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## GI infrastructure in Slovenia

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### Abstract

The paper presents the current situation in Slovenian GeoInformation Infrastructure (GII). There will be explained some activities of the GeoInformation Centre of the Ministry of Environment and Spatial Planning. GeoInformation Infrastructure in Slovenia offers its services to the users and to the providers (i.e. producers) of spatial data. Main goal of geoinformation infrastructure is the improvement of the efficiency using spatial data. GII include two basic subsystems (1) metadata system, which enables standardised way of spatial data description and exchange of information about spatial data and (2) data ordering and delivering system, which main intention is to simplify the process of data ordering on the user side and the process of data delivery on the data provider side. Basic technology is Internet based, which enables all users to have unified and easy accessible services of the geoinformation network.

*Keywords:* geoinformation infrastructure, spatial data, metadata, geoinformation centre, data ordering and delivering

### Introduction

The growing attention from public and private organisations for Geographic Information is a logical consequence of the development society in last few years. Geographic information and GeoInformation Infrastructure becomes more and more important in every segment of our society. Today technology is rapidly developed and it allowed users to explore GI database easy and fast. There are still some lack of experience and knowledge on the user side. From those reasons is weary important to improve the services for users of spatial data and exchange best practice and experience between departments of public and private sector. There is also present a need for improve the level of awareness of geographical information within the users and data providers and for improve the availability of GI within the government administration and private sector. For all those reasons Geoinformation Centre was founded by government in 1991 with description of following tasks: (Regulation and co-ordination of GI policy (national level), National & international co-operation/co-ordination, standardisation, legislation, policy, legal and organisational aspects of data exchange and distribution...) and also for providing some user services (Metadata system, Prototype of Data ordering and delivering system, remote access to metadata catalogue, planned internal GIS, discussion forums, advising users, making available info from users/providers, ...)

In Slovenia was established On-line metadata catalogue (Slovenian Spatial Data Catalogue) available also on the Internet [http://www.sigov.si:81/gic/projekti/giskat/gis\\_katalog/index.html](http://www.sigov.si:81/gic/projekti/giskat/gis_katalog/index.html) and get some process of establishing a GII network. There were signed Co-operation Agreements between GIS/MESP and 6 data providers from government level and two co-operation agreements with local community for establishing regional organisation for GI infrastructure.

In Slovenia is running the process of forming a National GI association. All those tasks are now done by GIC/MESP. (Slovenia is a candidate member of EUROGI from January 2001). Government Centre for informatics and Geoinformation Centre are work on common project of GI-subportal within Government electronic portals. All those activities are done for raising benefits of GI infrastructure, land management, fiscal policies and support of socio-economic development.

All activities about metadata and Slovenian geoinformation infrastructure were founded by the Ministry of Environment and spatial. Some activities were supported by the loan of IBRD bank (i.e.ONIX project 1997-2000).

## The institutional concept of National Geographic Information

### The concept

The Slovenian GII has been defined as a collection of policy, data sets, agreements between users and providers, standards, technology and knowledge. The creation of such infrastructure has been realised as a way to create new economic opportunities, since it will allow improving existing services and data sets. First steps in development of the GII were made within the Ministry of the Environment and Spatial Planning, but a lot of parallel activities were running in other institutions and organisations.

### Data protection

The Act of the electronic commerce and electronic signature (August 2000) regulates a new field of the operation of the economic subjects, citizens and state organs. This field has not been regulated until now, but it is becoming more and more important because of the fast technological development. The Act of the electronic commerce and electronic signature wants, in the time of its validity, to achieve various goals, amongst which we will mention only the most important ones. With the Act the Government wants to encourage and in no way to obstruct fast technological development of the electronic commerce and to remove normative obstacles for the electronic commerce with a special emphasis on equalising the safe electronic forms with the classical paper form (requirement for the written form) and equalising of safe and reliable electronic signatures with the autograph signature. The new Act provides clear and predictable rules for the exchange of the electronic messages, and rules for the use of the electronic signature and operation of the certification service providers of the electronic signatures. The new Act insured also that the Slovenian legal framework of the electronic commerce and electronic signature is adjusted with the relevant foreign, mostly European and international legal framework, and thus to ensure an international recognition of the electronic signatures. The Slovenian Certification Authority SI-CA was established a few months ago. (<http://www.sigov-ca.gov.si/glava.htm>).

### Copyright

Copyright and Related Rights Act\* (of March 30, 1995- regulated also ownership of geographic information. (Official gazette 21/95, 14/04/95)

### Personal privacy

Act for security of personal data (Of.gazette 59/99, 23/07/99) strongly influent on data access policy.

