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The Hungarian National Spatial Information Infrastructure

1. Introduction

Geoinformatics represent today the most efficient tool for managing data in space and time. Geoinformatic data can describe all natural and artificial objects being on the Earth's surface, as well as any natural, cultural and human phenomena, referring to given geographic location. The information on the location can be a spatial co-ordinate, defined within a geodetic reference system, or any other geographic positioning element, e.g. postal address, districts of public administration, population census, city planning, or a map sheet.

The geoinformatic data is a special sort of information data that describes spatial relations of the local, regional or global environment: What is where? Where is what?

Today's technical level enables us to achieve intelligent connection; efficient acquisition, processing, analysis and display of map reference data, produced through lifelong manual work and the descriptive information kept in analogue form. The geoinformatic data created this way is able to satisfy the user demands in wide circles, using information technologic elements.

Information technology has already conquested almost all fields of life, supporting private sphere, business world, public administration and governmental sections, increasing the efficiency of information procedures. One can see explosion-like development in the fields connected to geoinformatic data. But in many application fields, the efficiency of applications stays much behind the level offered by technology, because of unsolved legal, economic and organisational questions.

The geoinformatic data represent one of the most valuable sort of data because of their strategic character, wide applicability in public administration, local governments and business life, complexity and expenses of their production. So, the increase of efficiency of geoinformatic information procedures, also the regulation of the procedures are basic governmental tasks.

2. Overview

The economic and social changes of the past almost one decade, the intention to join the European Union and NATO membership made managing data in time and space extraordinarily valuable, and caused that the geoinformatic tools also became extremely popular in Hungary.

Examinations show that at least 80% of data used to various purposes can be connected to geographic locations. From this point of view, there is no difference among descriptive data of administration database, documents, forms, reports, plans, photographs, moreover, video-shot and audio-record either. Consequently, a map can be the perfect inventory of all these sorts of data, and powerful integration tool of knowledge connected to the same location in space. As in the eighties in the West, this branch of informatics reached a high state of development, and by the beginning of the nineties, the necessary technical conditions were also created in Hungary, during the past couple of years the map-based information systems became well-known here as well. The geoinformatic systems with most complex functionality and data content have been developed in the field of operating public works, settlement administration, road registration, environmental protection, water management and statistical data service. But the development of countrywide geoinformatic systems for the land management sector, the territorial planning and tourism is also well under way. The Geoinformatic National Project, co-ordinated by the National Board of Technological Development, between 1993 and 1996 proved to be a good catalyst, which - beyond its several other achievements - supported the consolidation of the system-developing companies, too. At the same time, the emerging of geoinformatics strongly affected the

development of those disciplines - digital mapping, remote sensing, image processing, satellite geographic positioning - the results of which it can built on.

In Hungary, it was a significant step ahead, when the Resolution No. 13/1997 (X. 15.) of the Governmental Commission for Informatics and Telecommunication was elaborated, including the main goals of the whole home geoinformation sector, and also the National Geoinformatic Strategy in six programme-booklets. (The present report is essentially built upon that carefully prepared material, also citations are taken from that.)

But the quick, mostly intensive development also raised several professional and organisational problems. This statement is especially valid for the public administration, which is one of the most important users of geoinformatics, and which is especially sensible that its various sectors' development be well-balanced and co-ordinated. The experience accumulated up to now enables us to identify the major problems and to plan the opportunity of stepping forward.

To find solution as soon as possible for those problems is vital, because nowadays in the modern economic, cultural and political life, in public administration, the quick case management, careful service of customers, creating up-to-date information, their maintenance and servicing, professional and precise preparation of decisions, correct decision-making is unimaginable without using geoinformatic technology. At the same time, the preparation of decisions, the distributions of resources, controlling of the use is going on through high-level system of geoinformatic tools in the European Union, and Hungary, as a candidate country should already be able to join the systems already in the phase of pre-accession.

Components of the geoinformatic infrastructure are hardware, software, network, data, value-added products and services, human resources and skills, technical and legal regulation environment, but they also include capacity for education-training and technology development, and also the institutional-organisational background that assures the operation of the whole. The present overview is built on those components.

