



# Spatial Data Infrastructures in Hungary: State of play 2010



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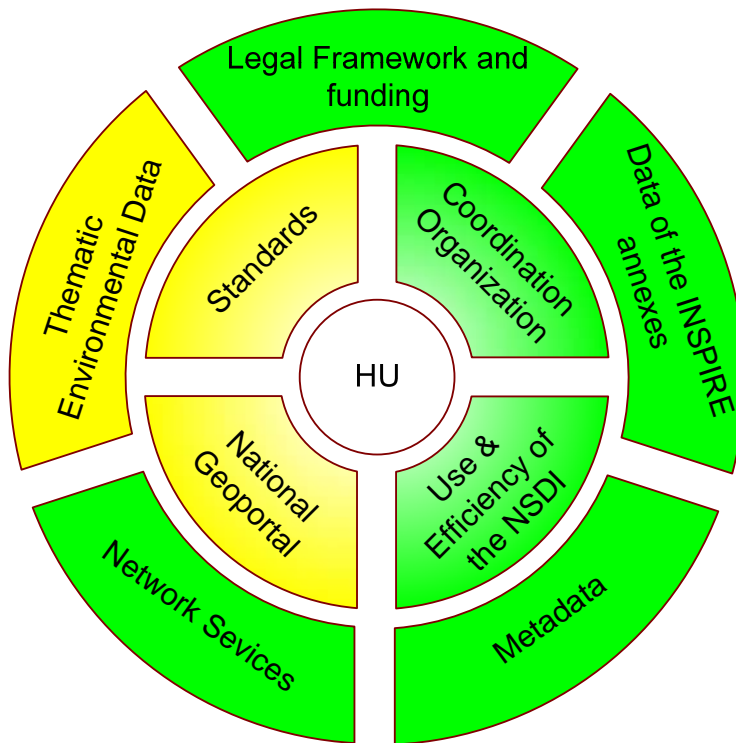
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5.0	2003-08-17	Jos Van Orshoven	Harmonisation with updated version of

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## Change matrix 2010 versus 2007

A concise graph is added to indicate changes of the various paragraphs compared to the previous report. Two colours are used: Green and Yellow indicating major and minimum changes respectively compared with the 2007 State of Play. This graph does not reflect the country situation. Merely it represents our findings/changes per section on our preparation of the desktop analysis



## Executive Summary

In Hungary there is not yet an existing common SDI and thus there are no spatial data services running as part of a National infrastructure. However, new legislation such as the amendment of the Environmental Law of December 2008 which entered into force on 15 May 2009, and the Government decree 241/2009.X.29 is setting up the National Environmental Spatial Information System, including the implementation of the INSPIRE directive. The Ministry of Environment and Water has been assigned as national contact point for INSPIRE and a committee has been set up to help the work of the Contact Point, namely the National Environmental Spatial Information Coordination Committee (NESICC). The committee is made up of the data owners of the INSPIRE themes. The National Environmental Spatial Information System will work as a Spatial Data Infrastructure in Hungary.

Along with the Ministry of Environment and Water the key executive player in the elaboration of the NSDI is the Institute of Geodesy, Cartography and Remote Sensing (FÖMI). FÖMI is operating a website which aims at providing access to metadata, some geodatasets and some other spatial data services.

FÖMI is subordinate to the Ministry of Agriculture and Regional Development which is the main producer of GI in Hungary. Besides the FÖMI, the Ministry's institutional network includes 136 District and County Land Offices. The Hungarian Institute for Town and Regional Planning, which also belongs to the Ministry of Agriculture and Regional Development, is responsible for data related to regional development, an increasingly important area of policy in all the accession countries. Other key providers of spatial data are the Mapping Agency of the Home Defence Forces, the Central Statistical Office.

Hungary has a national Association for Geo-Information, HUNAGI ([www.hunagi.hu](http://www.hunagi.hu)), which is a non-profit, interdisciplinary umbrella association.

All surveying, mapping and related activities in Hungary are governed by a single Act, i.e. Act LVXXI of 1996 on land surveying and mapping activities and GIS. Some European Directives have been transposed in Hungarian Law: Directive 2001/29 on copyright in the information society and Directive 2002/58 on privacy and electronic communications.

During last years both the hardware and software environment of the Hungarian permanent GPS network have considerably been developed. The network development (geometry, services) has focused on the full coverage of the country with real-time services (GPSNET.HU). At the same time FÖMI started preparing a common INSPIRE compliant geo-portal with the Military Mapping Agency. They have established new organisational structures for the INSPIRE implementation.