### Standardisation policy

Standards and metrology authority within the Ministry of science and technology has in January 1999 accepted a group of CEN TC287 pre-standards for Geographic Information.

Minister for Environment and Spatial Planning has on 1.7.1999 issued an "Order" for all data providers within Ministry of the Environment and Spatial planning for updating metadata descriptions every 6 months with MPEdit tools (using CEN TC287 SIST ENV 12657:1999 Geographic information – Data description – Metadata) and submitting them into the Metadata system on GIC/MESP

### Pricing alternatives

Some policy directives for governmental data recommend, that they are free of charge, only material costs could be charged for users. At the moment there is no legal acts about pricing policy.

## Operational model – Geoinformation Centre and GI network

Ministry of the Environment and Spatial Planning of the Republic of Slovenia, Geoinformation centre department, has been founded in 1991 with following tasks:

- Regulation and co-ordination of GI policy, National & international co-operation/co-ordination, standardisation, legislation, policy, legal and organisational aspects of data exchange and distribution.

- User services and Metadata management, remote access to metadata catalogue, data mediation/provision, data provision through a distributed data warehouse system, transaction accounting, on-line GIS, discussion forums, user's requirements analysis, translation of requirements in terms of info processing, advising users, advertising, contracting, making available info from users/providers, complaints treatment, quality support (preparation of quality manual, quality assurance, quality audits).
- Supporting tasks. Raising awareness on importance, maintenance of the IT infrastructure, human resources management, research and development, provision of tools, training, data integration, transformation on data sets...

Within the process of establishing an GII network, there were signed Co-operation Agreements between GIS/MESP and 6 data providers from government level and two co-operation agreements with local community for establishing regional organisation for GI infrastructure.

There is a need to form a National GI association. All those tasks are now done by GIC/MESP. (Slovenia apply for candidate membership of EUROGI in September 2000)

Government Centre for informatics and Geoinformation Centre are work on common project of GI-subportal within Government electronic portals.

Surveying and Mapping Authority and Geoinformation Centre work on the concept of electronically (on-line) access to the geodetic databases.

### Examples of relevant projects within the framework of the National Spatial Data

Slovenian GI initiative counts on the active involvement of the main GI actors together with a high level of political commitments to its development. GII is an important element of national information society strategies. Geoinformation centre manages and promotes several projects that intend to raise awareness of the geographic information and to promote the communication among the GI actors. Examples of such project are described in this paper.

#### METADATA - Slovenian National Spatial Data Catalogue

Slovenian National Spatial Data Catalogue is the most comprehensive directory of digital geospatial data sources and its providers in Republic of Slovenia. (URL:<http://www.sigov.si:81>). Available product is MPEdit - solutions for data collections

Current state: 407 metadata, classified into 43 thematic groups by 110 providers.

Directory contains information about content, purpose, usage, quality, distribution and all other information necessary to select and use available spatial data. Metadata conforms to prEN287009 metadata standard, which is the official standard in Republic of Slovenia. Metadata comprise following sections: (Dataset identification, Dataset overview, Dataset quality elements, Spatial reference system, Extent, Data definition, Thematic classification, Administrative metadata, Metadata reference, Metadata language)

#### EIONET-Slovenija

In April 2000 was signed a co-operation agreement between Geoinformation centre and EIONET Slovenia on metadata system and data delivery for EIONET/CDS needs. Integration between CEN and CDS data description was made by MP EDIT tools.

#### Spatial data providers – reference data

The main data providers in Slovenia are governmental ministries and agencies:

- Ministry of Environment and Physical Planning (MESP)
- Ministry of Environment and Physical Planning, Surveying and Mapping Authority (<http://www.sigov.si/gu/index.html>) – land cadastre, basic geodetic system, cartographic and topographical database

- Ministry of Environment and Physical Planning, Office for Physical Planning <http://www.sigov.si/mop/index.htm> – state spatial plans
- Ministry of Environment and Physical Planning, Environmental Protection Agency of the Republic of Slovenia (<http://www.sigov.si/uvn/indexeng.html>) – environmental data
- Ministry for the Environment and Physical Planning, Hydrometeorological Institute of the Republic of Slovenia (<http://www.rzs-hm.si>) – hidrometreorological database
- Ministry of Environment and Physical Planning, Geophysical Survey of the Republic of Slovenia (<http://www.sigov.si/ugf/ang>) – geophysical information system
- Ministry of Environment and Physical Planning, Geoinformation centre (GIC/MESP) (<http://www.sigov.si:81>) – Corine Land Cover
- Statistical Office of the Republic of Slovenia (<http://www.sigov.si/zrs/index.html>) – statistical data
- Other Ministries and governmental agencies  
Local communities and utility companies
- Private sector / commercial data service providers

### National Topographic-Cartographic system

The global goals are to “acquire once and use many times” and satisfy a range of users (especially state administration) with minimum costs. The managing of the national topographic-cartographic system is performed on different levels, from supervision, planning, legal issues, financing to user levels.