2.1 Information Technology

The technological infrastructure of geoinformatic systems - similarly to other information systems - is formed of hardware, software and network environment. Considering the environmental components, the map-based systems are differing from other information systems that majority of them are using some kind of geoinformatic basic software as well. These basic software-types provide the most frequently used special geoinformatic functions in the systems. Concerning hardware, Hungary is a "recipient", concerning software, database management systems, graphic data management and display systems (e.g. Arcinfo, Mapinfo) are all applied according to the international standards. There are Hungarian-developed systems as well.

It is characteristic of the geoinformatic applications that the internet/intranet solutions are spreading more and more; all the recent versions of the basic software offer solutions like those.

The object-oriented approach, the relational DBMS, the multi-media, the 3-D and the opportunity of using the virtual reality are also characteristic of the geoinformatic applications.

Leading geoinformatic software systems are all accessible for the Hungarian public administration; the achievements of the home development are all available, too. Consequently, the creation of technologic infrastructure of map-based systems means a similar task for the users as when developing information systems of other type.

2.2 Data, Products, Services

Data are extremely important resources of the organisations. The knowledge on the operational field of the organisation - in this case, Hungary as a country or one of its regions, subregions - relating to the operative use of this resource becomes more and more important. The quality of the use is determined by the fact, if the space-related datasets acquired from

internal or external sources are well known or respected within the organisation, if they are compatible with given procedures, can be cross-referenced, and contacted and integrated into organisational information. The above statements relate equally to the spatial data of the visible (man-made and natural) and non-visible (organisational life, markets of a settlement) environment. If the access of the players acting on the given field (public administration, economic organisations, citizens) to those data and its use is efficient in the interest of their effective operation, this is an indisputable factor of success, among others, from the point of view of improving quality of life.

Concerning spatial data, the most fundamental ones are those that are used most generally; those data used for creating the highest number of further datasets are called basic data. Those basic data represent the data-infrastructure, which naturally includes the system of standards, regulations, and services. In the most developed countries - based on a strategy developed as a result of wide agreement - defining the know-how of production, maintenance and servicing - the servicing fields are mostly the following:

- Reference, reference system data,
- Public administration borders,
- Aerial photos, orthophotos,
- Relief, terrain relations,
- Traffic network,
- Hydrography,
- Cadaster,
- Surface cover and its subsystems,
- Population Census,
- Environmental protection,
- Geology,
- Others.

2.2.1 Reference Circle of Basic Data

The category of reference circle of basic data contains the reference system and the geodetic control network, also the land surveying and topographic base maps. The family of airphotographs and satellite images belong here, too.

The Hungarian situation can be described the best with the adjective "transitional". The elaboration of a strategy, co-ordinated by the Prime Minister's Office was started in 1997/98, with partial studies, but the synthesised, coherent, countrywide and national, governmental strategy is not available yet. (See National Geoinformatic Strategy - a Decision-Preparing Strategy Study, Proposal for the Governmental Committee for Informatics and Telecommunication, Hungis Foundation, Budapest, 17. July 1998.) It is understandable from professional point of view: the well-known status of the land registration, as a result of the privatisation and the compensation, and the insufficient will and insufficient resources for the development of information systems, resulting in backlogs of the land management sector. In spite of all that, in the nineties, significant programmes were formulated, realising important developments (e.g. National Geoinformatic Project, TAKAROS System for the land offices and the TAKARNET network also for land offices); also important initiatives were born (National Cadastre Programme, National Topographic Programme, Regional Development System etc.). In all these projects, programmes, the elaboration of the technological terms, the creation of technical, organisational and human resources, data acquisition, data management and processing within the organisation are decisive. The servicing, the wide use of data, including basic datasets in terms of data infrastructure have not been considered as priorities up to now. But at the turn of the millennium, on the one hand, the explosion-like progress of accessibility through network, the availability of computertechnics, information tools technologies. On the other hand, the constraints from user-applier side, as a result of the closing Euro-Atlantic integration, the professional challenges of globalisation urge and require to reach and introduce stimulating solutions, which provide the user/applier with wider the better, ever growing accessibility to and use of data. Of course, not at the price of those systems, datasets, information systems and applications that are still missing, or not able to cover the demands at the moment.