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## Abbreviations and acronyms

ABDS	Administrative Boundary Data Services
BVQI	Bureau Veritas Quality International
CEN	European Committee for Standardization
CT	Core Thematic Data
DAT	Digital Base Map Standard
DEM	Digital Terrain Model
DGPS	Differential Global Positioning System
DLM	Department of Land and Mapping
DP	Data Protection
DTA	Digital Topographic Base Map
EC	European Commission
EKG	Electronic Government Network
EOV	Uniform National Projection system
EU	European Union
EUPOS	European Position Determination System
EUSC	European Union Satellite Centre
ESA	European Space Agency
EOMA	Uniform National Height System
EOTR	Uniform National Mapping System
EOVA	Uniform National Horizontal Network
EUROGI	European Umbrella organisation for geographical information
FIR	Further Investigation Required
FNT	Database of Geographical Names (Földrajzinév-tár)
FOI	Freedom of Information
FÖMI	Institute of Geodesy, Cartography and Remote Sensing
GEOX	Hungarian Private Company Ltd. Name
GI	Geographical Information
GINIE	Geographic Information Network in Europe
GIS	Geographical Information System
GMES	Global Monitoring for Environment and Security
GNSS	Global Navigation Satellite Systems
GPRS	General Packet Radio Service
GPS	Ground Positioning System
GSDI	Global Spatial Data Infrastructure
HANAB	Hungarian National Accreditation Board
HAS	Hungarian Academy of Sciences

HCSO	Hungarian Central Statistical Office
HSO	Hungarian Statistical Office
HUNAGI	Hungarian Association for Geo-Information
ICCIS	Coordination Committee on Information Society
INSPIRE	INfrastructure for SPatial InfoRmation in Europe
IMIR	Integrated Management System
ISMS	Information Security Management System
ISO	International Organization for Standardization
KSH	Central Statistical Office
KvVm	Ministry of Environment and Water
MADOP	Hungarian Digital OrthoPhoto
MoARD	Ministry of Agriculture and Rural Development
MoD	Ministry of Defence
MoE	Ministry of Environment (MoEW)
MoEW	Ministry of Environment and Water
MoEWM	Ministry of Environment and Water Management (MoEW)
MIT	Ministry of Informatics and Telecommunication
MKH	Hungarian Administrative Boundary Database
MoD	Ministry of Defence
NCP	Network Control Program
NEIS	Nuclear Energy Information Service
NESICC	National Environmental Spatial Information Coordination Committee
NSDI	National Spatial Data Infrastructure
NSDS	National Spatial Data Strategy
ÖBKI	Ökológiai és Botanikai Kutatóintézet - Institute of Ecology and Botany of the Hungarian Academy of Sciences
OGPSH	National GPS Network
PMO	Prime Ministers Office
PPP	Public-Private Partnerships
PSI	Policy and legislation on access to public sector information
QMS	Quality Management System
REF	Reference data
RINEX	Receiver Independent Exchange Format
SABE	Seamless Administrative Boundaries of Europe
SDI	Spatial Data Infrastructures
SGO	Satellite Geodetic Observatory
TAKI	Magyar Tudományos Akadémia Talajtani és Agrokémiai Kutatóintézet (MTA-TAKI), this is the Research Institute for Soil Science and Agricultural Chemistry of the Hungarian Academy of Sciences (RISSAC)



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TeIR	Territorial Information System
VINGIS	GIS Register of Vineyards
VKKI	Vízügyi és Környezetvédelmi Központi Igazgatóság - Central Bureau of Water and Environment
WIPO	World Intellectual Property Organization
WFS	Web Feature Service
WMS	Web Map Service

# 1 GENERAL INFORMATION

## 1.1 Method

This report is summarizing the review of the SDI in Hungary, and reflects the degree to which the SDI situation in Hungary is similar to the ideas set out in the INSPIRE position papers<sup>1</sup> and in the more recent INSPIRE scoping papers.

The 2002 report was based on the analysis of various documents, project references and web sites readily accessible in English.

The 2003 version of the report had further been completed by the integration and consolidation of comments received from representatives of the NSDI initiatives. Those comments were provided either in written form or through interviews organized in the framework of Activity 2 of the State-of-Play project.

The updates to the 2003 report were based mainly on the presentation of Mr. Gábor Remetey-Fülöpp (MoARD) and Mr. Pál Bozó (MoEWM) during the workshop on INSPIRE for enlargement countries held in JRC in May 2004. The update of 2005 was based on input from the Hungarian Authorities. The update for 2006 was based on new information on legal issues obtained through various sources. In addition, some web sites were re-visited and information obtained from presentations at the workshop “*Preparing the National INSPIRE Information Days*” (organized by JRC for the new and candidate Member States), was integrated. For the 2007 update, information was received from several stakeholders separately through FÖMI: FÖMI itself, MoE, MoD, VKKI, TAKI and OBKI covering the most important sectors (but not all), i.e. environment, water, soil, topographic mapping, etc. All the information regarding data sets, services and use of the infrastructure was integrated. Some organisational/legislation information was added as well.

For the 2009 update the survey questionnaire was used, along with various web sources, publications and the geoportals. In this version obsolete information was removed, while a conclusion paragraph regarding the status of each indicator was added for each component.

## 1.2 The Hungarian GI-scene: NSDS and NSDI

In Hungary a National Spatial Data Strategy has been formulated to define the lines along which a nation-wide SDI, dominated by the public sector, is currently being elaborated. Several specific SDI-initiatives are being undertaken or have already been realised. The development of the Hungarian SDI has been and still is clearly driven / accelerated by the EU accession process.

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<sup>1</sup> INSPIRE position papers, final versions: RDM, ETC, DPLI, ASF, IST, IAS (latest version).

The National Spatial Data Strategy was formulated by a working group composed of representatives of the Prime Minister's Office, several ministries, national institutions and the GIS Foundation, HUNGIS. It involved the elaboration of the concept of the NSDS, a survey of the current situation both at national and international level, the specification of requirements, the elaboration of potential ways of development and of variants of strategy and the elaboration of detailed action plans. Six issues were addressed in detail:

- Macro-economic relationships;
- Legal issues related to mapping data and map-based information;
- Regulatory issues;
- Spatial data management issues;
- Quality-assurance and related standards;
- Marketing and PR issues.