#### Structure of National Topographic-Cartographic System

In a strictly technical sense, the national topographic-cartographic system is divided into:

- databases (data level)
- maps (product level)

In general terms, the national topographic-cartographic system is very complex due to the interaction of its elements. In our paper we will be focused primary on digital databases. Our basic idea is to use all available and apply them adequately in the process of making and updating maps. This results in the decrease of production costs and time consumption.

We use the Gauss-Krueger projection (transverse, cylindrical, conform projection) on the Bissell reference ellipsoid in mapping. Meridian zone width is  $3^{\circ} 15'$ . The line of zero distortion is the meridian  $15^{\circ}$  East of Greenwich.

### Digital databases

Digital topographic and cartographic databases will be organised in several different levels of accuracy and precision. With such an organisation we could successfully support different ways of using this data and partially automate map production. We intend to dedicate special attention to the existing digital databases in Slovenia.

#### Scanned Map Originals

Scanned map originals have been made from all reproduction originals of the basic topographic maps, scales 1 : 5 000, 1 : 10 000, topographic maps, scales 1 : 25 000 and 1 : 50 000 and small scale maps of Slovenia, scales 1 : 250 000, 1 : 400 000 and 1 : 750 000, for the entire territory of Slovenia. On all scanned map originals only the content within the frame of the page was scanned, making further use easier, especially in combining pages for system maps. The data is scanned with a resolution of 300 dpi, the contents of individual layers depending on existing reproduction originals of the maps. Each scanned

original is spatially referenced and recorded in its database with a name, date of conversion, scanning operator and the owner of data.

### Digital Topographic Database

The project of finding the methodological and technological solution for the establishment and maintenance of a digital topographic database (TOPO5) provided the instructions for its establishing and maintenance. The base comprised a test area. The sources of acquisition will be aerial photographs at scale 1 : 17 000 and some other sources, for example digital orthophoto plans and scanned publisher's originals of basic topographic maps at scales of 1 : 5 000 and 1 : 10 000.

Apart from their use in geodesy (providing a topographic topologically simple base in vector form and at the same time a cartographic base for drawing maps) these data are intended primarily for use in planning on a local level (roads, use and potential uses of an area, hydrography, forestry, etc.).

### Registry of Geographical Names

Parallel to the renewal of the maps at various scales (1 : 5 000, 1 : 10 000, 1 : 25 000) the SMA is creating a Register of Geographical Names (RGN). On the basis of the project for preparing the technological basis for establishing RGN, the instructions for the establishing, supervising and maintaining of RGN were also defined. The primary purpose of geographical names is the orientation in an area.

### Digital Orthophoto Plans and Maps

Digital partial stereorestitutions of maps are digitised aerial photographs transformed into the national coordinate system with the inclusion of a digital terrain model. They are drawn at a scale of 1 : 5 000. The sources for creating partial stereorestitutions are aerial photographs at various scales of recording (1 : 17 500 and 1 : 30 000).

### Digital Terrain Model

The model of the Earth's surface on the territory of Slovenia, defined by a square grid of points distanced 100 m apart is called the Digital Model of Relief (DMR). For each point the altitude above sea level is determined, enabling the production of DMR. The sources for data entries were basic topographic maps at scales of 1:5.000 and 1:10.000.

### Register of Spatial Units

The Register of Spatial Units (RSU) is a database, which includes digitised borders of spatial units with their centroids and descriptive data about interdependencies and hierarchy. In the RSU we keep data on the basic and additional spatial units. RSU is organised as a central base, which is kept and maintained at a single location, but access to the data is possible from all regional geodetic administrations.

### Generalised Cartographic Database

With a project started in 1994, the SMA managed to include the entire territory of Slovenia for four thematic groups of GKB25. We have chosen this title because data were derived from scanned map originals of the systemic topographic maps, in which individual elements were more or less generalised. Because of its structure and content it can be included among elements of a topographic base of medium accuracy. Four groups of objects have been digitised (roads, hydrography, railways, contour lines).

## GII- NETWORK

Within the project GII\_NETWORK, are signed a few co-operation agreements for data ordering and delivering process.

Modernisation of land cadastre records (harmonisation of newly produced digital cadastral plans using digital orthophoto) through the establishment of a register of buildings or a unified register of real estate was start in year 2000.

### ONIX Project

The World Bank supported MEPP Environmental Management Project (ONIX Project) was formally initiated at the ONIX Opening Conference in September 1997. The initial objective of the ONIX Project was the

creation of a Slovenian GeoInformation Infrastructure (SGII) and supporting GeoInformation Centre (GIC). As the project evolved, the project focused more on municipal application and process solutions supported by the SGII/GIC. Goal of the ONIX project was establishing the framework of Slovene Geoinformation Infrastructure on expert, technical, organisation, legal and managerial view and aspects.

The original focus of the ONIX project was the delivery of information on State, Municipal, and Utility geospatial source data through a metadata query system and the establishment of metadata standards and supporting infrastructure for Slovenia. The SGII/GIC Subproject, with the support of the other subprojects, was tasked with achieving these objectives. Structurally, the ONIX project consists of 7 Subprojects

- **Management Subproject:** overall project management functions and administration.
- **SGII/GIC Subproject:** the development and implementation of a GeoInformation Infrastructure in Slovenia (SGII) and a State GeoInformation Centre as a data-clearing house.
- **Physical Planning Subproject:** the analysis of data/information requirement for physical planning and the implementation of a pilot physical planning project in the Municipality of Koper.
- **Environmental Analysis Subproject:** the analysis of data/information requirements for environmental analysis in support of physical planning and the implementation of a pilot environmental analysis project in the Municipality of Ljubljana.
- **Real-Estate Management Subproject:** the analysis of data/information requirement for real-estate management at the municipal level and implementation of a pilot real-estate management project in the Municipality of Maribor.
- **Topography Subproject:** delivery of State topographic data/information to the pilot subprojects.
- **Cadaster Subproject:** delivery of State cadaster data/information to the pilot projects.

All activities in the project were based on World and European standards and trends and implement into the Slovene environment.

### Knowledge - Training Centre for Geomatics

A several training programs were organised within the project of Training Centre for Geomatics. There was prepared training programs for (1) preparation and maintenance of metadata description prepared by CEN standard for metadata and (2) Data provider's utilisation of the Source data ordering, provisioning and monitoring system. All the results of our activities are available at URL: <http://www.sigov.si:81/GIC>

### Conclusions

Our conclusions reflect the results of the presented activities: Initiative like eEurope will probably lead the process to ensure the accessibility to the basic information (spatial or not) to a broader user community and will stimulate the GI market. With establishing a new Ministry for Information Society, was also in Slovenia give some good background for e-Government activities

At the same time coherent and uniform base data will be of great benefit for the users itself. They will be used for developing and monitoring spatial policies and for spatial development of the Slovenian territory. Such write Mr Annoni and Liteljohn in their paper, that in the longer term other, both private and public organisations operating beyond their national borders are expected to become eager users of European base data too.

The key actors in GI must therefore be closely involved in all segment of information society. All in all this will bring us a big step further in the ultimate aim of creating an operational European Geographic Information Infrastructure for the benefit of all.

## References

Government Centre for Informatics (1999) »Strategy of Information Infrastructure in public sector in Slovenia« URL: <http://www.sigov.si/cvi/slo/strateg1.html>

EEMII Project - European Territorial Management Information Infrastructure. <http://www.ec-gis.org/etemii/>

EC DG INFSO (1999) "Communication on eEurope: an Information Society for All". [http://europa.eu.int/comm/information\\_society/publications/docs/index\\_en.htm](http://europa.eu.int/comm/information_society/publications/docs/index_en.htm)

Annoni A., Liteljohn M., (2000) »The project GI&GIS, a key action of the EC Joint Research Centre to support the creation of a European Geographic Information Infrastructure«, 4<sup>th</sup> Global Spatial Data Infrastructure Conference, Cape Town, South Africa, March 2000

EC DG INFSO (1999) "Green Paper on Public Sector Information in the Information Society". <http://www2.echo.lu/info2000/en/publicsector/greenpaper.html>

EC DGXIII (1997) "GI-Policy Study". <http://www.echo.lu/gi/en/docarchive/gi-policy.html>

PANEL-GI Project - Pan European Link for GI. <http://gisig.ima.ge.cnr.it/panel-gi/>

Catalogue of Digital Data of the Surveying and Mapping Authority of the Republic of Slovenia, Ljubljana 1995

Petek T., Smodis M. (1998), The topographic and cartographic system in Slovenia, GIS-Brno 98, Brno Appendix

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