Concerning the reference systems, forming the basis of the countrywide space-related data infrastructure and technical-measuring systems: the basic control networks are convenient, they are accessible through servicing, also in on-line mode (horizontal and vertical geodetic controls, controls of the National GPS Network, integrated into European reference systems). But the product-profile and prices have not been calculated in a way that would stimulate their use. The public administration boundaries data are available in the service in such packaging that is acceptable for users, independently or integrated into more complex products, for a price that follows the market, separated the geometric data (FÖMI) and their identifiers (KSH - Central Office for Statistics). An EU pilot project under name ABDS (Administrative Boundaries Data Services) for providing new generation on-line service is under way, co-ordinated by FÖMI that is responsible for the management of geometric data. As basic data, the digital topographic map at scales of 1:50 000 and 1:100 000 is serviceable, together with the related digital terrain models and various datasets, representing the traditional data acquisition methods.

The datasets organised in the national lands and mapping management were introduced at the session of the Geodetic Scientific Commission of the Hungarian Academy of Science, held on 8th October 1998. Their list is given in the **Attachment No. 1,** without further details. Here also belongs the digital geodetic base map, prepared in the framework of the National Cadastre Programme, in line with the DAT Standard.

It is especially worth of mentioning that an international project, supported by the European Commission, called "Administrative Boundaries Data Services for CEEC" is under implementation, the aim of which is to prepare and later on organise the servicing of the administrative boundaries data of the Central and Eastern-European Countries. (ABDS Project.) Its co-ordinator is FÖMI.

The following jobs are under way, supported by the ANP programme of the Ministry of Agriculture and Regional Development:

- Digital conversion of the relief of topographic base map at scale 1:10 000, prepared in EOTR (Uniform National Map System) using a 10cmx10 cm raster model,
- Taking aerial photographs of the whole country in one phase at scale of 1:30 000, resulting colour airphotographs, preparation of digital datasets from them, producing also orthophotos.

Further themes, road-network, hydrography, surface cover etc. can expect wider use, in connection with the visible environment. For revising them, the preparation and servicing of an orthophotographic standard set of data is representing the first imperative development element of the infrastructure. This is the first module of the Hungarian Topographic Programme at the same time. This module had to be started as an independent one, considering the relatively homogeneous datasets to be acquired, the refined processing techniques, and the explosion-like progress of internet-services and, the urging application development requirements. As a result of extensive discussions of professionals, an agreement was born concerning the data content and way of servicing. This agreed solution is decisive, when developing this element of infrastructure. FÖMI launched the project, on the order of the MARD.

In the Mapping Office of the Hungarian Army (MH TÉHI), the digital results of the military topography served as a basis for the first, fundamental geoinformatic basic data in Hungary. More details in the **Attachment No. 2.**

As an organic continuation of the MARD activity, the first phase of ANP Programme Package was realised in 1999, and building upon it, in the year 2000; the second phase was started. It contains the institution-developing tasks relating regional development, territorial planning, land consolidation and agrarian environmental economy, in such phases that assure an expectable level of preparedness by the date of the planned EU-membership. Under preparedness we mean competitiveness, economic efficiency, reliability and timeliness at the same time, taking mapping basis of geoinformatics into consideration as much as possible. This is connected to the National Topographic Programme in such a way and also as an

approach that both in the central database to be organised at FÖMI and infrastructure it will unite and functionally connect the parcel-based information system and the high-resolution operative remote control system (NÖVMON- Plant Monitoring, flood, internal waters etc.)

The best known fundamental circle of basic data collected by Central Office of Statistics of Hungary is MATÉRIA, which was ready in 1993, updated yearly since then. This can be used in PC Mapinfo environment, and is figuring in the product list of the Firm Mapinfo. Its basis is a digital map at scale 1:500 000, which contains public administration boundaries, objects of road and railway networks and hydrography etc., its alphanumeric data according settlements include the T-STAR and Population Census data, address lists of mayors etc. Mapinfo is widely used at the Central Office of Statistics not only in Mapinfo, but also for other information and analysing activities. Recently, Autodesk Word variant of MATÉRIA is also available.