The Hungarian SDI can be considered to consist of a series of building blocks including data and metadata initiatives, services and the like. The complete list of ongoing initiatives is listed in Section 3.1. Regional and local initiatives are integrated in and are part of the national initiative.

In addition, a myriad of GIS-projects (in various qualities) exist in Hungary which to a certain extent are integrated in the NSDI.

Key providers of GI in Hungary are the Ministry of Agriculture and Rural Development, the Ministry of Informatics and Communication, the Mapping Agency of the Ministry of Home Defence Forces, the Central Statistical Office and the Ministry of Environmental Protection and Water Management, the Hungarian State Geological Institute and the Eötvös Loránd Institute of Geophysics. Some supporting institutions behind certain ministries are owners or users of thematic reference data, e.g. the Environment Management Institute, the State Road Centre, the National Water Management Office and the Hungarian Office for Mining.

The Ministry of Environment and Water (MoEW) is playing an important role in the construction of the NSDI. Together with the MoARD, the MoEW is implementing the SDI components in the field of environment including applications and projects on agri-environmental issues, Natura 2000, disaster management, quality water management, etc. The MoEW developed a website to allow access to data of the MoEW.

The Ministry of Environment and Water has been assigned as national contact point for INSPIRE. A committee has been set up to help the work of the Contact Point, namely the National Environmental Spatial Information Coordination Committee (NESICC). The committee is made up of the data owners of the INSPIRE themes. The NCP will coordinate the implementation at national level and is responsible for contacts with the European Commission.

The National Environmental Spatial Information System will work as a Spatial Data Infrastructure in Hungary. It is built up by the Hungarian Environmental Information

System, maintained by the Ministry of Environment and Water and the Information Systems run by other spatial dataset owners.

All the mentioned institutions are data-producers, transformers, and data users at the same time, being authorities, research institutes and entrepreneurs as well. In this field, there exist a lot of parallel activities and also competence-division. It can be stated that the organisational order of the players in the public sector is inadequate. All these make the data management, the development of a data market and the elaboration of adequate regulations very difficult.

Hungary has a national Association for Geo-Information, HUNAGI (<http://unsdihu.blogspot.com/>), which is a non-profit, interdisciplinary umbrella association. It was established in order to achieve competitiveness of the Hungarian players in the rapidly growing European GI content market. It was founded in 1994 and registered by the court in 1996. It has full member status in EUROGI and has been acknowledged as an Advisory Board member by the steering committee of GSDI. Its member institutions (103 in 2010) are providers of data, value added products and services; data brokers; academic institutions; governmental agencies and users in many disciplines and application areas.

The professional organizations involved in the establishment of HUNAGI are:

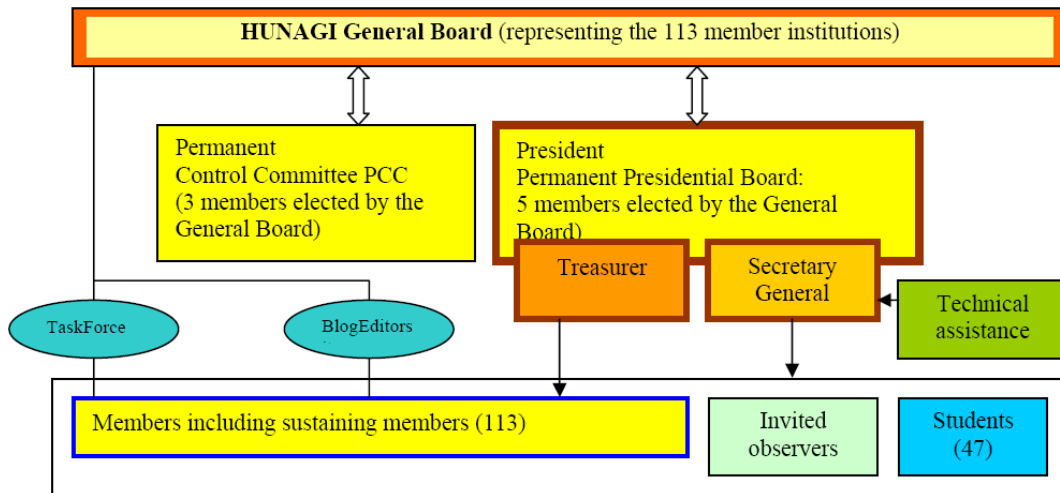
- gita Hungary
- National Information Infrastructure Development Program
- HUNGIS Foundation
- Hungarian Society of Surveying, Mapping and Remote Sensing
- Hungarian Geographical Society
- Hungarian Association for Settlement and Regional Development
- John v. Neumann Society for Computing Sciences
- College of Geoinformatics, The University of West-Hungary

HUNAGI has been recognized by the government as an interdisciplinary national GI association, a co-operating partner in strategic planning in the field of GI and synergy provider in the implementation of the spatial data infrastructure.

The primary roles of HUNAGI are:

GI policy maker/facilitator, Knowledge and information supplier, Public relations, awareness raising and promotion of GI, Program assistance and support, Political interface, lobbyist, Mediator, negotiator, Promoter of standards, certification, use of right terminology, Facilitator for education (professional development) and training (Remetey-Fülöpp, 2006).

**Organisational scheme**



## 2 DETAILS OF THE HUNGARIAN NSDI

### 2.1 General Information

(<http://unsdihu.blogspot.com/>),

**Official address:**

Overall contact person:

Gábor Remetey-Fülöpp

Ministry of Agriculture and Rural Development

Department of Lands and Mapping

H-1860 Budapest Pf.1.

H-1055 Budapest Kossuth Lajos tér 11.

### 2.2 Component 1: Coordination and organisational issues

The driving forces for the development of the Hungarian SDI are related to Lands and Mapping, Location Based Services and Environment. A lot of effort has been devoted to intra-community and inter-community coordination and co-operation through the Inter-ministerial Coordination Committee on Information Society (ICCIS). This Committee has several subcommittees: Policy on InfSo Development, Strategic Planning, e-Government / Public Administration, EU integration, Public Net, e-Content, Information security and Satellite navigation.

The National Board of Technical Development and the Prime Minister's Office (PMO) used to play a significant coordinating role with respect to the NSDI and projects contributing to it. Today, besides the Ministry of Informatics and Communication, the dominant driving ministry is the Ministry of Agriculture and Rural Development, which is the main provider of GI in Hungary. The Ministry is responsible and co-ordinates the integrated land registration and cadastral mapping, land use and large-scale topographic mapping. Its institutional network includes 136 District and County Land Offices and the Institute of Geodesy, Cartography and Remote Sensing (FÖMI), a leading R&D institute in GI. Since the INSPIRE initiative is taking shape, the Ministry of Environment and Water (KvVm) is acting as a coordinating body and is currently working on the creation of metadata service which will be extendible to all stakeholders.

At the same time the most active organisation complying with INSPIRE are:

FÖMI (Institute of Geodesy, Cartography and Remote Sensing) – Started preparing a common INSPIRE compliant geo-portal with the Military Mapping Agency. They have established new organisational structures for the INSPIRE implementation and VÁTI ([Hungarian Public Non profit Limited Liability Company for Regional Development and Town Planning](#)) initiated changes in the legal background of their information system, in order to make it INSPIRE compliant.

Moreover, the INSPIRE implementation pilot project regarding the Hungarian e-environment sector is realized in two phases with a finance of 306.000.000 HUF (cca. 1.140.000 Euro) (Tomor, 2010):

- Preparation phase: October 2008 –March 2010 (15 month)
- Realization phase: June 2010 –June 2012 (24 month)

The 241/2009 government decree assigned the setting up of a committee (National Environmental Spatial Information Coordinating Committee - NESICC) according to article 19 of the INSPIRE directive. The NESICC will help the work of the National Contact Point (NCP) with the following tasks.

Namely:

- Propose steps to improve the harmonisation of tasks amongst public authority handling spatial information
- Initiate at the NCP the measures set out in the 1995 LIII act
- Propose a strategy for the implementation of the INSPIRE directive
- Monitor the costs of setting up the National Environmental Spatial Information System (Hungarian NSDI)
- Monitor the developments made by public authority handling spatial information that are necessary to fulfil the interoperability and other requirements set out in the INSPIRE directive.

Technical subcommittees will be established to help the decision making process within the NESICC. Once a decision is made it will be the task of the public authorities to ensure execution. The NCP and the NESICC will monitor these steps.

However, there are no strategy documents yet. The Hungarian INSPIRE committee will have the task to create such documents.

The National Environmental Spatial Information Coordinating Committee (NESICC) will be responsible for the INSPIRE implementation. The composition of the committee consists of:

- Chairman of the committee
- the representative of the minister responsible for agriculture
- the representative of the minister responsible for mining
- the representative of the minister responsible for health
- the representative of the minister responsible for energy
- the representative of the minister responsible for forestry
- the representative of the minister responsible for employment
- the representative of the minister responsible for land management
- the representative of the minister responsible for defence
- the representative of the minister responsible for industry

- the representative of the minister responsible for disaster control
- the representative of the minister responsible for environment
- the representative of the minister responsible for public administration IT
- the representative of the minister responsible for transport
- the representative of the minister responsible for culture
- the representative of the minister responsible for education
- the representative of the minister responsible for civil national security
- the representative of the minister responsible for vocational training
- the representative of the minister responsible for nature conservation
- the representative of the minister responsible for regional development and spatial planning
- the representative of the minister responsible for mapping
- the representative of the minister responsible for water management
- the representative of the Central Statistical Office

A portal has been set up in order to keep informed the Committee members and to receive advices and comments from other spatial data set owners and experts who are not in the Committee. The portal can be accessed in three different levels. For only Committee members; For experts and for informing the general public.

## 2.2.1 Conclusions of Component 1

The Hungarian SDI approach is truly national. SDI building blocks have reached a significant level of operability. There is now a National Environmental Spatial Information Coordinating Committee – NESICC that is helping the NCP for coordinating INSPIRE related matters. FÖMI as NMA still plays a key role in the coordination, but it is this specific body in which all the relevant Ministries from the different sectors participate. HUNAGI is not directly involved in the coordination, but still plays a key role as well.

Based on these conclusions we score the indicators as follows:

- The approach and territorial coverage of the SDI is truly national
- One or more components of the SDI have reached a significant level of operability (3)
- The officially recognised or de facto coordinating body of the SDI is a NDP, i.e. a NMA or a comparable organisation (Not so clear)
- The officially recognised or de facto coordinating body for the SDI is an organisation controlled by data users (Not so clear)



- An organisation of the type 'national GI-association' is involved in the coordination of the SDI (Not so clear)
- Producers and users of spatial data are participating in the SDI
- Only public sector actors are participating in the SDI

## **2.3 Component 2: Legal framework and funding**

### **2.3.1 Legal framework**

Act LVXXI of 1996 on Surveying and Mapping and the related Ministerial decrees provide the core of the legal background of GIS-related issues. All official surveying, mapping and related activities are governed by this Act. The basic aim of the Act is to ensure that base maps covering the total area of the country are available, as to enable land registration, development of geographic information systems, and a wide range of applications on various economic, scientific and social subjects. The Act makes it compulsory to use the governmental base map data to create GIS.

The Joint Decree No 21/1997 "On execution of some rules defined by the Law LXXVI of 1996 on Activities in Surveying and Mapping" regulates the co-operation between the ministers responsible for surveying and mapping activities and the rules and conditions for the operation of a Map Supply Coordination Committee. Resolution No. 13 from 1997 of the Governmental Commission on Informatics and Telecommunications provides further steps toward the set up of an NSDI.

Recently, new legislation has been added that is also of importance for the legal framework for the Hungarian SDI. The amendment of the Environmental Law of December 2008 entered into force on 15 May 2009, and Government decree 241/2009.X.29 setting up the National Environmental Spatial Information System is ready to be officially adopted, including the implementation of the INSPIRE directive. Next to this decree, Government decision 1176/2009 (X. 26) setting up and clarifying tasks of the committee supporting the work of the INSPIRE contact point is also ready to enter into force. The remaining rules of the directive that needed to be transposed are included in a new governmental decree 241/2009.

### **2.3.2 Public-private partnerships (PPPs)**

Private commercial firms are indirectly involved in helping to implement the NSDS as subcontractor e.g. in the implementation of the National Cadastral Program in a competitive environment. For the surveying and mapping, there is a partnership supported by the Chamber of Engineers, the Hungarian Society of Surveying, Mapping and Remote Sensing, the HUNGIS Foundation, etc.

There are particular efforts to strengthen PPP under the EU-ESA-initiative on GMES through collaboration between HUNAGI-FÖMI-HSO-EUSC.

### **2.3.3 Policy and legislation on access to and reuse of public sector information (PSI)**

The Constitution of Hungary states that “in the Republic of Hungary everyone has the right to know and to disseminate data of public interest”. This fundamental right was elaborated in the Act on the Protection of Personal Data and Accessibility of Public Data, which requires all government agencies at national or local level to facilitate access to information in their possession, and to make accessible data concerning their activities, data types held by them, and acts concerning their operation.

Directive 2003/4 on access to environmental information has partially been transposed (see <http://ec.europa.eu/environment/impel/pdf/enforcementnoteaccess.pdf>). Act LIII of 1995 was amended to specify that environmental data must be accessible for everyone (except sensitive data). Directive 2003/98 on re-use of PSI been fully transposed through the amended Act on the Protection of Personal Data and Accessibility of Public Data; the Act on Publication of Data of Public Interest; and the 2005 Act on Freedom of Information by Electronic Means.

([http://europa.eu.int/information\\_society/policy/psi/actions\\_ms/implementation/index\\_en.htm#hungary](http://europa.eu.int/information_society/policy/psi/actions_ms/implementation/index_en.htm#hungary); ePSIplus, National Meeting Report Hungary).

(ePSIplus national meeting report, [http://www.epsiplatform.eu/content/download/14597/182632/file/Hungarian%20National%20Meeting%20Report%20\(final\).pdf](http://www.epsiplatform.eu/content/download/14597/182632/file/Hungarian%20National%20Meeting%20Report%20(final).pdf))

### **2.3.4 Legal protection of GI by intellectual property rights**

The most important rule of the Hungarian copyright-related legislation is the Law LXXVI of 1999 on Copyright, which was modified during the past decade several times. It explicitly protects photographs and maps and cartographic works. In 2000, the decision was taken by the Government in the Law Approximation Program to revise the copyright and related laws in order to ensure the harmonization with the copyright directives of the European Union, and to meet the requirement needed for the Hungarian adoption of the Copyright Agreement in the institutional framework of the WIPO. The sui generis right was included in the Copyright Act in 2001. Directive 2001/29 on copyright in the information society was also transposed into Hungarian law.

### **2.3.5 Restricted access to GI further to the legal protection of privacy**

Article 59 of the Hungarian Constitution protects the individual’s right to the "good standing of his reputation" as well as the inviolability of his or her home, private affairs and personal data.

Furthermore, the protection of personal data is assured by Act LXIII of 1992 on protection of personal data and the disclosure of data of public interest. The purpose of this Act is to guarantee the right of everyone to exercise control over his or her personal data and to have access to data of public interest, except as otherwise provided by law under this Act. The Parliamentary Commissioner for Data Protection and Freedom of Information plays the same role concerning the protection of personal data as he does for the access to public sector documents.

Directive 2002/58 on privacy and electronic communications has been transposed into national law.

### **2.3.6 Licensing framework**

No information has been found nor provided.

### **2.3.7 Funding model for SDI and pricing policy**

#### ***Funding***

Resources for the implementation of the NSDS come from both government budgets and cost recovery. Funding by the European Commission (PHARE, Tempus) is not negligible.

In addition to government funding, the NSDI is also funded by user fees.

#### ***Pricing***

According to the Act LXXVI of 1996 on Surveying and Mapping Activities and the Joint Decree No. 63/1999 FVM-HM-PM on handling, servicing of state-basic data of surveying and mapping; and the service fees the prices of the data for different users are the same in general. The earlier referred ministerial decree (Joint Decree No. 21/1997) identifies the exceptional cases. All environmental data are free of charge since those data are all public utility data.

On the FOMI website, prices are indicated for the datasets that are made available, either by referring to the applicable legislation or by the listing of the prices.

### **2.3.8 Conclusions of Component 2**

The INSPIRE text has been voted, but not yet published at the time of preparing the report; there are not yet strategic documents. Private commercial firms are indirectly involved in helping to implement the NSDS. Act LIII of 1995 was amended to specify that environmental data must be accessible for everyone (except sensitive data). Environmental data could be GI data. Resources for the implementation of the NSDS come from both government budgets and cost recovery. According to the Act LXXVI of 1996 on Surveying and Mapping Activities and the Joint Decree No. 63/1999 FVM-HM-

PM on handling, servicing of state-basic data of surveying and mapping; and the service fees the prices of the data for different users are the same in general.

Based on these conclusions we score the indicators as follows:

- There is a legal instrument or framework determining the SDI-strategy or – development (Partially)
- There are true PPP's or other co-financing mechanisms between public and private sector bodies with respect to the development and operation of the SDI-related projects (Not so clear)
- There is a freedom of information (FOI) act which contains specific FOI legislation for the GI-sector (In Preparation)
- GI can specifically be protected by copyright (No Information found)
- Privacy laws are actively being taken into account by the holders of GI (No Information found)
- There is a framework or policy for sharing GI between public institutions
- There are simplified and standardised licences for personal use (No)
- The long-term financial security of the SDI-initiative is secured (No)
- There is a pricing framework for trading, using and/or commercialising GI

## 2.4 Component 3: Data for themes of the INSPIRE annexes

### 2.4.1 Scale and resolution: European, National, Regional, Local, Other

Maps and spatial data are produced for the following major scale and resolution levels

Scale	Resolution	Prime data provider	
1:500	10 cm	Private Sector	AM/FM applications
1:1.000 (old 1:1.440 also used)	20 cm	DLM MOARD	Cadastre, Urban Planning, Local Governments
1:2.000 (old 1:2880 also used)	40 cm	DLM MOARD	Cadastre
1:4.000	80 cm	DLM MOARD	Multipurpose cadastre
1:10.000	2 m	DLM MOARD	CAP, multipurpose
1:50.000 and smaller	10 m and less	Mapping Service, MoD	Multipurpose

Furthermore there are digital orthophotos of Hungary (corresponding to scale 1:10 000). The country has been fully covered by analogue aerial photographs and rasterised orthophotos two times: in 2000 and in 2005. Starting from year 2007 instead of analogue new digital cameras are applied for aerial data acquisition. Ground resolution of the digital images is 50 cm/pixel. Full coverage was covered in four parts of the Hungarian (2007, 2008, 2009, and 2010) ([http://www.fig.hu/documents/Report\\_Sydney\\_2010\\_eng\\_fin.pdf](http://www.fig.hu/documents/Report_Sydney_2010_eng_fin.pdf)).

### 2.4.2 Data by resolution or scale range for the INSPIRE themes

#### Administrative boundary data

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 for the database has been finished in 1999. The database is commercially available.

The source of the database is the national cadastre containing directly measured coordinates of those boundary points, which represent in the same time administrative boundaries. The output products are geodatasets of different resolution derived from the source by means of generalisation.

The standard 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

To satisfy users' requirements some attributes, like statistical codes, area of units, elements of hydrography etc. were attached.

### Cadastral

The whole area of Hungary is covered by analogue cadastral basic maps in scale 1:1.000, 1:2.000, 1:4.000 depending on data density. Approximately 40% of the rural area cadastral maps are in digital form as a consequence of the compensation act 10 years ago. However their formats are not regular, not homogenous. Some 0,5 Mha of Hungary is covered by digital cadastral maps produced in the frame of so called National Cadastre Program and with data content and format defined by a new Hungarian digital map standard MSz 7772-1:1997 harmonised with CEN and ISO GI standards. Out of the cadastral maps covering the rural area of 8,5 million hectares are already vectorised by September 2005. Regarding urban area: the digital cadastral survey according to the Hungarian DAT Standard for about 0,5 million hectares (6% of the whole territory of Hungary) is completed. The further 0,4 million hectares have been digitized in vector form by 2007.

Recently, an IT development of the Hungarian land offices has been finished providing their computerisation (called TAKAROS system) and connecting them with a nation-wide intranet (called TAKARNET).

The Hungarian unified land registration system keeps about 10 million landed and other properties, including condominiums, etc. The Land Offices keep records not only of the ownership rights in land, but also of the land lease. The duty of land offices is to record the changes in facts and data of rights (ownership rights, mortgage, easements etc.) in land and other properties, parallel with updating the content of cadastral maps. The registration and maintenance of geodetic control points form also the duty of land offices ([http://www.fig.hu/documents/Report\\_Sydney\\_2010\\_eng\\_fin.pdf](http://www.fig.hu/documents/Report_Sydney_2010_eng_fin.pdf)).

### Topography

As basic data, the digital topographic map at scales of 1:10.000, 1:50.000 and 1:100.000 is serviceable, together with the related digital terrain models and various datasets, obtained from the traditional data acquisition methods. Recently a Hungarian Topographic Program has been proposed to carry out modernisation of digital topographic datasets.

A non-exhaustive list of core thematic geodatasets includes:

- TeIR, a Territorial Information System covering the whole of Hungary (owner: VÁTI, a settlement planning institution);
- Budapest Base Map in 1:25.000 scale (owner: Topolisz Ltd.);
- Population Census Data of Hungary (owner: KSH, Central Statistical Office);
- Digital geological maps (Zala County Complex Database, Minor Plain Database, Paks Atomic Energy Plant Geological Database, Geology of Budapest, Uniform Geological Digital Database, River Danube Geological Database), (owner: MÁFI, a Hungarian State Geological institute);
- Soil Scientific Database of Hungary (owner: TAKI, a Soil research institute);
- Settlement Addresses Database (owner: Geogroup Infograph Ltd.);
- OTAB as a 1:200.000 scale digital geographical map database (owner: Geometria Ltd.);
- Budapest-4.000 database (owner: Infograph Ltd.);
- Budapest CD Atlas (owner: Cartographia Ltd.);
- HALIS database of the Budapest water supply (owner: Budapest Water Works Company);
- Database of the Optical Backbone Network of Hungary (owner: MATÁV);
- KIR and KÖFIR electric supply database (owner: Budapest Electric Works Company);
- TIGÁZ database on gas supply;
- Voting District Database (owner: the Gallup Institute);
- Environmental Protection Sample District of the Lake Balaton and the Hortobágy;
- Local Government Managing and Geoinformation systems for the settlement Zugló, Szombathely, Debrecen, Hajdúszoboszló, Nyíregyháza, Pilis, Orosháza, Szeged, Pécs;
- Budapest Green Area Cadastre.

Regarding the three INSPIRE annexes addressing the 34 spatial data themes, Hungary is providing discovery and view services (FÖMI, MoE, MoD, VKKI, TAKI, OBKI) for most of them in a number of scales and resolutions while a number of them can be also downloaded. A complete list will be presented in the updated report including the information provided by the country in 2010.

### 2.4.3 Geodetic reference systems and projections

A reference system called Hungarian Datum 1972 (HD-72) was introduced in 1972 based on independent adjustment of Hungary's astrogeodetic network. Its reference ellipsoid is the IUGG Geodetic Reference System 1967 (GRS67:  $a = 6378160\text{m}$ ,  $b = 6356774.516\text{m}$ ,  $f=1/298.247167$ ). The HD-72 is located and oriented relatively at the terrestrial point Szőlőhegy.

Based on HD-72, Hungary established the:

- Uniform National Horizontal System (in Hungarian called: EOVA);
- Uniform National Height System (in Hungarian called: EOMA);
- Uniform National Mapping System (in Hungarian called: EOTR).

A projection system for civil use called EO (Uniform National Projection system) was introduced also in 1972. The reference ellipsoid of EO is the IUGG GRS67. The projection is of the oblique-axis reduced (secant) cylindrical type. The whole territory of the country is represented on one strip of cylindrical projection.

Projection systems of former times are still in use: three oblique-axis cylindrical projection systems: North, Median and South and a stereographic projection for cadastral maps at scale 1:2.880, 1:1.440 and 1:7.20.

To meet the requirements of the domestic and international professional communities, a Description Directory of Hungarian Reference and Projection Systems has been issued in 1995 by FÖMI. The Description gives an overview on the EO parameters, the HD-72 definition, the Hungarian vertical system and the relation of HD-72 to the WGS-72 and the EUREF-89 (WGS-84) systems. A revised version of the transformation parameters has been computed, harmonised in the frame of the EUREF Working Group of EuroGeographics and IAG, as well as disseminated for GI use in 2000. This version became part of the Hungarian GI standard.

#### *The Uniform National Horizontal Network (EOVA)*

The EOVA is based on the Hungarian Datum 1972, the network orientation is provided by 40 Laplace-points and the scale is maintained by 23 EDM lines.

Parameters connecting the Hungarian control network to the EUREF-89 and ED-87 systems have already been measured, computed and finalised.

For high order scaling, a 864-m long Standard Baseline at Gödöllő town (about 30 km from Budapest) has been measured with Väisälä interferometric method and Kern Mekometer in co-operation with Finnish Geodetic Institute in 1987 and re-measured in 1999. This very stable baseline with 5 pillars is accredited for EDM calibrations for national and international use.

The network consists of:



- 163 sites of 1<sup>st</sup> order (146 points within Hungary and 17 points in the neighbouring countries),
- 1974 sites of 3<sup>rd</sup> order,
- 4307 sites of principal 4<sup>th</sup> order,
- 43780 sites of 4<sup>th</sup> order exist in EOVA,
- The 1<sup>st</sup>, 3<sup>rd</sup> and principal 4<sup>th</sup> order sites have 10306 orientation sites. 6080 orientation sites have co-ordinates.

An EOVA Database was created and is operated by the Institute of Geodesy, Cartography and Remote Sensing (FÖMI), containing the positional and descriptive data of horizontal control sites (1st, 3rd and 4th order) as well as their sketching.

#### The Uniform National Height System (EOMA)

The EOMA has normal heights with Baltic Sea level. The reference point is Nadap with height in the EOMA system  $H=173,1638$  above Baltic Sea level; ( $H= 173,8385$  above the Adriatic Sea level, in which the height system of Hungary was given earlier.)

EOMA consists of:

- 41 principal fundamental benchmarks (16 established on rock, others are well-based benchmarks situated in sedimentary area);
- 800 of 1st order special benchmarks based in 3-5.5 m deep;
- 5981 sites of 1st order;
- 5096 sites of 2nd order (ready at 75%);
- 13417 sites of 3rd order (ready at 80%) (GPS technique for the replacement of the classical 3rd order levelling is introduced in 2000);
- Hungary has a kinematic network containing about 1100 points along the 1st order levelling lines to study the recent crustal movements;
- 23 connecting levelling lines to the neighbouring countries.

Upon the 1994 call of IAG/EUREF sub commission, Hungary has prepared data expressed in geopotential index numbers for the purpose of connecting the Hungarian vertical network to the UELN frame. Hungary participated at the EUVN 97 campaign with successful GPS observations as well as levelling and gravity measurements of 4 special benchmarks.

An efficient technique has been elaborated at FÖMI for the replacement of the 3rd order levelling with GPS and geoid. This technique is successfully applied in practice for the completion of the EOMA 3rd order network in the TransDanubian region, and operating recently.

A Database of Vertical Network containing the data of height control sites (1st, 2nd and 3rd order) was created and is operated by FÖMI. Items in this database are number of the sites, vertical co-ordinates, location of the sites (county, settlement and sheet number),

date of determination, measurement and control of the sites, textual and scanned description of the surroundings.

### The National GPS Network (OGPSH)

The Satellite Geodetic Observatory of FÖMI, Penc is the centre for the Hungarian GPS Network activities given below:

- 7 sites of Hungarian part determined in EUREF Network (1991 and 1997);
- 24 sites of the OGPSH (frame network) measured both in EOVA and ETRS-89 (1991);
- 1153 sites of the OGPSH measured all over the country.

The 3D spatial co-ordinates of the OGPSH sites are referred to the EUREF-89 reference frame, as well as determined in EOVA projection system for home mapping purposes. The superior accuracy of the OGPSH allows analysing the traditional EOVA network as a whole.

An OGPSH database was created and is operated by FÖMI. The database contains the most important data of GPS control sites. These data are: number of the sites, the EUREF and the EOVA vertical and horizontal co-ordinates as well as the location of the sites (county, settlement, and sheet number), textual and scanned sketch approach

### The Hungarian Active GPS Network

During last years both the hardware and software environment of the Hungarian permanent GPS network have considerably been developed. by the end of 2009, it was managed to cover the total area of Hungary with permanent stations and now all three concepts (VRS, FKP, MAC) of the networking RTK technology can be used anywhere in the country. Beyond the signals of GPS-satellites, the majority of the stations are able to receive the signals of Glonass-satellites too. The central software (GNSMART) of the German firm Geo++ provides real-time and virtual RINEX data for after-processing in any part of the country.

The network and its services are called GPSNET.HU. A web server with the same name has been installed, which provides access to all related information and RINEX data. The DGPS and RTK corrections are being distributed via the Internet, based on the NTRIP technology. The development, maintenance and data analysis are done at the FÖMI Satellite Geodetic Observatory (SGO).

Hungary is also participating in the EUPOS initiative, which intends to establish a Europe-wide, multipurpose GNSS network mostly for real-time applications. The developments are in accordance with the EUPOS standards.

### Implementation of the NTRIP technology

Within the framework of the EUREF-IP project, an Ntrip Broadcaster has been recently installed in Penc, Hungary. This first broadcaster in Central Europe is maintained by the

Satellite Geodetic Observatory and it provides access to real-time correction data from a number of active GNSS reference stations in Hungary. The NtripCaster software, available from the BKG is an Internet server used for disseminating differential and RTK correction data in RTCM-SC104 format (or raw GNSS data in proprietary binary format) based on the HTTP protocol.

Active GNSS stations equipped with dual frequency receivers and telecommunication facilities (Intranet/Internet connection) generate and transmit code and carrier phase corrections to the Network Centre at the SGO. The broadcaster software collects the data streams and re-transmits them via the Internet to a large number of users simultaneously on the same TCP/IP port. The users equipped with a GNSS receiver and Internet connection (rovers are using wireless Internet connection, e.g. GPRS) can access the required data streams and improve their positioning accuracies.

#### **2.4.4 Quality of data**

Data quality reporting by the major data producers includes positional accuracy, positional precision, logical consistency, completeness of objects, temporal characteristics.

The quality management system (QMS) of FