with the localities classified according to following typology: residence of Judet, Oras, Comuna, Municipiu and old localitati.

In March 2002, a new census will take place in Romania. The statistical offices in the counties do not work with GIS. In the case of censuses, they receive printed maps for guiding their work.

Most of the data are collected every half year, for population every month.

[5] See for more documentation the paper delivered by GeoSystems together with the data.

The GIS service consists of three persons.
ArcView is used mainly. The statistical data are not integrated in one uniform relational database. Departments like population, agriculture, trade, etc., pop-in with their own data in different formats (e.g. spreadsheets). The data are than loaded in ad hoc tables in ArcView and mapped 'on demand'. Most of the maps are choropleth maps.

The spatial database structure is exactly the same as the structure defined by Geosystems. No new layers were added.

Spatial analysis as such is rather limited. This is not possible because the type and quality of the data, and it is not really asked for. Also, the 'translation' of statistical data to other delimitation than the administrative ones (e.g. the ecoregions or geographical regions) is not of concern.

The NIS of Romania is using GIS basically for statistical mapping. The main database used to do so is developed by the distributor of ESRI Romania and dates from the beginning of 90. The topographic layers were never updated, while the administrative boundaries were modified by the NIS themselves whenever a boundary changed. The updates were never tracked so it is difficult to follow the changes over time. It seems that the NIS wants to use GIS for other purposes, e.g. the population census, but this is not done due to a lack of resources. For the same reason, the software is not upgraded.
The update of administrative boundaries is an important issue and should therefore receive more attention in the future. The development of more detailed metadata is another important issue. Now, the only metadata available is the documentation delivered by ESRI Romania with the database in 1996.
Until now, there was no real collaboration between the NIS and the NMA. The NIS is ready to develop such collaboration in view of the exchange of data and know-how. Collaboration started only now. The NIS will do its utmost best to take part in the workshop.

Action points:

- GfG will send the draft minutes of the visit to the NIS and can pose any further questions with regard to the visit and the use of GI/GIS within the NIS in general
- The NIS will give some comments and feedback
- GfG will do some suggestions with regard to the topics to be developed in the contribution of the NIS during the workshop of October 24.

2. Visit to the NMA

Before leaving for Bucharest, the visit seemed not to take place since several attempts to reach the NMA (more than 10 mails, faxes and phone calls) did not result in an appointment. The reason for this was the large reorganization of the NMA that only ended in June. With the help of the staff of the NSI and Mrs Ionescu, I finally could make an appointment with the head of the NMA and visit the Institute on 30 and 31 July. The meeting with the President was also attended by two people from the NIS.[6]

2.1 Agenda of the visit

Meeting with the Director General and his staff of the NMA on 30/07/01:
Visit to the technical departments of the NMA on 31/07/01

2.2 Organogram of the NMA

One of the main reasons for the difficulties to contact and make an appointment with staff from the NMA is its history, practice and the recent restructuring of the organization(s).[7] The people we've tried to contact before seem not to play a key role anymore. They are not the persons with the responsibilities that are attributed to them on the web-site of EUROGEOGRAPHICS (EG)[8]. I had the chance to talk with some people of EG and they confirm the continue changes within the Romanian NMA. This NMA is not often present at the meetings of EG, nor is the case for the EUROSTAT meetings. To understand better the situation the history should be clarified.

The National Office of Cadastre, Geodesy and Cartography (NOCGC), as it exist now has been brought under the Ministry of Public Administration on July 1 2001. There is a new President, Mr. Alex Radocea, who was the former Head of the Statistical Office of Romania. This explains why they did not react in June, while it also explains why Don Ion Ghergut, General Director of the NIS succeeded in contacting and convincing them to have an official meeting and visit organized on Monday and Tuesday.

Before July 2001, the NOCGC did already exist, but was linked to the Ministry of Agriculture. The NOCGC was established in 1996 by merging formally two separate Institutes: the Institute of Cadastre for the Organization of the Agricultural Territory, ICOTA. This Institute was formally linked to the Ministry of Agriculture, but worked in a certain sense autonomous. Apart from this Institute existed until 1996 the Institute for Geodesy, Photogrametry, Cartography for the Organization of the Territory (IGFCOT).

Physically, the Head Office of the NOCGC is in the Centre of Bucharest, while the operational branch is in the buildings of ICOTA, close to the airport.[9] This operational branch of NOCGC has its own General Manager, Mr. Crisan Radu and a Adjunct General Manager Mr. Ion Badescu.[10] During the visit, I've met with Mr Badescu. Within the operational branch, there are two key persons who are the Project Managers of the operational division and who should also receive future mail from EUROSTAT: Mrs Georgeta Luca and Mr. Victor Vasilescu. It should be stated that there is probably a real problem of bureaucracy. While some people received the questionnaire, they do not really communicate with the people responsible for the operational side of the work.[11]

There exist a local office of the NOCGC (ICOTA) in every of the 42 regions of the country. Local staff is carrying out field controls, etc.

Besides the NOCGC, there exist a DTM, the Military Department of Topography who are dealing with the traditional topographic maps. There is no close collaboration between both organizations.

So for the workshop and future initiatives EUROSTAT should contact:
Mr. Alex Radocea, President of the NOCGC[12]
202 A, Splaiul Independentei, 1st Floor
Sector 6, Bucharest
EUROSTAT should also send in copy letters to:
Mr. Ion Bodescu, Director General

[6] The NIS was very pleased that they finally had direct contacts with the NMA.
[7] The NMA is not used to work with the NIS of Romania, and neither with EUROSTAT at European level. The Institute(s) were until now working on their own.
[8] On the web-site of EG, it is indicated that Mr. Gabriel Popescu is the President and Mr. Soroc Bondoc is the Vice President. The questionnaire arrived, but these people are not responsible anymore.
[9] On the name cards, ICOTA is still indicated as the official name, even 5 years after the merger and establishment of NOCGC.
[10] Stating on his name card Director General.
[11] One of the operational Project Managers stated that some of the people of the NOCGC always concentrate on reorganizing issues and planning of their own career, while the Project Managers earn only 100 US $ a month and sometimes need to invest themselves in the organization (but doing it because they do believe in what they do).
[12] There is also a Vice-President, Mr. Gabriel Stanescu who I did not meet.

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Bucuresti

I think it is also wise to mail copies to the two Project Managers within ICOTA:

Mrs. Georgeta Luca and Mr. Victor Vasilescu

ICOTA@ICOTA.RO and GLUCA@ICOTA.RO

2.3 Meeting with the President of NOCGC (30/07)

The President of the NOCGC, Mr. Radocea decided the meeting, on demand of and after consultation with Mr. Ghergut from the NIS.

Participants[13]	Mr. Alex Radocea	NOCGC
	Mr. Cicu (advisor)	ibidem
	Mrs. Georgeta Luca	ibidem
	Mr. Victor Vasilescu	ibidem
	Mrs. Tatiana Barsanescu	NIS
	Mrs. Mihaela Fotin	ibidem
	Mr. Danny Vandenbroucke	Ground for GIS

The objectives for the Workshop were explained as well as the methodology used for preparation (questionnaire and visits to two of the Candidate Countries).

Mr. Radocea explained the reorganization and current situation in the NOCGC. He stressed the importance of the collaboration between the NMA and the EC, and between the NMA and NIS, which he admitted, did not yet exist.

It was said that:

- The questionnaire that was received would be further filled in with their technical staff and been send to Ground for GIS/EUROSTAT.
- The NOCGC will receive the official invitation and agenda for the workshop of October 24. The NOCGC will most probably participate in the workshop.
- The NOCGC would think about a contribution for the workshop, but asks for feedback on the possible contents of the paper. That is should also be clarified whether it should be a paper of both the NMA and NIS or of the Institutes separately.
- The person who will participate in the Workshop on GIS for Phare Countries, would also participate in the Working Group of the day after.
- Ground for GIS would keep in touch with the technical staff in order to follow up the preparation of the questionnaire and the participation to the workshop.

Technical staff gave a brief overview of their activities and an invitation was given for a visit to the operational department of the NOCGC. It was underlined by the NOCGC that their activities relate to data acquisition, construction of databases, GIS operations and project management.

2.4 Visit to the NOCGC - ICATA (31/07)

Making paper maps is not a task or objective of the NOCGC anymore. The DTM is still carrying out the traditional map making. NOCGC is working completely digitally.

There is one digital photogrammetric station with the necessary equipment to collect information and to transfer the data to a central computer (interface developed by the NOCGC).

[13] According to Mrs Fotios of the NIS, the fact that the President of the NOCGC convocated the most important people involved and asked the NIS to be present was a positive step forward in view of the future collaboration.

A large scanner is used to digitize existing films of topographic maps. The objective is to scan all the basic layers of these maps (contour lines, rivers, roads, etc.) and convert them into a GIS. For the elevation contours the NO works at an interval of 20 meters. This should normally be enough for most of the users since Romania is for 66% mountain area. Whenever necessary, the NO can decide to collect more detailed information for the plain areas from the same film source. The original maps are at scale 1/25.000.

With regard to the updates it has been decided that first the basic maps, most of them originating from the eighties, should be entered in the system and that future changes should be integrated directly in the resulting digital database.

For scanning and editing, the NO uses Microstation Bentley products. For editing this is done in part on Intergraph workstations which are too expensive to be upscaled. Following modules are available and used for tracing, cleaning and editing the scanned data: I/RASB, IRASC, I/GeoVec, I/ParVec and Base Imager. In total 8 computers can be used for data acquisition. Operators carry out the scanning, some other do tracing and editing, etc. This is hard work because high accuracy is needed. Also text data (place names) are stored in the database.

There is a central GIS room to prepare GIS projects: mapping, analysis, integration of data, etc. AutoCAD Map is intensively used for this purpose. GIS projects are carried out on 'demand' of end-users. Users of the data include cities and other local authorities, but also private companies. Examples of large projects include the cities of Craiova and Constanta in which 1000 original plans were integrated in one database. Data include cadastre parcels, hydrology, administrative boundaries, roads, railways and ground control points. These data are rather detailed: from 1/1500 - 1/10000. They are used by the cities for urban management (in the form of maps). In a similar way data sets exist for rural areas with the aim to manage the agricultural registers. Other applications include land value and slope detection for administrations. For the more detailed data sets ground control points do exist and are part of the database. The GIS room comprises of 3 computers.

Apart from the lager scale applications, some small-scale data sets exist at level 1/500.000. It includes all the layers that are typically on topographic maps, including the delimitation of settlements. Settlements have a name, but also a code, the so-called SIRUTA code. One of the typical characteristics is that settlements are often divided in two pieces: the centers and the outer ring. This information is also available in the database

The NOCGC does concentrate on the spatial data. The descriptive data are managed by the 'clients'. E.g., the NO doesn't have all the cadastre information (there is a separate Ministry managing these data), the same is true for the agricultural registers. The spatial objects do contain always a code. This is also the case for the administrative units (ref. to the SIRUTA code).

There is no real meta-information available. Of course the basic source of the data are know but not part of the database itself.

For the whole territory, orthophotos from between 1996 and 1997 are available.

Formats include DVD, DGN and even ASCII.

There are three central servers (PC's) connected via a 100 Mbit line to the 26 operator and application computers. One of the servers acts as a data server, another as backup server and a third as the mail server. Servers are connected to each other via a 1 Gbit backbone.

There is some experience with C++

The NMA is carrying out some nice GIS applications. They do not cover advanced spatial analysis, but consist rather in data inventories of which the resulting database is used by end-users in the form of digital maps, etc.

The NMA itself is focusing on database construction following standard procedures and using the most recent techniques like digital photogrammetry, scanning and tracing, etc. Construction and maintenance of the descriptive databases is not an activity for the NMA. Updating of the basic topographic layers will be focused on in the future.

The 1/500.000 database could be of use for the EC, since it contains information that is comparable with the GISCO database.

The NMA is open for collaboration with the NIS and with the EC, EUROSTAT.

Actions to be undertaken:

- GfG will send the draft minutes of the visit to the NMA for comments and additional information.
- GfG will also verify whether the right persons receive this and future invitations
- The NMA will finalize the questionnaire and send it to GfG.
- The NMA will discuss internally the upcoming workshop and their possible contribution to it.
- GfG will also recontact the NMA technical staff in view of the preparation of the workshop and their contribution (paper).

Recommendations

We want to put forward some issues that could be important for further consideration.

- The idea of the NIS to have a concrete project in which the NIS and NMA work together after the workshop could be supported. It could be a joint project of the NIS, the NMA, other Romanian partners and EUROSTAT focusing on update procedures, standardisation issues, exchange of data and meta-information.
- EUROSTAT could ask samples of the 1/500.000 database in order to evaluate the data themselves: quality and usability for future integration in the GISCO database. The same could be done with the database of the NIS developed by ESRI Romania (1/1.000.000).
- The contribution of the NIS and the NMA should probably focus on:
- The use of administrative data in Romania (explaining the different levels - Judet, Oras, Comuna, Municipiu and Localitati); the problem of updating these data (collection of the information in 'the field' to GI data). - NIS
- The construction of the basic topographic database and development of an example of the use of these data for one of the cities of Romania.

INDEX

EUROPEAN COMMISSION
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES

Directorate E: Social and regional statistics and geographical information system
Unit E-4: Regional indicators and accounts, population and geographical information system

Document: **WS/PHARE-Doc. 4**
Original: **EN**

Meeting of the Workingshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Report on the use of GI in the Central Statistical Office and Head Office of Geodesy and Cartography in Poland

Working document concerning item 7 of the agenda of the meeting

Mail: Bâtiment Jean Monnet, Rue Alcide de Gasperi, L-2920 Luxembourg. Telephone: (352) 43 01-1.
Offices: Bâtiment Joseph Bech, 5 Rue Alphonse Weicker, L-2721 Luxembourg
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http://europa.eu.int/comm/eurostat/

Report on the use of GI in the Central Statistical Office and Head Office of Geodesy and Cartography in Poland

(Bogdan Lesiak, Central Statistical Office, Poland)
(Teresa Lubowicka, Head Office of Geodesy and Cartography, Poland)
(Adam Grabos, Central Statistical Computing Centre, Poland)

Abstract

In Poland, official statistics data are produced by Central Statistical Office (CSO).

Geographical Information System in public statistics in Poland means standalone desktops with different GIS tools, mostly used for making thematic maps accompanying office publications. Actually we do not have central database for statistics with spatial and geographical data.

Nowadays, we can use MapInfo software with numeric maps of territorial divisions (voivodships, poviats, gminas) provided together with software tools. The pilots project within the framework of methodological issue are made undergoing at the Agriculture Division and the statistical office at Poznan.

In the year 2000, the feasibility study for GIS application in regional statistics have been made. The study result it is the concept of built up and use of GI central database on the base of the maps from NMAs. We plan to launch this project in 2003.

By the end of this year, an agreement between CSO and HOGC (responsible for provided geographical and cartographic information and for creating of the land information system LIS) is going to be drawn up. The objectives of this agreement are to reform the access procedures and use of information sources, created and actualised by mentioned offices. In the frame of future co-operation, HOGC will provide database of the boundary of territorial divisions and will be responsible for updating the data.

This report includes, up to now accomplishments in the field of GIS applications and concerning to launch GI database to regional statistics on the strength of numeric maps received from HOGC.

Territorial register TERYT and NTS classification

The National Official Register of Territorial Division of the Country (abbreviation TERYT) is a binding standard of territorial identification for units running official registers and information systems of public administration,
Includes the following systems:

- identifiers and names of administrative division units,
- identifiers and names of places,
- statistical regions and census districts,
- address identification of streets, real estates, buildings and dwellings.

TERYT is running by CSO as the system of codes and statistical identifiers used in other evidences, registers and systems relating to territorial units and in the boundary territorial divisions database.

Since 1999 a 3 level structure of territorial division of the country was started:

1	Voivodship	16
2	Poviat	373
3	Gmina	2489

Nomenclature of Territorial Units for Statistical Purposes (NTS) came into force by a Decree of the Cabinet of July 13, 2000 (NTS). NTS nomenclature is a five-level hierarchical classification, used in processes of gathering information, carrying out statistical surveys and disseminating them in spatial cross-sections (was elaborated on the basis of the European Nomenclature of Territorial Units for Statistics NUTS) and it is generally based on the present territorial division of the country. (in Poland level 3 is not direct equivalent in the

binding territorial division). NTS divides Poland into territorial, hierarchically connected units on five levels, of which 3 were defined as regional levels, 2 were defined as local levels.

Regional level includes:
Level 1 - area of the whole country,
Level 2 - voivodships,
Level 3 - sub-regions.
Local level includes:
Level 4 - poviats,
Level 5 - gminas.

Names of levels and territorial units on these levels:

No of the level	Names of the level units	Number of units
1	country	1
2	voivodships	16
3	sub-regions (group of poviats)	44
4	poviats and cities with poviat rights	308+65
5	gminas, including municipal gminas which are cities with poviat rights	2489 65

GIS applications in the CSO

Hardware and software

The desktop workstations equipment with MapInfo (7 licences) and AVISO (7 licences) are used in Warsaw and in 4 regional statistical offices.

Numeric maps

The CSO has the numeric maps of the boundary territorial division (in scale 1:1 000 000) provided together with MapInfo software, Numerical Plan of Poznan (in scale 1:20 000), Settlements of the Wielkopolskie voivoship.

GIS applications in the CSO

1. In the publications - the presentations of the selected statistical data on the map of Poland (3 levels). GIS is used as graphical tool to creating semi-final products - the pictures to papers and electronics publications.
2. In the statistical analyses to estimate the crop of grain. Agriculture Division receives from Institute Geodesy and Cartography maps and data on the base of gentlemen agreement, but it has not its own system. The lack of system to collect and store the data.
3. Within the framework of methodological issue - the pilots project "Urban statistics" at Poznan.

Geographical information in the CSO

- Nowadays these is no uniform GIS system used in both offices (no maps and statistical data interchange),
- No GIS database (GIS - is feeding by data from database with no graphic, no spatial data, join with statistical identifier),
- Database with border of territorial divisions is kept in HOGC, but base on territorial register and statistical identifiers is created and updated by the CSO,
- Owner of database with border of territorial divisions is HOGC, but CSO within a framework of agreement will have right to its internal use. External use will be limited to paper maps or pdf-files,
- On the basis of maps of territorial divisions, a map of NTS will be created,
- Bank of geographical terminology is compiled and updated by HOGC,
- No formal co-operation statistical offices with voivodship offices of geodesy and cartography; no agreement,
- Only presentation of statistical data aggregated on territorial division and NTS levels.

Spatial Information Systems in HOGC

In Poland the central body of government administration appropriate for issues of geodesy and cartography is the Surveyor General of Poland.

The Surveyor General of Poland performs his tasks with the assistance of the Head Office of Geodesy and Cartography.

Consistent with the Act of 17 May 1989, Geodetic and Cartographic Law, the Surveyor General of Poland performs specific tasks including:

1) manages the geodetic and cartographic resources,
2) manages the national registers of borders of the Republic of Poland and the administrative borders of provinces (voivodships),
3) registers land information system of national importance and stores their securing copies and also co-operates with other ministries in establishing and managing geographic information system.

Referring to the tasks mentioned above within the PHARE project Pl. 9206-10 „System of Spatial Information on Poland's administration borders" according to the technical conditions laid down by the MEGRIN organisation, presently EuroGeographics, two SABE 30 and SABE 200 bases „Seamless Administrative Boundaries of Europe" were executed for Poland, with 30 and 200 metres accuracy of border point co-ordinates. The data in these bases satisfy the EUROSTAT requirements accepted by EU countries.

The contract was signed in Brussels on 18 May by the Surveyor General of Poland and the MEGRIN organisation under the terms of which the administrative borders base of Poland was included in the administrative borders base for Europe SABE.

In Poland there was developed a concept for a national spatial information system at all central and local government levels. The Team for Geo-information infrastructure was appointed in order to ensure good co-ordination and co-operation between the departments establishing their own information systems (GIS). When the scope of substance of data bases at various levels of public information is decided, it will be the job of

HOGC to elaborate national standards for a system of spatial information and to construct fundamental data bases.
In 2000, by order of the Surveyor General and the chief administration officer (marszałek) of the Kujawy-Pomerania province, work to construct a topographical data base at the detailed level of a 1:10,000 map was commenced. Introductory work was carried out, connected with the creation of a prototype of a topographical data base on a "Kujawy" test object. This object of 1600 sq.km area was chosen due to its location in a place of importance for the province administration (stretch of the Vistula River below Włocławek). Apart from the topographical data which emerged, the results of work for this object will be used to elaborate guidelines regulating operations performed at work stations adapted to creating concrete data collections.
Late last year work was also begun on creating a national general geographic data base of a degree of detail corresponding to a 1:250,000 scale.

The general geographic database will include data on figure and position of spatial objects and effects, which can be used as the basis for developing thematic data. The main purpose of establishing and keeping general geographic database is providing for state and self-governmental administration and other interested with updated and reliable spatial information.
The information structure of general geographic database is determined by the division to the following topics:

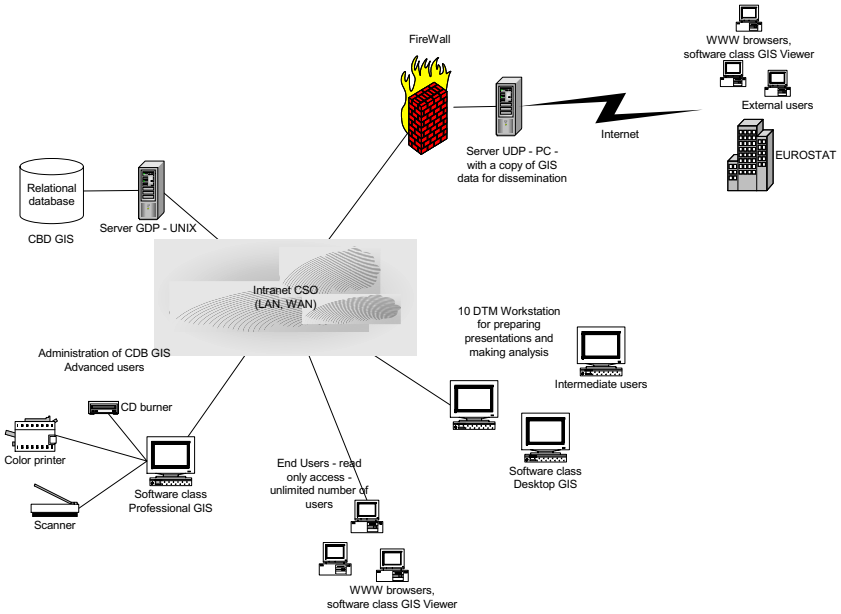
- administrative division,
- settlement network and antropogenic objects,
- hydrography,
- relief,
- transport,
- land cover and land use,
- areas of protection and closed areas,
- geographical names

Construction of the GIS database for the needs of regional statistics

The process of GIS creation is made within the framework of the regional statistics modernisation. Construction and launch GI database and trained staff will be completed by the end of year 2003. The project assumes the process of building a central spatial database and establishing data processing infrastructure enable to apply GIS technology. GIS system will be administrated and processed on the central level at the CSO in Warsaw (project management), also in computing centre CSCC in Łódź (database administration). The system will be operated and enriched with information by thematic departments, available in LAN CSO network to interested statisticians and also to external users.

The picture below shows the scheme of GIS system infrastructure in CSO elaborated within "Feasibility study of options for GIS application in regional statistics in Poland" by Polish experts.

Concept of GIS system in CSO



source: Feasibility study of options for GIS

The crucial aspects in the implementation of GIS project are gathering numeric maps, selecting GIS tools, building data processing infrastructure and establishing team of specialists responsible for service and management.

We plan to receive the necessary numeric maps from NMAs: HOGC, IGC and from army.

The important condition of smooth implementation of GIS in statistics is to launch co-operation with national office responsible for official maps in Poland (HOGC) and to gather needful numerical maps. We plan to set an agreement in the second part of this year specifying the bilateral conditions of easy access and use of information sources, created and updated by mentioned offices (CSO gives the run of National Official Territorial Registers and Local Data Bank, and HOGC - an official database of numerical maps and spatial database). Due to this agreement we enquire numerical maps of Poland (scale 1:100 000) as a part the Map of Europe composed in accordance with SABE project. This map is the core to elaborate numerical Map of Poland by statistical divisions (1:100 0000) in accordance with NTS nomenclature.

In accordance with the list of national expert from IGC, there is a need to create the following maps in regional statistics: settlement (1:100 000), voivodship cities (1:25 000), polish sea border (1:250 000, 1:500 000), land use and land cover (1:250 000, 1: 500 000), hydrology (1:250 000, 1:500 000), transport network (1:250 000, 1:500 000).The forgoing maps are not directly accessed neither in administration offices nor at companies, so they should be created purposely. The base for the maps is available from HOGC, IGC and database military map.

Conclusions

Constructions of the GI database for statistics with collaboration in HOGC enable all statistical offices use the uniform maps and geo-referenced aggregated statistical data.

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3. GIS for CSO - Poland -expert report - Lars H.Backer
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EUROPEAN COMMISSION
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES

Directorate E: Social and regional statistics and geographical information system
Unit E-4: Regional indicators and accounts, population and geographical information system

Document: **WS/PHARE-Doc. 5a**
Original: **EN**

Meeting of the Workshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Report on the use of geographical information in the statistical office of Romania

Working document concerning item 5 of the agenda of the meeting

Report on the use of geographical information in the statistical office of Romania

Mihaela Fotin

Role of the NSI in Romania

The official statistics in Romania are organised and co-ordinated by the National Statistical Institute, special body of the central public administration, subordinated to the Central Government.
According to the law of official statistics, organization and functioning of the NSI and its attributes are approved by Government Decisions.

The tasks of the National Statistical Institute are:

1. Inform the public opinion and the authorities regarding the economic and social situation of the country and provides to the interested users the data resulted from the statistical researches;
2. Elaborate the statistical system of indicators;
3. Organise and conduct the recording of the necessary information regarding the economic and social processes and phenomena by censuses and total surveys;
4. Collect, process and store data and information for the national fund of statistical data;
5. Collaborate with the ministries and other special bodies of the central public administration for making compatible the statistical system with the other informational systems;
6. Represents Romania in the international relationships in statistical field and co-operate with similar organizations from other countries, with United Nations Organization and with other international bodies;
7. Ensure the compatibility of the national statistical system with the systems used by UNO and its agencies, and with other international organizations.

The activity domains of National Statistical Institute are: development of the national statistical system; statistical methodology; national accounts; statistics of industry and constructions; statistics of trade, tourism and services; statistics of agriculture, environment; social statistics; statistics of population and demography; publications/dissemination; informatics etc.

The use of GIS in the National Statistical Institute – Romania

The needs for better presentation and interpretation of statistics, together with improved and more available tools for geographical analysis and statistical mapping, have put GIS on the agenda in the our statistical institute since 1996.

In the beginning, the main objective of the NSI was to develop a GIS capability within the Census Division, to disseminate information from the 1992 Census and to use GI/GIS for planning the next population and agricultural censuses. For the Population and Housing Census which will be carried out in March 2002, censors will go on the filed with printed maps. GIS is not used within the census project because of lack of resources.

NSI has the principle elements of a GIS (hardware- is not upgraded, software, data, personnel

and customers).

The GIS unit is part of Census Division and consists now of 3 persons. This unit elaborates specific thematic applications for censuses, population statistics, agriculture, environment, demography etc.
Our users are the departments of NSI and we also have external users (President of Romania, Government, Parliament, central institutions, National Library etc.).

The GIS tools that are used: ArcView 3.0 (3.2 for testing) and pc ARC/INFO 3.5. These tools are mostly used for producing thematic maps accompanying official publications. ArcView is used most intensively.

The central database

All the data used by NSI were received from Geosystems (ESRI – Romania). The database contains the administrative boundaries of the territorial units of Romania in vector format.
" The digital map of Romania" was realized in pcARCINFO format, at scale 1:1.000.000 and the data are stored in meters.

The database that consists of 52 pcARC/INFO coverages is subdivided in 11 themes.

Theme	Coverage
1. Administrative boundaries at county level (NUTS level 1)	ROMANIA – one cover with Judet boundaries, border line, the residence towns)
2. Administrative boundaries with communal territories (NUTS level 5), one coverage for each of the 42 counties (Judet - NUTS 3 level)	Alba, Arad, …. Vrancea
3. Railroad network	CFR
4. Roads	DRUM and DRUMEU
5. Localities	LOC
6. Hydrography – the main rivers	HIDRO
7. Hydrography – the main lakes	LACURI
8. Hydrography – detailed – water courses and lakes	APE
9. Ecoregions	ECOR
10. Pedoclimatic microzones	MICROZ
11. Border lines	HOTAR

The NSI also uses two other coverages, created by the NSI itself: one for the development regions (NUTS level 2) and one for communes (NUTS level 5). These coverages are created from the existing ESRI coverages.

This database was created by ESRI-Romania to promote the use of spatial data and use of GIS tools and was given to our institute for free to use it for statistical analysis and other needs.
However, the database has its limits. There were several errors (missing communes, different shapes for localities and, for example, we did not use the localities coverage LOC because 129 of them have been placed in the wrong administrative territory). ESRI never rebuild a new version at this scale. So, NSI had to modify the data itself. pcARCINFO was used for adding, deleting, changing arcs, for changing names/codes. We couldn't modify the boundary of a commune in some cases because we didn't know exactly where to make the changes and the source maps were not available for verification.

To link statistical data with the spatial data, the NSI uses the SIRUTA key - as primary key. SIRUTA is just a unique code for each locality and for each county. If this locality disappear its code in never given to another. E.g. SIRUTA code 1017 is unique for Municipiul Alba Iulia. No other locality will receive this code. Every County also has a SIRUTA code 1 – Alba , 2 – Arad, 41 – Vrancea)

In the NSI, one of the departments update every six months the SIRUTA nomenclature for localities according with the changes made at administrative level, which are published in an official publication named "Monitor Official''.

SIRUTA_locality	TIP	Name of loc	SIRUTA for County	Code for region
1017	1	MUNICIPIUL ALBA IULIA	1	7
1151	2	ORAS ABRUD	1	7
1455	2	ORAS CAMPENI	1	7
1696	2	ORAS CUGIR	1	7
1794	2	ORAS OCNA MURES	1	7
1874	2	ORAS SEBES	1	7
8096	2	ORAS TEIUS	1	7
1936	2	ORAS ZLATNA	1	7

The changes are referring to the name of the localities, of the key code SIRUTA and in case of appearing new towns or communes, etc. For each type of changes the database on localities include classification codes according to the following typology: TIP=1 for residence of Judet, TIP=2 for town (Oras), TIP=4 for Municipiu and TIP=3 for Communes (1,2,4 for urban areas and 3 for rural areas). For example, one of the last changes was that a commune became town so the TIP was changed from 3 to 2 .
The nomenclature of localities is usedfor the needs of statistical surveys and for automatic data processing. This is the reason why all the departments of the NSI create the statistical database only using this key. To join our attribute tables with the external data received from our users we also use the SIRUTA key. This is much easier for us to work this way because the attribute table for this coverage has more than 2600 communes (NUTS 5 level) and it is very difficult to link tables by 'name'.

GIS is used in NSI in the field of population, demography, agricultural and election statistics.

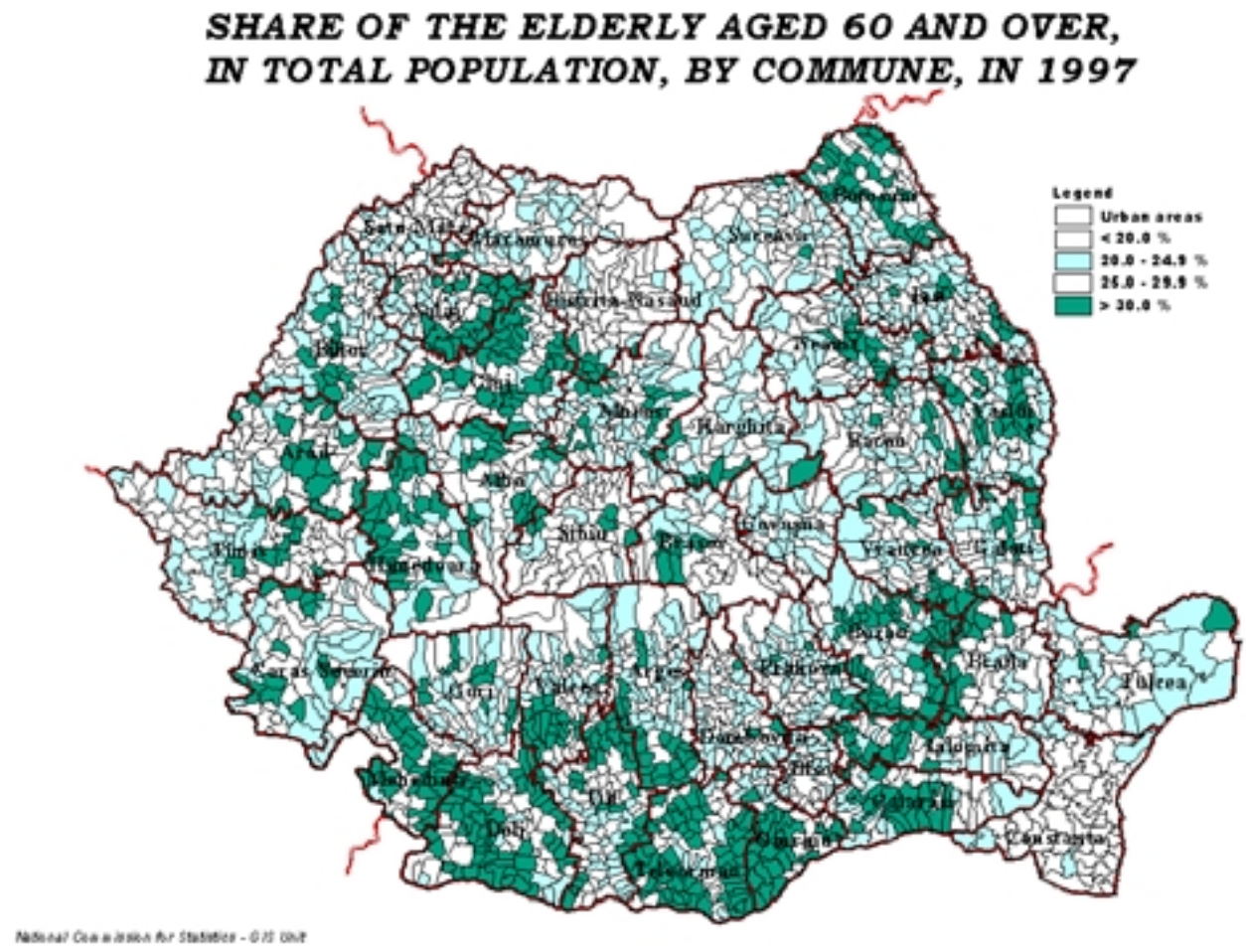
Maps are produced with different regional statistics (maps by counties, by regions, by communes, by selections, by overlaying more strata and by querying the database) according to the requirements of the users.

To produce the maps, we receive from the interested divisions the statistical database. We establish the requirements for the format of the database that they are giving to us (usually the formats accepted by ArcView – elaborated with FoxPro, Visual FoxPro).

Until now, we did not integrate the statistical data in one uniform relational database because the users are coming from different departments and have their own database. It is not covering necessary the whole territory, nor complete time series.

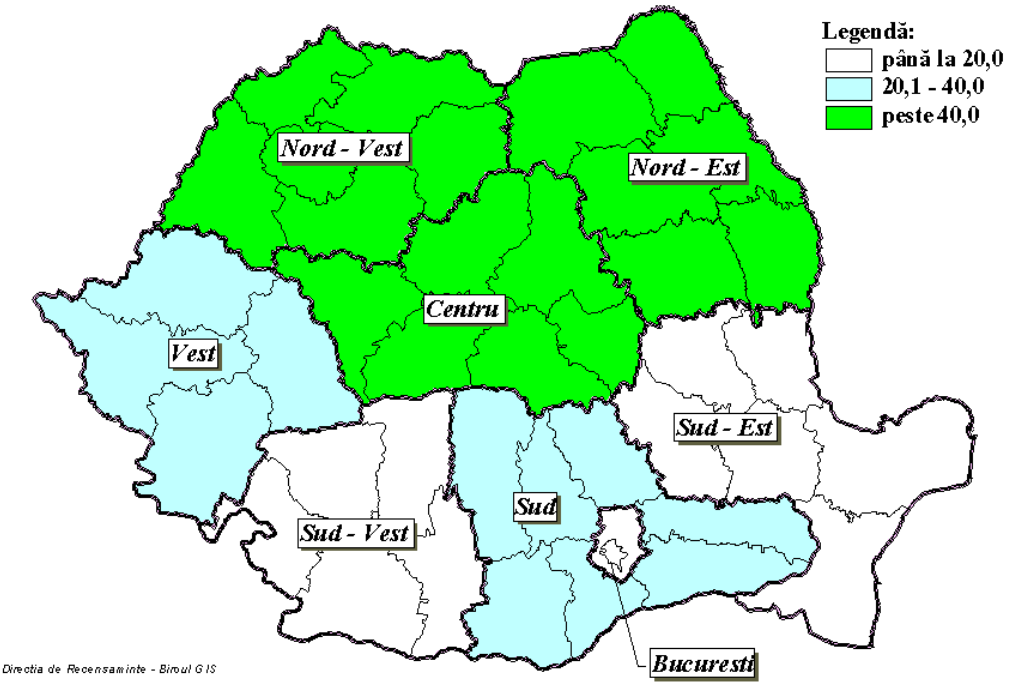
The statistical themes used for mapping in NSI :

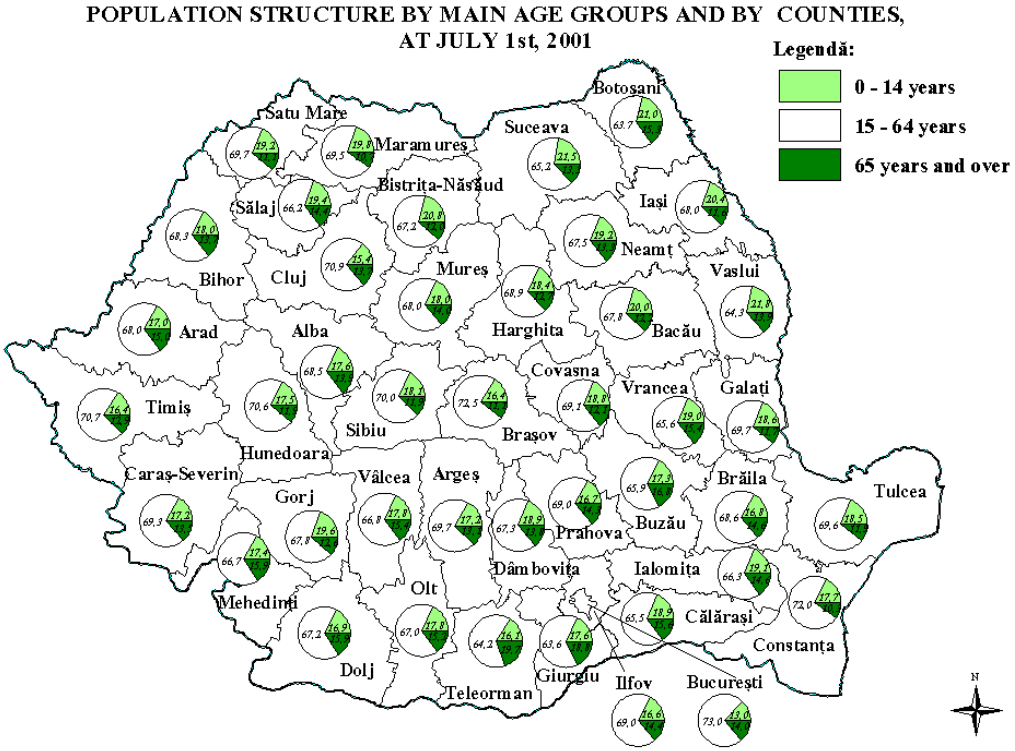
Themes	
Demography	Distribution and trends of the main demographic indicators (fertility, mortality, marriage, divorce, internal and external migration, etc)
Population	Population structure by area, by number of inhabitants, density, structure of population by age groups, by occupation, by gender by economical activities, by nationality, classification of counties and localities by inhabitants number, population of counties, municipalities and towns
Agriculture	Cultivated area by main crops, crop production, livestock, animal production , agricultural area etc.
Industry, election statistics, environment, economic statistics, regional statistics	


SHARE OF THE ELDERLY AGED 60 AND OVER,
IN TOTAL POPULATION, BY COMMUNE, IN 1997
Legend
Urban areas
< 20.0 %
20.0 - 24.9 %
25.0 - 29.9 %
> 30.0 %
Bistrita-Nasaud
Arad
Alba
Sibiu
Timis
Caras Severin
Gorj
Valcea
Arges
Dambovita
Ilfov
Dolj
Olt
Teleorman
Prahova
Buzau
Vrancea
Galati
Braila
Tulcea
Ialomita
Calarasi
Constanta
Bacau
Vaslui
Iasi
Neamt
Suceava
Botosani
Maramures
Satu Mare
Bihor
Salaj
Cluj
Mures
Harghita
Covasna
Brasov

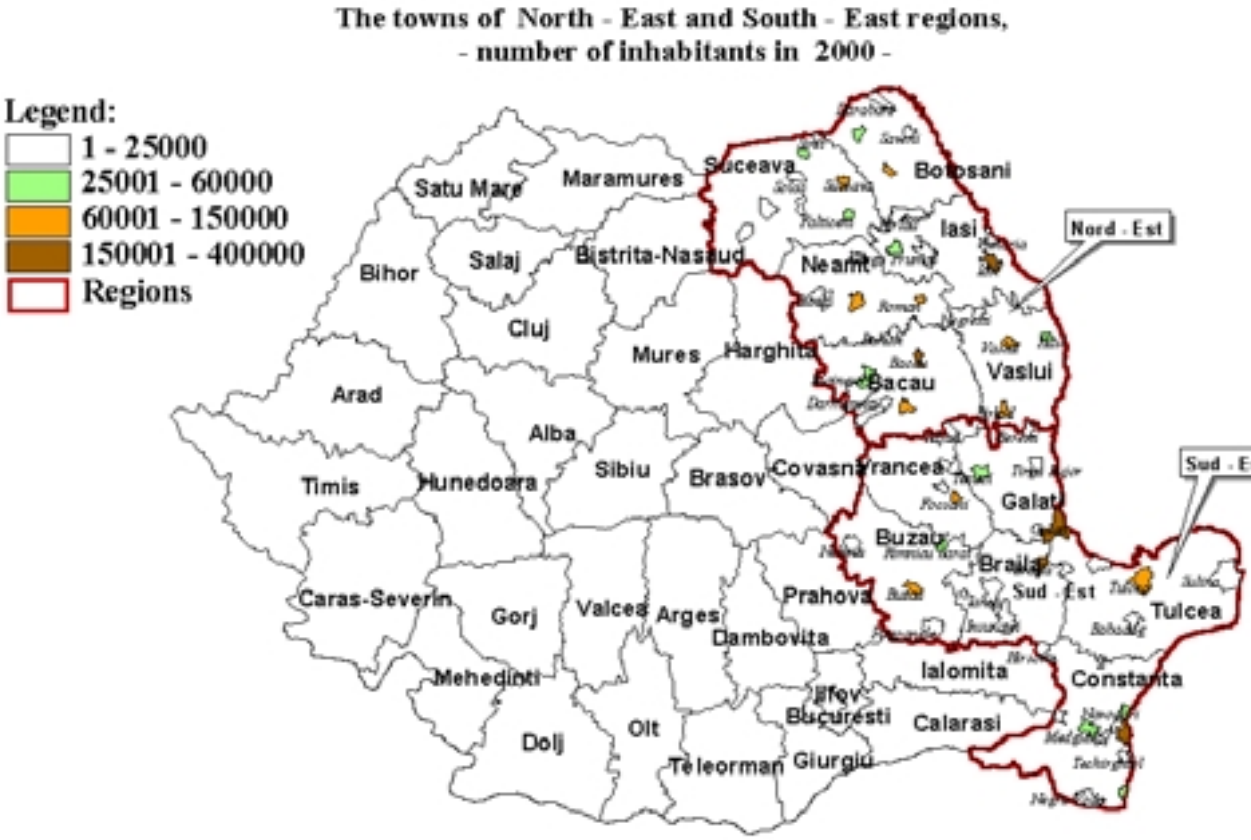
DISTRIBUTION OF THE DEVELOPMENT REGIONS BY THE SURFACE CULTIVATED WITH POTATOES, IN 2001

- thou hectares -





GIS is used now in a more advanced way. The ArcView geoprocessing tool is used to make overlays - for creating new data based on the themes in the view. We reduce the extent of a theme (clipping one theme based on another or intersecting two themes or by combining features in two or more themes. In the map below we created a new theme using thr intersection (of the towns of two of the regions). The attribute data from both themes are included in the new theme's attribute table and used to produce this thematic map.


The towns of North - East and South - East regions,
- number of inhabitants in 2000 -
Legend:
1 - 25000
25001 - 60000
60001 - 150000
150001 - 400000
Regions
Satu Mare
Maramures
Suceava
Botosani
Iasi
Nord - Est
Bihor
Salaj
Bistrita-Nasaud
Neamt
Cluj
Mures
Harghita
Bacau
Vaslui
Arad
Alba
Sibiu
Brasov
Covasna
Vrancea
Galat
Timis
Hunedoara
Buzau
Braila
Sud - Est
Tulcea
Caras-Severin
Gorj
Valcea
Arges
Prahova
Dambovita
Ialomita
Constanta
Mehedinti
Ilfov
Bucuresti
Calarasi
Olt
Dolj
Teleorman
Giurgiu

GIS perspective and co-operation

For the future use of GIS in the NSI, it is necessary to have a more detailed spatial database.

If the NSI will use GIS for the General Agricultural Census , there is a need for:

- large scale maps at 1:5000 for localities,
- medium-scale basic maps of Romania at 1:50.000,
- evaluation of aspects based on the maps for enumeration areas that wiil serve for the next census
- codification
- the needs to process geo-referenced information with european standards
- exchange of information with regard to the solutions applied in other countries

The NSI is not a map producer, nor is it a constructor of spatial databases. The competence in the field of geodesy and cartography belongs to The National Office of Cadastre , Geodesy and Cartography(NMA).

The presidents of ONCGC and NSI intend to start a collaboration between the two institutes for integration of statistics and geography.

In a short time, we will start a twinning project with Italy through the PHARE Programme 2000. This project has two components: Land Use Statistics and Estimation of Vegetal Production. The partners in our country are: the NSI – coordinating partner, CRUTA (Romanian Center for using Remore Sensing in Agriculture) and the Ministry of Agriculture. This project includes a pilot survey in agriculture, based on areaframe sampling and will use the experience of CRUTA.

Contacts

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EUROPEAN COMMISSION
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES

Directorate E: Social and regional statistics and geographical information system
Unit E-4: Regional indicators and accounts, population and geographical information system

Document: **WS/PHARE-Doc.5b**
Original: **EN**

Workshop for Candidate Countries on Geographic Information Systems (GIS)

Joint meeting with National Statistical Offices and National Mapping Agencies

Luxembourg, October 24, 2001
JEAN MONNET Building (Room "M5")
Beginning of the meeting: 10 a.m.

Report on the use of GI in the NMA in the Republic of Romania

Working document concerning item 5 of the agenda of the meeting

REPORT ON THE USE OF GI IN THE NMA IN THE REPUBLIC OF ROMANIA

G.Luca

Since the first of July 2001, the National Office of Cadastre, Geodesie and Cartography (NOCGC) was reorganized and is under the authority of the Ministry of Public Administration. The President of NOCGC is Mr. Alexandru Radocea, who was the former Head of the Statistical Office of Romania (This gives us hope that from now on there will be a better cooperation between NMA and NSI).

Before July 2001, the NOCGC did exist, but it was linked directly to the government as a National Agency and had a subordinate Institute, but only for research. Before 1996, when the NOCGC was established, there was an Institute of Geodesy, Photogrammetry, Cartography and Territory Organisation (IGFCOT) that was linked to the Ministry of Agriculture. This Institute was the main map producer from the civil range. In 1996, this Institute was transformed in Institute of Cadastre and Territory Organization, under the same authority: Ministry of Agriculture. To became more efficient and to have a better coordination, in July 2001 according with the government policy the NOCGC was established with 42 OJCGC subordinated in every district (called JUDET) and an operational branch: the Institute of Cadastre, Geodesy, Photogrametry and Cartography.

According to the law the NOCGC has the authority to:

- Elaborates the concepts and trends of the geodetic, Photogrammetric, cartographic and cadastrial activities.
- Administrates and co-ordinates research, scientific and technological development.
- Drafts generally binding geodetic systems and location standards.
- Stipulates the terms of quality for the performance of geodetic and cartographic activities.
- Ensures the establishment and measuring points, marking and measurement of the national geodetic network and updating the geodetic network together with the Ministry of Defence.
- Organise and administrates the National Geodetic and Cartographic Fund and also the national cadastrial database in a uniform system.
- Stipulates compilation, updating and publishing state map series.
- Issues and suspends the certificates on technical competence to and from physical persons and private firms.
- Co-ordinates, organizes, manages all activities of geodetic, cartographic, photogrammetric, cadastre and land management kind in the field of agriculture.
- Organises the cadastre activities and realizes the informational system for the agricultural territory.
- In the field of real estate, the cadastre stipulates the tasks in the arrangement of the ownership rights to the land.
- Stipulates international cooperation.

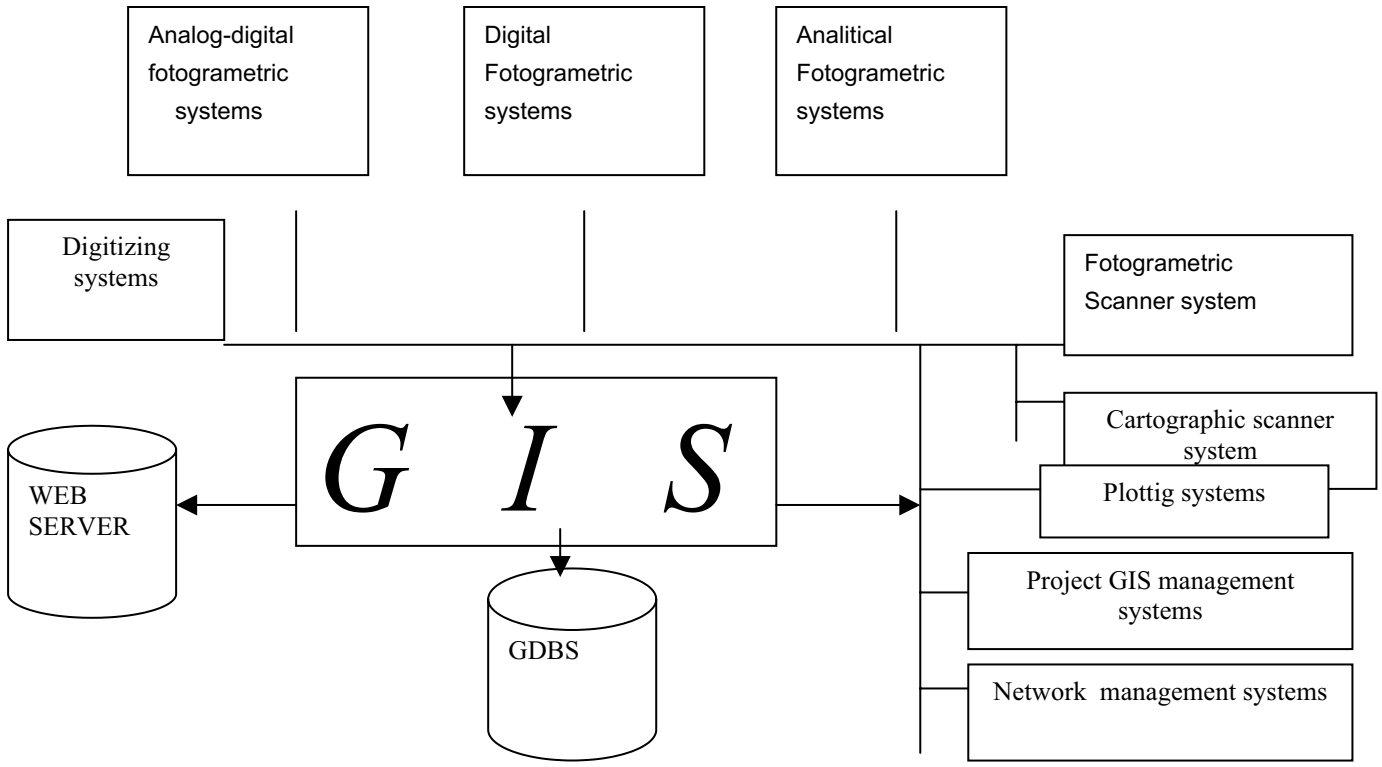
The Institute of Cadastre, Geodesie, Photogrammetry and Cartography (ICGFC) is the operational branch of the NOCGC. It's activities is related to data acquisition, construction of databases, GIS and project management in geodesie, Photogrammetry, cartography, cadastre and land management. A special department of the Institute is the National Geodetic, Photogrammetric and Cartographic Fund (NGFC).

NGFC is a special archive in which materials of record-keeping value are collected, maintained, protected and made accessible. NGFC archives stores all the documentation concerning geodetic points, maps, photograms in analogue and digital format.

The other two departments of ICGFC are Geodetic, Photogrammetic and Cartographic Direction (DGFC) and Cadastre and Agricol Territory Organization (DCOTA).

Although ICGFC has the technology to print "traditional" maps, this isn't a main task or objective anymore. At this time we have the technology and trained people to produce digital maps, databases, GIS and to carry out project management.

ICGFC has a network with: four central servers (one acts like a data server, one like a backup server, one like mail server and a domain controller) connected via 100 Mbit line to one digital photogrammetric station and a scanner, two analogue-digital stations (stecometers with interfaces developed by us), one cartographic scanner, 4 GIS computers, 14 computers for data acquisition, 2 computers for project management, one for network administration and two plotters.



Based on these systems we obtained several digital maps. For example the digital map of Romania at scale 1:500.000 and one at scale 1:50.000. We used the same technology:

- We scanned the originals films that were used for editing the paper maps, with all their basic layers (with the cartographic scanner-Anatech an Intergraph scanner), keeping like this the precision of the original scale.
- After the mathematical transformations and after putting everything in co-ordinates (Stereographic 70 projection - the official projection for civil maps) of raster information we proceed to obtain the graphical database.
- The software products for data acquisition we used are: MicroStation –Bentley, I/Ras B, I/Ras C, I/Parcel Vec, I/GeoVec - Intergraph.

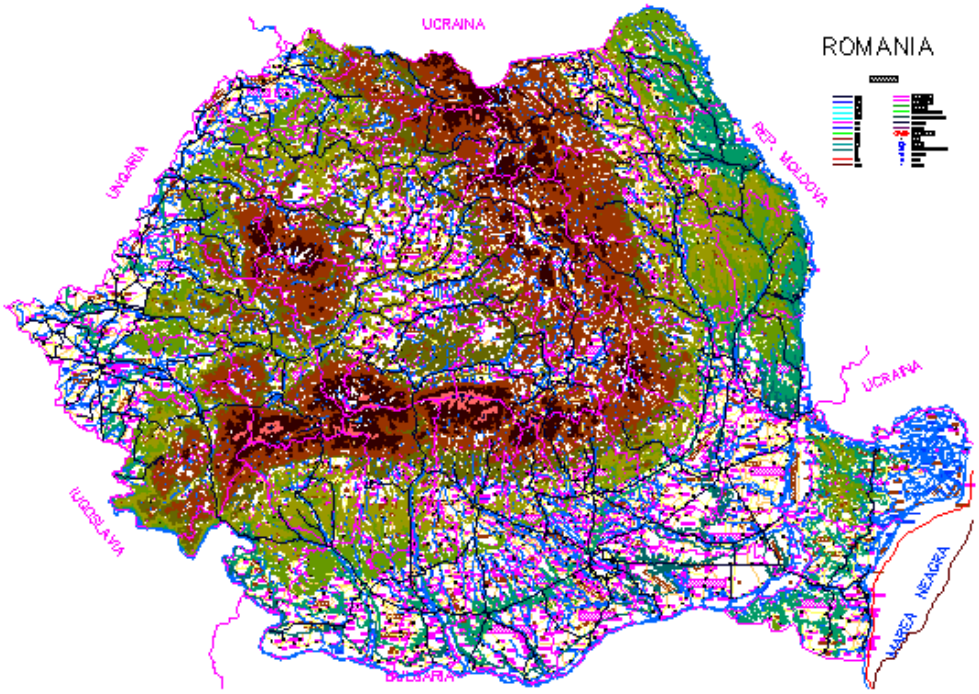
- The software products for GIS are: MGE (MGE- Basic Administrator, MGE- Basic Nucleus, MGE- Base Mapper) from Intergraph and AutoCad Land Developer from Autodesk. We have also Microsoft-SQL as database software.

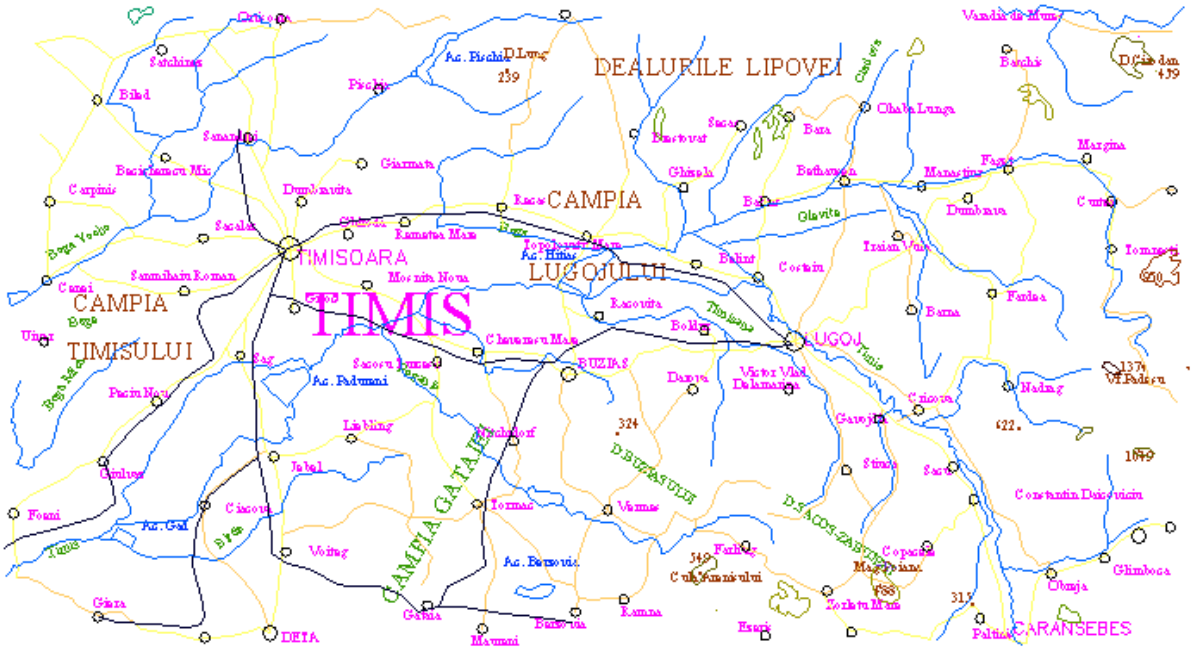
The digital map of Romania at scale 1:500.000 has the following layer structure:

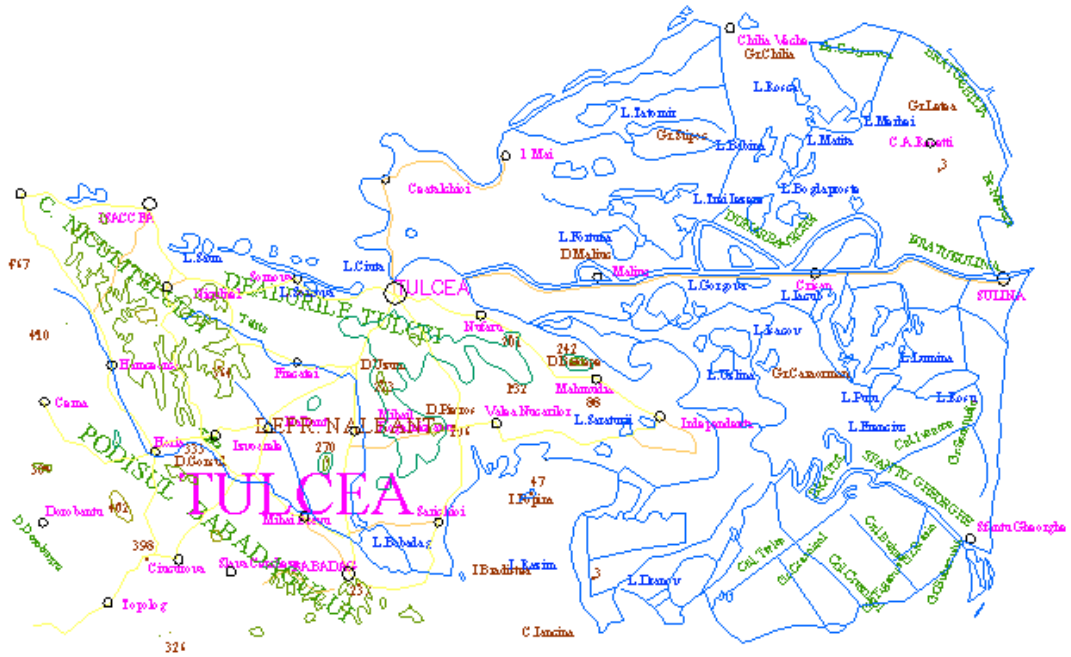
1. planimetric elements- railways, high-way, european-roads, national-roads, district (judetean)-roads, all the settlments (from cities to communes), administrative boundaries (borders and district boundaries), text regarding: place names, regional names, etc.

2. hydrography- main rivers, lakes, Danube-delta, Black-Sea.

3. elevation- at an interval of 100 meters (the DTM was realized).



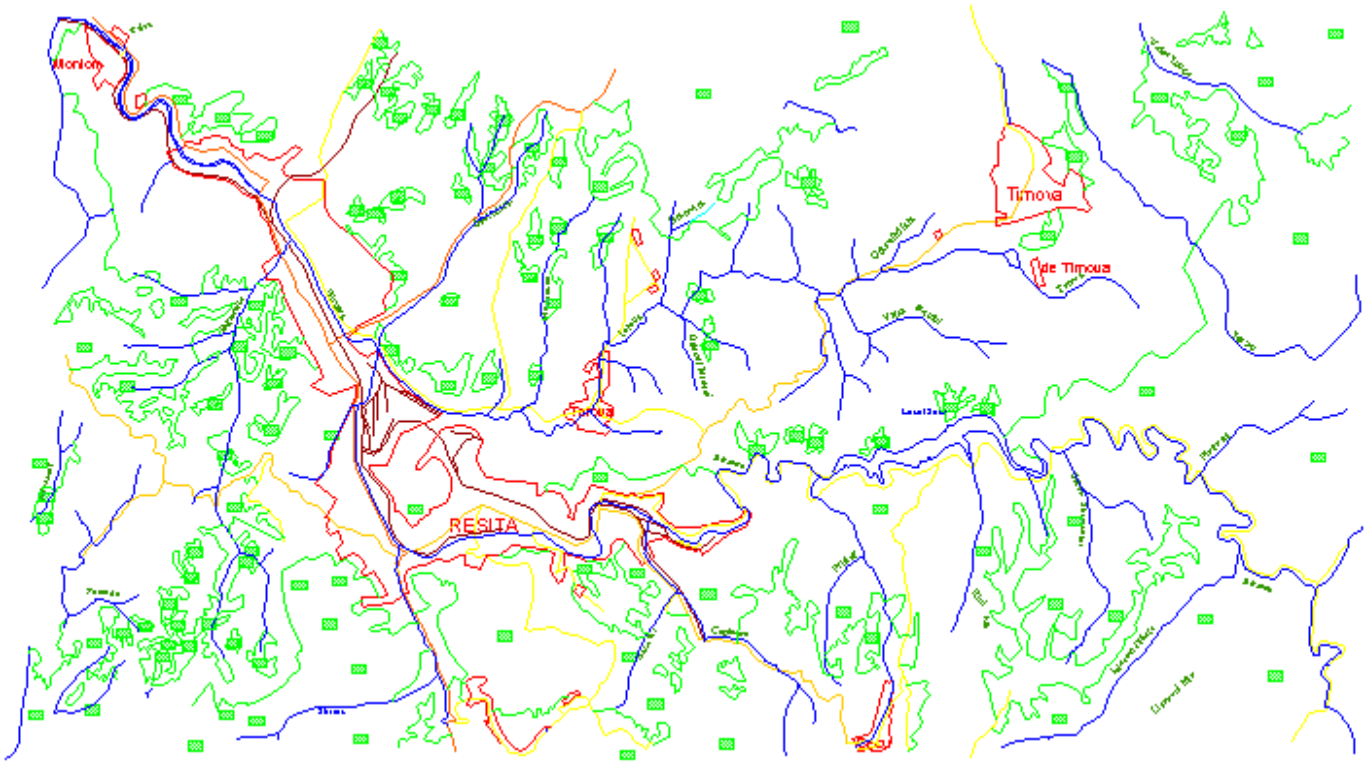




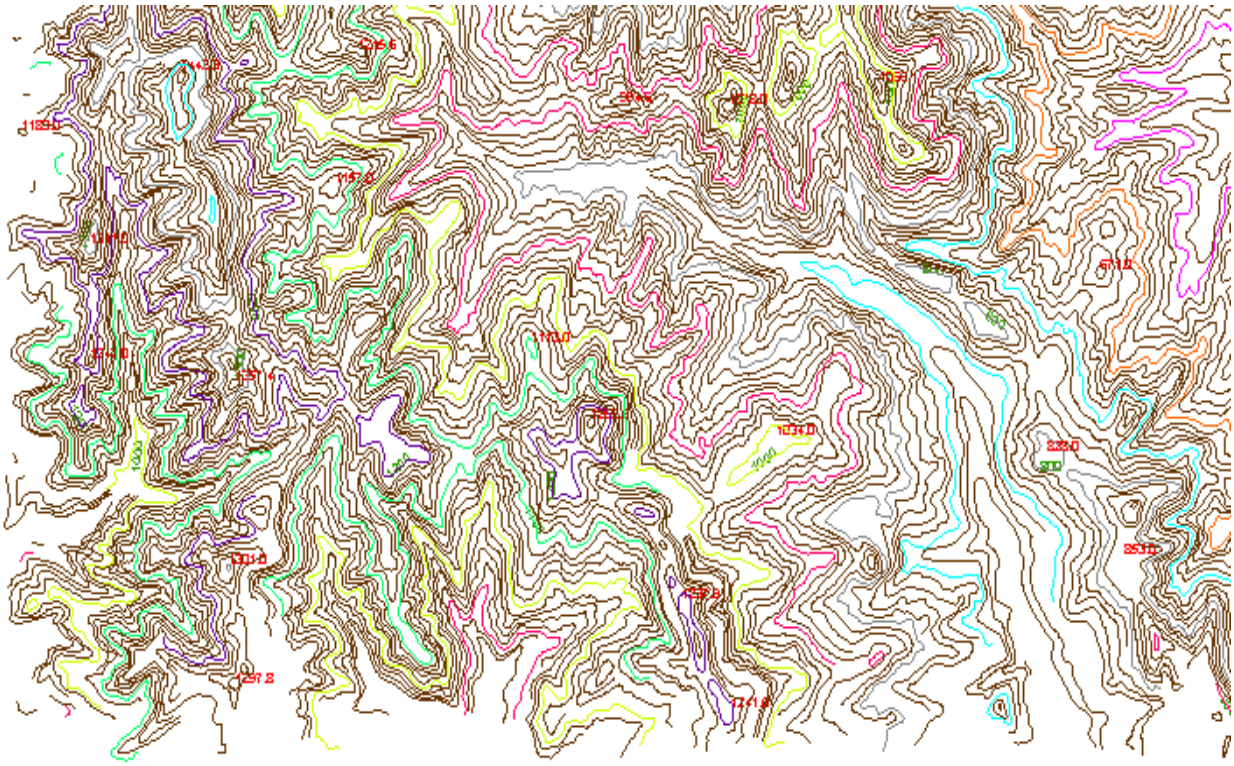
The digital map of Romania at scale 1:50.000, has more details but we didn't digitize all the topographical elements ,but only the ones we considered that didn't change to much in time. That's because the information on the maps is from the eighties. This digital map can be updated and completed in time with recent information from orthophotos (a program running now for 12 districts), or any other information that will be integrated.

The map has several layers: Planimetry and Hydrography

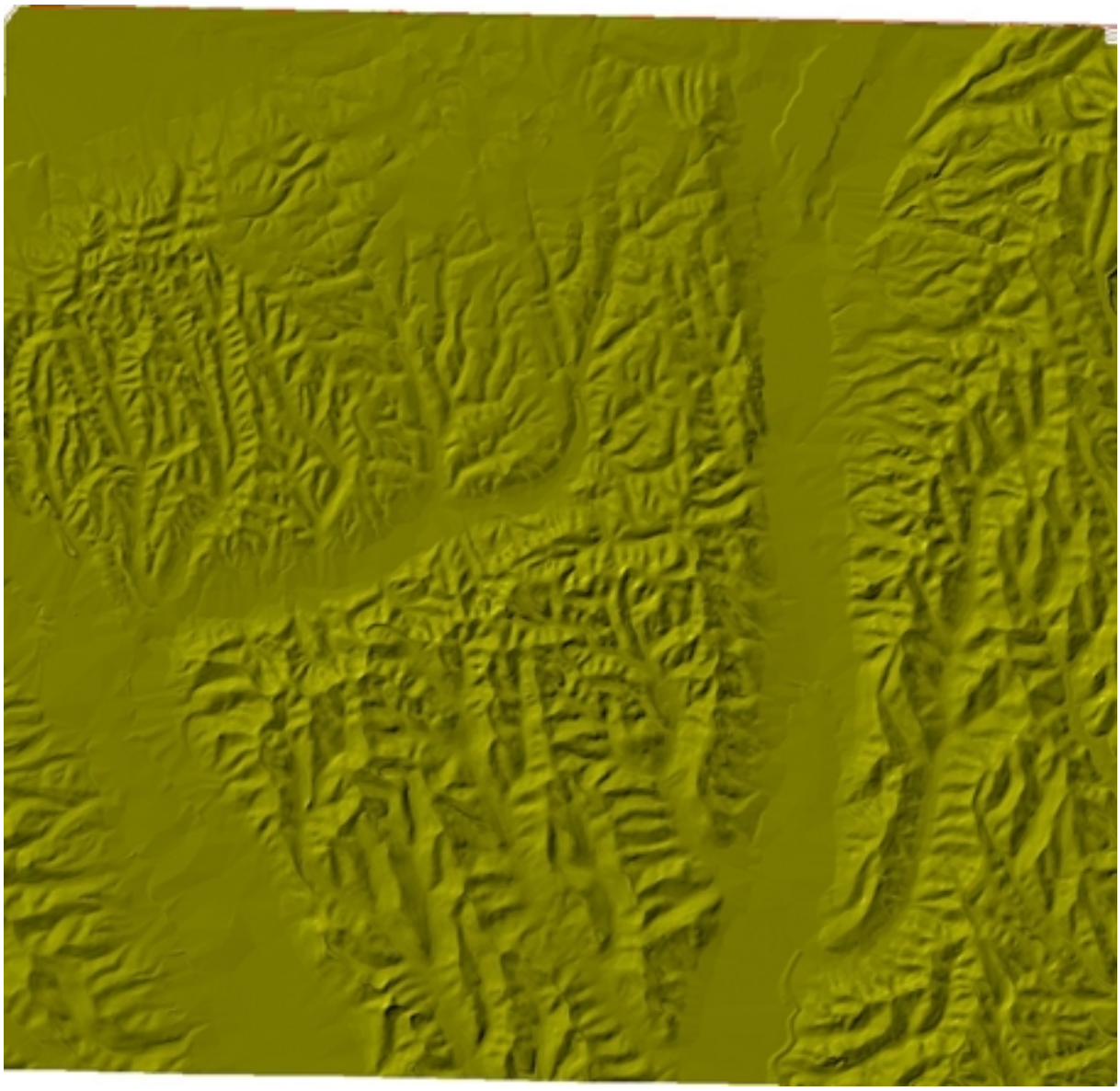
Fcode	Fname	Flevel	Fcolor	Fweight
1	Hydrography	1	1	0
3	Hydrography text (names)	1	1	0
4	Railways	2	99	0
5	National Roads	3	30	0
6	District Roads	4	52	0
7	Communal Roads	5	4	0
8	Border boundaries	6	5	0
9	City Residence of district boundaries	7	3	0
10	Municipiu boundaries	8	3	0
11	City boundaries	9	3	0
12	Commune boundaries	10	3	0
13	Village boundaries	11	3	0
14	District Boundaries	12	109	0
56	Municipiu names	56	6	0
68	City names	57	6	0
32	State name	6	5	0
33	District names	12	109	0
37	Commune names	10	3	0
38	Village Names	11	3	0
69	City administrative boundaries	57	6	0
43	Lakes boundaries	19	1	0
70	Commune administrative boundaries	58	6	0
71	Commune administrative names	58	6	0
34	City residence of district names	7	3	0
35	Municipiu names	8	3	0
36	City names	9	3	0
20	Wood boundaries	20	3	0



The elevations lines (with elevation contours 20 meters) are on different layers and with check points the digital map is prepared to proceed to DTM.

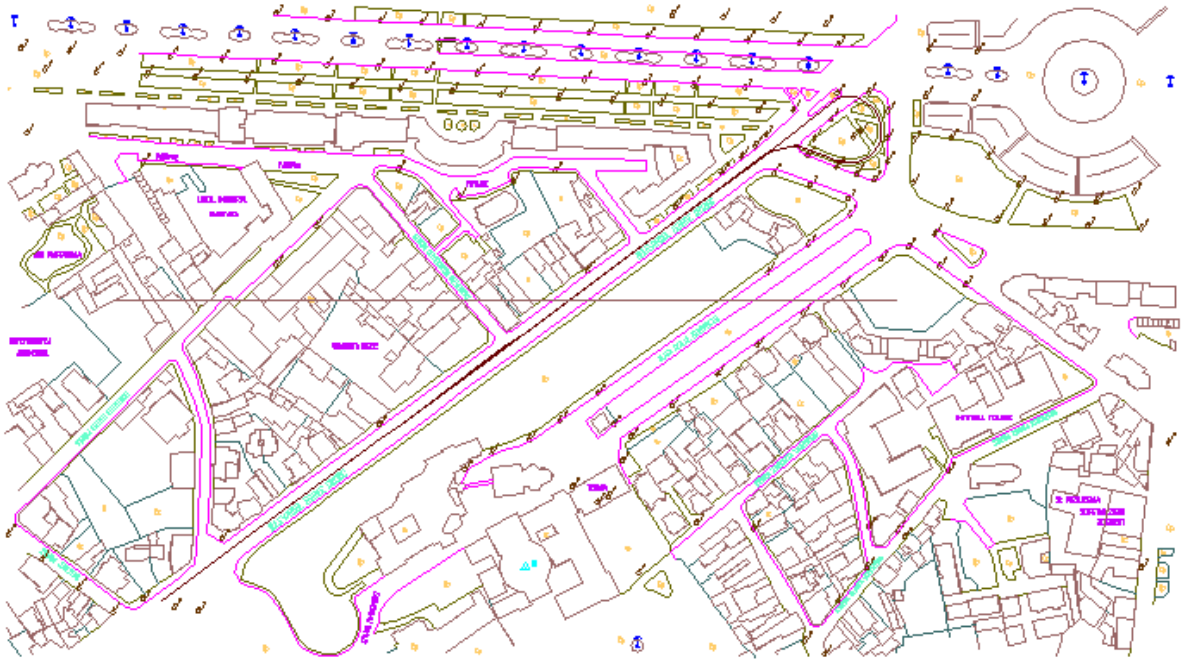


DTM is realised with the digitized elevation.



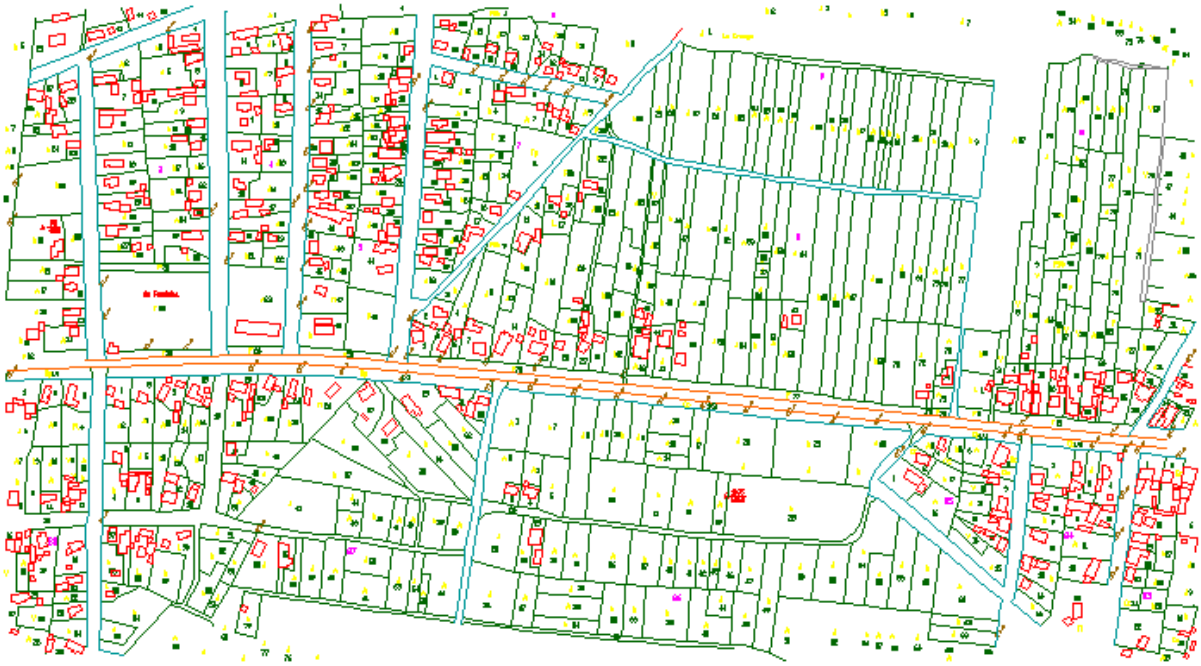
As you can see the very detailed spatial data contained by the digital map concerning the administrative boundaries can be linked with an ID-code named SIRUTA key. This code is unique for every administrative unit and together with the code for the centre/outer ring and the cadastrial number, it represents the identification number for the two databases (graphical-text) in the real estate cadastre.
Our Institute realised with this technology several projects such as:

- Digital map of Bucharest at scale 1:2.000- the map is very recent, from 1997. Every topographical element is on a separate level.

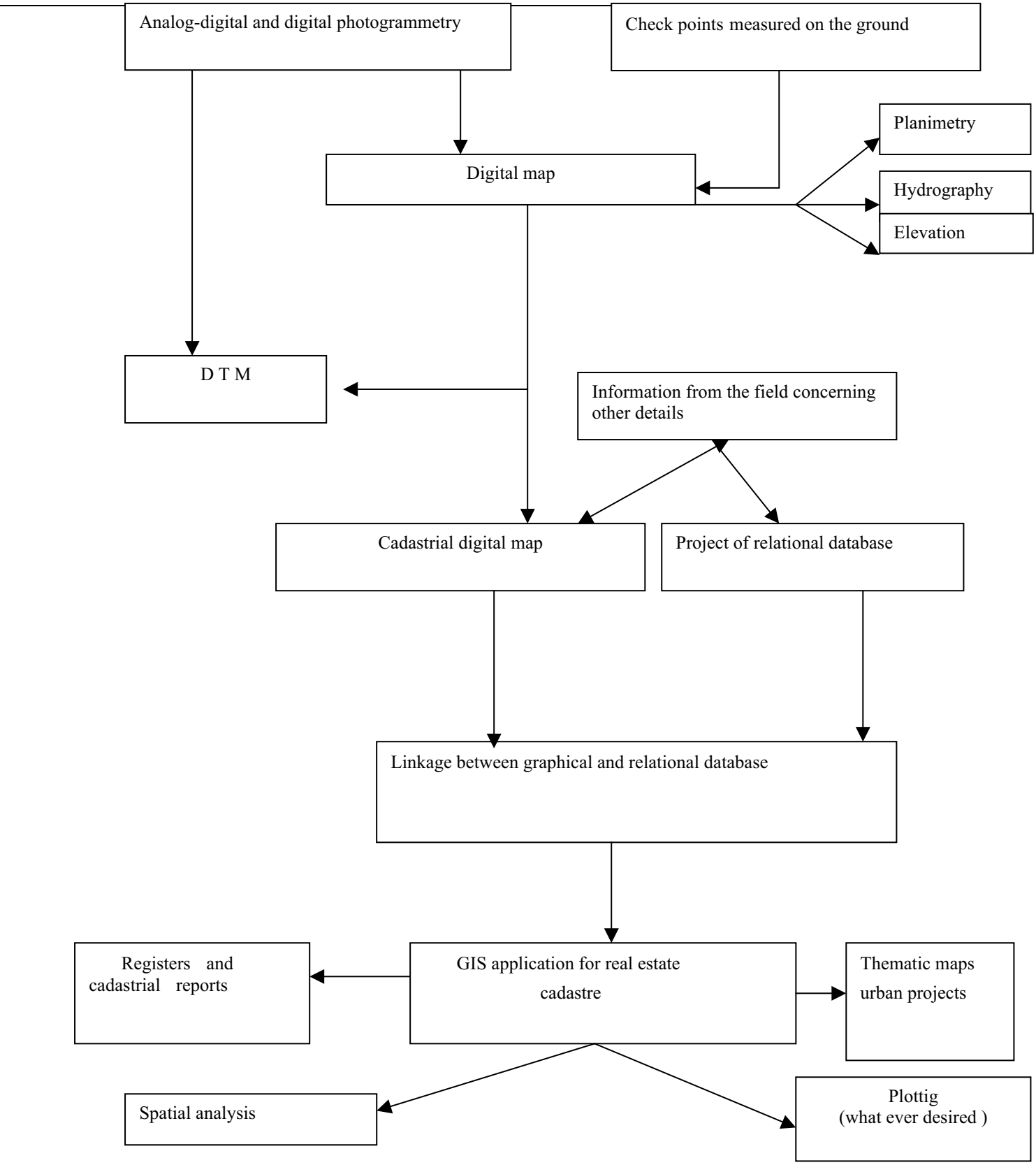


For this project were scanned and digitized aprox.450 editing originals.

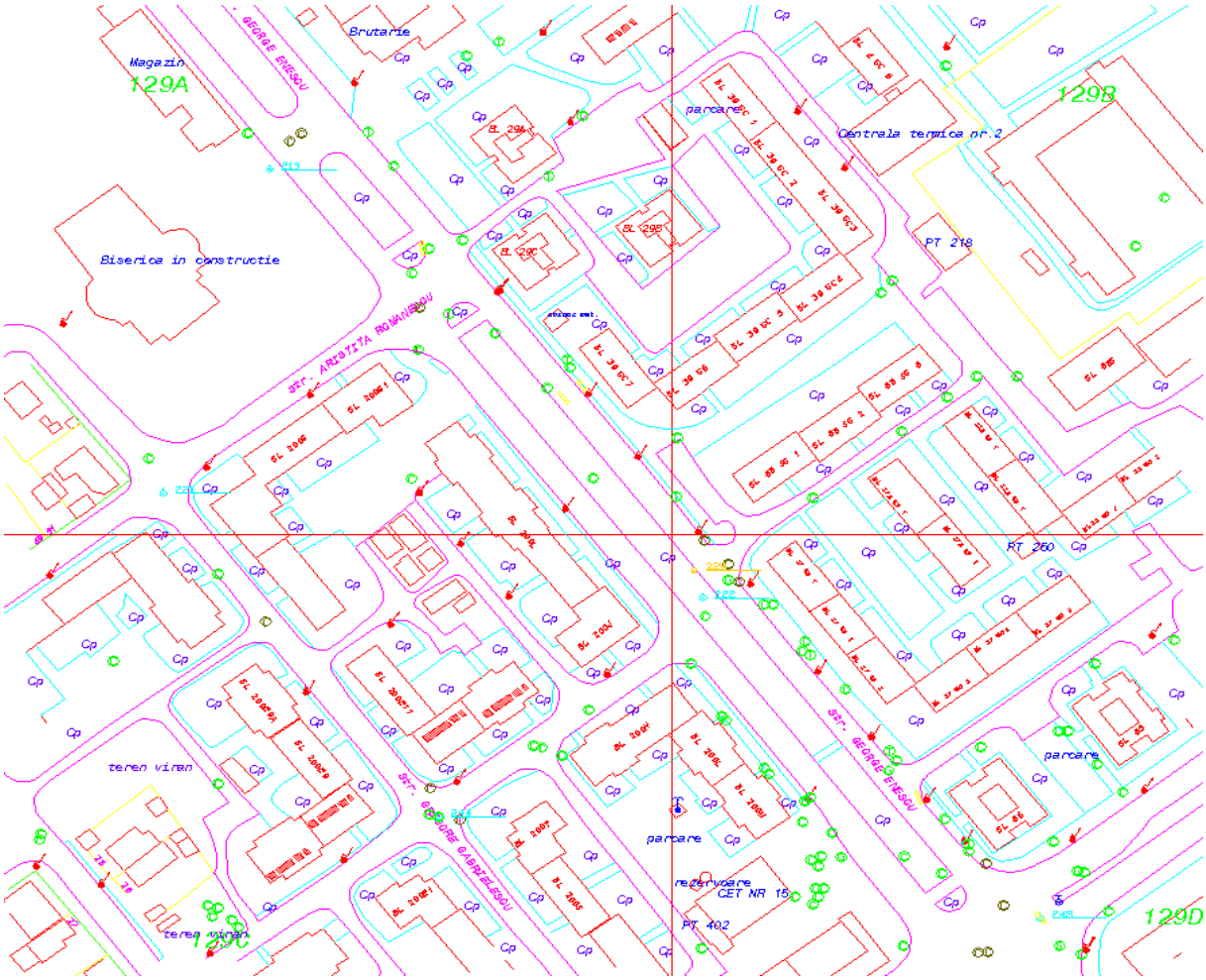
- A great project was made for the city of Constanta. The GIS project (real estate cadastre) was with a graphical database and with a RDB. We used the Intergraph modules for data acquisition and for GIS and SQL-Microsoft as a Relational DataBase. The digital map obtained is at 1: 500 scale.
- A research GIS project for agricultural cadastre that is at scale 1:2000 for Fundulea and includes all the administrative territory of the city.



- A very important project that is taking place now is the GIS project for the municipality of Craiova. It's important because of the technology we adopted and may became an example of realizing GIS for real estate cadastre.



Digital map of Craiova at scale 1:1.000 realized with the technology adopted by ICGFC.



Conclusions

Construction of GIS databases in our Institute can be developed more but we need to upgrade our existing software (and this because we have several trained people to work with them) and more PC's and of course at least one or two servers because according to our policy we must integrate databases from different sources concerning real estate cadastre.

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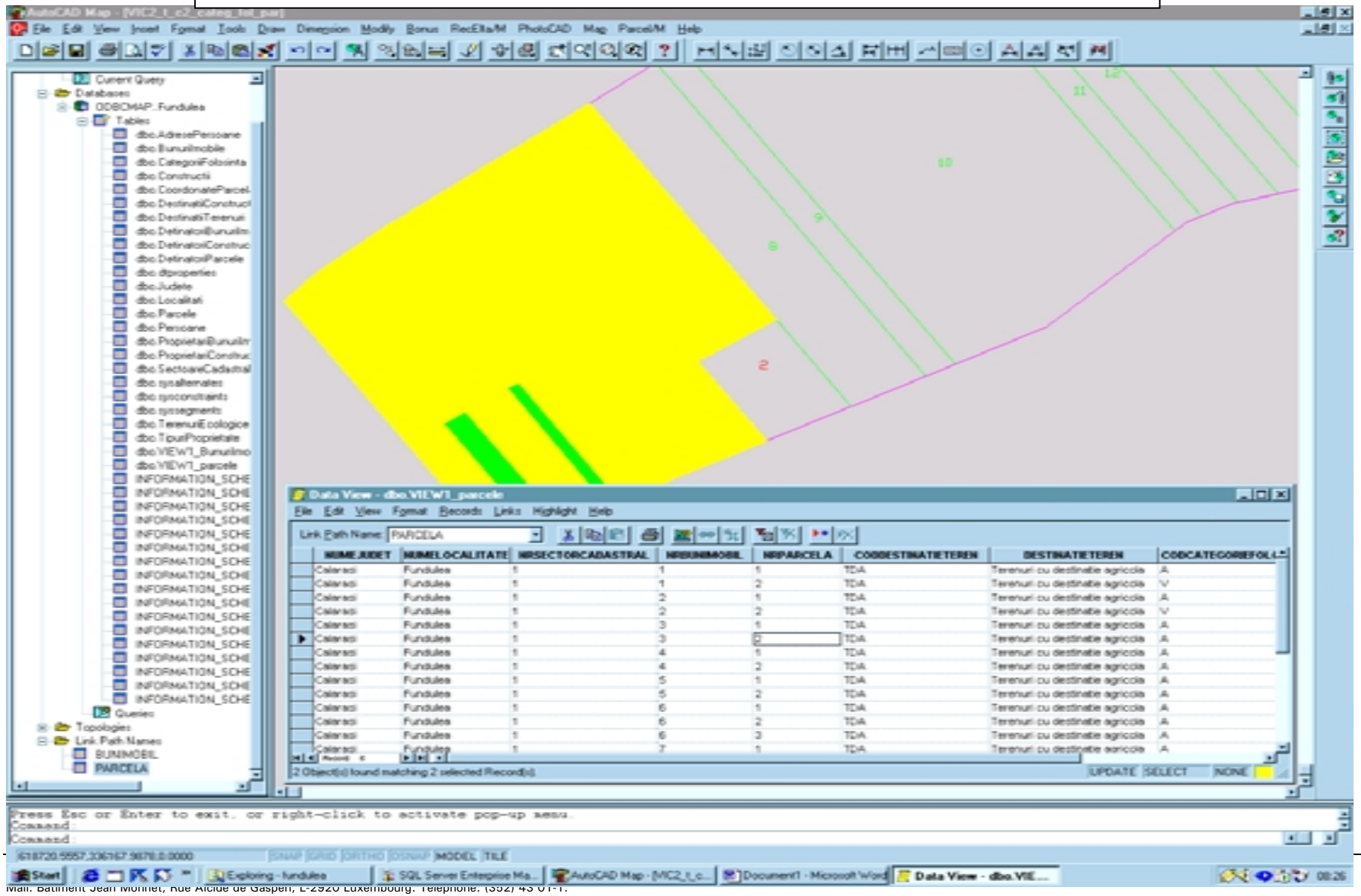
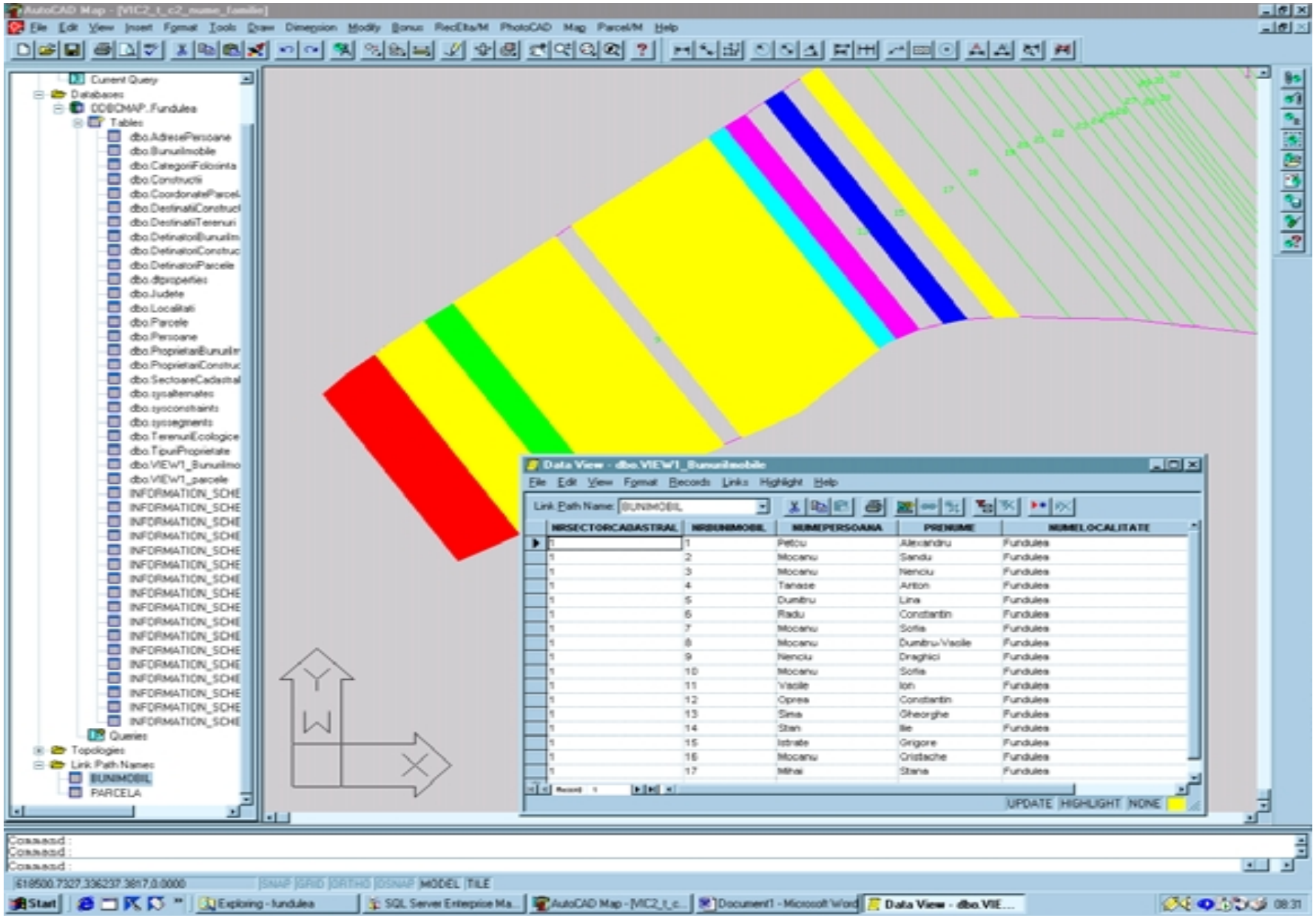
Examples of query from GIS –graphical and database- realized for real estate cadastre.



Mail: Bâtiment Jean Monnet, Rue Alcide de Gasperi, L-2920 Luxembourg. Telephone: (352) 43 01-1.
Offices: Bâtiment Joseph Bech, 5 Rue Alphonse Weicker, L-2721 Luxembourg
Office: BECH D3/733. Telephone: direct line (352) 43 01-33411. Fax: (352) 43 01-34029.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dbo.TerenuriEcologice
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1 1 Petcu Alexandru Fundulea
1 2 Mocanu Sandu Fundulea
1 3 Mocanu Nenciu Fundulea
1 4 Tanase Anton Fundulea
1 5 Dumitru Lina Fundulea
1 6 Radu Constantin Fundulea
1 7 Mocanu Sofia Fundulea
1 8 Mocanu Dumitru Vasile Fundulea
1 9 Nenciu Draghici Fundulea
1 10 Mocanu Sofia Fundulea
1 11 Vasile Ion Fundulea
1 12 Oprea Constantin Fundulea
1 13 Sima Gheorghe Fundulea
1 14 Stan Ile Fundulea
1 15 Istrate Grigore Fundulea
1 16 Mocanu Cristache Fundulea
1 17 Mihai Stana Fundulea
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Mail: Bâtiment Jean Monnet, Rue Alcide de Gasperi, L-2920 Luxembourg. Telephone: (352) 43 01-1.
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EUROPEAN COMMISSION
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES

Directorate E: Social and regional statistics and geographical information system
Unit E-4: Regional indicators and accounts, population and geographical information system

Document: **WS/PHARE-Doc.6**
Original: **EN**

Meeting of the Workshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Report on the use of GI in the NSI and NMA in Estonia

Working document concerning item 7 of the agenda of the meeting

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Report on the use of GI at NSI and NMA of Estonia

Inge Nael, Statistical Office of Estonia
Kristian Teiter, National Land Board, Estonia

ABSTRACT

The Statistical Office of Estonia (SOE) as NSI and the Estonian Land Board (ELB) as NMA are governmental agencies and financed 100% from the state budget. SOE is acting under the jurisdiction of the Ministry of Finance and ELB, under the jurisdiction of the Ministry of Environment. The collection, availability, distribution and security of information, including GI, are regulated and guaranteed by the corresponding laws – the Databases Act and the Personal Data Protection Act, as well as statutes of state registers and the related institutions, and datasets. Official co-operation between SOE and ELB and other state institutions and local municipalities is based on the abovementioned legal acts. Co-operation is the closest in the field of data exchange and use of topographic data. For example, SOE has used the Estonian Base Map and orthophotos to compile digital maps for the 2000 Population and Housing Census.

NSI

SOE (http://www.stat.ee) is a government agency which organises and co-ordinates the production of official statistics in Estonia.
The Official Statistics Act (RT I 1997, 51, 822; RT I 2000, 47, 289) establishes the legal bases for the conduct of systematic and purposeful official statistical surveys[1]. The Official Statistics Act is in compliance with the Statistics Act of the European Union and follows the principles of official statistics in the region of the Economic Commission for Europe. The task of SOE is to provide the society with the objective and reliable statistics that would give an adequate overview of the situation of the environment, population, social sphere and economy of Estonia[2].

THE USE OF GI AT NSI

SOE has produced thematic maps of different subject areas on a county level to be published in statistical yearbooks of Estonia and in a publication “Counties in Figures” using MapInfo since 1994. A new stage in developing GI activities started during preparations for the 2000 Population and Housing Census in Estonia. A detailed description of compiling digital Census maps has been presented in **WS/PHARE-Doc.6.Census maps**. The 2000 Population and Housing Census was conducted on the basis of the Population and Housing Census Act (RT I 1998, 52/53, 772; RT I 1999, 101,901) which provides the procedure for the organisation of national Censuses, the processing, use and storage of Census data, and the publication of Census results[3]. Pursuant to the Population and Housing Census Act Census maps are, besides other documents, the main Census documents which are used in the planning phase, during fieldworks and in the dissemination of Census results. Digital Census maps are available for state institutions and local authorities in digital form free (only data conversion and data storage services are available at a low price). SOE faces a problem of how to update the GIS database every year because on a state level there is no yearly updating. SOE is now looking for possibilities for co-operation with local authorities and other institutions to update the GIS database on a building level (xy-coordinate points for centroids).

Regional breakdown

Pursuant to the Territory of Estonia Administrative Division Act passed by *Riigikogu* (Parliament) on 22 February 1995, administrative units Estonia´s territory are county, rural municipality and city. State administration on a local level is realised in counties. The county is divided into cities and rural municipalities where local administration is executed.. As of 1 January 2001, there were 15 counties, 42 cities and 205 rural municipalities in Estonia.

Codification

See Appendix 1 Classification of Administrative Units and Settlements of the Estonian Republic.

Geographical units

At present, grids are not used in statistics.

Estonia has been divided into 2050 tiles of 5 x 5 km in the framework of the Basic Map program.

See also Appendix 2 The Estonian Classification of Territorial Units for Statistics NUTS.

NMA

The Estonian Land Board (ELB) (http://www.maaamet.ee) is responsible for:

- maintenance of the Land Cadastre;
- co-ordination of the land reform;
- supervision, organisation and co-ordination of the activities in the fields of land consolidation, land assessment, geodesy, cartography and geoinformatics;
- maintenance of the archive of geodesy and cartography;
- supply of the society with high-quality services in the related fields.

ELB can be regarded as a major producer of GI in Estonia. ELB orders mapping services from private mapping companies through public tenders, but the copyright and ownership of the data and publications produced by order of ELB belong to ELB.

Cadastral data are public and everyone has a right to access the data. The use and price of digital topographic data are regulated by the corresponding procedure to be approved by the Minister of Environment. The right to use topographic data is free of charge for state agencies and local governments, other users have, as a rule, to pay for this.

ELB is engaged in the following mapping projects:

- Estonian Basic Map – topographic digital database 1:10 000;
- Estonian Base Map – GI digital database 1:50 000;
- Estonian Soil Map – GI digital database 1:10 000;
- Maps of urban areas – topographic digital databases 1:2000;
- MapBSR - digital database 1:1000 000 produced in international co-operation between the states within the Baltic Sea catchment area;
- EuroGlobalMap – digital database 1:1000 000 for the whole of Europe produced under EuroGeographics conforming to GlobalMap specifications.

Estonian Basic Map 1:10 000

The most important mapping project is the Estonian Basic Map 1:10 000 the development of which is actively being dealt with.

The Estonian Basic Map is a seamless digital topographic database covering the whole territory of Estonia and which contains information on utilities (roads, electric power lines, etc.), settlement, hydrography, relief, place names and land use. The accuracy and content correspond to the mapping scale of 1:10 000. The projection used is L-EST. Digital data are in MicroStation DGN format.

The principles of the Estonian Basic Map Project were developed and approved in 1991. As source materials aerial photographs, fieldwork materials, existing cartographic and statistical data were used. Contractors are chosen through public tenders. The project provides users with the following products:

- Digital orthophotos 1:10 000;
- Digital vector and raster map 1:10 000.

By the end of 2001, the digital mapping of 67% of Estonia´s territory will have been completed in the framework of the Basic Map Project. The digital map covering the whole of Estonia is expected to be ready by the end of 2002.

MODELS OF SPATIAL DATA

The aim of the project is to create preconditions for maintaining spatial data of different state registers and databases in Estonia in the same system and allowing cross-reference between them. Three models will be created: reality, data and presentation models that must set uniform requirements for both producers and users.

In 1999, in the first stage of the project, a detailed analysis of the current situation was made and a preliminary list of features was compiled. In 2000, i.e. in the second stage, principles of the creation of models were defined. In 2001, in the third stage, the reality model of the Estonian National Topographic Database (ENTD) will be created.

ENTD is the Land Board's GIS-database that contains topographic data collected during basic mapping. Furthermore, the GIS-database will contain features causing restrictions to cadastral units and features determining the extent of restrictions (restriction zones).

The reality model of ENTD complies with the ISO 15046/10 standard and contains the following information:

- name of feature in Estonian and its English equivalent;
- shortened name of feature;
- does the feature cause restrictions;
- code of feature;
- Basic Map code of feature;
- definition of feature;
- guidelines for identifying the feature in nature, selection criteria of the features to be mapped, references to additional materials;
- feature attributes, definition, references to additional materials, data type, measurement unit, definition of attribute value;
- relationship with other features, name of feature relation, name of related feature, description and conditions of feature relation.

CADASTRAL INFORMATION SYSTEM

The new Cadastral Information System (CIS) was completed in the spring of 2001 and will be implemented in the county cadastral offices during this year. The new Intergraph Geomedia 4 product family software was acquired. CIS constitutes one part of the Estonian National Land Information System (NLIS) and consists of the Land Register (i.e. Estonian name for the cadastral register), cadastral maps and the archive.

CIS can be divided into two parts based on its technological architecture:

- Data Registration Application – a tool for data registration (LAN-WAN application);
- Public Services System (WEB application).

More important in respect to the use of GI is the Public Service System. It enables public access to spatial data maintained by ELB. The Public Service System is a group of services based on the Land Board's datasets and map server and offered on the Internet. The Internet map server is based on the Intergraph Geomedia Web Enterprise 4 technology.

There are two services what are operational:

1. Land Information Service for the Public User

The Land Information Service is available for everyone and has been designed especially for the public at large. Everyone can use this service free of charge. For users the service is a web map application. Using navigation tools it is possible to see administrative boundaries and the Estonian Basic Map on a scale of 1:50 000 as a topographic background map. Zooming further the user can choose either the Estonian Basic Map or digital orthophotos, both on a scale of 1:10 000. Also the cadastral and geodetic information is available. It is possible to display geodetic points and the parcel boundary layer, and by clicking in the point or parcel the alphanumerical information is displayed in a pop-up window or as a tool tip. The service is accessible through the Land Board's homepage http://www.maaamet.ee/teenus/maainfo.php

2. Cadastral Unit (CU) Data for the Public User

CU Data Service has also been designed for public usage and is free of charge. Using different queries it is possible to get alphanumeric data from the cadastre. The service is suitable in cases when graphical cadastral data are of no interest. The service is accessible through the Land Board's homepage http://www.maaamet.ee/teenus/kiirp2ring.php. It is also possible to query information by mobile phone using WAP protocol. The address is wap.maaamet.ee/ky

Besides the services already implemented, several new services are under development.

Geographical systems used

The *de facto* standard coordinate system in Estonia is L-EST (Lambert Conformal Conic; GRS-80; ETRS89). In the future the L-Est coordinate system will also be enforsed as the *de jure* national coordinate system. The IAG Sub-Commission for Europe (EUREF) (Prague 1999) has endorsed the subset of I order points with rectangular co-ordinates as improvements of and extensions to ETRS89.

Data collection issues

The major providers of spatial data are private surveyors (cadastral data) and mapping companies (topographic data). The collection of topographic data is mainly related to the Estonian Basic Map program and performed during mapping works. In 2003 principles of data collection will be changed. When the Estonian Basic Map is ready and the national topographic database (ENTD) operational, the data will be mostly collected through cross-usage between ENTD and different national and private databases containing spatial data. This will allow the amount of expensive mapping works to be decreased.

Changes over time

By the end of 2001, 67% of Estonia´s territory will have been digitally mapped in the framework of the Basic Map Project. The digital map covering the whole of Estonia is expected to be ready by the end of 2002 and data will be converted into ENTD. This will enable the updating processes to be accelerated and the updating period to be shortened. Besides, the policy of data updating will be changed. ENDT will create possibilities for updating only a certain topographic feature in the database, not necessarily the whole map sheets.

References

[1] Official Statistics Today and Tomorrow. Tallinn, 2001
[2] 2000 Annual Report. Statistical Office of Estonia, Tallinn, 2001
[3] The 2000 Population and Housing Census. REFERENCE BOOK. Tallinn, 1999

Appendix 1

Classification of Administrative Units and Settlements of the Estonian Republic

The Classification of Administrative Units and Settlements was worked out in 1990 and is meant to denote the territorial location of any objects in state and local datasets.

The Classification covers:

- counties
- cities and rural municipalities
- city and rural municipality districts

as administrative units, and

- cities
- cities without the status of a city
- townships
- boroughs,
- villages and
- urban regions, etc.,

as settlements.

Code system

The Classification contains the identification code, name (if applicable, parallel name) and classification characteristics.
The identification code is a four-digit number given to a classification object depending on its administrative or municipal status.
Codes from 0030 to 0099 are used for counties, those from 0101 to 0999 for other administrative units and municipalities, codes from 1001 to 9999 for settlements (other than cities with the status of a city, their code for settlement is the same as for municipality). Codes from 0001 to 0029 are for special use (for example, they may be used to identify the continental territory, sea area, etc.).

Classification characteristics include three indicators:

- county location
- municipality jurisdiction
- type of object.

The county location is represented by a two-digit sign, 00 for counties or two right-hand digits of the county code for all objects located on the territory of the county.
The municipality jurisdiction is represented by a three-digit sign, 000 for counties, cities or rural municipalities and three right-hand digits from the code of city or rural municipality, or from the code of city or rural municipality district.

The types of object have one-digit codes:

0 - county	(*maakond*; pl. *maakonnad*)
1 - rural municipality	(*vald; vallad*)
2 - rural municipality district*	(*osavald; osavallad*)
3 - (rural) town (borough)	(*alev; alevid*)
4 - city (as an administrative unit (community) and as a settlement)	(*linn; linnad*)
5 - city without the status of a city	(*vallasisene linn; vallasisesed linnad*)
6 - city district	(*linnaosa; linnaosad*)
7 - small town (township)	(*alevik; alevikud*)
8 - village	(*küla; külad*)

9 - urban region or other settlement (not listed)**. (*asum; asumid*)

*No administrative units of this type exist at present.

**No settlements of this type exist at present.

For various uses additional indicators are permitted.

Updating

The Classification will be updated pursuant to decrees of the Parliament or decisions of the Government of the Republic.
The identification code will be changed only if the administrative status of the object is changed.
If two objects join, the resulting object will assume the identification code of the object whose name is given to the resulting object or whose territory is larger.
For new objects there are codes in reserve (of the 69 possible codes for counties, 15 are in use, of the 899 codes for other administrative units 267 are in use, of the 8,999 codes for settlements, 4,611 are in use).
The changes to the boundaries do not affect the identification codes.
The identification codes shall not be reused (at least when there are unused codes).

Appendix 2

Estonian Classification of Territorial Units for Statistics NUTS

On April 3, 2001 the Government of the Republic of Estonia confirmed by its Regulation No 303 The Classification of Estonian Territorial Units for Statistics (NUTS) to be used in conducting official statistical surveys.

The confirmed classification is the following:
level 1 – whole country;
level 2 – whole country;
level 3 – groups of counties:
1) Põhja-Eesti (Harju maakond);
2) Kesk-Eesti (Järva, Lääne-Viru and Rapla maakond);
3) Kirde-Eesti (Ida-Viru maakond);
4) Lääne-Eesti (Hiiu, Lääne, Pärnu and Saare maakond);
5) Lõuna-Eesti (Jõgeva, Põlva, Tartu, Valga, Viljandi and Võru maakond);
level 4 – counties (maakond);
level 5 – towns (linn) and rural municipalities (vald).

The Classification confirmed by the Government and the Classification used by the Statistical Office hitherto and on the basis of which data were transmitted to the REGIO database differ in NUTS level 3.

The following groups of counties were used up to now at NUTS level 3:
1) Põhja-Eesti (Harju maakond);
2) Kesk-Eesti (Jõgeva, Järva, Rapla and Viljandi maakond);
3) Kirde-Eesti (Ida-Viru and Lääne-Viru maakond);
4) Lääne-Eesti (Hiiu, Lääne, Pärnu and Saare maakond);
5) Lõuna-Eesti (Põlva, Tartu, Valga and Võru maakond).

The previous NUTS level 3 for Estonia was accepted by Eurostat.
But this classification was reconsidered and modified as the groups of counties were not homogeneous internally, i.e. one group of counties comprised counties whose socio-economic indicators differed.

The former and new units, groups of counties, are purely statistical groupings and do not represent any administrative structure. The former units were and new units will be used by the Statistical Office of Estonia for producing regional statistics in cases when data by counties could not and cannot be published due to data confidentiality requirements. and was used only by the Statistical Office for statistical purposes.

In working out the new groupings of counties the following criteria were taken into account:
statistical comparability of the regions (population, territory);
socio-economic homogeneity of the regions;
territorial integrity of the regions and existence of one attraction centre.
So, the new classification of territorial units for statistics is the first one in Estonia that has been officially confirmed by the Government. It meets fully the requirements of the draft Regulation of the European Parliament and of the Council on the establishment of a common classification of Territorial Units for Statistics (NUTS) also in terms of the statistical comparability of population sizes and territories of the regions.

The Statistical Office will undertake recalculations of regional data at NUTS level 3 according to the confirmed classification and transmit the recalculated data to the REGIO database in December 2001.

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EUROPEAN COMMISSION
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES

Directorate E: Social and regional statistics and geographical information system
Unit E-4: Regional indicators and accounts, population and geographical information system

Document: **WS/PHARE-Doc. 6 b**
Original: **EN**

Meeting of the Workingshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Census maps;

Submitted by the Statistical Office of Estonia

Working document concerning item 6 of the agenda of the meeting

CENSUS MAPS

Inge Nael and Svetlana Pavlova

ABSTRACT

The Statistical Office of Estonia (SOE) has completed the mapping programme for the 2000 Population and Housing Census. The programme was launched in 1995 and the database was completed in 1999. The delineation of enumerator areas and the printing of enumerator maps were based on this database. However, for the post-Census data processing and analysis the database structure had to be adjusted. The software for scanning and processing the Census questionnaries and an anonymous Census database were developed in Oracle relational database management system (RDBMS). Therefore the decision was made to convert the existing GIS database (in Mapinfo and ArcView formats) into Oracle Spatial or/and ArcSDE.

Census maps in co-operation with mapping companies and local municipalities

The **Statistical Office of Estonia** (ESA) launched the mapping programme for the 2000 Population and Housing Census in 1995. After completing the test areas the specification of the digital Census maps was compiled. According to the Specification, 1:50 000 maps in rural areas and 1:5 000 maps in urban areas were drawn. The specification was optimized to create a cartographic basis for the Census planning (Census area (CA) delineation) and the Census itself (maps for enumerators, maps for supervisors and maps for census districts). The Census mapping process was outsourced from ESA, the work was done by two companies – in rural areas by Estonian Map Centre Ltd. and in urban areas by Regio Ltd. The production methodology was different. In rural areas, paper maps of the 1989 Census were used as a source material, digitized by the mapping company and updated by local governments. In urban areas, the existing maps and orthophotos were used as a source and the maps were updated by the mapping company. For rural and urban areas the municipalities compiled household lists including the number of inhabitants in each building or apartment. The purpose of household lists was to provide information about the number of inhabitants for the delineation of enumerator areas (EA).
ESA stores digital maps in urban areas in Mapinfo, in rural areas in ArcView software and household lists in Foxpro software. The Census maps were ready in December 1999.

The next task was planning of Census areas (CA). ESA assigned each settlement the number of EAs based on the population count and other parameters. The aim of planning was to delineate the predetermined number of EAs for each region.

For towns (56 settlements) the dedicated software was created which uses Census map data in MapInfo format and outputs the new layers with all three levels of CAs (EA, supervisor areas and Census districts). The work of the software was semiautomatic - the task of the operator was to run automatic enumerator area delineating algorithm, and to verify intermediate results of the automated process. The software was sent to most of the towns in the hope that local expertise helps achieve a more logical delineation. For the remaining towns the job was done in ESA.

The conclusion of the semiautomatic delineation was that the CA generation software was efficient - the whole town was done in less than one working day, adjusting input parameters enabled testing of several versions quickly, output data was used without further processing in enumerator map printing, etc. The campaign faced also with a number of problems – computer literacy in towns was not very high, there was a need to train a lot of operators during a short period of time, the algorithm was sensitive to minor irregularities in the maps, household lists were not up-to-date.

In rural areas (205 local governments) and smaller settlements of urban type (172 in total) the CA delineation was done by hand, based on the Census maps and the printed lists of households. Work was done by regional

bureaus of ESA in close cooperation with local governments. The paper maps with EAs drawn on them were sent to mapping companies for digitizing.
The delineation of CAs was completed in February 2000. In total, there are 5,323 enumerator areas, 995 (collection of 4-6 EAs), and 165 Census districts (collection of supervisor areas).

The printing of enumerator maps started in January 2000 and was completed in March 2000, one week prior to the critical moment of the Census.
Four types of maps were printed:

Map type	Scale in urban areas	Scale in rural areas
Enumerator maps	1:3 000 to 1:5 000	1:5 000 to 1:50 000
Supervisor area maps	1:3 000 to 1:22 000	1:10 000 to 1:100 000
Census district maps	1:5 000 to 1:22 000	1:20 000 to 1:120 000
Wall maps for local Census offices	various scales	

For this task two A3-size color laser printers were used by subcontractors, the third was in reserve in ESA as a backup for possible equipment breakdowns.

In parallel to the enumerator area map printing the household lists were cross-matched with the Population Register and Building Register data. Selected columns from the resulting database were printed for each enumerator as auxiliary information to speed up the filling-in of Census questionnaires. The cross-matching was relatively labour consuming as at present there is no reliable identifier system to build up the relationship between different registers. Automatically, only 1 to 70% of database rows were matched using addresses, the percentage being higher in urban areas. The relationship between registers was created by local governments using their expertise and information about local inhabitants.

Enumerators are instructed to mark corrections on the EA maps. These corrections will be entered into the Central GIS database. The result will be the most detailed and up-to-date database of Estonian buildings and roads.

As a result of mapping effort, ESA has created a data set of about 400,000 buildings from approximately 300 urban settlements and about 200 rural municipalities, digital maps are associated with alphanumeric data – household lists, which in turn are associated with data from the Building Register and the Population Register. The data set is unique in Estonia in terms of accuracy, completeness, up-to-dateness and scope, which is worth of maintaining in a better IT-environment than it has been feasible so far.

Central Common GIS Database

The next task is the presentation and analysis of the summary Census results and to built up the central common GIS database.

The way of how the Census map database was processed until the completion of map production was not the most “high-tech”, but completely fit for purpose. However, the following disadvantages may hamper further development:
- different software environment for storing the Census data and spatial data would be difficult to handle;
- in case of paper maps the overlapping areas around urban areas were unavoidable, but in the spatial database it creates unnecessary duplication;
- in GIS data files is difficult to ensure data consistency and security;
- the data split between a number of files and file formats is difficult to analyze and use for generation of small-scale maps.

Description of Census data processing

The Census questionnaires were scanned with two high-volume Fujitsu scanners and interpreted with Eyes&Hands software. During interpretation, operators had resolved the characters or words, which cannot be recognized by the OCR/ICR software. The output of interpretation is text files.

The full database was archived and stored in a highly secured archive. During the next stage, primary and secondary person identification information will be removed. As a result, an anonymous Census database will be created. The anonymous database will be processed by dedicated software for generation of tabulations and providing an open access to the database. The anonymous database can be used with Oracle Reports, Oracle Discoverer and a number of other tools, including GIS software.

The link between GIS and the anonymous database processing software has been designed. However, the anonymous database **does not** include geographic information at the present moment. The map data must be stored and processed by GIS software (refer to Figure 1).

The Census data processing software is powered by Sun Ultra Enterprise 450 server and Oracle ver. 8.0.5.

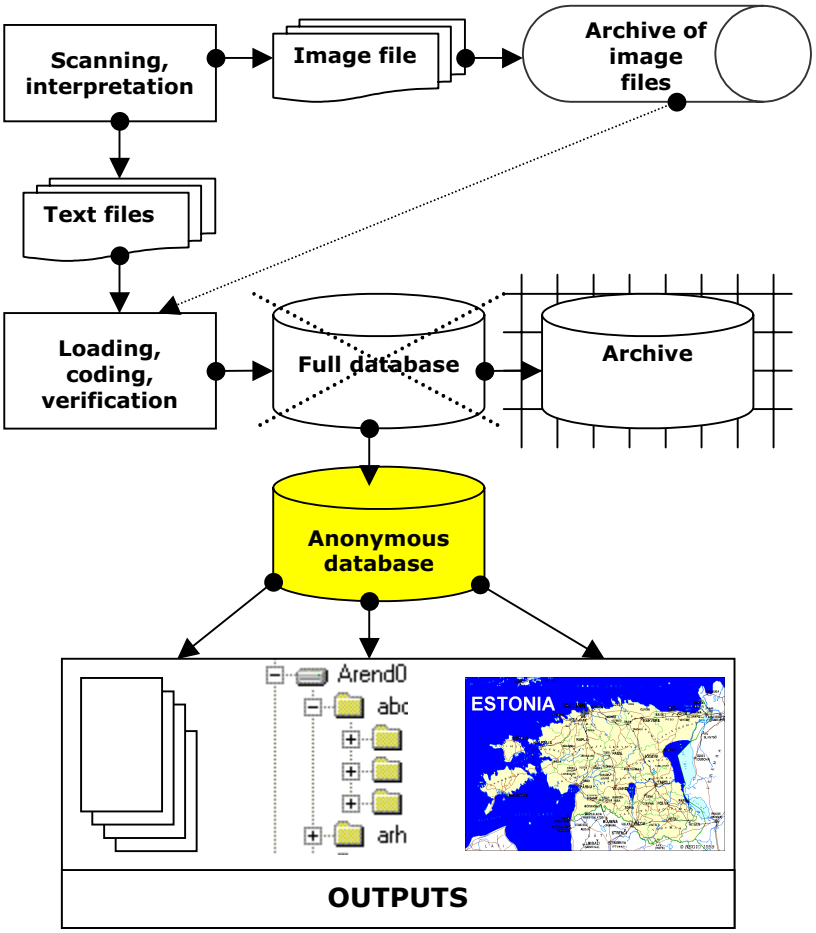

Figure 1. Simplified process diagram of Census data processing.[2]

The anonymous database is "GIS-supported", but does not include spatial data. The goal of the Central GIS database is to create tight association with anonymous database and collected map data and carry out spatial analysis in the same IT-environment, as it is common for alphanumeric data.

Now there is a single database of all dwellings with unique addresses, XY_IDs and x and y coordinates. This data will be linked to the Census database through addresses and each dwelling house will get a XY_ID.

To connect the anonymous Census database and the GIS database at the building level the address matching was done by the PL/SQL procedure. The cyclic databases linking process consists in the automatic linking of entries and an operator's work. The working cycles had repeated until all entries of the Population Census database had been linked to the GIS database.

Then the houses were given a unique identifier, XY_ID, which was calculated from the x and y coordinates of the building. From the XY_ID the location of a house can be recovered with an accuracy of less than 6 meters if the respective function is known. This XY_ID is necessary to keep information on the location of the dwelling houses in the Census 2000 database after the exact addresses (street name, house number and flat number) have been deleted to ensure the anonymity of the database.

For security reasons only the Population Census GIS Section of the Statistical Office will be able to do this since the Section knows the function in order to calculate the coordinates from the XY_ID and have the spatial database with addresses, XY_IDs and x and y coordinates.

For implementing the Central GIS database ESA it is planned to use 10 licenses of Oracle 8i Enterprise Edition and Oracle Spatial. GeoMedia, GeoMedia Pro and Mapinfo Professional will be used as client GIS software for handling spatial data.

Future work

As a result, ESA will be able to perform a detailed GIS analysis of Census data as well as generate various thematic maps based on the tabulation data. A powerful and flexible database system gives an opportunity to provide services for studies, initiated by scientists outside of ESA, as well as various on-line services in cooperation with other organizations.

REFERENCES

[1] Oracle Spatial. Data Sheet, March 1999.
[2] Inno. V., Data Processing for Census 2000. Newsletter of Statistical Office of Estonia, 1999. (In Estonian)

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Directorate E: Social and regional statistics and geographical information system
Unit E-4: Regional indicators and accounts, population and geographical information system

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Meeting of the Workingshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Report on the use of GI in the NSI and NMA in Latvia
Part 1: The use of GI in the NSI in Latvia

Working document concerning item 7 of the agenda of the meeting

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http://europa.eu.int/comm/eurostat/

Report on the use of GI in the NSI and NMA in Latvia
Part 1: The use of GI in the NSI in Latvia

1. GIS status in CSB of Latvia.

1.1. We had:

First we had:

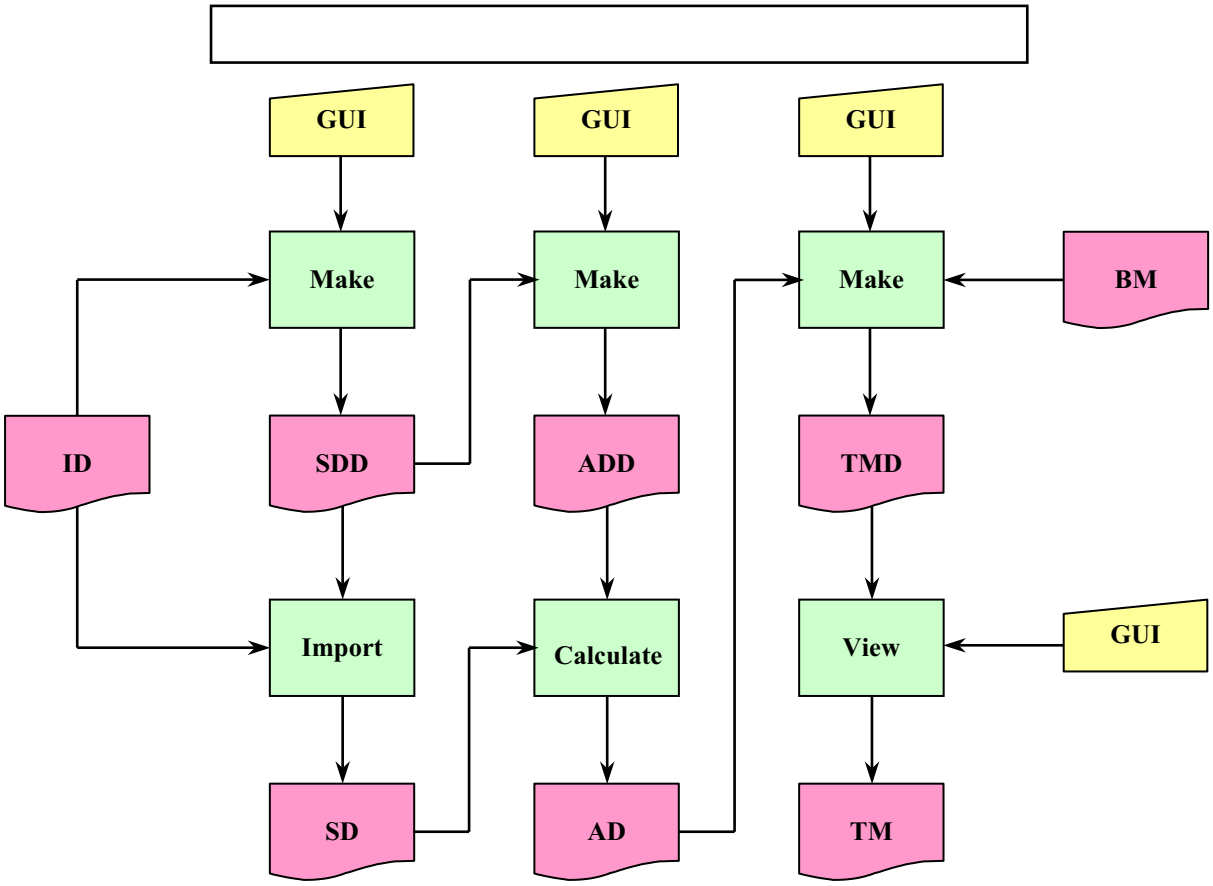
- Four licenses for ArcView 3.2 (two of them now are upgraded to 8.1);
- One license of "Spatial Analyst";
- Data, which had territorial code.

1.2. We have got:

- We went through the course of using ArcView GIS software in local office of the ESRI representatives. Latvian State Land service gave us the following maps:
  - Latvia's map on the level of parishes (municipality level) and big cities - regional centers (Map 1);
  - Latvia's map on the level of districts (Map 2);

1.3. We have done:

Using ArcView 3.2 we have made several thematic maps on the level of regions, data used for creation of those maps was taken from the population census of Latvia 2000 and population register (Maps 3 - 17), in this case separate maps for regions and regional centers were produced. Regional map of Latvia was used not only for displaying census data, but also for displaying demographic data. All demographic data has been put on the maps (Maps 18 - 23), using ArcView 8. We also have developed, in Avenue programming language, a program for thematic maps creation and publishing in ArcView 3.2 environment. The program uses MSExcel 97/2000 files for data input. Actually this program is user interface to GIS which allows to import data into the GIS system, edit and process data, create new and manage existing output data format descriptions and produce thematic maps with the possibility of viewing and exporting them into, suitable for publishing, format and publishing itself within LAN limits. One of the most important system features is user rights and access level definition possibility with which it is possible to manage data access and restrict it, if necessary. System works as ArcView 3.2 extension, and its principal scheme is:



Terminology:

- Input Data (**ID**) – Statistical data aggregations, prepared by the user, in MSExcel 97/2000 format, which corresponds to software definite specification;
- Source Data Definition (**SDD**) – input to output data transformation description in syntax, understandable by the software;
- Source Data (**SD**) – data, prepared in software database, corresponding to source data definition;
- Attribute Data Definition (**ADD**) – output into attribute data transformation description in syntax, understandable by the software;
- Attribute Data (**AD**) – source data processed (recalculated or regrouped) in accordance with attribute data definition to ensure base map cartographic object join with related alpha-numeric information;
- Thematic Map Definition (**TMD**) – description of base map cartographic object join with attribute data and desirable display method in syntax, understandable by the software;
- Thematic Map (**TM**) – digital cartographic information prepared for visualization;
- Base Map (**BM**) – Cartographic data prepared in Arc/Info or ArcView GIS format, which contain main physics-geographical objects and is used as the thematic map basis;
- Make – Is a function of new SDD, ADD or TM creation on definite data processing stages;

The system provides users with the possibility of displaying map data, on any available cartographic unit level (like municipality level), in the following ways:

- Unique value;
- Graduated color/symbol;
- Dot density;
- Pie chart;
- Bar chart;
- Main physics-geographical objects (as additional layer);
- Textual help information;

System produces maps for printing in A5-A0 format range.

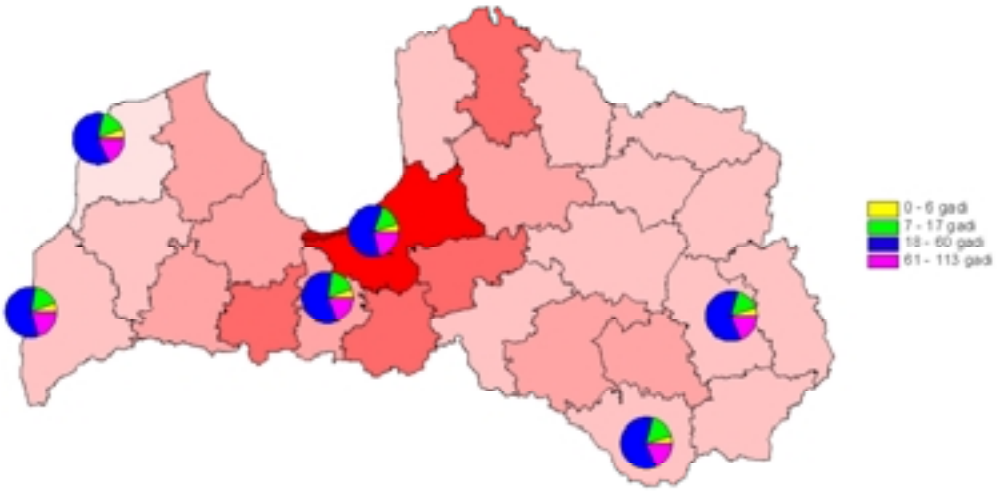
2. CSB of Latvia future plans concerning GIS.

One of the most important tasks for us today is to get {x;y} coordinate map of Latvia, so it would contain an {x;y} coordinate of every building in Latvia. Coordinate based map is needed for the point-based statistics. There is another very important reason why we need that kind of map it is up-coming territorial reform, after which, to be able to compare or to link previous periods data to the present one's we will need not only the territorial code of the building, but also the geo-code of the one. We will combine the register of the inhabitants with the household register, and place the result on the map in accordance with building addresses and geo-codes. This will also keep the data of the passed censuses and investigations. The coordinate level based map is very useful for enterprise data analysis as well, where data before and after territorial reform is involved. So we will also combine the coordinate level map with an Enterprise register, and obtain enterprise of Latvia coordinate map. Another task is to rewrite existing GUI system, produced for ArcView 3.2., in ArcView 8 environment, keeping and extending its functionality. And of course spatial analysis is the major task to handle, using "Spatial Analyst".

Map 1.

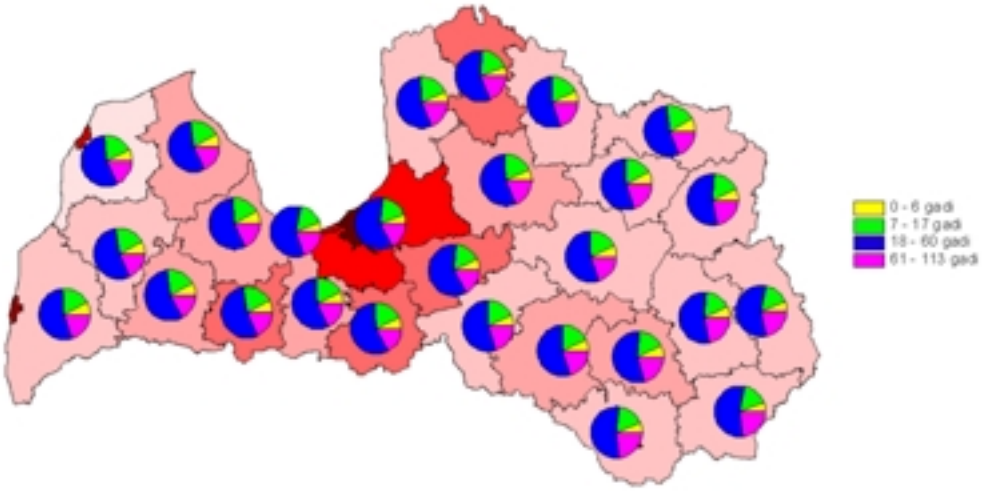
Map 2.

Vēcumu grupas lielās pilsētās.

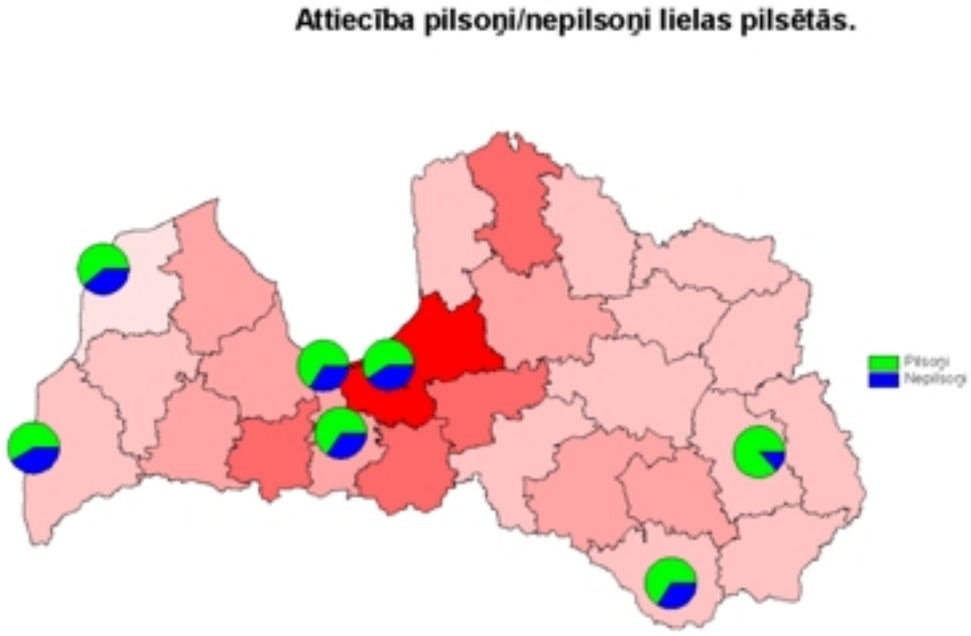


Map 3.

Vēcumu grupas rajonos.



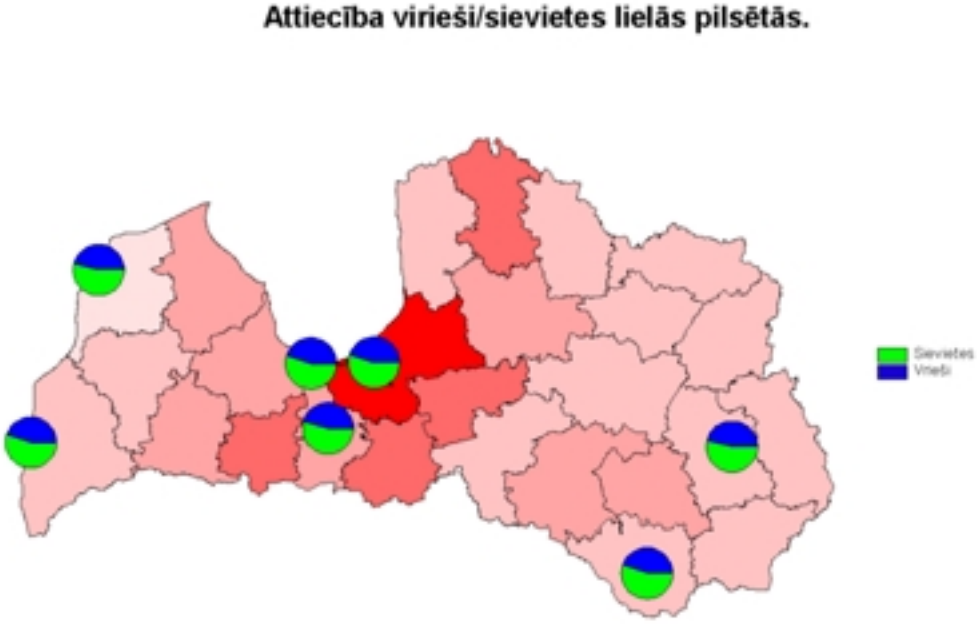
Map 4.


Attiecība pilsoņi/nepilsoņi lielas pilsētās.
Pilsoņi
Nepilsoņi

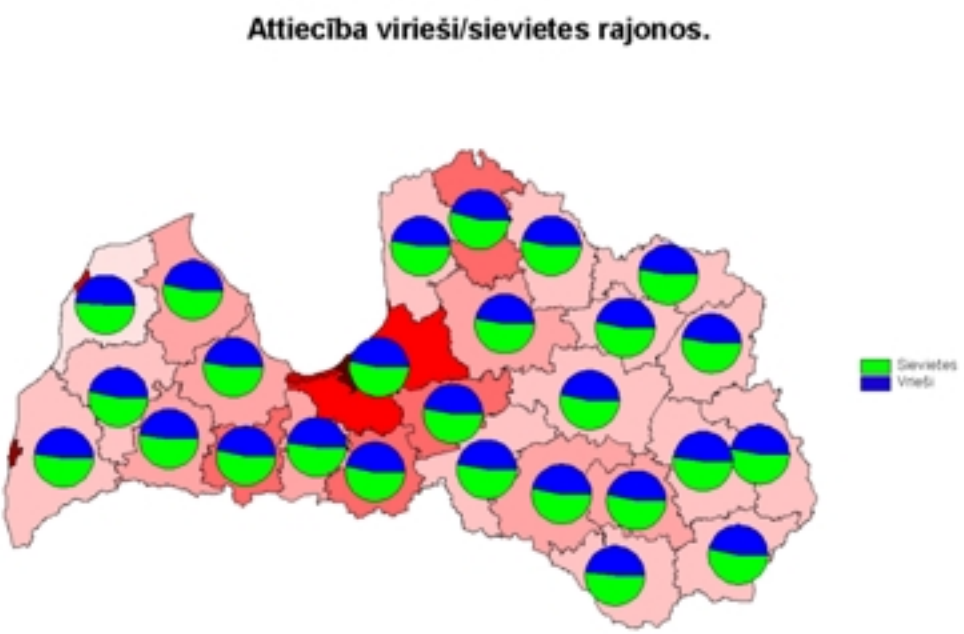

Attiecība pilsoņi/nepilsoņi rajonos.
Pilsoņi
Nepilsoņi

Map 5.

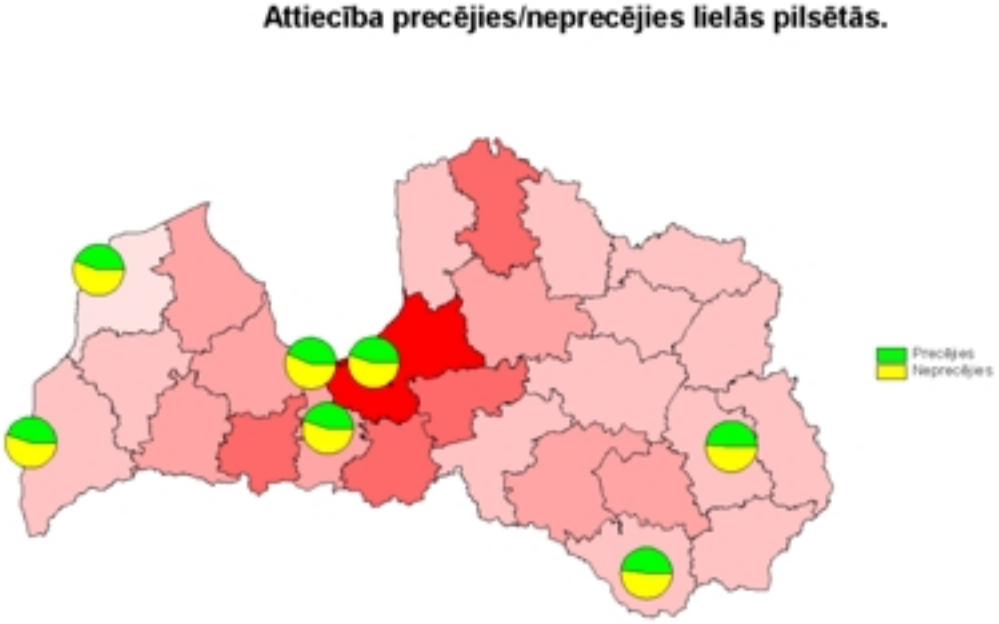
Map 6.


Attiecība virieši/sievietes lielās pilsētās.
Sievietes
Vīrieši

Map 7.


Attiecība virieši/sievietes rajonos.
Sievietes
Vīrieši

Map 8.

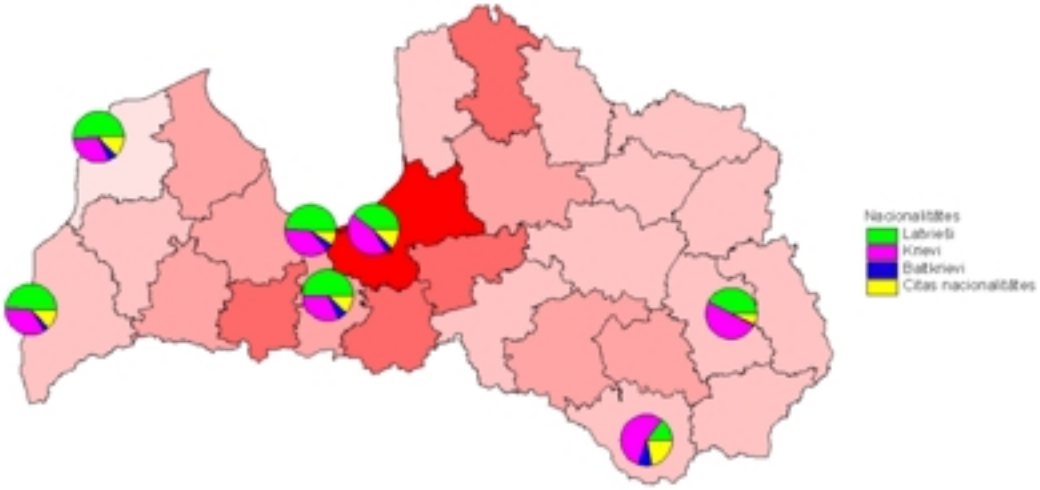

Attiecība precējies/neprecējies lielās pilsētās.
Precējies
Neprecējies

Map 9.


Attiecība precējies/neprecējies rajonos.
Precējies
Neprecējies

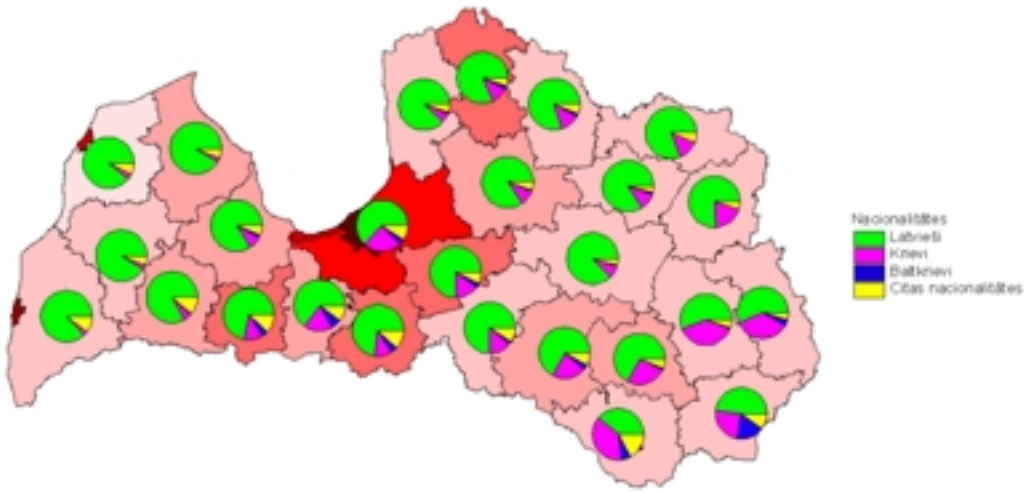
Map 10.

Latvijas lielo pilsētu nacionālais sastavs.

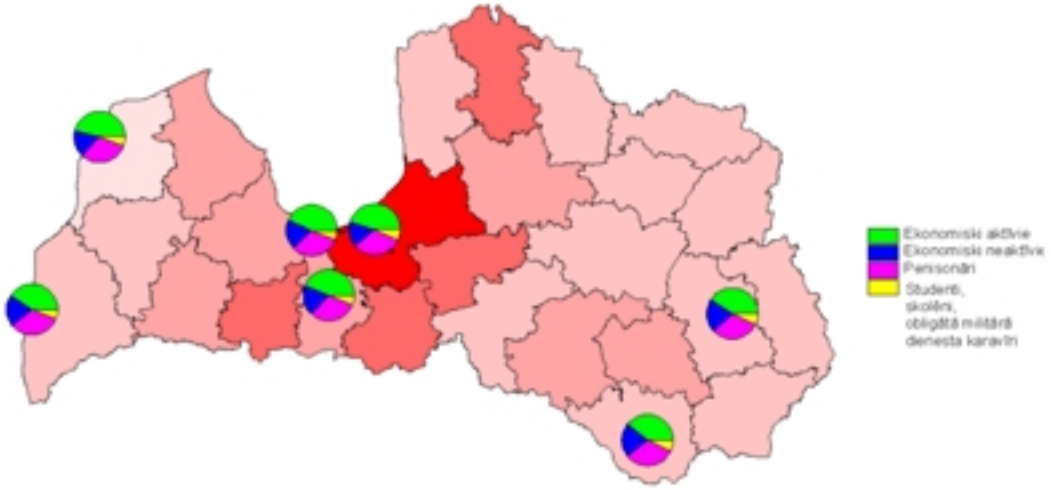


Map 11.
Map 12.

Latvijas rajonu nacionālais sastavs.

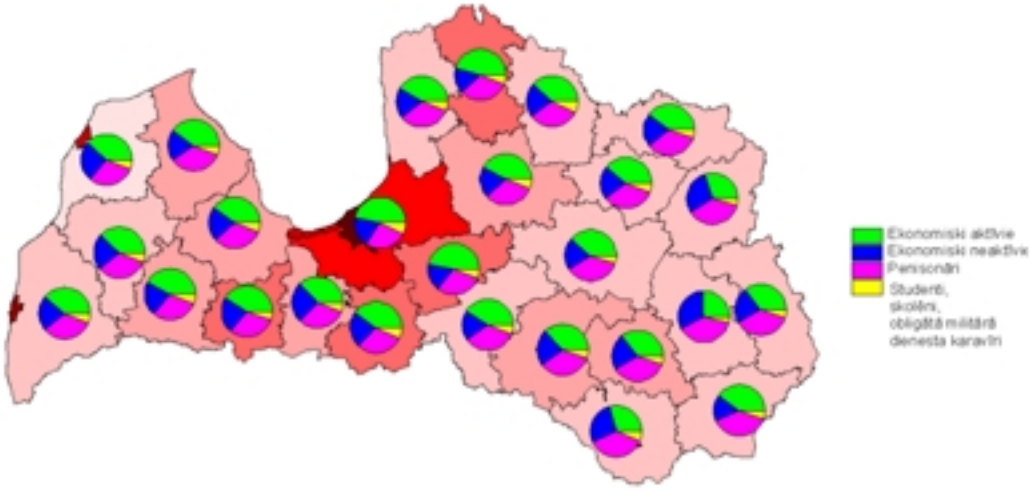


Latvijas iedzivotāju ekonomiska aktivitāte (lielas pilsētas).

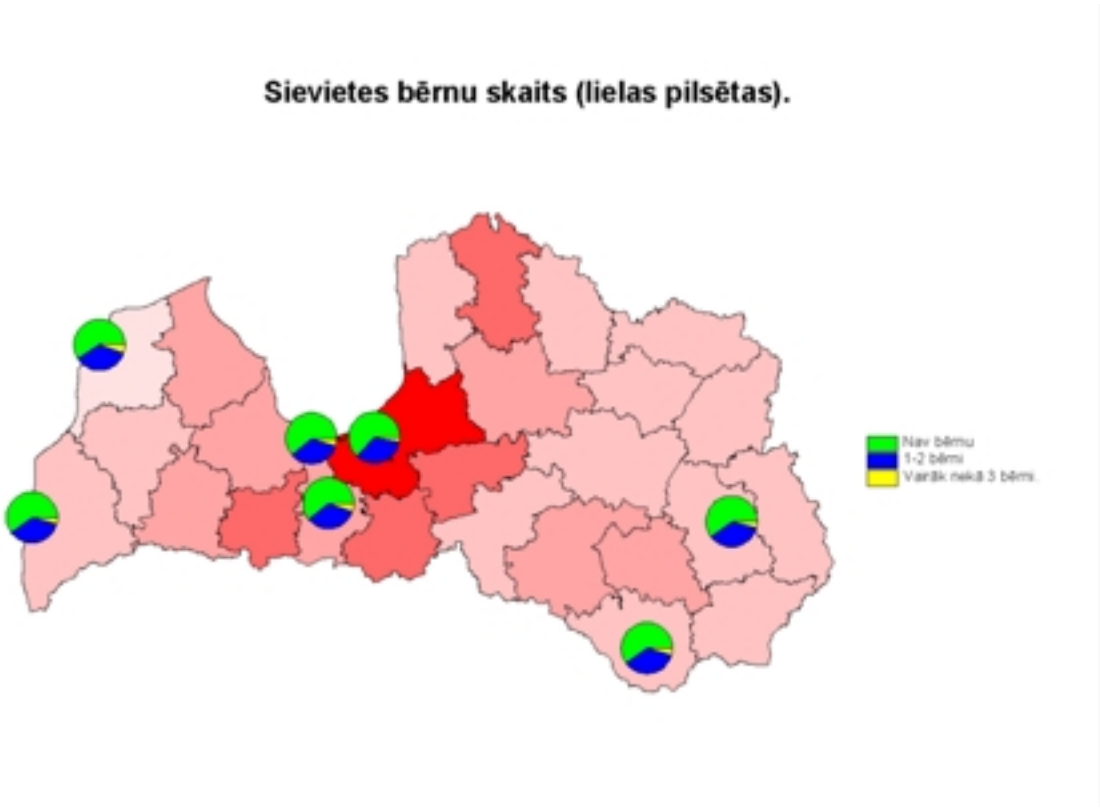


Map 13.

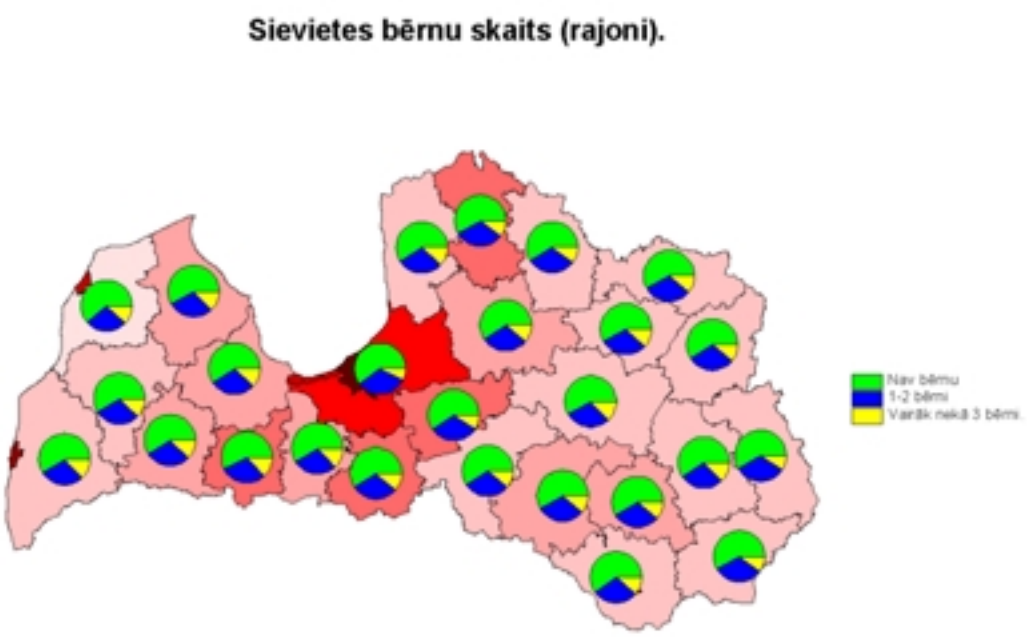
Latvijas iedzivotāju ekonomiska aktivitāte (rajoni).



Map 14.


Sievietes bērnu skaits (lielas pilsētas).
Nav bērnu
1-2 bērni
Vairāk nekā 3 bērni

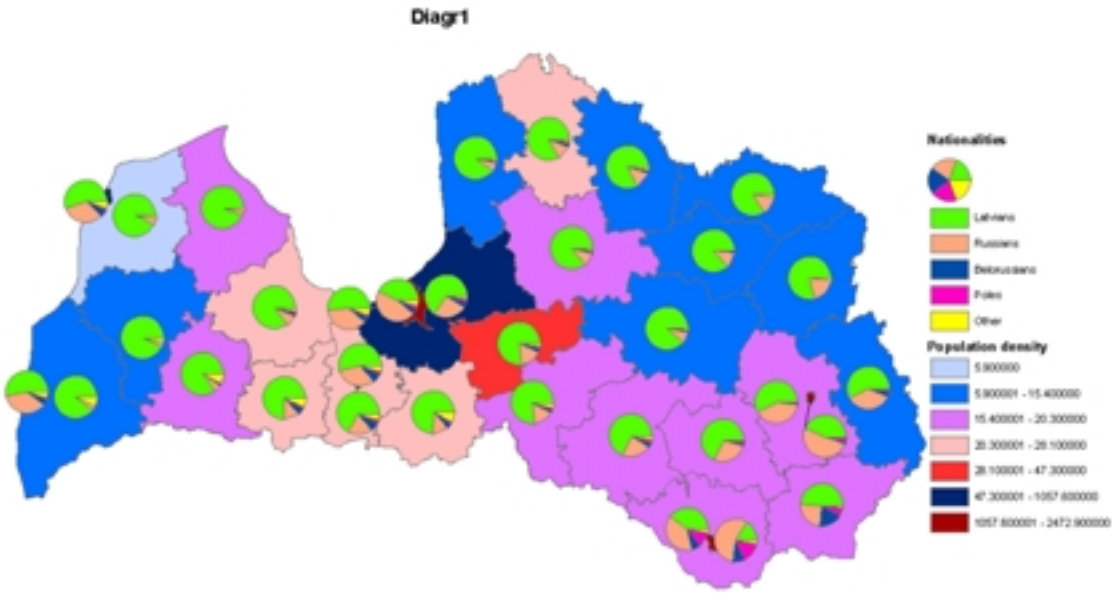
Map 15.


Sievietes bērnu skaits (rajoni).
Nav bērnu
1-2 bērni
Vairāk nekā 3 bērni

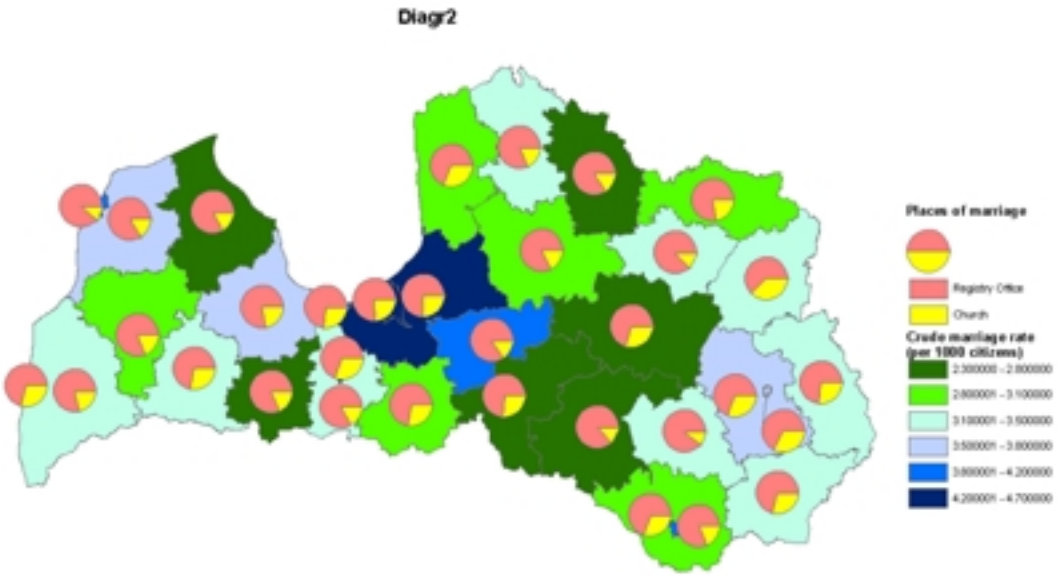
Map 16.


Iedzivotāju blīvums
6
7 - 17
18 - 23
24 - 34
35 - 47
48 - 1043
1044 - 1601
1602 - 2523

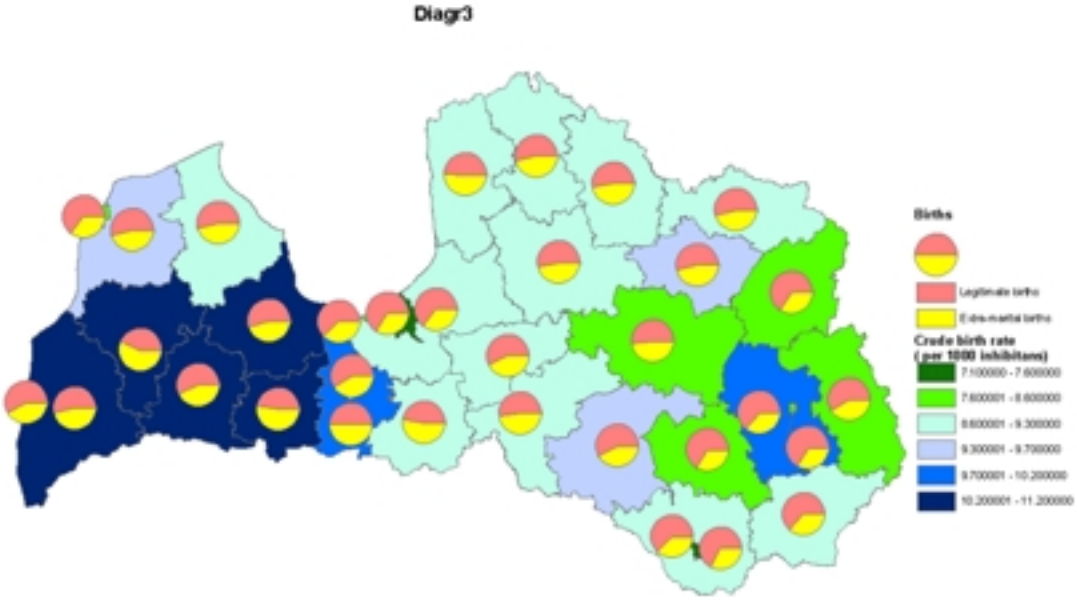
Map 17.


Diagr1
Nationalities
Latvians
Russians
Belorussians
Poles
Other
Population density
5.900000
5.900001 - 15.400000
15.400001 - 20.300000
20.300001 - 28.100000
28.100001 - 47.300000
47.300001 - 1057.600000
1057.600001 - 2472.900000

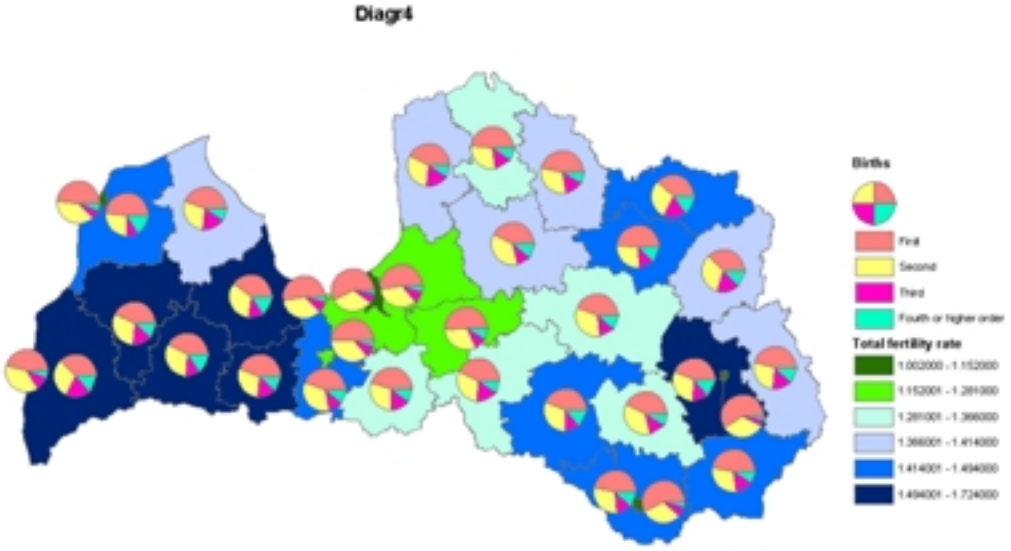
Map 18.


Diagr2
Places of marriage
Registry Office
Church
Crude marriage rate
(per 1000 citizens)
2.300000 - 2.800000
2.800001 - 3.100000
3.100001 - 3.500000
3.500001 - 3.800000
3.800001 - 4.200000
4.200001 - 4.700000

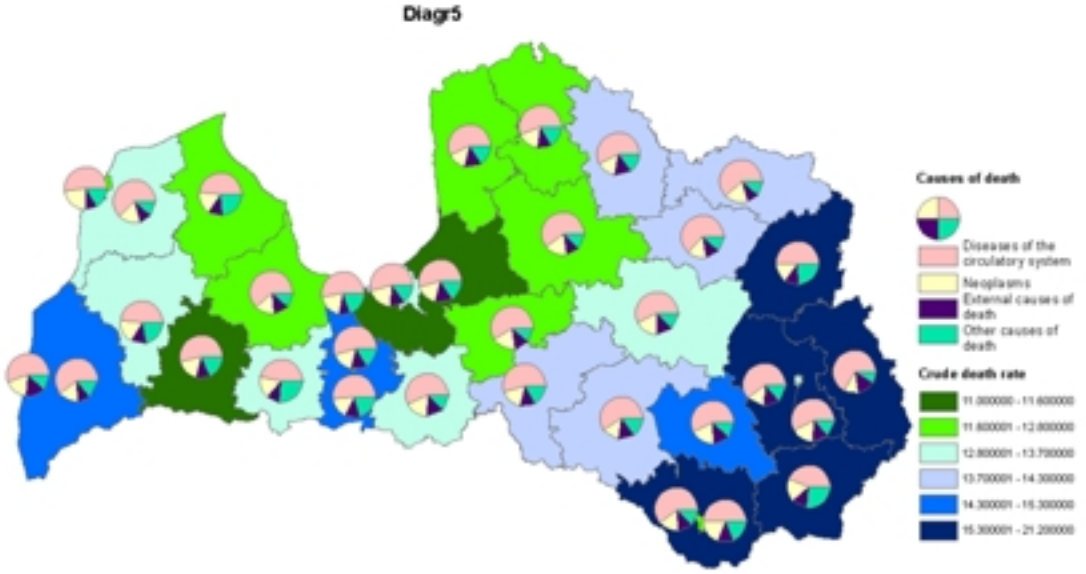
Map 19.


Diagr3
Births
Legitimate births
Extra-marital births
Crude birth rate
(per 1000 inhibitans)
7.100000 - 7.600000
7.600001 - 8.600000
8.600001 - 9.300000
9.300001 - 9.700000
9.700001 - 10.200000
10.200001 - 11.200000

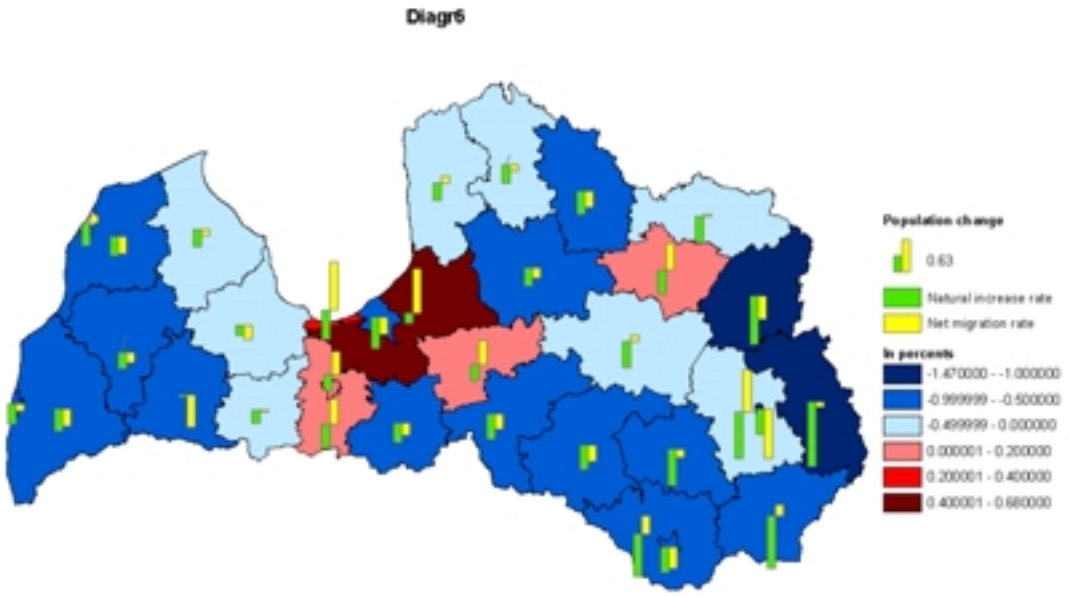
Map 20.


Diagr4
Births
First
Second
Third
Fourth or higher order
Total fertility rate
1.002000 - 1.152000
1.152001 - 1.281000
1.281001 - 1.366000
1.366001 - 1.414000
1.414001 - 1.494000
1.494001 - 1.724000

Map 21.


Diagr5
Causes of death
Diseases of the circulatory system
Neoplasms
External causes of death
Other causes of death
Crude death rate
11.000000 - 11.600000
11.600001 - 12.800000
12.800001 - 13.700000
13.700001 - 14.300000
14.300001 - 15.300000
15.300001 - 21.200000

Map 22.


Diagr6
Population change
0.63
Natural increase rate
Net migration rate
In percents
-1.470000 - -1.000000
-0.999999 - -0.500000
-0.499999 - 0.000000
0.000001 - 0.200000
0.200001 - 0.400000
0.400001 - 0.680000

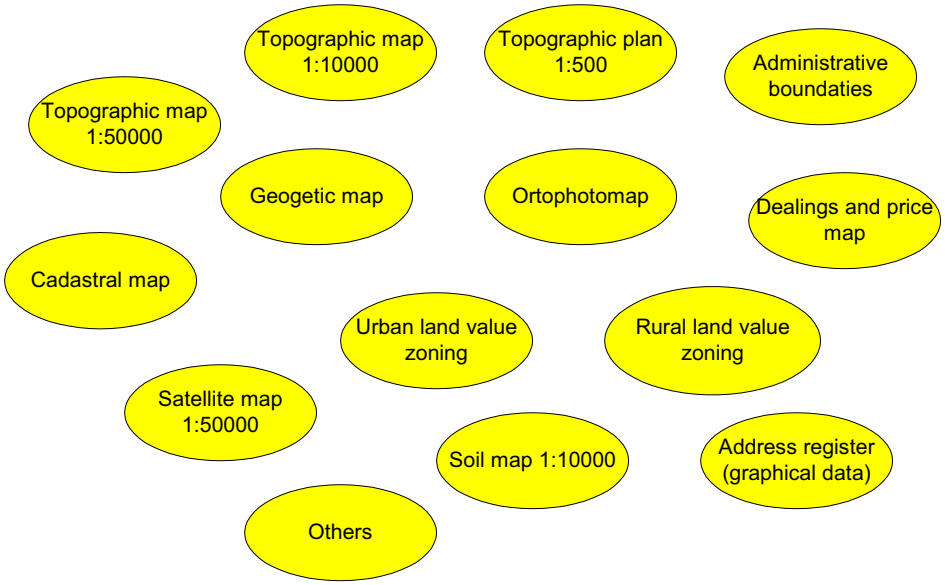
Map 23.

The development of Geographical information system in State Land service of the Republic of Latvia

Helen Sherman

24.-26. of October, 2001
Luxembourg

Present situation
The State Land Service is the biggest graphical data sets keeper in Latvia.



As described by law, Latvian State Land service (SLS) is responsible for maintenance of the following datasets:

Data set	The beginning of production	Digital or manual	Coverage %	Responsible SLS department
Topographic map M1:10000	1999	D		Large scale mapping board, regional offices
Topographic map M1:50000	1998	D	20	Cartography board
Topographic map M1:25000	2001	D	1	Cartography board

Topographic plans M1:500	No data			Regional offices
Orthophotomap	1994	D	85	Large scale mapping board
Digital Terrain Model	1996	D	85	Large scale mapping board
Cadastre (cadastral map)	1995	D	90	Main board of information, regional offices
Address register	1999	D	10	Main board of information
Satellite Map M1:50000	1994-1998	D	100	Cartography board
Soil Map	2000	D	5	Main board of information
Valuation map	1999	M	100	Real estate formation board
Administrative boundaries	1998	D	90	Real estate formation board
Stocktaking plan	No data			Real estate formation board
Geodetic map	1993	M	85	Geodesy board

Characteristic on present situation

- ✓ unarranged legislation;
- ✓ lack of qualified personnel – Latvian education system does not prepare students of essential profile;
- ✓ lack of financial resources – shortage of necessary finances for qualitative maintenance of graphical databases;
- ✓ sharp rise in development of GIS technologies – facilating the complexity of job versus need for more qualified personnel;
- ✓ Standardization for geographical data, data exchange, data processing etc is not yet performed;
- ✓ Establishing of common data management principles is weak. Also there are imperfection of coordination between SLS regional structures;
- ✓ Data integrity losses – data duplication, failure in merging analogous datasets;
- ✓ Lack of experience in the advanced stage of data maintenance;
- ✓ Responsibility for data maintenance is divided between SLS regional offices.

Why we started our “development of GIS” project?

As described above, graphical datasets and responsibility on them have been divided between SLS regional offices. In the course of time there was a different prefigurations of GIS in SLS. Therefore today some of SLS boards are fully responsible of their datasets, while others have decided to divide the data maintenance and storage functions between the regional offices – leaving ourselves only control, methodical leading and monitoring functions.

As the result some additional problems arise:

- ✓ Wantage of common structure of GIS authority – responsible for GIS maintenance and development within SLS;

- ✓ Concurrent information gathering on separate datasets (data duplication);
- ✓ Dissident data interpretation;
- ✓ Different understanding of GIS principles;
- ✓ Different understanding of political needs;
- ✓ etc.

Conclusion: there must be founded an complex of actions (project) with assignment to solve existing known problems. As first step the present situation analysis must have been done thru investigation of SLS boards and regional offices. In parallel gathering of local and foreign experience in this field is necessary. After situation analysis the solving decision offer must be made.

Base subjects for realization of mentioned GIS project

- ✓ realization of common data management principles;
- ✓ implementation of unified politics in:
- ✓ starting local standardization;
- ✓ starting law adjustment in the field of geodesy, cartography and GIS;
- ✓ starting of building common metadatabase;
- ✓ data integration in unitary GIS;
- ✓ rational using of available financial resources;
- ✓ getting to know on actual status on every dataset in SLS responsibility
- ✓ …

Implementation of project

- ✓ Present situation finding up, analysis and description on every dataset:
- ✓ On which legal base any dataset development and management is based;
- ✓ Which goals are set up for each dataset
- ✓ Who is responsible on each dataset;
- ✓ What are the main problems spotted in maintenance etc routine for each dataset;
- ✓ Who are the most reliable clients for SLS and why?
- ✓ Extra data sources in outside organizations;
- ✓ General description of possibly changed dataset creation, maintenance and storage routines;
- ✓ Characterization of involved personnel;
- ✓ Characterization of involved software and hardware assurance;
- ✓ Necessary change foundation, referring to present situation and concept on joint GIS core;
- ✓ Development of system conception:
- ✓ GIS technical base: software and hardware description, …
- ✓ GIS organizational base: rules and routines for existing and nascent datasets.

Conclusion

One of the most important aspects of our conception is the co-operation with other organizations.

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STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES

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Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Report on the use of GI in the NSI and NMA in the Czech Republic
Part 1: The use of GI in the NMA in the Czech Republic

Working document concerning item 9 of the agenda of the meeting

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Report on the use of GI in the NSI and NMA
in the Czech Republic
Part 1: The use of GI in the NMA in the Czech Republic

Vratislav Plischke, Land Survey Office, Czech Republic

ABSTRACT

Report deals with GI and mapping activities of the NMA in the Czech Republic. It also deals with co-operation between NSI and NMA.

Role of the NMA

NMA in the Czech Republic is represented by Czech Office for Surveying, Mapping and Cadasre (COSMC).

COSMC represents an independent sector of the state administration which is responsible for
- Complete administration of the Cadastre
- Development and maitenance of the Information System of Cadastre in the Czech Republic
- Maitenance and modernisation of horizontal, vertical and gravity control in the Czech Republic
- Large -scale mapping (cadastral maps)
- Medium- scale mapping (Base map of the Czech Republic (1:10 000, 1:25 000, 1:50 000, 1:100 000, 1:200 000)
- Small-scale mapping of the Czech Republic (1:500 000, 1:1000 000)
- Creation of the Fundamental Base of Geographic Data (ZABAGED)
- Geodetic surveys and documentation of state boundaries
- Standardisation of geographical names
- Co-ordination of research and international co-operation in geodesy, cartography and cadastre

Structure of the NMA

The Czech Office for Surveying, mapping and Cadastre controls the following institutions
- Land Survey Office
- Cadastral Offices (77 Cadastral Offices in districts and 35 Branch Offices in larger towns)
- Survey and Cadastral Inspectorates (7)
- Research Institute of Geodesy, Topography and Cartography

Activities of the NMA in the field of GI and mapping

A) Fundamental Base of Geographic Data (ZABAGED)

- ZABAGED represents the digital landscape model of the Czech Republic in vectorial form.

- The realisation of the project is carried out by Land Survey Office (LSO)
- This project should offer uniform spatial base to all GIS that are being formed by public administration, academic and private sectors as well as many further branches that are demanding spatial information support

- Main use of ZABAGED
- GIS analysys for the state administration, local government and other institution or organisation
- digital cartography and map publishing
- base data product for third parties doing client applications

- The topologicaly clean space component of ZABAGED has been compiled by scanning, vectorizing and interactive editing of updated sheets of the Base Map 1:10000.
- The attribute component of ZABAGED represents an information domain of administrators of individual categories of geographic phenomena (e.g. administration of roads, watercourses, railways, etc.)
- The attributes contain descriptors and other information on 105 types of objects that are structured to 60 thematic layers of the dgn files.

- Digital topographic model of topological-vector art in S-JTSK (Uniform Trigonometric Cadastral Net) reference system, where
- positional control is based on BESSEL‘s ellipsoid and
- conform projection to sphere of reference and from this sphere to oblique conform conic projection

- This conform conic projection has two paralels with no length distortion that are parallel to the longitudinal axis of the figure of national territory and has maximum length distortion on the central parallel -10 cm/km and on northern and southern boundaries of national territory +14 cm/km.
- Existing transformation from S-JTSK to ED 87 system with 2m accuracy and to ETRF system with 3m accuracy.

- National elevation datum with normal heights derived from middle sea level at Kronstadt - Baltic Datum after Adjustment - Bpv
- The total national territory is covered by 4572 map sheets (every sheet covering area of 4.8x3.8km)
- Map updating on the total territory on the average every 8.5 years, urbanized areas with many changes 3.5 years
- Future frequency of updating should be 4 years

- ZABAGED is running in Microstation graphical environment of Intergraph MGE product and uses ORACLE relational database for storing feature codes and attribute information linked to graphics.
- Horizontal positional accuracy is variable according to object classes (1-10 m).
- Vertical accuracy varies according to the slope of relief, lucidity of territory and survey technology used (1.5 - 6 m).

- Date of creation of the space component was the end of 2000
- Date of completing (attributes encluded) is the end of 2003
- Date of the first updating is the end of 2005

- Coordinated creation and maitenance of spatial and attribute components of ZABAGED is supported by many measures of institutional, organisational, metodic and other art.

- Topological clean geodatabase

- 8 categories of objects
- settlements, economical and cultural objects (27 types of oblects)
- communications (27)
- power lines and pipelines (6)
- hydrography (12)
- territoral units (2)
- vegetation cover and land use (14)
- terrain relief (12)
- geodetic points (3)

- Output graphic files
- planimetry (hydrography encluded)
- 2D dgn file (MicroStation)
- altimetry
- 2D conture lines
- 3D conture lines
- digital terrain model - option

- Data output formats
- DGN or DXF (vector files)
- MPD (packed export MGE project file)
- MapInfo

- ASCII

- Coding of objets
- mostly corresponds to DIGEST
- also corresponds to ETDB
- also defined in LSO (in special cases)

- Present-day activity in ZABAGED project
- creating orto-photo files using 3D contour lines for the purpose of ZABAGED updating
- updating of ZABAGED vector files (phptogrammetric and topographic) in co-operation with the mapping departments of the main 7 regional Cadastre offices (started in the year 2000)
- finishing detailed vectorization of built up areas during the first updating
- coding and attributing process of the updated vector files (started at the beginning of the year 2000) and creating seamless database in MGDM environment (MGE GeoDataManager)
- map production using ZABAGED data on the base of digital cartography (started in the year 2000)

- Collaborating organisations in attributing process (adminastrators of branch phenomena)
- Ministry of environment
- hydrological institute
- land preservation institute
- geological institute
- Ministry of transport
- road and highway administration
- Czech railways
- Czech Statistical Office
- Cadastre offices

- ZABAGED data are being used in the IACS project (agriculture development support) by Ministry of agriculture

- ZABAGED data are being tested and intended to be used for territorial planning by Ministry for regional development

B) Digital raster data (RZM)

- LSO (Land Survey Office) is also responsible for Digital raster data (RZM) derived from the medium- scale Base maps of the Czech Republic.
- Disponible RZM raster data
- RZM10
- RZM25
- RZM50
- RZM200

- National reference system S-JTSK (Uniform Trigonometric Cadastral Net System)
- National elevation datum - Baltic Datum after Adjustment (Bpv)
- Separations of the analog Base Map were scanned on the precise scanner

- Two models of RZM
- digital black and white separations of the map sheets (1pixel=1bit)
- digital color model with the basic quadrant modul of land, which sides are oriented oriented parallel with coordinate axes of the S-JTSK system
- RZM are used for visualisation and looking for geographic data and their visual analysys
- They form suitable graphic background for decisive processes, environment monitoring, nature protection, territory planning, communication, transportation, energetics, client service, etc.)

- Output formats

- CIT, (eventualy RLC or others)
- BMP(BM_), TIF, (others)
- Resolution
- 400 dpi
- 200 dpi
- Disponible on several data medias
  floppy
- CD ROM
- optical disk (1.2 or 1.3 GB)
- ZIP

- RZM10
- 4572 of map sheets
- geodetic points encluded
- rectangular coordinate net and geographic net
- basic quadrant for color model is 2x2km
- 5 separations, for Prague 7 (names of streets)
- future updating from ZABAGED vector database

- RZM25
- 787 of map sheets
- rectangular coordinate net (1km interal) and geographic net
- basic quadrant for color model is 5x5km
- 5 separations
- updating folows the RZM updating

- RZM50
- 217 of map sheets
- used for derived branch thematic maps and also for updating of administrative and cadastre boundary vector files for the whole territory of the Czech Rep.
- basic quadrant for color model is 10x10km
- 7 separations
- continuous updating

- RZM200
- 19 of map sheets
- basic quadrant for color model is 50x50km
- 6 separations
- updating cca in 5 years intervals
- resolution 508 dpi for black and white model (exception)

C) Vector files of the Adminastration boundaries of the territorial units in the Czech Rep.

These files contain vector boundaries at all hierarchical levels (cadastre, comune, district, region, state) and definitions points and code numbers of cadastre and comune territories. The files are administrated and updated at scale 1:50 000.

Administration boundaries at scale 1:10 000 form one thematic level of the ZABAGED described above.

D) State Map Series in Paper Form

Large-scale maps (also in raster form as files)

- Cadastral maps at scales 1:1000, 1:2000, 1:2 880, 1:5000
- Derived State Map 1:5000

Medium-scale Base Maps

- Base Map of the Czech Republic 1:10 000
  1:25 000
  1:50 000
  1:100 000
  1:200 000

Medium-scale Maps of Territorial Parts

- Map of Districts of the Czech Republic 1:100 000
- Map of Regions of the Czech Republic 1:200 000

Small-scale Maps of the Czech Republic

- The Czech Republic 1:500 000
- The Czech Republic 1:1000 000

Thematic State Map Series

- Map of Fundamental Settlement Units of the Czech Republic 1:50 000, 1:500 000
- Base Map of Water Manegement of the czech Republic 1:50 000
- Road Map of the Czech Republic 1:50 000, 1:200 000

Other official maps

- Maps of Administrative Division 1:2000 000,1:500 000, 1:200 000
- Sheet Indices of Base Map Series 1:2000 000, 1:500 000

Co-operation between NSI and NMA

NMA provides vector files with administration boundaries of the territorial units in the Czech Republic to NSI for the statistical analyses and other needs of these institution. NSI is responsible for coding of territorial units.The co-operation between NMA and NSI is either direct or by means of the Ministry for regional development (MMR). In the second case NMA provides vector files (in dgn MicroStation format) to MMR, where the database (in dbf format) of the territorial units is administrated for the use and needs of the Ministry (MMR). MMR then offers these database both to NSI and NMA.
Now, in the NMA (Land Survey Office) the creation of the new database of the administration boundaries is being prepared in ARC/INFO format to be conforme with the demands and needs of the projects organised by EuroGeoGraphics (SABE, ABDS).
Good co-operation between NMA, MMR and NSI was made in the years 1998 – 2001 in the framework of the Census 2001 program. NMA was providing administration boundaries vector data at scale 1:10 000 derived from ZABAGED.

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Report on the use of GI in the NSI and NMA in the Czech Republic

Working document concerning item 9 of the agenda of the meeting

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http://europa.eu.int/comm/eurostat/

Part 2: The use of GI in the NSI in the Czech Republic

Jaroslav Kalina, Czech Statistical Office, Czech Republic

NSI - The use of GI in the NSI – Czech Statistical Office (CZSO)

Software: most of all products of ESRI or Oracle companies.
CZSO uses currently following SW products:

SW name	No. of licences
ArcInfo	2
ArcIMS	1
ArcSDE	1
ArcView 3.2.	21
3D Analyst	3
Arcpress	4
Spatial Analyst	4
TIFF/LZW	1
Oracle 8.1.8	1

Hardware:

Application server: SUN Enterprice 300,0
OS: Sun Solaris 2.7
Data server: Compaq G 860
OS: Compaq Tru64
PC's: mostly Compaq - different types and levels
Colour printers : mostly HP - different types

Software use

CZSO uses two different applications.

One of them is the older one and is based on Arc View. This product is for incorporation of individual data into maps.We incorporate data produced by CZSO or from other administrative resources.
Maps created with a help this application are included in the Statistical Yearbook of the Czech Republic, in statistical yearbooks for individual regions, in publications on regional GDP and regional differences. These maps can be also found in publications dealing with the results of the Census of retail trade network, and in environment protection and in publications on results of elections.

The second application of GIS is ORACLE database for preparation of Population and Housing Census 2001 and presentation of census data.

Preparation of Census: to describe data (table form) is necessary to objects and census regions add their geographical characteristics - x and y coordinates of objects - and identify borders of census regions above these objects. This task has already been fulfilled. We have printed 54000 maps of census regions (3 volumes)

Technical implementation - database services

Geographical database and following user system are supported by general concept of ESRI ArcGIS. It's created by three level architecture client - services - data
Part of data uses the database server system operated by CZSO. It's Compaq platform (models GS60, or GS40) under operational system Compaq Tru64, version 4.0f with database Oracle 8i, especially version 8.1.6. Middle level of geographical database services is provided by ArcSDE 8. Oracle 8 together with ArcSDE 8 (Arc Spatial Database Engine) allow to administer geographical data of database server.

Technical realisation - application services

Internet application WebCENSUS was created to mine and display data comfortably and easily. This map service is provided on two processor server Sun Enterprice 3000 with operation system Sun Solaris &. A web server iPlanet 4.0 is also under the operation. The main part of the whole system is created by the application of interface for administration of map services ArcIMS 3 (Arc Internet Mapping System) installed into the same hardware.

CENSUS and GIS results

Geographic results are most of all used in standardised programme of census and individual outputs of GIS. CENSUS results are provided in electronic form and will be situated on Internet, Intranet and Extranet network.

We currently prepare the evaluation of data collected during the census - information from census commissioners about definition points of objects, or census regions. Another task is the analysis of space and descriptive items. Descriptive items include the set of classifications METIS, space items include drawing of census regions and location of definition points of objects. Clear definition of this relation is required for results of CENSUS. These tasks will be finished by the end of this year, we will start the data processing next year. The processing of standardised results takes usually two years period, full processing of data takes of course much longer period. Various possibilities will depend on concepts and projects which has started recently and has been under the implementation.

Plans for further development

To investigate further development of GIS SW and to focus on following directions:

1. to transform projects and data from the 'older application' to the 'younger application'
2. to extend the presentation of maps via Internet and Intranet network
3. to enable the creation of maps via Internet to external users

Appendix 1

Regional break down of Czech Republic

NUTS 5 - municipalities - territorial units with elected deputies
NUTS 4 - districts - territorial administrative unit for needs of state administration, created by municipalities
NUTS 3 - regions - territorial unit with elected deputies, created by districts
NUTS 2 - areas - territorial unit necessary for reporting towards EU created by regions.

Appendix 2 – example

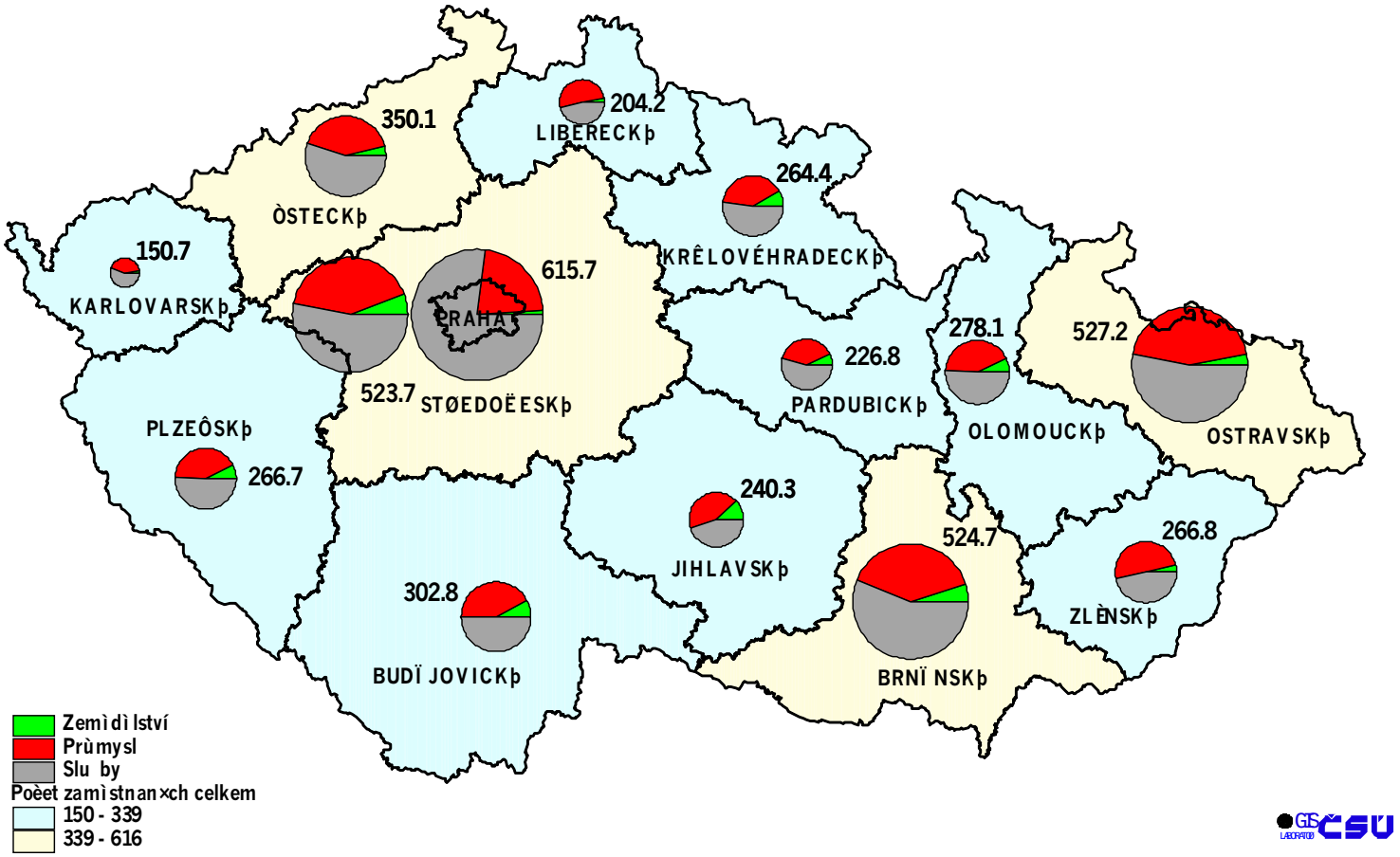
Employment Structure and Number of Unemployed Persons in the Czech Republic

Appendix 3 – example

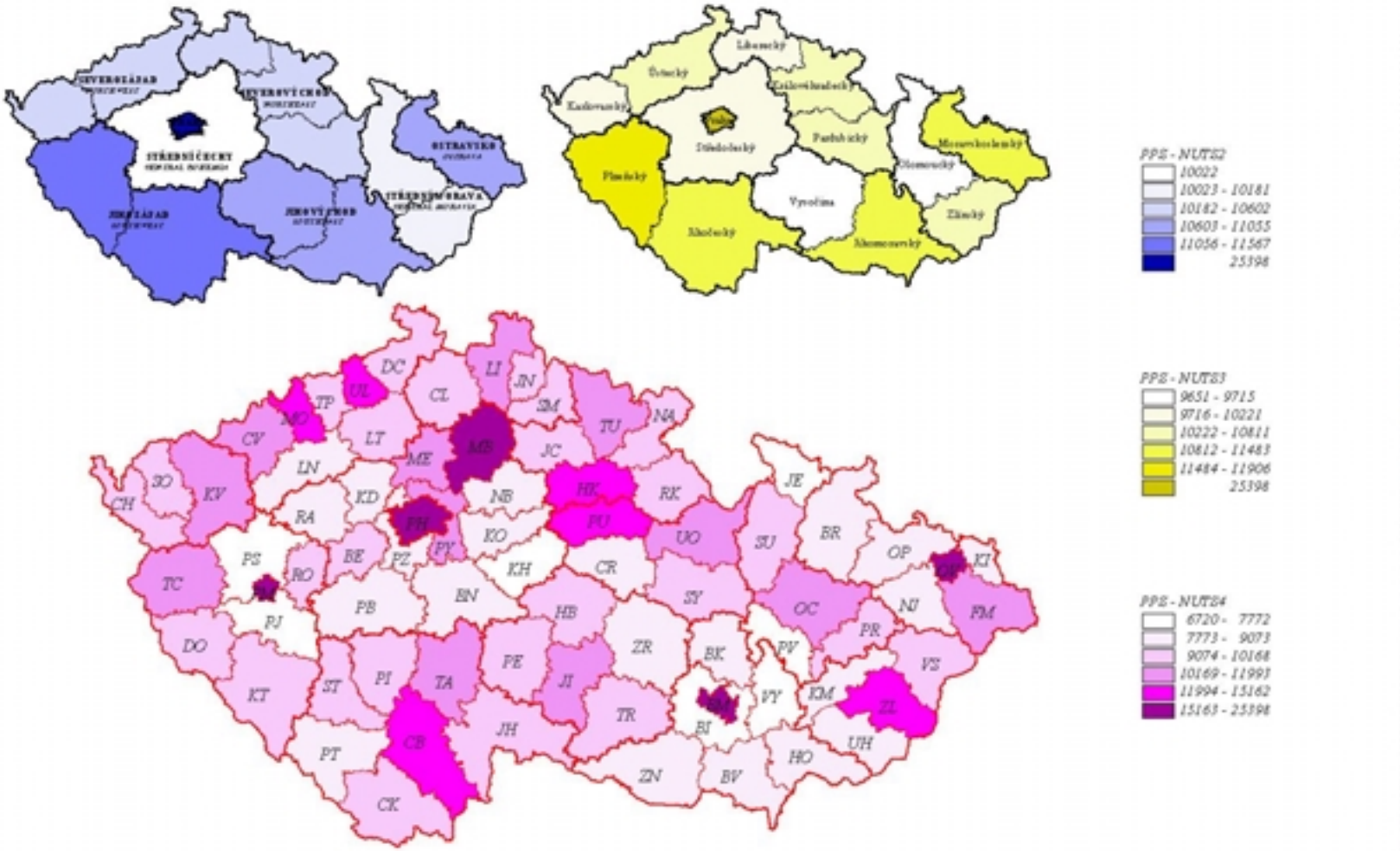
Czech Republic - Gross Domestic Product per capita in 1998, PPS


CZECH REPUBLIC
(regional breakdown)
LIBERECKÝ
ÚSTECKÝ
KARLOVARSKÝ
KRÁLOVÉHRADECKÝ
PRAHA
STŘEDOČESKÝ
PARDUBICKÝ
MORAVSKOSLEZSKÝ
OLOMOUCKÝ
PLZEŇSKÝ
VYSOČINA
JIHOČESKÝ
JIHOMORAVSKÝ
ZLÍNSKÝ
DC
LI
JN
UL
CL
SM
TU
NA
TP
MO
LT
CV
LN
ME
MB
JC
SO
KV
CH
KD
NB
HK
RK
JE
RA
PH
PY
KO
PU
UO
SU
BR
BE
CR
OP
OV
KI
PS
PZ
KH
SY
TC
RO
PM
BN
OC
NJ
FM
PB
HB
PJ
ZR
BK
PR
DO
PE
PV
VS
PI
TA
ST
JI
KM
ZL
KT
TR
BM
VY
JH
BI
UH
CB
HO
PT
ZN
BV
CK
Borders
NUTS2
NUTS3
NUTS4
ČSÚ

Czech Republic – Employment Structure and Number of Unemployed Persons



Czech republic - Gross Domestic Product per capita in 1998, PPS



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Report on the use of geographical information

in the Statistical Office of the Slovak Republic

Working document concerning item 10 of the agenda of the meeting

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Report on the use of geographical information in the statistical office of the Slovak Republic

Zuzana Podmanická, Ivan Masaryk,
Statistical Office of the Slovak Republic

1 Geographic Information at the National level

Creation of GI strategy and GI infrastructure in the Slovak Republic is a part of the State Information System

1.1 The State Information System

The state information system is a set of information entities and information activities that secures the fulfilment of the functions of the state. Information entities and information activities are parts of the state information system, insofar as they are financed by the state budget of the Slovak Republic . Information entities and information activities are secured by the bodies acting in the area of the state information system. The state information system is subdivided into parts. A part of the state information system is an information system operated under the competence of a central administrative body. A part of the state information system can also be a functional part thereof securing one or more information activities.

Basic tasks in the area of the state information system are performed by the Ministry of Education of the Slovak Republic and the Council of the Government of the Slovak Republic for Information Technology.
Other tasks in the area of the state information system are performed by the ministries and other central bodies of state administration of the Slovak Republic (Statistical Office of the Slovak Republic, Geodesy, Cartography and the Cadastre Authority of the Slovak Republic, etc.), the Office of the National Council of the Slovak Republic, the Office of the President of the Slovak Republic, the Constitutional Court of the Slovak Republic, the Supreme Court of the Slovak Republic, the Supreme Supervision Office of the Slovak Republic, and the Office of the Prosecutor General of the Slovak Republic, local bodies of state administration and municipalities.

1.2 Geodesy, Cartography and the Cadastre Authority of the Slovak Republic

In the field of space identification the main role is played by Geodesy, Cartography and the Cadastre Authority of the Slovak Republic (hereinafter referred to as " The Authority"), the aim of which is to build up and administrate the Automated Information System of Geodesy, Cartography and Cadastre.

The Automated Information System of Geodesy, Cartography and Cadastre is part of the State Information System and contains data on geodetic control, data on the real estate cadastre and primary database of geographic information system.

Primary data base for the geographic information system

The primary data base for the geographic information system is composed of the files of planimetry, altimetry, hydrography, canopy, lettering and the data on the standardized names of non-residential geographic objects at the level of the contents of the Basic map of the Slovak Republic 1:10 000.

The primary data base for geographic information system in a raster form has been made by scanning the map print base of planimetry, lettering, hydrography, canopy and altimetry from 2.820 map sheets of the territory of the Slovak Republic. In 1997, the creation of the primary data base for the geographic information system in vector form was started.

- The vector data base with the level of detail corresponding to the Basic map of the Slovak Republic 1 : 50 000 has been made by vectorizing the scanned fair draughts of the print base of planimetry, lettering, hydrography and areas. Individual elements are separated into 52 levels.
- The vector data base with the level of detail corresponding to the Basic map of the Slovak Republic 1 : 200 000 has been made by vectorizing the scanned fair draughts of the print base in the diversification of a settlement, communication, forest area, hydrography and lettering.
- The vector data base with the level of detail corresponding to the Map of the administrative division of the Slovak Republic 1 : 400 000 has been made by vectorizing the line and lettering data with the level of detail corresponding to that of the Basic map of the Slovak Republic 1:50 000. The map is processed in the layers of boundary (republic, region, district, municipality, cadastral area, urban district) and lettering.
- The raster data base with the level of detail corresponding to the Administrative map of the Slovak Republic 1 : 250 000 has been made from the fair draughts of the print base in the diversification of a settlement, communications, forest area, hydrography and lettering.

1.3 Cooperation

Organisation setting (scene?) is at present formed mainly by GIS workstations (authorities?) of the resort and non-resort organisations which are involved what means that it is formed by organisations which generate and use spatial data. Inner coordination among the above mentioned organisations or working places is not on required level yet. Exchange, supplying with already processed data and use of already processed information is realized in limited extent.

Statistical Office of the Slovak Republic cooperates mainly with the Authority which provides SO SR positioning base for spatial data set, with the Ministry of Interior of the Slovak republic provides data on changes in legislation on each level of territorial units, with the Ministry of the Environment of the Slovak Republic on the level of updating and revision of Basic Residential Units.

2 Geographic Information at the Statistical Office level

2.1 Statistical Office of the Slovak Republic

In accordance with the Act on Official Statistics and in the context of GI Statistical Office of the Slovak Republic (hereinafter referred to as " SO SR") fulfils following tasks:

- elaborates the principles of policy for the official statistics of the SR and the Program of Statistical Surveys
- defines methodology for the field of official statistics
- organises and carries out surveys, collection and processing of statistical data
- ensures comparability of statistical information for assessment of development in the Slovak Republic as from the international point of view
- in co-operation with competent central governmental bodies prepares statistical classifications, nomenclatures and registers
- proposes the way of production of identification numbers of reporting units and directs its giving and announcing to these units

- defines ways of data collection and appropriate data processing methodology
- builds up information system of resort.

2.2 Codification

The territory of the Slovak Republic is divided into the following statistical territorial units:

Level 1

KÓD	CODEEUROSTAT	NÁZOV	NAME
SK	SK	Slovenská republika	Slovak Republic

Level 2 - Statistical territorial units

KÓD	CODE - EUROSTAT	NÁZOV	NAME
1	SK01	Bratislavský kraj	Region of Bratislava
2	SK02	Západné Slovensko	West Slovakia
3	SK03	Stredné Slovensko	Central Slovakia
4	SK04	Východné Slovensko	East Slovakia

Hierarchical division corresponds with the Nomenclature of territorial units for statistics published by Eurostat. The aim of this nomenclature is to provide comparative base for regional statistics on the base used within the European Union.

Structurality of statistical territorial units is secured also by territory of districts and municipalities. It is compulsory for all authorities which deal with state statistical surveys and for authorities dealing with resort statistical surveys to use this nomenclature of statistical territorial units.

Level 3 - Territorial units

KÓD	CODE EUROSTAT	NÁZOV	NAME
1	SK01	Bratislavský kraj	Region of Bratislava
2	SK021	Trnavský kraj	Region of Trnava
3	SK022	Trenčiansky kraj	Region of Trenčín
4	SK023	Nitriansky kraj	Region of Nitra
5	SK031	Žilinský kraj	Region of Žilina
6	SK032	Banskobystrický kraj	Region of Banská Bystrica
7	SK041	Prešovský kraj	Region of Prešov
8	SK042	Košický kraj	Region of Košice

Nomenclatures of territorial units are stated for the needs of statistical surveys and for automatic data processing. Use of nomenclatures of territorial units is liable for authorities providing state statistical measurements and for reporting units within the field of state statistics.

Level 4
In the Slovak Republic there are 79 districts. Nomenclature of districts is formed by three digit code with the region number as the first one.

Level 5
In the Slovak Republic there are 2883 municipalities. Nomenclature of municipalities of the Slovak Republic is formed by identification numbers within interval 50001 - 59999.

The content of all nomenclatures is stored in the central automated register of spatial units which is administrated by SO SR.
In the field of creation of registers of statistical units and their use for statistical purposes Recomendations of EU 2186/93 and 693/93 are gradually implemented.

2.3 Data filles

Automated Statistical Information System

Automated Statistical Information System (hereinafter referred to as "ASIS") is a part of the State Information System, and it has been built according to conception SO SR. ASIS consist of the following subsystems:

- subsystem of metainformations - METIS,
- subsystem of registers - REGIS,
- subsystem collection and first data processing - ZBER,
- subsystem of data bank of statistics - DS ZBD, DS PBD,
- subsystem of information service - ELIS.

The first two subsystems ensure the governance of the ASIS integration tools, the other two subsystems work with the processing activities above the statistical data, and the last subsystem serves for presentation and distribution of statistical information. The interrelationships between the individual subsystems, as well as between the entire system and its surroundings is described at the chart below.

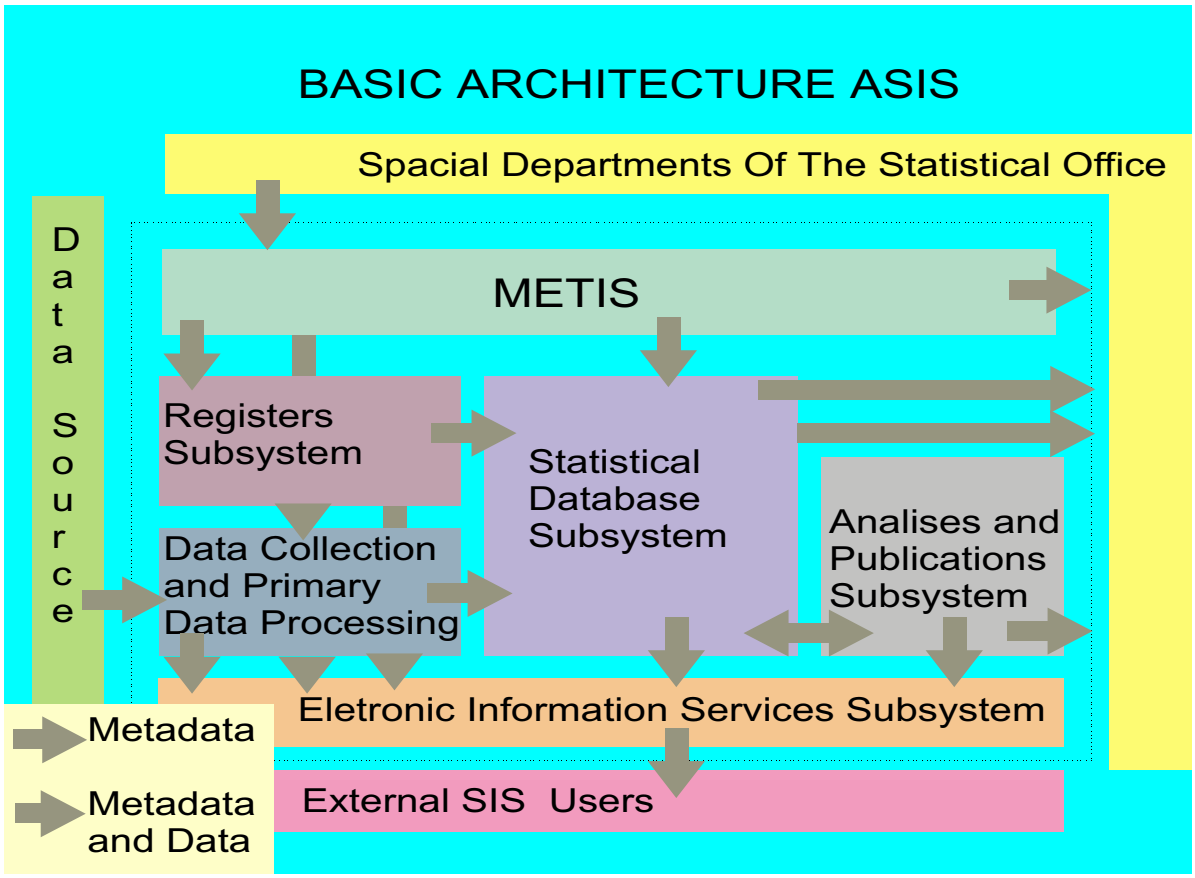

Chart 1: The basic ASIS architecture

The ASIS database architecture, where the statistical data are stored and automatically processed is shown at the following chart.

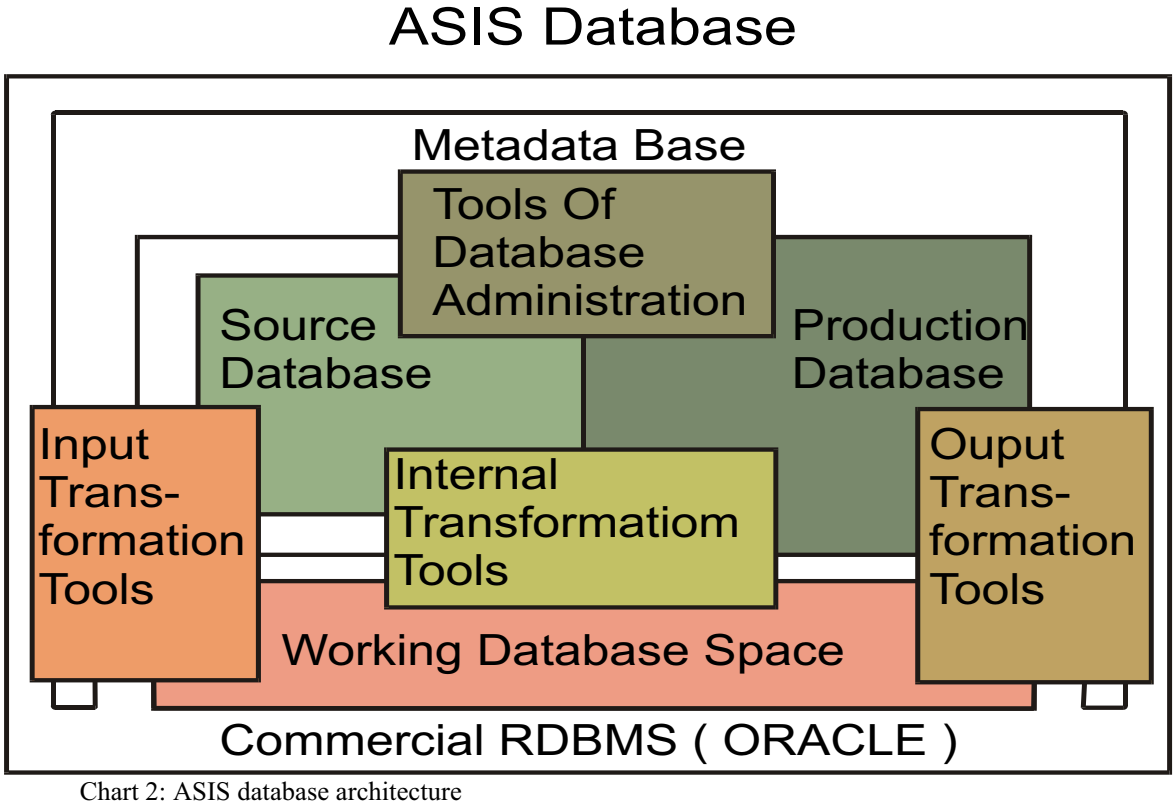

Chart 2: ASIS database architecture

REGIONAL DATABASE

The regional database is in the process of development and processing, having the company Infostat as a supplier. The database is in DBF format at present, which will be gradually converted into Oracle format. The application program for the work with this database will be elaborated in Visual FoxPro environment, which operates under Windows 95 and higher. The deadline for this supply is December, 2001.
The regional database contains data from the individual sectors, as required by the NACE Rev.1 and NACE-CLIO standards, and its regional level reaches the range of NUTS1, NUTS2, NUTS3. The content of this regional database and the methodology of the individual parameters is gradually harmonised with the requirements and standards of Eurostat.

Database UMS/UIS
Software UMS/UIS is a database application that enables recording of data on municipalities and cities of the Slovak Republic, the user is made able to create various output tables and reviews of urban wards, urban districts, municipalities, cities, districts, regions and the whole Republic as well. This application is set-up in Visual FoxPro 5.0 environment and it works under Windows95 and higher.

This part of statistical work in Slovakia is aimed at present at data on municipalities and cities through the means of automation information systems called "Urban and Municipal Statistics"(UMS) and "Urban Information System"(UIS). The latter one is so far functioning in the capital: Bratislava, exclusively. The difference between these two systems is of principle in levels on which monitoring is carried out and in number of surveyed indicators. In UMS the data on municipalities and cities is surveyed on one level, in UIS there are three levels: a city - an urban district - an urban ward.
In future prospect UIS launching on is assumed in all regional centres.

2.4 The use of GIS

2.4.1 Current situation

So far GIS was used by the SO SR in the field of population statistics, in the regional statistics and election statistics.

Population statistics
Census 2001: The recommendations for census around the year 2000, as approved by the European Statistics Conference during the 44th plenary session, June 1997, for the ECE region, recommend to the involved parties inter alia to prepare and ensure the counting in order to allow for and to improve the international recognition of the results, emphasizing the early distribution of the outputs to all users.
The census as an exhaustive investigation was performed in the Slovak Republic at May 26, 2001, and it will provide the information about the inhabitants, working power, habitats etc. A numerous data are processed, selected, inventorying at present, and these data will necessarily be presented (visualised) and used for the spatial analyses, syntheses of the knowledge and the statistical modelling in the follow-up phase.
Software ArcView 3.2 is ready for GIS, data from population census – Oracle, tables located in the database server of the SO SR, spatial server SDE /Spatial Database Engine/ as a superstructure above Oracle, and the ArcIMS /Internet Map Server/ technology with a possibility to visualise and analyse via the web site.

Demography: Demographic statistics processes data on the number of inhabitants, their structure (biological – sex, age..., economic – profession, economical activities..., cultural – nationality, education...) as well as on population processes (natality, mortality, marriages, physical movements...). The data come from the population census (10 years period), as well as from the statistical announcements on the movement of inhabitants. The processing deals mostly with the sorting by the local, time and substantive point of view, their recording and visualisation. Demographic department uses mainly the visualisation function of GIS at present, the future GIS use for elaboration of population basis analyses, population processes analyses and inhabitants development projection is foreseen.

Regional statistics
Regional statistics uses technological facility PopMap, which is a product of Statistical Section of UN Division of Economics and Social Affairs. It represents a GIS for Windows application and it facilitates to set, edit and present geographical data in connection with statistical ones directly on map by means of its internal tools.

Election statistics
Information on the process and results of the elections for the public is the main task. ArcIMS technology was used for the last elections to the Slovak Parliament results presentation in 1998. This presentation is accessible at http://volby.statistics.sk/

2.4.2 GIS perspective

Regarding the long term perspective, SO SR is aiming at the functional incorporation of GIS technology into its sectoral information system according to the state IS concept.

The main short term aims are as follows:

- development, management and upgrading of databases: GIS technology will be necessary to incorporate into the individual statistical survey projects. Use the opportunity to work with Oracle database and its data, and via ODBC allow the access of the end user to the required data.

- software: ArcView will be used for the analytical activities. SO SR owns two licenses. We recommend to use freeware ArcExplorer at several workplaces, for a period. We recommend to focus the future development on the product, which will be broadly applicable, and which will use the usual graphical formats (shape files ArcView, coverage ARC/INFO, ArcSDE layers).

As a following development step we recommend to design universal GIS application, that will be linked to Oracle database and its SDE superstructure. This will make it possible to work with the graphical files stored in Oracle. The access to spatial data and statistical data will be very quick. An additional advantage will be Intra/Internet accessibility.

- GIS outputs quality: The author of the map should realise, that each map has its expert, technical, esthetical and ethical component. They need to be processed consistently, they need to be harmonised, respecting the overall principles. In a short term perspective use of such maps has two basic purposes – they serve as an information base, as well as results presentation. From the long term point of view there is a need to explore GIS analytical tools more extensively. SO SR uses the vector map spojitá vektorová mapa SVM 50.

- education: Implementation and use of GIS technologies are complex procedures and they require detailed studying by all potential users.

- publications: Printing out for publishing purposes of the graphical outputs is solved mostly by the end layout under CorelDraw at present. Universal GIS application will allow to enrich and to harmonise the graphical outputs for publishing.

- Intra/Internet presentations: To apply GIS technology for the statistical data presentation. Presentation of the majority of statistical data is static at present. Universal GIS application will make it possible to simply present the data also as dynamic graphical manner, and it will substantially improve the information quality. According to the needs it will be possible to add also other outputs Additional outputs will easily be incorporated as needed. The graphical layout of all outputs will be harmonised.

Contacts

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Directorate E: Social and regional statistics and geographical information system
Unit E-4: Regional indicators and accounts, population and geographical information system

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Meeting of the Workingshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Report on the Use of Geographical Information in the Geodesy, Cartography and Cadastre Authority of the Slovak Republic

Working document concerning item 10 of the agenda of the meeting

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Report on the Use of Geographical Information in the Geodesy, Cartography and Cadastre Authority of the Slovak Republic

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Geodesy Cartography and Cadastre Authority

of the Slovak Republic

1. THE STATE INFORMATION SYSTEM

National programme of informatization of SR passed by the government of SR in June 1992 started the process of the informatization of society, which aimed at improving information environment, reasonable spending of finance and resources and facilitation of information exchange both within the state and in relation to foreign countries.
One of the crucial issues is the informatization of state administration, which since 1995 is regulated by the Act NR SR No. 261/1995 corpus iuris on the national information system (ŠIS). The Act on ŠIS for the first time has established legal base for integrated creation and operation of ŠIS and its parts and it regulated the rights and duties of state agencies, communities, state organizations, natural and legal persons in ŠISs creation and operation. The Act institutes standards as tools for the integration of ŠIS parts.
The Act defines ŠIS as a set of information and information activities, which serve for exercising the tasks of the state and are built and operated from the state budget finance. ŠIS is divided into parts, which are made up of the information systems within competence of central organs of state administration. In creating and operating ŠIS operators are bound to secure the implementation of standards. Data from legal persons or natural persons for ŠIS can be obtained only on the basis of law, otherwise the data from legal persons or natural persons can be obtained only with the consent of the persons. The operators are responsible for correctness, veracity and updating of the data provided and they are responsible for protecting data against alienation, damage, destruction or misuse.
Despite the fact that the standards in question will be binding for building the information systems in the state administration, they „must“ be respected also by the creators of commercial information systems, which have relations and/or links to the National Information System.

Computerized Information System of Geodesy, Cartography and Cadastre
Standardization in the field of information technologies is necessary for building ŠIS and other information systems in Slovakia. In this effort an irreplaceable place in the sphere of spatial identification belongs to the Geodesy, Cartography and Cadastre Authority of the Slovak Republic (hereinafter referred to as "The Authority"), which under the act NR SR No. 215/1995 corpus iuris on geodesy and cartography builds the Computerized Information System of Geodesy, Cartography and Cadastre (hereinafter referred to as "AIS GKK”), which will serve as a positioning base for territory-oriented information systems.
In order to avoid duplicities in collection, generation and updating of the information in the given information systems and facilitate information exchange within the state and in relation to foreign countries a **Working Group for Geographic Information Systems in State Administration** has been established at the Council of the Government of the Slovak Republic for Informatics on 3rd October 2000. It should lead to reasonable spending of finance for building given information systems and avoid prevent unnecessary load of the department of the Authority, which is a supplier of base data.

2. GEODESY, CARTOGRAPHY AND THE CADASTRE OF THE REAL ESTATES IN THE SLOVAK REPUBLIC

The central body of the state administration of the Slovak Republic for geodesy, cartography and cadastre of real estates is the Authority. The Authority was established by the Act No. 347/1990 Coll. of The Slovak National Council on the organization of ministries and other central bodies of the state administration of the Slovak Republic in the wording of subsequent regulations. The Authority is linked to the state budget by its revenues and expenses.
The Authority has established and directly controls the Geodetic and Cartographic Institute, Bratislava, the Cadastral Institute in Žilina and Research Institute of Geodesy and Cartography in Bratislava in order to fulfil its tasks. The local authorities of state administration in the area of geodesy, cartography and cadastre of the real estates are the cadastral departments of regional authorities and cadastral departments of district authorities. From January 1st 2002 cadastral departments are going to be under direct control of the Authority.
The geodesy, cartography and cadastre of real estates are stipulated in the legal provisions as follows:

- the Act No. 215/1995 Coll. of National Council of the Slovak Republic (hereinafter referred to as „NC SR“) on geodesy and cartography,
- the Act No. 162/1995 Coll. of NC SR on the real estate cadastre and on the entry of the owner's and other rights to real estates (cadastral law) as subsequently amended.

2.1 Main tasks of the Authority and the organisations active in the sector of geodesy, cartography and the cadastre of real estates

On the basis of the generally binding regulations the **Authority**
a) in the field of geodesy and cartography, especially:

- elaborates concepts and trends of the development of the geodetic and cartographic activities that are conducted to meet the needs of the State,
- drafts generally binding regulations, guidelines and instructions,
- stipulates binding geodetic systems and location standards,
- stipulates the terms of quality for the performance of selected geodetic and cartographic activities and the procurement of their taking over, evaluation, documentation, recording and accessing,
- ensures the establishment and measuring of the geodetic points, marking and measurement of the geodetic points of the state border and updating the geodetic part of the border documentation work,
- stipulates compilation, updating and publishing state map series,
- standardise geographical names,
- stipulates setting up and operation of the AIS GKK,
- issues and suspends the certificates on technical competence to and from physical persons,
- administrates and coordinates research, scientific and technological development,
- stipulates international cooperation,

b) in the field of the real estate especially:

- works out concepts of developmental trends,

- methodologically manages the performance of state administration carried out by regional and district authorities by publishing generally binding regulations, guidelines and instructions, reviews decisions pursuant to special regulations and controls these procedures
- verifies the district authorities employees ´ competence to decide on the proposal for the entry into the real estate cadastre,
- conducts cadastral inspection above the level of administration, updating, and renewal of the real estate cadastre and above the level of the tasks related to the real estate cadastre,
- stipulates the tasks in the arrangement of the ownership rights to the land,
- stipulates international cooperation.

2.2 Main tasks of the Geodetic and Cartographic Institute, Bratislava (GCI)

According to the Statute, The Geodetic and Cartographic Institute, Bratislava ensures especially:

- administration, i.e. establishing, updating and renewal of the spatial, horizontal, vertical and gravimetric geodetic control including modernization, documentation, the operatus registration, providing information and claiming indemnity for the damage of survey marks and means of protection of monumentation at geodetic stations,
- monumenting and measuring of the geodetic points of the state boundary and updating the geodetic part of the border documentary work,
- administration and updating of the state map series of scales 1:10 000 to 1:1 000 000, documentation of their operatus and the sales of maps,
- administration of the branch information centre,
- administration of the Central Archive of Geodesy and Cartography,
- administration of the AIS GKK,
- preparation of drafts for the standardization of geographical names , creation of the geographical names publications and documentation of the standardization results,
- providing information from the state documentation.

2.3 Main tasks of the Cadastral Institute in Žilina

According to Statute, the Cadastral Institute in Žilina ensures especially:

- renewal of cadastral operatus,
- revision of the real estate cadastre data,
- scanning large-scale maps,
- providing information from the state documentation.

2.4 Main tasks of the Research Institute of Geodesy and Cartography in Bratislava

According to the Statute, The Research Institute of Geodesy and Cartography in Bratislava ensures especially:

- research and development in the field of geodesy, cartography and real estate cadastre,
- processing the drafts for technical standards,
- training of scientific workers in the field of geodesy and cartography,
- activities of the branch-training centre.

2.5 Main tasks of the cadastral departments of regional authorities

The cadastral departments of the district authorities carry out state administration in the sector of the real estate cadastre, and they especially:

- decide upon the matters in which in the administrative procedure in the first degree district authorities proceed,
- manage and control the performance of state administration carried out by cadastral departments of district authorities,
- process summary data of the real estate cadastre regarding the land fund,
- compile the draft of the register of the renewed inventory of the land pursuant according to a special Act.

2.6 Main tasks of the cadastral departments of district authorities

The cadastral departments of the district authorities carry out state administration in the first degree in the sector of the real estate cadastre, and they especially:

- decide in cadastral proceeding,
- administer and update the real estate cadastre,
- control geodetic and cartographic activities, whose results are to be taken over for the real estate cadastre,
- authenticate geometric plans and other results of selected geographic and cartographic activities related to the real estate cadastre,
- process summary data of the real state cadastre on the land fund,
- standardise geographical names,
- administer state documentation,
- provide information from the real estate cadastre.

3. COMPUTERIZED INFORMATION SYSTEM OF GEODESY, CARTOGRAPHY AND CADASTRE

The AIS GKK is a part of the State Information System and contains data on geodetic control, data on the real estate cadastre and principal database of geographic information system.
AIS GKK is a united nation-wide information system based on the database technology of processing the geodesy, cartography and cadastre data.
Every copy of data sets from the AIS GKK must include a protective clause about copyright to the base used and the year of edition in the form „Principal Database for Geographic Information System © the Geodesy, Cartography and Cadastre Authority of the Slovak Republic...“ and the date to which the set of information was updated.
Data can be used for the purposes given by a customer in his/her order and its further distribution is prohibited.
In the event of illegal scanning and map digitising from the copies bought in map agencies sanctions are applicable under the Act NR SR No. 215/1996 corpus iuris on geodesy and cartography.
The most relevant conditions of the digital products use are stated in the Act No. 215/1995 corpus iuris on geodesy and cartography. In the regulations of the Act following duties are included:

- ask for consent to use the documentation of a cartographic series, publisher of which is the Authority,
- pass two free copies of a cartographic series published in analogue form and, if a digital form is available, one copy of the final projection on storage medium for archiving purposes within 30 days of their publishing to a special archive established by the Authority,
- observe the binding character of standardized geographic names.

Contract of the use of a series is drawn up on the basis of a request (order) in writing.

3.1 Geodetic Control

Geodetic control is made up of spatial, horizontal, vertical and gravity control.

State Spatial Network

New geodetic control makes up the integrated control points, which are determined by geodetic technologies in specialized networks in extreme precision. At present, the GCI has provided work in specialized geodetic networks, namely:

- it built the State Spatial Network in the ETRS89 system; its framework consists of the SLOVGERENET points (43 points, one permanent station), 340 points of geodetic control were connected in the given period,
- it continued the overview of the State Trigonometric Network points,
- within the framework of the coordination of work in specialized networks the selected points were included in the State Spatial Network and State Gravimetric Network.

The Conception 2001 follows the building of new geodetic control of the Slovak Republic and observes the IAG - EUREF subcommittee recommendations.
When completed, the system will replace the hitherto geodetic control.

Horizontal Control

Horizontal control is made up of the State Trigonometric Network of the orders I to V, and the State Astronomic and Geodetic Network.
At present, the state Trigonometric Network of orders I to V is a base of a coordinate system of the Datum of Unified Trigonometric Cadastral Network (hereinafter referred to as "S-JTSK"), which is defined by Bessel's ellipsoid and Krovák`s conform conic projection in a general position. The average density of points of orders I to V order is 1 point on 2.7 sg.km.

Vertical Control

Vertical control is made up of the State Levelling Network of orders 1st and 2nd in the Baltic Vertical Datum - after Adjustment. The State Levelling Network of 1st order is vertically secured by 11 vertical datum points.
In 1996, the 1st order of the State Levelling Network was adjusted in the innovationed Baltic Vertical Datum - after Adjustment 1985 and geopotential differences between the network's 250 points were calculated for the connection of the State Levelling Network to the United European Levelling Network (UELN). In the European United Vertical GPS Network (EUVN) 3 points of SLOVGERENET from the territory of the Slovak Republic are defined.

Gravity Control

Gravity control is made up of the State Gravimetric Network, which contains 278 points, 10 absolute points, and 12 relieving gravimetric points and was adjusted as a free network with connection to the point Praha in the Postupim 1958.

Precision is characterised by an error of 0.26 $\mu m.s^{-2}$ with possible distortions 1.5 $\mu m.s^{-2}$. The network has been connected to the Uniform Gravimetric Network of Eastern Europe by connecting measurements. Updating is carried out by building absolute gravity points, readjustment of the State Gravimetric Network with neighbouring countries and also independently and building three gravimetric bases (comparative, vertical and micro base).

3.2 The Cadastre of Real Estates

The real estates cadastre is a geometric definition, a list and description of real estates. Part of the real estates cadastre is area data on the titles to real estates. The real estates cadastre is made up of cadastral operatus arranged according to cadastral areas.

In the Slovak Republic, due to the heritage of the past, a complicated functional system, which is insufficient for the needs of the state of law, has evolved. This has resulted from special history of the real estate inventory and the registry of the titles to real estates. The status, all recorded in the land register administered until 1951, was not identical with the actual situation and the lands cadastre operatus was not filed in its full extent.

Another distinction is the high degree of the fragmentation of the land to which ownership relations are linked (12 million plots, average number 20 co-owners per 1 plot). In the period 1951 -1989, land-use relations to real estates were prioritised and the entries of ownership rights in the land register remained unchanged at 1 January 1951, i. e. without updating. Another reason was deliberate mystification of the ownership rights to real estates and their replacement by various institutes, such as private property, the right of personal use, the right to manage the national property.

From 1993, a new-type of the real estates cadastre has been built in operation, serving as an information system largely especially for the protection of the rights title to real estates, for tax and charge purposes, for land evaluation, for the protection of agricultural and forest land resources, and for the building of other information systems.

The real estates cadastre contains the file of survey information and the file of descriptive information. Part of the real estate cadastre is also the collection of documents, the summary data of the real estates cadastre on land, the resources, land registers, railway register, and other documents.

The information system of the cadastre of real estates at the district level is operated on personal computers in the local network and at the central level it is administered by the Geodetic and Cartographic Institute, Bratislava, in the central computer system.

The Survey Information File

The survey information file contains cadastral maps, the maps of stated operatus, geometric plans, a fair sheet, survey sketches, the records of the map revision survey, field documents and reviews of the numbers of detailed survey points, the file of break points of the boundaries of cadastral areas and lists of the coordinates of detailed survey points. The data on the connection of break points, label point of cadastral areas, parcel centroids, operatus from the staking-out of the lot lines and other geodetic documentation are also part of the survey information file.

The cadastral map - as part of the survey information file - provides the user with the location information on the territory. At present, the territory of the Slovak Republic is covered by more than 40, 000 cadastral maps.

The map of stated operatus is the most appropriate map of the earlier land records containing the original real estates that merged into greater wholes. There are 12 % of 40 000 maps of the stated operatus available in the territory of the Slovak Republic.

The Descriptive Information File

The descriptive information file contains the data on cadastral areas, real estates (lots, constructions, housing and non-housing space), titles to real estates, owners and other authorised persons, matters related to the titles to real estates and residential and non-residential names.

The set of descriptive information is managed in computer form all over the territory of Slovakia.

3.3 Principal Database for Geographic Information System

In the past the principal data base for the geographic information system was composed of the files of planimetry, altimetry, hydrography, canopy, lettering and the data on the standardized names of non-residential geographic objects at the level of the contents of the Basic map of the Slovak Republic 1:10 000.
In the year 2001 a new conception of the **Principal Database for Geographic Information System** creation and administration was worked out. The collection of data will be secured by digital photogrammetry, in the coordinate system ETRS 89, with the level of detail of the content corresponding to the Basic Map of Slovak Republic 1:10 000.
The Seamless Vector Map 50 was completed as the spatial object-oriented database, which was created by vectorizing the scanned print bases of the Basic map of the Slovak Republic 1:50 000 in the ArcInfo and ArcSDE environment. Individual features have been separated into 52 levels.
In the year 2000 the layer of the boundaries of territory-administrative and territory-technical units were updated. The creation of a digital model of the relief of Slovakia using vectorization of print bases of the altimetry component, part of the map 1:10 000 in cooperation with the SR Army continued.

4. COOPERATION

In the sector of geodesy and cartography the competence in the field of administering thematic state map series ranges with the Ministry of Defence of the Slovak Republic, Ministry of Agriculture of the Slovak Republic, Ministry of Environment of the Slovak Republic, Ministry of Transport, Posts and Telecommunications of the Slovak Republic and Ministry of the Interior of the Slovak Republic. The above-given ministries create branch geographic systems. They are primarily as follows:

- Military information system on the territory (Ministry of Defence),
- Geographic information system of forest management (Ministry of Agriculture),
- Geographic information system of water management (Ministry of Agriculture),
- Geographic information system on soil (Ministry of Agriculture),
- Information system of environment - subsystem Information system on the territory (Ministry of Environment),
- Geographic information system of the railways of the Slovak Republic (Ministry of Transport, Posts and Telecommunications),
- Geographic information system of the Administration of road management (Ministry of Transport, Posts and Telecommunications),
- Regional information system of state administration (Ministry of the Interior).

Within the framework of international cooperation the GCCA participates in activities within the EuroGeographics and projects within its framework. The project **"Seamless Administrative Boundaries of Europe** (SABE)" as a vector database of administrative boundaries in Europe includes the boundaries of administrative units with identifiers, names and information on hierarchical level. At present version to 26 May 2001 has been created from the territory of the Slovak Republic.
GCCA is an active member of the WPLA (Working Party on Land Administration) at the UN Economic Commission, committee/board for human settlement the activity of which lies mainly in the section of the real estate cadastre, exchange of experience in legislation and technical spheres and in the sphere of implementing information technologies in administering the cadastre of real estates and building the cadastre of a new type.

The GCCA cooperates with all neighbouring countries, particularly in the field of levelling and gravimetric networks, in the field of setting-out, marking, measuring and processing the geodetic part of final operatus of the documentary work concerning the state boundaries.

5. THE STATE MAP SERIES

The existing map fund that is used in the territory of the Slovak Republic is the result of over a 100-year activity. In respect of the scale, the map fund is divided into large-scale maps 1:1000 up to 1: 5000, medium-scale maps 1:10 000 up to 1:200 000, and small-scale maps 1: 250 000 up to 1: 1 000 000.
In respect of its contents, the state map series is divided into the basic state map series and the thematic state map series. The Authority is responsible for compilation, updating, and editing of the basic state map series and some thematic state map series. The basic state map series project the state territory in a coherent way, its basic content can be widely used and it is compiled in accordance with uniform rules.
The prints of the state map series are sold via Mapping Services.

5.1 Large-scale Maps

Within this group are the maps at scales of 1:1000, 1:2000, 1:5000 and in fathom scales, created for the purposes of the real estate cadastre.

5.2 Medium-scale Maps

The group of medium-scale maps is represented by a set of basic maps in S-JTSK and the Baltic Vertical Datum - after Adjustment. The map sheets are of a uniform format 630x470 mm, the cartographic symbol system and the method of their colour expression are harmonized.
The Basic Map of the Slovak Republic 1:10 000 has been made by updating the 1:10 000 topographic map published before 1971 in S-42. In its compilation current aerial photos were used. The first edition was published carried out in the period 1972-1986. From 1987, systematic revision of the map series has been systematically revised done using aerial photos in a differentiated cycle depending on the territory significance. The map is published as a 5-colour print.
The Basic Map of the Slovak Republic 1:25 000 has been made by deriving from the Basic map of the Slovak Republic 1:10 000. The content of the maps generalised during the cartographic processing. The first edition of the map started in 1973, 75% of the map sheets have been published. The map is published as a 5-colour print.
The Basic Map of the Slovak Republic 1:50 000 has been made by cartographic re-editing of the previous map series published in S-42. The first edition in 1970 -1971, covered the whole territory of the Slovak Republic. Regarding the wide use of the map as a base for future basic and thematic state map series, the contents of the map series are annually updated in the extent of the whole state territory and since 1981, has been renewed in a regular 6-year cycle. The map is published as a 6-colour print.

The Basic Map of the Slovak Republic 1:100 000 is a scaled - down version of the Basic map of the Slovak Republic 1:50 000. The first edition published in 1983 -1990.The map Revision is carried out according to requirements. The map is published as an 8-colour print.
The Basic Map of the Slovak Republic 1:200 000 is a map derived from the Basic map of the Slovak Republic 1:50 000. The first edition was published in 1971 - 1972, and by 1997 two all-area revisions had been conducted out. Since 1992, it has also been published in a reduced version without canopy and boundaries simultaneously with standard eight-colour prints.
Within the medium-scale maps, are also the maps of territorial units, published on the basis of chosen basic maps. They are the City map of the Slovak Republic 1:10 000, edited and published on the basis of the Basic map of the Slovak Republic 1:10 000 for towns with the seat of the district authority, the District Map of the Slovak Republic edited and published on the basis of the Basic Map of the Slovak republic 1:50 000, the Region Map of the Slovak Republic 1:200 000 edited and published on the basis of the Basic Map of the Slovak Republic 1:200 000.

5.3 Small-scale Maps

The group of the small-scale maps includes the Basic Map of the Slovak Republic 1:500 000 and the Basic map of the Slovak Republic 1:1 000 000. Both the maps are published as a 6-colour print. The territorial and administrative division of the State is projected on the administrative maps at scales of 1:250 000, 1: 400 000 and 1:500 000 and the maps of the administrative division of the Slovak Republic at scales of 1:400 000 and 1: 1 000 000.

5.4 Digital form of the state maps

- the raster sets of the Basic Maps of the Slovak Republic 1:10 000 was made by scanning the map print base of planimetry, lettering, hydrography, canopy and altimetry from 2,820 map sheets of the territory of the Slovak Republic and in the year 2000 has been updated,
- the raster sets of the Basic Maps of the Slovak Republic 1:50 000, 1:100 000, 1:200 000 was made by scanning the map print base,
- the vector sets of the Map of the Administrative Division of the Slovak Republic 1: 400 000 has been made by vectorizing the line and lettering data. The map is processed in the layers of boundary (republic, region, district, municipality, cadastral area, urban district) and lettering,
- the raster sets of the Administrative Map of the Slovak Republic 1: 250 000 has been made from the fair draughts of the print base in the diversification of a settlement, communications, forest area, hydrography and lettering.

6. THE CENTRAL ARCHIVE OF GEODESY AND CARTOGRAPHY

The Central Archive of Geodesy and Cartography is a special archive established within the branch of the Authority, in which materials of record - keeping value are collected, maintained, protected, and made accessible. The Central Archives of Geodesy and Cartography archives stores the fair draughts of geodetic control, the geodetic part of the documentation work of the state border, the documentation of the state map

series, the standardization of geographic names on medium-scale maps and related data bases of the AIS GKK, the operatus of the "stable" cadastre (of 19th century Austrian Empire), the maps at scales of 1:3 600 to 1:14 400 for taxation purposes from 1851-1858, the maps of land consolidation, regulations and publications published by the Authority.
These are especially materials related to the maps that had been compiled in our territory until the end of the 18th century. In this period, the precursors of the present-day archive are rooted - the land cadastre archive and the archive of cadastral maps, in those times within the framework of the administration of the Austro-Hungarian Monarchy. The oldest map contained in the archives is the map of 1792.
In the Central Archives of Geodesy and Cartography are stored all the published cartographic series, including the basic and thematic state map series, atlases and globes, which the archives are donated by the publishers as mandatory deposit copies.

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EUROPEAN COMMISSION
STATISTICAL OFFICE OF THE EUROPEAN COMMUNITIES

Directorate E: Social and regional statistics and geographical information system
Unit E-4: Regional indicators and accounts, population and geographical information system

Document: **WS/PHARE-Doc. 11**
Original: **EN**

Meeting of the Workingshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Report on the use of GI in the NSI and NMA

in the Republic of Slovenia

Working document concerning item 11 of the agenda of the meeting

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Report on the use of GI in the NSI and NMA in the Republic of Slovenia

Mr. Gregor Sluga, Mrs. Danijela Šabić, Mr. Bojan Pirc, Mrs. Irena Ažman

Abstract

Mapping Authority of the Republic of Slovenia (SMA) and Statistical Office of the Republic of Slovenia (SORS) produced Register of Areas of Territorial units (RATU) and Record of House Numbers for the use in 1981 census. They were merged in the Register of spatial units (RSU) in 1993, when SMA started a project which should assure all conditions for managing and maintaining the RSU by modern information science's standards. Data from RSU are public and available to all clients for their use; only material costs are charged for issued data.
SORS is utilising data from RSU and other registers for methodological and dissemination purposes. Commercial and tailor's made software is used.

1. Georeferenced data at the Surveying and Mapping Authority of Slovenia (SMA)

1.1.Introduction

Register of spatial units (RSU) was established from two data collections: Register of Areas of Territorial units (RATU) and Record of House Numbers, that were produced by Surveying and Mapping Authority of the Republic of Slovenia (SMA) and Statistical Office of the Republic of Slovenia (SORS) in early eighties. As an official administrative register for the field of official division of space, the RSU is one of the most important registers in the country. On the basis of corresponding official documents (laws, decrees, municipal decisions, decisions passed by the SMA), the Register provides data on addresses and other spatial definitions for the central national registers (the Central Population Register, the Slovene Business Register, the Register of Taxpayers) and many other records, registers, cadastres and other collections of data. Data from RSU are found in many other databases that are connected to address or other spatial unit. These databases are particularly used in business, state administration and public services. With goecoded data the RSU offers the basics for locating data and events in space. Data from RSU are used by many different GIS.

1.2 History of Register of spatial units

For 1961 census SORS made the statistical cadastre that described census districts graphicaly and descriptivelly. There was also prepared the list of house numbers for each census district. This cadastre was updated for census 1971, but it become unclear and not useful for further use. In the year 1978 SMA was included in solving the problem of changing census districts. With cooperation of SORS and SMA the RATU and Record of House Numers were established for the use in 1981 census. Either of two is very important in presentation and analysis of census data.
In the years from 1983 to 1990 SMA made digitalisation of all the spatial units, centroides of spatial units and centroides of house numbers. Borders and centroides were digitalised from maps at scale 1:5000, rarely at scale 1:10000 and exceptionally at scale 1:25000. Methodically and organizationally the SMA leads the maintaining of RATU and Record of House Numers. Descriptive and graphical database were maintained by community's geodetic service on local level and on central level by SMA. SORS kept the descriptive data and SMA maintained graphical data in the central database (Lipej 1990)..
In the year 1993 SMA started the project of RSU. The project should assure all conditions for managing and maintaining the RSU by the SMA by modern information sience's standards. The test central database of RSU was established in year 1994. There were many logical controls particularly on descriptive and graphical data. Together there has been checking on topologhy and belonging of house numbers to corresponding spatial units. The operative database started in year 1995. The result of the project is today's Register of spatial units.

1.3 Regional breakdown

The RSU contains data on various types of units or facilities which differ in the following properties: type of topology (point, linear, polygonal), coverage of the territory of the country (homogenous, non-homogenous), cartographic data (available, not available), hierarcy (exist, does not exist) and competencies of updating (the main office of the SMA, regional geodetic administrations or branch offices). The Register contains data on house numbers, streets, settlements, municipalities, administrative units, cadastral communes, voting units, school localities, local communities, village communities and city district communities, as well as other types of units. As a rule, data on spatial units are recorded for the entire area of the country and cover it homogeneously, without any overlapping or gaps. Data on names, codes, boundaries, regions, surface area, centroids, mutual connections, origin, changes and history kept for all spatial units.
For presentation of statistical data we use SKTE (Standard Classification of Territorial Units), introduced with a Decree on the Standard Classification of Territorial Units (OJ RS No. 28/2000). It is a national standard for keeping records, collecting, handling, analysing and presentation of regional breakdown data. It has eleven levels; it is harmonised with NUTS (Nomenclature of Territorial Units) down to the fifth level.

1.4 Codification

Register of spatial units uses two different types of codification. First is classical codification with the code of spatial unit. Generally the code is just serial number of spatial unit on the same level. For the lower levels we combine the codes of higher levels and we add the serial number. This kind of codification was used in RATU and Record of House Numers. The second codification was introduced with establishment of Register of spatial units. Every spatial unit has a unique unchangeable eight digit MID (intersector identificator).

1.5 Application for browsing and maintaining of RSU

The RSU is kept in the form of the central database, while its maintenance and updating are conducted through distributed local databases. The competencies of updating are divided between the Main office of the SMA, regional geodetic administrations and their branch offices. For the all regional geodetic administrations and their branch offices, the RSU is updated currently using and updating application in the rapid communication network of the state bodies and an Intranet application for the updating of house numbers. The user database of the Register at the Government Centre for Informatics is updated daily on the basis of these entries (Activities report of SMA 2001).

1.6 Data accessibility

Data from RSU are public and available to all clients for their use. They may not be copied, processed, published or disclosed to third parties without the previous approval of the competent geodetic administration. According to the regulations in force, only material costs are charged for issued data. The price list is adopted by the Minister.
Governmental Institutions linked to the Government Centre for Informatics user data base of the Register have free access to different types of units according to their responsibilities.

1.7 Approach concerning changes over time

Spatial units are changing over time differently. The changes can be caused by laws, community's regulations or by SMA's decree. Some of them like census districts are changing almost daily and some like community are changing once in several years. The approach for all spatial units is the same. When the change is made the SMA makes the change in the database. If there is a new spatial unit established it gets new serial number and new MID. The MID of abandoned spatial unit is abandoned as well and it can not be used for another spatial unit.

2. Geographical information systems and georeferenced data used at the Statistical Office of the Republic of Slovenia (SORS)

2.1 IPOS

IPOS is an in-house developed software for handling georeferenced data from administrative and statistical registers and their merging with scanned or vectorised topographic maps. It was used in the Regional Statistics Department to prepare maps for the 2000 Census of Agriculture and for the 2002 Population Census. Software was made especially for this kind of tasks. The user can prepare thematic maps with all the geodetic data layers (administrative boundaries, hydrography, infrastructure, relief, etc.) in combination with statistical data. Geodetic data are updated daily from the copy of the Register of Spatial Units at the Government Center for Informatics. It has functions for fully automated procedures for preparing great number of similar maps. It was used in the 2000 Census of Agriculture for preparing topographical maps with exposed farms. It helped a lot to enumerators to find all the farms. The same task was done to prepare maps for the 2002 Population Census, but this time all the houses were exposed.

IPOS offers other possibilities too. It is used by SORS's Sampling and Survey Methodology Department for optimisation of sampling schemes for different household and personal surveys (e.g. Household Budget Survey, Labour Force Survey, Time Use Survey). Different databases and registers are inputs in GIS: the 1991 Census of Population and Dwellings, the Register of Agricultural Households, the Central Population Register, the Register of Territorial Units. The census enumeration areas are in terms of the number of inhabitants or households too small for sampling units, but GIS enables us to combine them into larger units taking into account also their geographical vicinity. This way less bias in estimates and lower travel costs for enumerators are guaranteed. In 2001 the Database of Primary Sampling Units (clusters of enumeration areas) from 1996 was updated with the information on the number of inhabitants registered in the enumeration area in order to avoid too small PSUs.

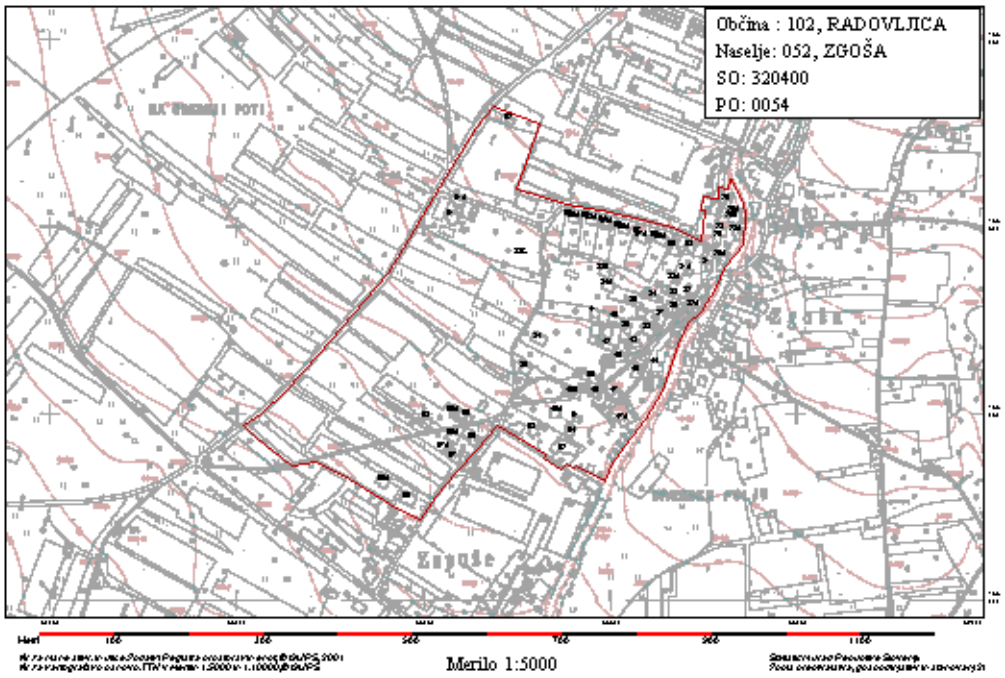


Figure: Example of a map for census enumerators

2.2 SDMS

In 1993 SDMS was introduced. SDMS software was developed in Slovenia for regional planning. It was replaced by MapInfo Professional in 1999.

2.3 MapInfo

Regional Statistics Department uses MapInfo products for presentation and analysis of statistical data. Geodetic data are used for graphical presentation of georeferenced statistical data and for georeferencing statistical data. We are able to produce thematic maps on administrative borders or gird basis. For analysis we mostly use queries and GIS functions that are built into MapInfo Professional.

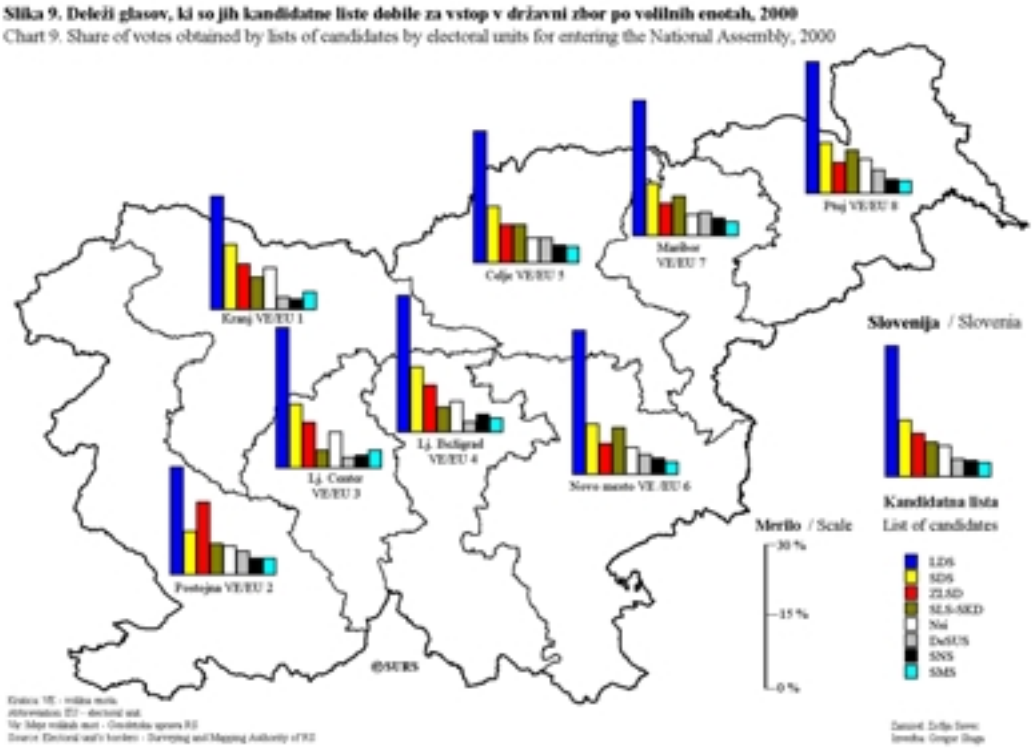
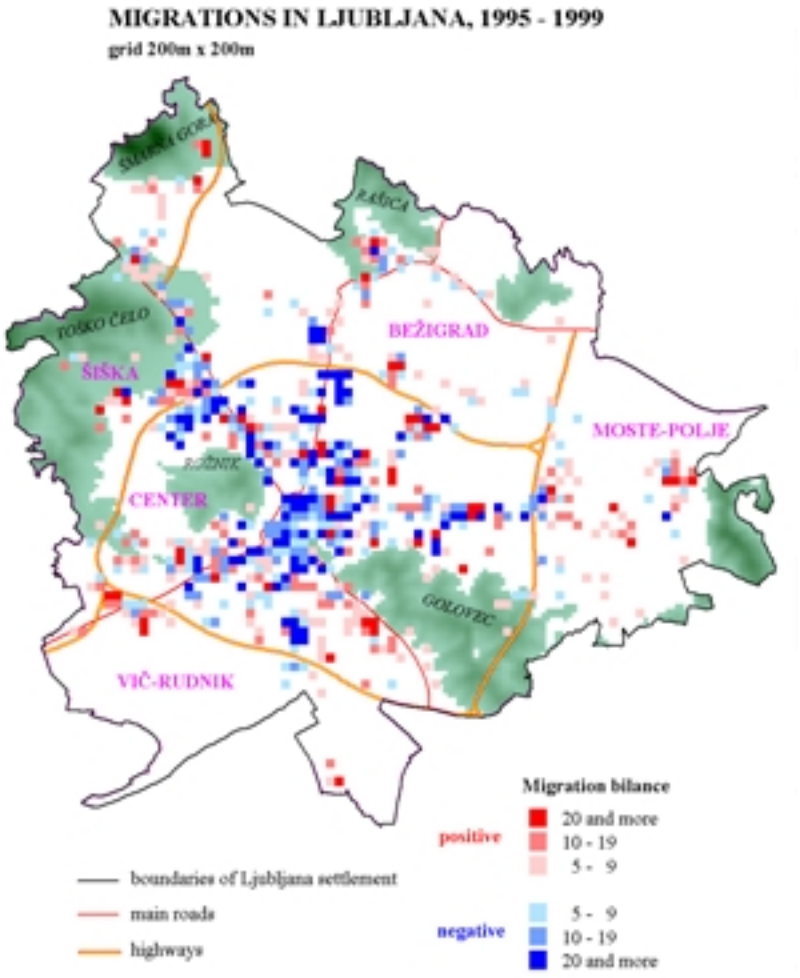


Figure: Example of a thematic map showing results of National Assembly elections, 2000

Figure: Example of a thematic map using 200-m grid for presentation basis

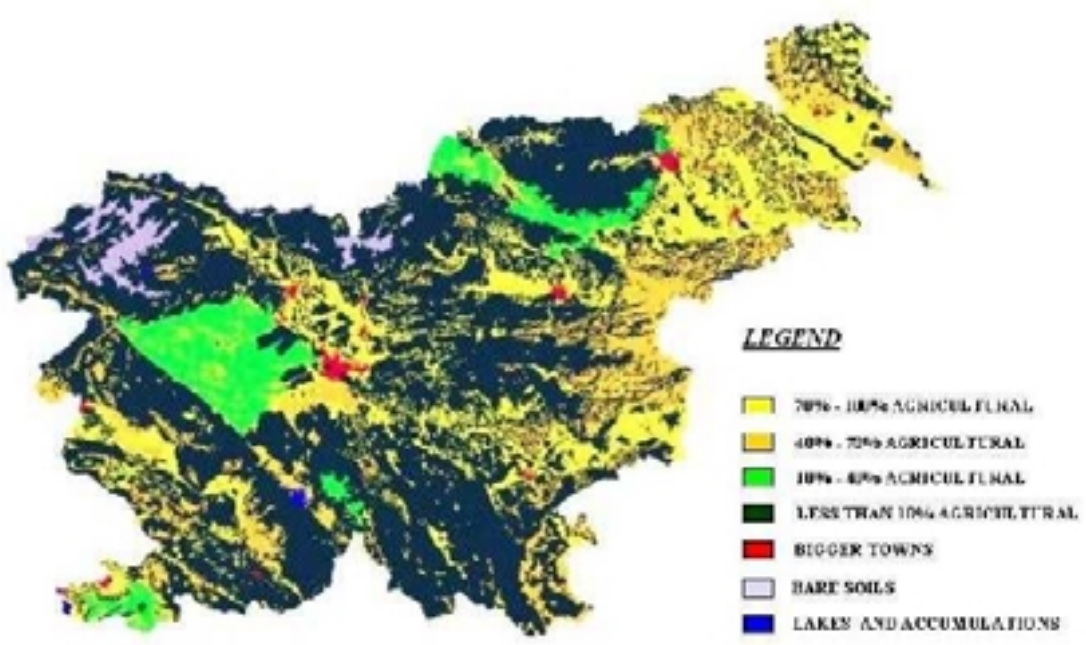


2.4 Arc/Info and Imagine

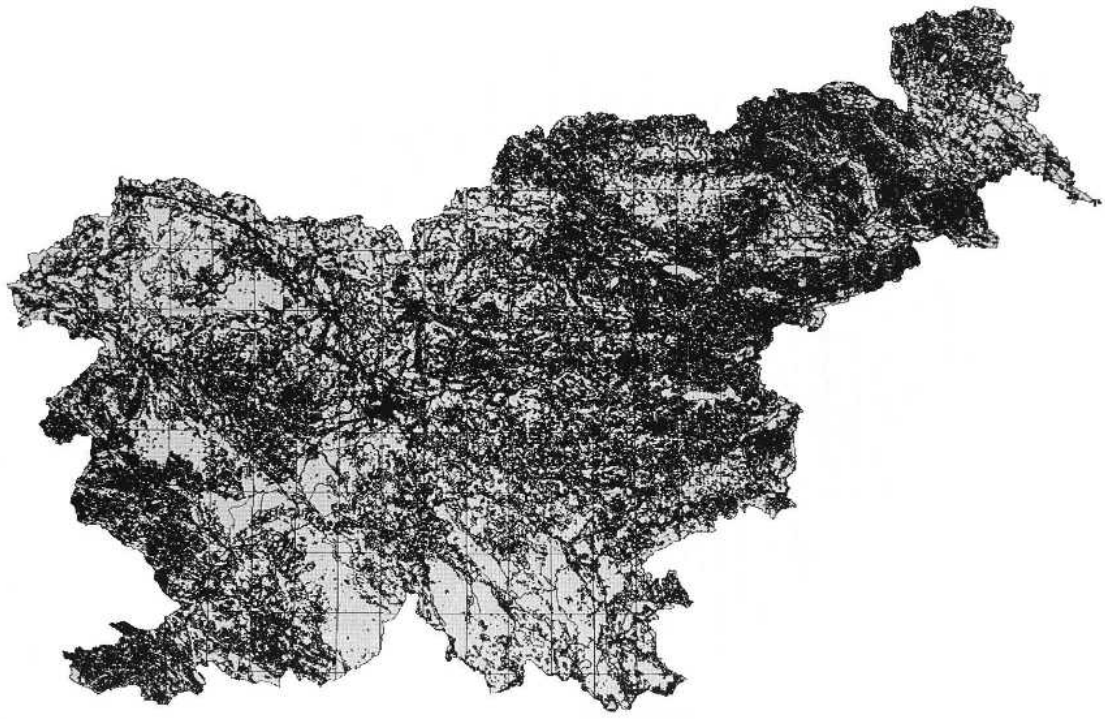
At the Statistical geomatics and GIS Department Arc/Info and Imagine are used.
The growing need for a general land cover map of Slovenia based on objective, homogeneous and up-to-date data dictated the compilation of a choroplet vector numerical land cover map of Slovenia from Landsat TM '93 data based on fine stratification according to the intensity of agricultural land use (Picture 4). Those results were used to calculate data on general land cover/land use classes. Later the same satellite data together with other digitised data were used for compiling the Statistical Land Cover/Land Use GIS of Slovenia - state '93 (GIS '93). Tabulated data by regions were published in national and international reports, while vector data were given at disposal to governmental and non-governmental users (Picture 5). With the use of centroids of houses - state 1997 compared to the GIS '93 data, the built-up area spread was assessed and the same exercise was repeated for the time span '97 - '99 (Table 1). But only the spatial distribution revealed that the expected major spread on the account of agricultural areas does not occur just around urban centres - it is also spread evenly over the agricultural area (Picture 6).

In 1998 the updating of the GIS started, based on Landsat TM '97 data, SPOT Pan '96-'97 data, mostly updated digitised data already used for GIS '97 compilation and some newly added data (Picture 7). It was finished in the frame of the project *"Further Alignment of Slovene Statistical Office in View of Accession to the EU" SL - 9803.02.0001(StatCOP98)* with the assistance of a CESD expert (Pictures 8 and 9). The nomenclature was harmonised to a clear land cover categorisation (Jansen 1998), but still enabling the user to point out some land use classes with the re-allocation of some subcategories (Picture 10). At the same time special attention was

given to development of the method for data quality assessment which will be used to produce inputs in metadata description of the statistical database (StatCOP98 2001).
We are now in the phase of Landsat ETM '01 scenes acquisition. After the GIS update land cover changes will be assessed and spatial analysis of data from different registers combined with land cover data will follow.



Picture 4: Stratification of Slovenia according to the intensivity of agricultural use based on Landsat TM '93 data - mapping unit 20 ha



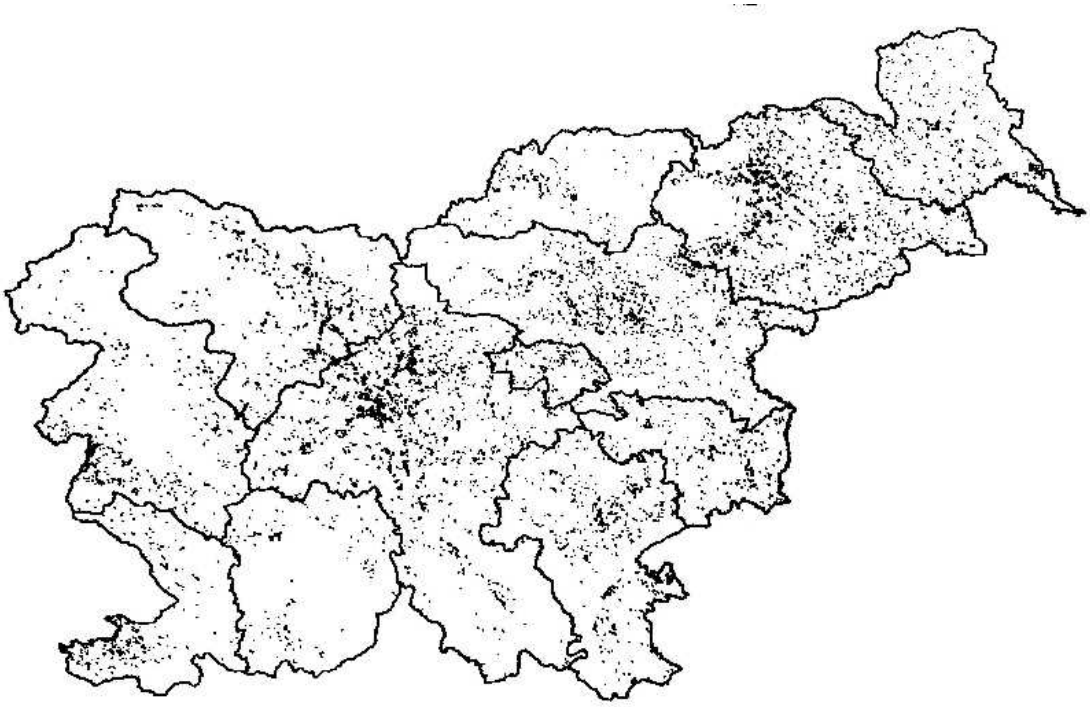
Picture 5: Statistical Land Use/Land Cover GIS of Slovenia - state '93

Table 1: Land cover change due to augmented build-up areas in Slovenia

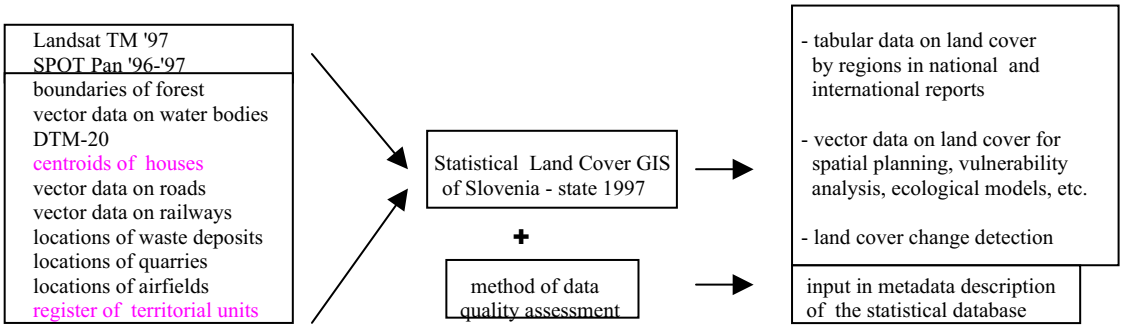
ha

Statistical regions[1)]	Surface area	Augmented build-up areas '93 -'97			Augmented build-up areas '97 -'99		
		Total	On account of		Total	On account of	
			forest	agric.land		forest	agric.land
Slovenia	**2 027 277**	**895,66**	**40,71**	**854,95**	**654,30**	**50,63**	**603,67**
Pomurska	133 764	55,29	0,39	54,90	45,02	0,99	44,03
Podravska	216 964	147,68	2,00	145,68	105,93	3,16	102,77
Koroška	104 060	21,86	1,60	20,26	19,74	2,49	17,25
Savinjska	238 417	124,28	5,15	119,13	90,34	8,93	81,41
Zasavska	26 354	20,20	1,60	18,60	13,63	3,04	10,59
Spodnjeslovenska	88 503	27,94	0,55	27,39	17,91	1,69	16,22
Dolenjska	168 418	66,21	2,33	63,88	56,05	2,75	53,30
Osrednjeslovenska	354 609	244,77	15,50	229,27	185,15	14,69	170,46
Gorenjska	213 655	62,21	4,85	57,36	45,41	4,72	40,69
Notranjsko-kraška	145 632	21,17	1,30	19,87	12,31	0,25	12,06
Goriška	232 472	58,39	4,22	54,17	31,40	3,28	28,12
Obalno-kraška	104 429	45,66	1,22	44,44	31,41	4,64	26,77

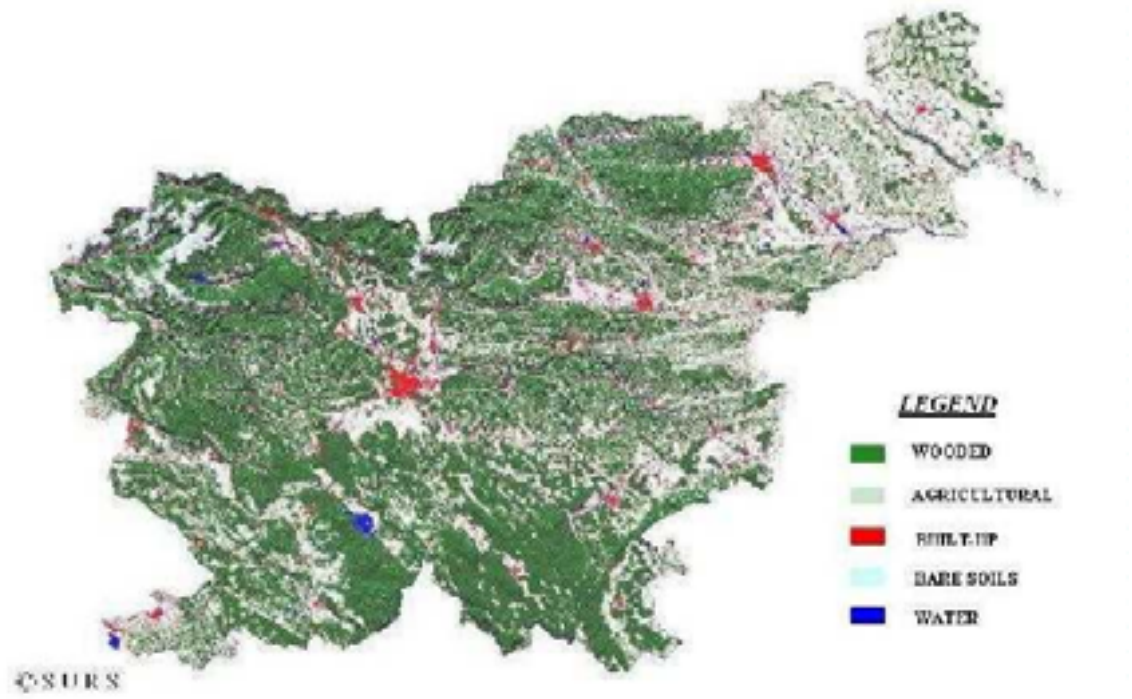
1) Statistical regions valid until 2000.



Picture 6: New build-up areas in Slovenia by region, 1993 - 1997



Picture 7: Statistical Land Cover GIS - state '97 compilation



Picture 8: Statistical Land Cover GIS of Slovenia - state '97

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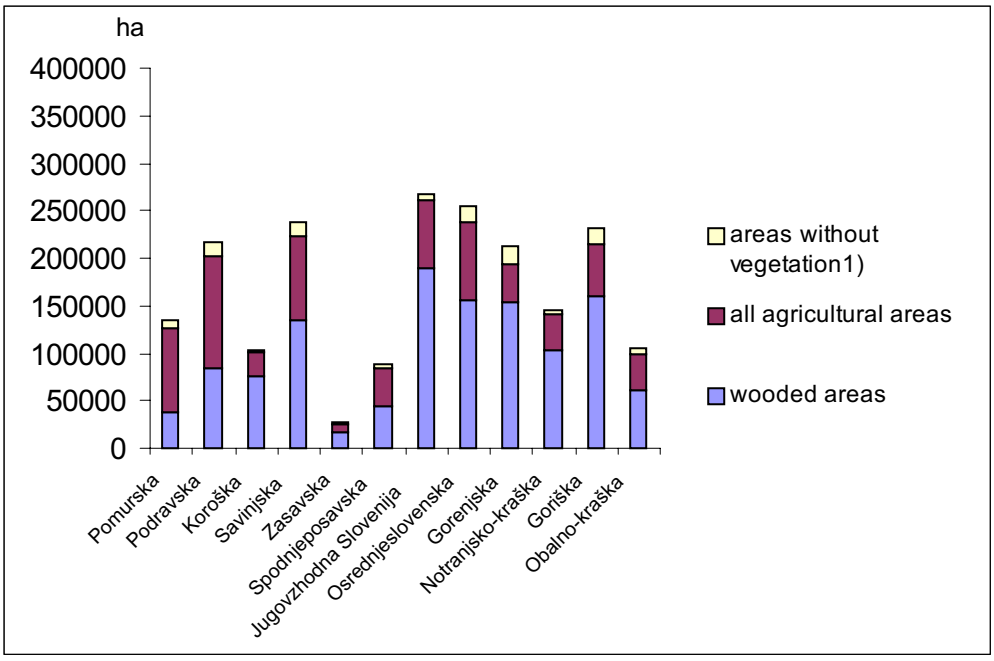

1) Areas without vegetation are bare soils, water, built-up areas, railways and roads.

Picture 9: Main Land Cover cathegories of Slovenia by region.

LAND COVER GIS CATEGORIES for regional (NUTS-III ~ SKTE-III) level

	Headings	Code	*Definitions*
Wood	Wooded areas	wood1[1)]	Forest for timber production, woods for protection, forest nurseries, areas under bushes and shrubs.
		wood2[1)]	Parks in urban areas covered mostly by trees used for recreation.
Veg[2)]	Vegetated non-wooded areas	veg1[1)]	Grassland, annual and permanent crops, heathland, marshes.
		veg2[1)]	Parks in urban areas covered mostly by grass used for recreation.
		air[1)]	Grassland for land and take-off of sport airplaines.
Bare	Bare soils	bar1[1)]	Rocks and scree.
		bar2[1)]	Nonvegetated river banks and shores, areas under construction.
		bar3	Waste deposits.
		bar4	Quarries.
Wat	Water	wat1	Rivers, lakes, artificial lakes.
		wat2	Liquid waste basins.
		wat3[1)]	Saltpans.
Buil	Built-up areas	buil1	Buildings with: yards, kitchen gardens, parking lots, storage places, defined by buffering the centroids of houses with a 20m radius.
		buil2[1)]	Areas between and in proximity to buffered centroids of houses that are not under vegetation.
		air -b[1)]	Runways of airports and their facilities.
Rail	Railway	rail1	Railways.
		rail2	Bridges.
		rail3	Crossings with roads.
Road	Roads	road1	Roads of four levels.
		road2	Bridges.

[1)] Is possible to categorise only with the use of SPOT **and** TM satellite scanned data
[2)] This land cover heading covers vegetated areas not belonging into the category of wooded areas. In Europe this actually means all agricultural areas.

Picture 10: Nomenclature of Statistical Land Cover GIS - state '97

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Ljubljana, 3rd October 2001

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EUROPEAN COMMISSION
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Directorate E: Social and regional statistics and geographical information system
Unit E-4: Regional indicators and accounts, population and geographical information system

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Meeting of the Workingshop on GI/GIS matters for Phare Countries

Joint meeting with National Statistical Offices and National Mapping Agencies of the Phare Candidate Countries

Luxembourg, October 24, 2001
JEAN-MONNET-Building (JMO-Room M/5)
Beginning of the meeting: 10 a.m.

Report on the use of GI in the NSI and NMA in Hungary

Working document concerning item 7 of the agenda of the meeting

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Report on the use of GI in NIS and NMA in Hungary

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Abstract

The legal framework of contribution between the Hungarian Central Statistical Office (HCSO) and the Hungarian National Mapping Agency (Department of Lands and Mapping of the Ministry of Agriculture and Regional Development – MARD-DLM) was regulated by the Act XLVI/1993. Besides of the mandatory collaboration the two institutions has developed effective co-operation in fields of GIS, remote sensing, and some basic issues enabling data exchange between them.

The territorial breakdown is defined by the HCSO, while areas of territorial units are supplied by the NMA. For merging databases both institutions use HCSO's indexation system of the administrative territorial units; while beneath the NUTS 5 level the real estate registry numbers (geocodes) coming from the national cadastre.

The GIS IT-system of the HCSO operates on commercially available types of software, therefore there is no obstacle to the use of data coming from the land administration and mapping.

Since 1990 the HCSO has been compiling geo-referenced presentation of statistical data, resulting in the MATÉRIA database, which gives wide range of statistical and other public data.

The operative body of the Hungarian NMA the Institute of Geodesy, Cartography and Remote Sensing (FÖMI) - being a committed organisation for the development of National Spatial Data Infrastructure – is deeply interested in the use of GIS data in various sectors of economy and public administration, amongst them in statistics. Following this mission news products and solutions has been offered to the HCSO.

The co-operation of HCSO and FÖMI is marked with a number of joint projects like Remote Sensing in Urban Statistics , Vineyard and Orchard Cadastre, Agricultural Statistical Digital Map Project, and the ABDS for the CEEC project.

Introduction

The general framework of statistical data collection in Hungary is regulated by the Act XLVI/1993. The actual tasks for each year are defined in a Governmental Regulation. As described in Decree 173/2000 X.18 the Hungarian National Mapping Agency has to deliver data necessary for preparation of yearly territorial and economical statistics. Data requested by this Decree are delivered to the Central and Regional Statistical Offices free of charge.

Being member-organisation of the National Map Supplying Committee, the Central Statistical Office has direct possibility for expressing their special interest in mapping and GIS issues. The HCSO has used GI since 1993 to improve publications, to support statistical analysis and to organize preparation of different statistical surveys. The use of GI at HCSO plays an important role in the population census activities. GI is also used in regional, demographic, population, agricultural, and environmental statistics.

In spite that the two institutions have no formal contract for collaboration, a good number of joint projects stem from the successful co-operation at operative level. This situation has being changed; the formalisation of contribution meets both parties' interests.

1. Legal basis

At present dissemination of regional statistical data is limited by the strict requirements for managing individual data of Act XLVI of 1993 on Statistics and Act LXIII of 1992 on the protection of personal data and access to data of public interest.

On the basis of the Acts mentioned above, personal data and individual data of non-public interest can be published or displayed in aggregated form only, and with certain conditions. The rule prevailing today is that only those aggregations can be disseminated where the number of suppliers of data of non-public interest is at least three. An exception is allowed only in case the concerned data suppliers agree in writing the publication of their data. In case of display on maps, this level of aggregation cannot be a settlement, a part thereof or an enumeration district of the Population Census. The limitation of dissemination holds true in each of these cases.

This legal regulation was eased by Act CVIII of 1999 modifying Act XLVI of 1993 on Statistics. In compliance with this modification, concerning data supplies to Eurostat, individual data can be supplied too in certain cases.

2. Technological background

2.1. IT infrastructure

The IT infrastructure of HCSO and FÖMI is fully compatible. The types of software (without version numbers) used in the two organisations are presented in the table bellow:

	Number of licences	
Software	**HCSO**	**FOMI**
Arcview	55	17
Arcinfo	4	5
Mapinfo	4	2
Erdas Imagine		39
Bentley Microstation		34
Different types of Hungarian GIS software		30
Autodesk Mapguide	1	

Table 1: Types of software used in HCSO and FÖMI

2.2. Databases of the HCSO

For the domestic regional statistics the database T-STAR of settlement statistics of HCSO is a basic source of data which, since 1975 annually renewed, includes some 400 variables of all settlements (NUTS 5 level settlement data) and some further 100 data on towns. Our settlement-level database also enables us to make comprehensive long-term analyses of socio-economic phenomena while from the settlement-level data the data of higher settlement-levels can also be produced, such as small regions, counties, regions and the whole country. Our settlement-level database can be considered conform to that of the EU and it is more comprehensive than the local database of Eurostat SIRE (European Infraregional Information System).

The databases of various special statistics generally include county-level (NUTS 3) data as well, the regional database system of the counties (MR-STAR) consist of these and of the results of the sample surveys on county and regional levels. At preparing this system we had maximum regard for the data contents of the database of Eurostat REGIO (Regional data bank).

The organizational unit of the HCSO dealing with regional statistics has been searching for the way of selling of the settlement statistical database (T-STAR) of the HCSO as a geographical information basis since 1990. In addition to this it has made efforts itself to apply the geographic information system in the dissemination and methodological work also with the demands of the regional directorates of the HCSO in view.

That is how the „MATÉRIA" administrative GIS database came to being in 1993. Being a development on MapInfo basis, it is a joint product of CARTOGRAPHIA Ltd., LANDINFO Ltd. and HCSO. A PC 386, MapInfo for Windows 2.0 software, 4 MB RAM, VGA monitor, MS Windows Version 3.0 are the minimal configuration being necessary for the application of this graphic and textual database including data of public administration, population, industry, trade, tourism, dwelling stock, education, culture and population censuses selected from over 3100 settlements of Hungary.

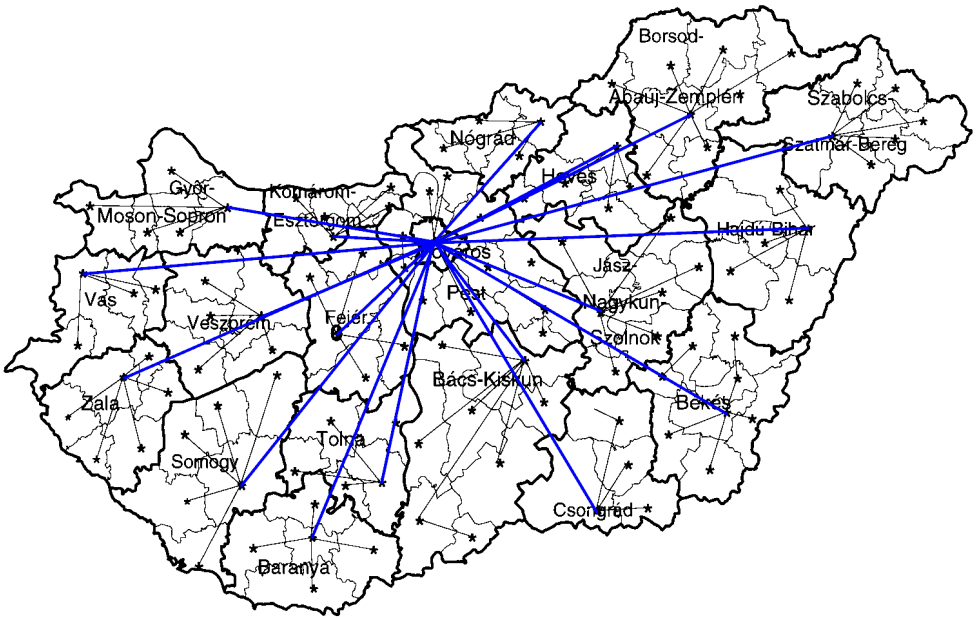
The graphic basis of MATÉRIA is the administrative map on the scale of 1:500,000 made by CARTOGRAPHIA Ltd. in 1994. Including each independent administrative unit, the paper-based map shows the boundaries of cities and parishes, settlement symbols, road and railway network and hydrographic symbols etc. By processing the original typographic covers with subtracted colours three data carrier layers have been prepared for each county: the administrative boundary, the settlement symbol and the name of the settlement. The graphic objects on the layers are closed polylines, circles and texts, respectively. By projecting further layers (national boundaries, county boundaries, county names, road network, railway network, hydrographic symbols) on each other, the usual cartographic scenery appears. The layers are joint by county.
The textual file of MATÉRIA consists of some 180 integrated data per settlement selected from the T-STAR database of the HCSO, the data of the 1990 population census and the electoral database of the Ministry of the Interior. The scope of the data is very wide including both the address of the Mayor's Office and the indication if there is a petrol station, a post office or a pharmacy at the given settlement.
MATÉRIA is an open database; the users can enlarge it with their own data. Moreover, the layers of the existing cartographic stocks can be shaped to a form, which is the most suitable for the user's need. The product is annually updated, at present the version containing the 2000 data is already available in MapInfo, AutoCAD MAP, and Autodesk World version.

The Internet Map Server of HCSO is under construction. The digital map is the National Geographical Information System Database (Hungarian abbreviation ''OTAB'') and the data added to the OTAB mostly comes from the T-STAR database, population census in 2001 and agricultural surveys. The Internet Map Server software is Autodesk MapGuide.

2.3. Data coming from FÖMI

The Hungarian National Mapping Agency, the Department of Lands and Mapping of Ministry of Agriculture and Rural Development (MARD DLM) together with its operative body, the Institute of Geodesy, Cartography and Remote Sensing (FÖMI) performs each year data supply to the Central Statistical Office for preparation of the yearly statistics. These data comprise both territorial data coming from the national cadastre and advanced data collection sources like remote sensing.

Nowadays the Hungarian cadastre is in state of transition from the paper-based registry to the digital one. The descriptive data (property sheets) are now fully digitised, while cadastral maps have being digitised. The



necessary infrastructure, the TAKAROS system (Countrywide Computerisation of Map Based Cadastre) was installed by the end of June 2000. The data transfer between the land offices that are responsible for the registry of local data was solved by an Intranet system called TAKARNET. Owing to our recent developments the Hungarian land administration is able to supply up to date data to the statisticians. However full transition to true vector GIS is only in perspective. Some particular projects implement full integration of GIS, but these projects are limited either in territory and/or in thematics.

Fig.1: Dataflow within the TAKARNET system

Both statistical and land administrations have their own identification system (indexation or geocodes). For linking the databases of the two organisations the land administration integrated the statistical territorial indexes that are delivered and regularly updated by the Central Statistical Office.

One of the most important statistical data – the area of different **land coverage type** is taken from the land registry system. The unit of data storage in land registry is the lot (parcel) belonging to one owner and having a unique registration number. Besides of property records the register informs about the utilisation of the lot by a code. This code makes possible to filter the database for different content. Te Central Statistical Office usually requires area of cultivated lands, forests, watersheds, industrial zones, transportation facilities, etc. Data filtering for **owner groups** of real estates is possible as well; the usually required categories are state-owned, corporate-owned or private estates. Such kind of classification was very important to follow the process of privatisation.
Using other attribute data of the real estate registry we can calculate **average land values** for different administrative units derived from cadastre as well.
All operation based on cadastre are solved at database level, direct map based visualisation of the result is possible only for those territories, where vector based GIS systems are available.

Another important input for statistics is the **area of territorial units**. These data come from the cadastre as well. The continuous maintenance of cadastre enables to deliver the most exact and up to date data reflecting the actual legal status of the territorial units. As required by the law the data delivered to the Central Statistical Office reflect the status valid on the 1st January.

As stated in the previous paragraphs vector GIS at cadastral level is not yet available for the majority of the country. However there are two fields, where vector data are available for the whole territory of the country – the Administrative Boundary Database of Hungary and the CORINE land-cover database.

As part of fulfillment of the government resolution on the "Development of environmental information systems", the implementation of the **CORINE Land Cover database at scale 1:50,000** has started within the frames of the Acquis National Programme in 1999. The database supports Hungary's accession to the EU in various programmes, such as the planning of sustainable agriculture, rural development, agri-environmental planning and nature conservation.The CLC50 project has direct links to the standard European CORINE Land Cover project, however most elements of the methodology were upgraded according to the present level of technology in geo-data processing. The CLC50 nomenclature has been developed from the standard (level-3) nomenclature and includes nearly 80 level-4 and level-5 classes, which have been adapted for Hungarian conditions. Orthorectified SPOT-4 satellite images taken in 1998-99 and computer assisted photo interpretation allowed high positional accuracy of delineation. The 0.04 km^2 size minimum mapping unit (0.01 km^2 for lakes) provided enhanced geometric details.

The Institute of Geodesy, Cartography and Remote Sensing initiated the compilation of the **Hungarian Administrative Boundary Database (MKH)** in 1998 for two reasons. Firstly, to find another application and new market to a part of data collected and owned by the Land Offices of the country, and secondly, to facilitate the integration process to the European Union. Data collection of the database has been finished in 1999. The database is commercially available.
The source of the database is the national cadastre, the directly measured co-ordinates of those boundary points, which represent in the same time administrative boundaries too. The output products are databases of different resolution derived from the source level by means of generalisation.
The list of standards products and their characteristics are shown in the following table:

Resolution	Approximate scale	Precision of co-ordinates
1 m	1 : 5 000	1 m
2 m	1 : 10 000	1 m
5 m	1 : 25 000	1 m
10 m	1 : 50 000	1 m
20 m	1 : 100 000	10 m
50 m	1 : 250 000	10 m
70 m	1 : 350 000	10 m
100 m	1 : 500 000	10 m
200 m	1 : 1 000 000	100 m
500 m	1 : 2 500 000	100 m

Table 2: Standard products of MKH

To satisfy users' requirements some attributes, like statistical codes, area of units, elements of hydrography etc. were attached. The pricing is polygon based. The data can be purchased separately for every administrative unit, in case of purchasing more units the buyer can achieve discounts.

Fig. 2: Administrative boundaries of Hungary at NUTS 5 and NUTS 3 levels derived from MKH

The basic unit of the MKH is the settlement (NUTS 5 level). However the need of the local users encouraged us introducing further breakdown. This year the Institute of Geodesy, Cartography and Remote Sensing finished the distinction between built-in and non-built in areas of settlements.

For more rapid and complete data capture new methods has been integrated. The use of remote sensing opened quick and reliable ways of statistical data collection. Having expertise in environmental, land coverage, and crop monitoring the Institute of Geodesy, Cartography and Remote Sensing offered remotely sensed data in a number of various projects.

3. Examples of contribution

3.1. ABDS for the CEEC project

The FÖMI co-ordinated between 1998 and 2000 an international project called ABDS for the CEEC (Administrative Boundary Data Services for Central-East Europe) aiming at the on-line delivery of these data in the region. The HCSO actively participated in the project, giving specific aspects of the representation of the breakdown of territorial units, nomenclature, and indexation.

Based on the inventory compiled for Finland, Estonia, Lithuania, Latvia, Poland, Czech Republic, Romania, Bulgaria, and Greece the participating organisations defined scientific and technological prerequisites for an international on-line service. Depending on the available funding the participant of the project are determined for the continuation; the stepwise implementation of the European service in close collaboration with Eurogeographics and the partner NMAs.

3.2. Remote Sensing and Urban Statistics Project

In the framework of the work program for remote sensing and statistics for 1995/1996 of the CESD (Centre Européen des Statistiques du Developpement) Communautaire, the HCSO, and the FÖMI - together with several Hungarian partners - completed the first part of the project "Remote Sensing and Urban Statistics: Delimitation of Urban Agglomeration, Pilot Survey of Population Census Zones of Budapest - Zugló". The results were presented in Budapest on 20 April, 1998 and in Luxembourg on 23-24 April, 1998 (at the workshop of unit E-4 of Eurostat). In frame of the project Earth observation data were tested for establishing a standardised digital coverage of urban agglomeration of Budapest according to European nomenclature CLUSTER. High-resolution satellite images (IRS-1C and COSMOS KVR-1000) together with digital cadastral boundaries of 78 settlements of the agglomeration were processed and analysed. The CORINE Land Cover technology was adapted and extended for this purpose. Database according to CLUSTER–level II was created for the entire area of the agglomeration and according CLUSTER–level IV for Zugló district. Based on the results of the computer aided visual classification the delimitation of urban morphological zone has been created, as well.

3.3. Thematic maps for the vineyard and orchard census in 2001

The urging necessity to tool HCSO representatives up with maps in the vineyard and orchard census within a very short time involved the application of remote sensing. Since information on the land use of topographical maps has been outdated, the polygons of vineyards and orchards were derived by using temporal series of satellite images. In absence of vector GIS we used the scanned topographical maps completed by polygons representing the presumptive plantations. The topographic maps and copies of cadastral maps were delivered by the FÖMI. The Remote Sensing Centre of FÖMI started to develop methods for **SATELLITE BASED VINEYARD AREA ASSESSMENT** to monitor the real extent of production vineyard areas in Hungary. In 1997-98 this was carried out in case of selected areas of Mór, Etyek, Szekszárd wine-districts using high resolution satellite data (Landsat TM, SPOT, IRS-1C/1D LISS-III.). The complete survey of the vineyard area of Heves county including Eger and Mátraalja wine-districts was also accomplished in 1999. FÖMI RSC also implemented a test survey of ***orchard*** areas in 2000 for 8 settlements. In December, 2000, according to the EU regulations, the Hungarian Government enforced by law, that the Central Statistical Office (CSO) has to conduct a census in 2001. The census's objective is to have an up-to-date information about the vineyard and orchard areas in Hungary. As a preparation for the census FÖMI RSC carried out the assessment of the potential vineyard and orchard areas covering the whole country (19 counties) using high resolution satellite data in a very short, two months surveying period in 2001. The resulting vineyard and orchard map for the country, and one of the 2870 documentations given to the CSO can be seen on Fig. 21. This high-tech RS-GIS technology gave a really good basis for the census.

4. Other GIS project in HCSO: Hungarian Agricultural Statistical Digital Map Project

The national preparation and harmonisation of the Common Agricultural Policy (CAP) and later joining the CAP and the implementation of the entire institutional system is an enhanced field of Hungary's accession to the EU. Several governmental programmes have been launched in connection with the CAP. Among them there are GI related projects as well, for example the nationalisation programme of MARD on AICS. The following paragraphs descibe the HCSO project, entitled Hungarian Agricultural Statistical Digital Map, drawn up in relation with the CAP. The project is implemented with the financial support of Phare.

The structure of aims of the project

The general objective of the Phare project entitled Agricultural Statistical Development is to prepare and support the Hungarian agricultural statistical system so that the HCSO should be in the position to receive, analyse and provide EU harmonised data. The direct aim is to implement the processing of the results of the ongoing orchard and vineyard plantation cadastre through GIS means.

The project plans have identified three target areas of the development:

- Information technology: Upgrading the existing IT system and basic databases of the HCSO to provide the exchange of statistical data on agriculture between the competent EU and Hungarian authorities.
- Institutional: Strengthening the institutional capacity and the understanding of EU integration requirements of Hungarian institutions involved in agricultural statistics.
- Functional: The HCSO must be enabled to support the EU harmonised sector policy planning with analytical, planning and data providing services.

The project has been divided in seven implementation stages. The expected result of each stage is given in the following table:

MAIN ACTIVITY	Summary of activity	Practical result
Project Inception	The official implementation of the project starts: Short overview of the present state and further development of the project plan.	Detailed project plan.
System design	System design: recording business needs, preparing software plans.	GIS conception and plans meeting business needs.
Compilation of eBook	Set of electronic maps is compiled: eBook: compilation of electronic book of maps.	eBook: index map sketches of plantations in electronic form and their geo-codes.
GIS development	The software: Preparation of the application and data integration.	The GIS software is ready for accepting test .
Setting into operation	Setting into operation of the DM (go live) at HCSO: training, installation.	The system operates at HCSO.
Project Closure	Finishing the official implementation.	Final Report.
Procurements	Procurements: Land Offices, national open tender for scanning and geo-coding.	Base data: scanned map and geo-codes are available.

Table 2: Overview of project stages

The project has successfully completed the inception stage and started the system design and procurements. The interviews are completed, the overall GIS development conception is being shaped, the first version of the system requirements will also be ready soon. In consideration of the lengthy procurement procedures, the specification of the base data to be procured has already been drawn up, the procurements will soon begin.

The Hungarian Agricultural Statistical Digital Map will be embodied in two closely related software products that can be used separately as well. These are recorded by the administrative project documentation together with the name referring to the type of the product, that is why these names are a little bit unimaginative: Digital Map and eBook.

The first Digital Map is the extension of the present GIS system of the HCSO. The Digital Map will help in the analysis, representation of the agricultural statistical data and their publication with an informative purpose. Furthermore, it will support the regional level examination of the results of agricultural censuses providing geographical information, aiming at the registry of vineyards and fruit plantations.

The geographical database of the Digital Map will be based upon the Administrative Boundary Database of Hungary (MKH-10), described in the precious chapter.

The project envisages the compilation of 20 eBooks (for the 19 counties and Budapest), which is the collection of electronic maps at plantation level. The electronic maps are produced through the scanning of index maps of surveying base maps, in 1:10 000 scale in case of agricultural areas and in 1:4000 scale in case of closed gardens and urban area.

The first version of the Digital Map is under completion focusing on vineyard and fruit plantation cadastre, however not neglect further needs in fields of agricultural statistics either. The final version of the Digital Map will be formed as a result of further, successive projects. The present project is the first step that determines the success of later phases to a great extent. The most important measures be taken to ensure later success are as follows:

- An electronic publication should be available by the name Agricultural Statistical Digital Map that contains the geo-coded census data, the database of administrative boundaries and the raster index map.

- A user interface should be prepared that enable the execution of the most important spatial IT functions on the Agricultural Digital Map, the maintenance of data files and their extension with new records.

- Connecting the Digital Map system to the databases of the HCSO relating to the data of the vineyard and fruit cadastre, so as to ensure the operative use of the Digital Map's services through the user interface by the Agricultural Department of HCSO.

- The HCSO staff involved in agricultural statistics should acquire the knowledge of operating the system, they should realise the inherent possibilities of the system and they should be encouraged to participate in the exploitation of these possibilities.

- Foundational written works should be available, on the basis of which the line management of the HCSO can regulate the operation of the system and plan later developments.

Conclusion

The collaboration of the Central Statistical Office and the Hungarian NMA yielded important results. The key for data exchange is on one hand accepting the integration of statistical identifiers into the land administration, on the other hand their continuous update by the Statistical Office. The HCSO integrates the registration system of land administration in cases, when data collections and analyses has to be done at level beneath the settlement. The integrated management of mapping, land administration, and remote sensing opened fresh opportunities for new methods of statistical data capture, for selection of the most effective ones and for their mutual control. We strongly recommend this approach to the other countries as well. The EARSel member organisations can provide effective help in this task.

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