2.2.2 Other, Thematic Circles of Basic Data

Nowadays, there are numerous thematic circles of basic data. A list without aiming at completeness:
TeIR (VÁTI), **Budapest Base Map** (Topolisz Kft.), **Population Census Data** (Central Office of Statistics), MÁFI digital database: **Minor Plain, Zala County Complex Database, Paks Atomic Energy Plant Geologic Database**, Geology **of Budapest, Uniform Geologic Digital Database of Hungary, DANREG for the River Danube; Soil Scientific Database** (TAKI), **Settlement Address Database** (Geogroup, Infograph), **OTAB** (Geometria Kft.), **BTA 2000** (Geometria), **Budapest-4000** (Infograph), **Budapest CD Atlas** (Cartographia), **HÁLIS** (Budapest Water Works), **Database for optical backbone network of MATÁV, KIR and KÖFIR database** (Budapest Electric Works), TIGÁZ **Network Control System, Voting District database** of the Gallup Insitute, **Environmental Protection Sample Districts of Lake Balaton and Hortobágy** , **Settlement- Managing Geoinformatic Systems for Local Governments** (Zugló, Szombathely, Debrecen, Hajdúszoboszló, Nyíregyháza, Pilis, Orosháza, Szeged, Pécs), **Budapest Green Surface Cadaster**.

2.2.3 Metadata

Metadata put datasets "on show" in the shop window. Metadata describe all important features of the dataset. The user cannot have direct access to the data, but he/she can have all necessary information for decision-making concerning the possible use of the dataset.

Definition of metadata is compact and simple: data on the data. The metadata describe the source, technology of producing data, contents, quality, accessibility, distribution of data etc. The aim of the metadata is to document the dataset and facilitate its efficient use or selection.
In Hungary, the following metadata are available:
- FISH metadata (FÖMI)
- METATÉR (comprising metadata prepared by the Prime Minister's Office, FÖMI, VÁTI and MÁFI)

At the Prime Minister's Office, the building up of the metadatabase called KIKERES (Search) for public administration is under way. It is also based on METATÉR, among others.

To give a sample, the service structure of the web-site being in the FISH Centre is the following:
- Novelties - Shop Window
- Data House
- Registration
- Products - Databases, Maps, Aerial Photographs, Satellite Images, Software, Professional Regulations
- Search - What is here?
- Services - Data Acquisition, Data Integration, Analysis, Thematic Mapping
- Information - Answers to Frequent Questions
- Search - Based on Keywords
- Users - Ideas, Users' Club

- Partners - Data Suppliers - Synergy
- Proposals - Feedbacks.

2.3 Human Resources

During the past 10-15 years of geoinformatics, a wide group of professionals has been formed, who possess significant knowledge on software, being data owners or data users, partly on the urging effect of the spreading geoinformatics, partly supported by the international practice and the continuously developing geoinformatic education/training. But it is not enough. Hungary has to each a level that satisfies the geoinformatic culture and the current demands, considering both the number of professionals and the quality of their education and experience.

2.4 Technical and Legal Standardisation

Concerning legal background of GIS, the most important is the Act LVXXVI./1996 on land surveying and mapping activity and the related Ministerial decrees. The status of the copyright of intellectual products is still to be revised. Legal protection of the databases of maps and the related mapping data are to be solved in an EU-conform way. The Hungarian GIS umbrella-organisation, HUNAGI, co-operating with the Hungarian Union for Industrial Right Protection have just elaborated an action programme with the participation of the Department of Lands and Mapping of the Ministry of Agriculture and Regional Development, the Mapping Office of the Hungarian Army and the HUNGIS Foundation. The action programme was produced considering the surveying results in EU member countries and recommendations made by the corresponding European organisations (DG XIII LAB, EUROGI and CERCO).

In Hungary, within the framework of the Hungarian Standardisation Council, the GIS Standard Technical Committee No. MB818 started to work in 1994. Thanks partly to this, the Institute of Geodesy, Cartography and Remote Sensing (FÖMI) was able to start its standardisation activity, followed soon by the progressive part of professional circles. This activity is parallel with CEN TC287 and also with ISO TC11. The Hungarian Board of Technical Development, the Ministry of Agriculture and Regional Development and also Ministry of Defence have efficiently supported these efforts.

As a result of the standardisation activity, the following documents were elaborated:

a) MSZK 1066;1996, General requirements on military digital topographic maps,
b) MSZ7771:1997, Hungarian GIS data exchange standard,
c) MSZ772-1:1997, Conceptual model of the digital base map.

The following should be emphasised:

- The GIS data exchange standard is valid, but to complete its operability, further standard development is needed.
- The idea and plans of Hungarian Topographic Programme resulted in a change of concept, following the German ATKIS standard: two-level regulation (on the level of topographic database and on that of cartographic database). Therefore - though it has been used up-to-now - the Hungarian standard MSZK 1066 can loose its validity.

The regulation system of digital base maps was built on the standard No. MSZ 7772-1:1997, publicly called DAT standard:

a) DAT1 regulation: Planning, production, quality control and state acceptance of digital base maps

- Supplement DAT1-M1: Structure, data exchange and management of databases
- Supplement DAT1-M2: Digital legend
- Supplement DAT1-M3: Software for checking the internal consistence

b) DAT2 regulation: Digital transformation

- Supplement DAT2-M1: Projection transformations

The elaboration of the conceptual model and standard for the digital topographic database **No. MSZ 7772-2**. is under way.

This is identical with **ENV-12009:1997, and is published with the permission of CEN, Rue de Stassart 36, B-1050 Bruxelles, Belgium.**

Recently, the Hungarian Standardisation Council has been working on the adaptation of GIS pre-standards, (which belong to the so-called structural standards category) prepared by CEN TC287 standardisation Working Group.

The following seven standards were adopted as ENV:

- ENV 12009:1997 - 1997-06-23 Geographic Information - Reference Model
- ENV 12160:1997 - 1997-08-13 Geographic Information - Data Description, Spatial Schema
- ENV 12656:1998 - 1998-10-09 Geographic Information - Data Description - Quality
- ENV 12657:1998 - 1998-10-09 Geographic Information - Data Description - Metadata
- ENV 12658:1998 - 1998-10-09 Geographic Information - Data Description - Transfer
- ENV 12661:1998 - 1998-10-10 Geographic Information - Referencing - Geographic Identifiers
- ENV 12762:1998 - 1998-11-30 Geographic Information - Referencing - Position.

2.5 Education

As they recognised the importance of the map-based systems, the education of geoinformatics has made significant progress. High-level educational and developing activity is going on in several Universities of Hungary: Budapest Technical University, Debrecen Agricultural University, Szeged University of Science, Gödöllõ Agricultural University, Sopron University and its Székesfehérvár College for Land Surveying and Land Management. The preparedness of the lecturers is generally well known. The educational institutions are provided with hardware and software on a relatively good level. They teach geoinformatics in the secondary schools as well, and moreover, trials were made to integrate this discipline into the primary level education.

While significant achievements can be experienced in the education of high-quality professionals, there is certain backlog in the management and user training, and this seriously holds up the utilisation of geoinformatics.

2.6. Institutional and Organisational Background

Professional supervision and place in the state budget of the state-financed GIS players shows a colourful picture. The Institute of Geodesy, Cartography and Remote Sensing (FÖMI) together with the land office network (115 districts land offices, 19 county land offices and that of Budapest and its districts), and also the National Cadastre Programme Non-Profit Co., funded from a state-guaranteed credit have been operating under the auspices of the Department of Lands and Mapping of the Ministry of Agriculture and Regional Development. The Mapping Office of the Hungarian Army is financed from the budget of the Ministry of Defence, but professional supervision is provided by the Chief of Staff of the Hungarian Army.

Significant data owners are the Hungarian State Geological Institute and the Eötvös Loránd Institute of Geophysics, which - under the umbrella of the Hungarian Geological Service - both belong to the Ministry of Industry, Commerce and Tourism. The Ministry of Agriculture and Regional Development finances VÁTI Non-profit Company. Some supporting institutions behind certain ministries are thematic data owners at the same time (. e.g. Environment Management Institute, State Road Technical Information Centre Non-Profit Co., National Water Management Office, Hungarian Office for Mining). All these make the data management, the development of data market, the elaboration of adequate regulations very difficult and urge them, too.

All the mentioned institutions are data-producers, transformers (also making orders for data-transformation) and data users at the same time, being authorities, research institutes, moreover, entrepreneurs as well. In this field, there exist a lot of parallel activities and also competence-division: this latter one is already strange when using modern technology. One can find activities and rights qualified as incompatible within the same institution. It can be stated that the organisational order of the players in the public sector is inadequate.

There can be seen some kind of specialisation among the players of the data market, the positions are being clarified, but further reorganisation or appearance of further players cannot be excluded, especially if major civilian and military projects are to be started.

The National Board of Technical Development and the Prime Minister's Office have been playing significant role in geoinformatics for a long period.

At the beginning of the 90s, as traditional land surveying, mapping and informatics found each other, conferences were organised and professional periodicals started:

- The monthly "Geodézia és Kartográfia" that has jointly been published for 49 years by the Hungarian Society of Geodesy, Cartography and Remote Sensing and the Ministry of Agriculture and Regional Development, increasingly deals with geoinformatic issues in addition to geodesy, cartography and remote sensing,
- The monthly Térinformatika (Geoinformatics) started in 1988, accompanied by an Annual Source Book of Hungarian Geoinformatics, in one year in Hungarian, in the other in English,
- The monthly Geoinformatika started in 1996, mostly for land surveyors,
- From 1991 on, National Conference on Geoinformatics has yearly been organised, first for local governments, but soon became a national geoinformatic conference,
- From 1992 on, a conference on "Geoinformatics in Higher Education" has been organised jointly by Hungis Foundation and the Department for Landscape Planning of the University of Food Industry. It is an annual meeting not only for lecturers of geoinformatics in higher education, but also for teachers in middle and basic level. In addition to the issues of education, the recent professional achievements are shown, and the results of the competition for the best thesis, invited by Hungis Foundation are announced.
- The Hungis Foundation plays the significant role of the organiser in the Hungarian geoinformatic forum.

Apart from the textbooks published for the education, professional books have also been published in the topic of geoinformatics:

- Detrekõi, Á. - Szabó, Gy. - Introduction to Geoinformatics, Budapest, 1995, 2997, 1998.
- Kollányi, L. - Prajczer, T.: Geoinformatics in Practice, Budapest, 1995.
- Kertész, Á.: Geoinformatics and its applications, 1997.

Among the textbooks elaborated by colleges, universities for their own students, the series of textbooks on geoinformatics published by Neumann János Secondary Vocational School is the best.

All three volumes of NCGIA CORE Curriculum, used as textbook in general, being the most popular handbook on geoinformatics were published in Hungarian in 1994, and was supplemented with a fourth volume especially adapted to the Hungarian situation.

3. Government Geoinformatic Strategies

The reason why geoinformatics was introduced in Hungary and is being utilised with success is mostly of political and organisational character, and not that much technical one. Data production, transformation and distribution are expensive.

In Hungary, policy of geoinformatics and organisation co-ordination are vital for being increasingly competitive, and also they create healthy environment for the technical development. They support the better and more efficient governmental activity, better use of existing

sources and information, creating new business potentials and also the cost-effective, efficient realisation of international programmes of great significance. This strategic approach is in accordance with the main goals of the information society and directly serves its realisation. It is also in line with the leading principles of EU Aid Programme. We should initiate the forming of a uniform market of geoinformatic products. If Hungary fails to step forward now; we will miss this chance.

3.1 Foreign Strategies

The National Geoinformatic Strategy of the USA is the most remarkable. The National Research Council (NRC) founded by the Scientific Academy of the USA (NAS) in 1916 has got a mandate for providing the Federal Government with consultation and recommendations in scientific and technical issues. Though the USA is considered to be a state where they were converted from industrial society to information society already in the early sixties, the conditions of it (e.g. NII, the wide-area network information infrastructure) became ripe enough widely by the nineties for searching a new approach, using also the campaign led by Mr. Al Gore for screening the performance of the public offices. The results of one of the first fundamental surveys were published in 1990 by the Mapping Science Commission (MSC) of NRC with active co-operation of the Geological Service under title: "Geoinformatic data demands: future of the national mapping programme". It was followed by the document " Co-ordinated Geoinformatic Infrastructure of the Nation", supported by 14 federal institutions. Number one data suppliers of the US geoinformatic market are the following sectors: home affairs, agriculture, commerce and defence. MSC prepared its report in 1993 that declared its main goal: development of a large-scale national geoinformatic data infrastructure (NSDI) aiming at the national map supply. All these are happening to enable the governmental level, moreover, all players of the market to make well-founded decisions, provided with the necessary information.

Pillars of the strategy elaborated in 1994 were the following:
- creating a data house (NGDC) organising the data producers and data users in one network,
- elaboration of standards for documenting, collecting and exchanging data,
- formulation of the procedure of NGDC framework and defining the first data circle,
- widening the framework by involving new data owners from any sector.

Further national strategies were elaborated, first in Great Britain and The Netherlands. The number is so high both in Europe and overseas that listing them and analysing them would need a separate study - this is not the topic of the recent report.

Also regional geoinformatic strategies are being prepared all over the world. For Hungary, the European geoinformatic strategy has a leading role. The European strategy was formulated in the document GI 2000. Now this document is mentioned under the name EGII (European Geographic Information Infrastructure).

The demand for the formulation of the European geoinformatic policy was raised first by the DG XIII. (Information Technology and Telecommunication) of the European Commission. The document preparing the foundation of the European Geoinformatic Umbrella-Organisation (EUROGI) was ready in fact by the same date as the document "White Book on Expansion, Competitiveness and Employment" was published, signed by Mr. Jacques Delors, president of the Commission of that time. This was followed by the Bangemann Report, forecasting the details of the European information society that was discussed at the Corfu Summit Meeting of the Commission in June 1994.

The GI 2000 strategic document has gradually been refined during the past couple of years, mostly by taking the remarks of professional groups and politicians into consideration. On the Internet, the Discussion Forum may still be alive that is accessible for users and the general public. The communication of the European Commission on the GI 2000 was discussed in 1998 in the European Council and European Parliament.

Recently, the world's informatic professionals, cartographers and land surveyors have started to elaborate the concept and operation of a GSDI (Global Spatial Data Infrastructure).

3.2 Home Governmental Strategies for Geoinformatics

Studying the past two decades of the Hungarian land surveying, mapping and geoinformatics, it can be stated that automated mapping - in spite of their relatively early appearance in the domestic practice - the profit produced directly or indirectly through the application of geoinformatic systems stays far behind the opportunities provided by the information technology. The demand of the geoinformatic sector on public sources can only be based on the measurable advantages of the geoinformatic systems, and it is important to get the moral support of the society as well.

Those organisations optimised on traditional paper-based culture and information flow, tasks inherited from the paper era, analogue data- and map-systems are going under special development process, increasingly leaving space for the advantages provided by the information technology. There are many examples of excellent geoinformatic applications in the home practice. But lacking adequate strategic co-ordination, the countrywide use of isolated achievements is low, and their effect remains local in the environment of contradictory legal, technical and economic regulations.

First paragraph of the decree (13/1997. (X.15., ITKB) of the Government Commission on Informatics and Telecommunication prescribes the elaboration of a comprehensive National Geoinformatic Strategy (NGS). According to the decree, the Secretary of Public Administration of the Prime Minister's Office was responsible for that, involving the corresponding ministers and leaders of national institutions, the deadline was June 3o, 1998. Deputy Secretary of the Prime Minister's Office invited the HUNGIS Foundation to perform the task. As first step to the strategy, HUNGIS Foundation decided to elaborate the concept. Considering the importance of the task, the Foundation involved KPGM Hungária Kft., having significant experience and adequate methodology in fulfilling appointments like this. They also invited eminent specialists of the profession to form a commission for supervising the preparatory phase and the elaboration of the concept.

The preparation of the NGS is divided into five phases:

- elaboration of the concept of the National Geoinformatic Strategy,
- surveying the current situation both on national and international level,
- specifying the requirements,
- starting from the current situation, consider the newly formed mission statement for elaborating the potential ways of development and variants of strategy,
- After decision making: elaboration of the action plan in details.

The participants, who elaborated the concept, preliminary studied also the National Informatics Strategy that was prepared in 1994/95 as the government strategy for the realisation of the information society.

Accordingly, the following projects were completed:

P1 - Macroeconomic examinations
P2 - Problems of legal regulation
P3 - Regulation of geoinformatics
P4 - Development of data acquisition
P5 - Quality management of geoinformatic data
P6 - Marketing, PR (Public Relations).

All six volumes of the above mentioned projects are available at the Prime Minister's Office. It's a relatively well-organised, very informative source material for geoinformatic specialists.

4. Recommendation

The elaboration of the Government Geoinformatic Strategy united the professionals in the interests of preparing a government-level decision making. The preliminary studies are

already finished; the proposals for submission to the Government are partly ready. Partly only, because of change of government in the meantime, and because certain involved circles have not entirely been convinced concerning the strategy. Various tasks of scientific significance are still waiting for solution.

The essence of the recommendation is that the Sub-Commission for Geoinformatics formed within the Geodetic Scientific Commission of the Hungarian Academy of Sciences should elaborate the Hungarian National Geoinformatic Strategy starting from scientific points of view and submit it to the Government through the President of the Academy, co-operating with the ministries, the Prime Minister's Office and the governmental commissions.
The Sub-Commission for Geoinformatics has prepared its work plan and selected its members in accordance of and considering the above detailed recommendation.

Thank you for your kind attention.

Attachment No. 1.

Databases organised by the Institute of Geodesy, Cartography and Remote Sensing (FÖMI) for the public land surveying and mapping

Existing basic data are to be digitised, the data to be collected through new surveys already in digitised form, structured in database. In the past 4-6 years and also today, this has been the task in FÖMI, being national centre and archives for public land surveying and mapping.
The following databases are available up-to-now, partly by digitising analogue data, partly by digital data acquisition:

1. Database of public administrative borders of Hungary (MKH02)
2. Database of public administrative borders of Hungary (MKH51)
3. Database of public administrative borders of Hungary (MKH10)
4. Database of public administrative borders of Hungary (MKH50)
5. Database of Vertical Controls (MAGAB)
6. Database of Horizontal Controls (VAB)
7. Hungarian Surface Section of the Geoid (HGR95C)
8. Database of Hungarian Geographic Names (FNT)
9. Centralised Database of the National Land/Property Registration
10. Map Coverage Information
11. Topographic Maps
12. Cadastral Maps
13. Database of the Digital Topographic Base Map at scale 1:100 000 (DTA-100)
14. Database of the Points of the National GPS Network (GPSINF)
15. Database of Aerial Films (digital registry, analogue images)
16. Database of SPOT Satellite Images
17. Database of Landsat Satellite Images
18. Database of IRS1-C Satellite Images
19. Database of ERS-1 and ERS-2
20. Database CORINE Land Cover (CLC-100)
21. Experimental Database CORINE Land Cover (CLC-50)
22. Arable Land Plant Monitoring.

Attachment No. 2.

Databases organised by the Cartographic Institute of the Hungarian Army DDM-50, DDM-10

The Hungarian Military Cartography - in co-operation with the Frequency Managing Institute - produced and sells 3D digital relief model of Hungary, which is available in variants of 50mx50m and 10mx10m raster density. The Army and telecommunication needs this model, but it is an important tool for other sectors of the economy, on the given level of resolution.

DTA-200

Digital dataset prepared on the basis of the topographic map of Hungary at scale 1:200 000 is available. Its format is DXF or DWG.

DTA-50 Digital topographic map at scale 1:50 000

This is a countrywide database and a standard geoinformatic system, enabling the map-making in a traditional way. Its geometric basis is good, some of the themes (road, hydro-graphy, objects/establishments) need slight improvement. Public administation and gazetteer are to be added.

Adaptation variants by layers, sheets, projection system, and conversions to various software formats were realised in good quality.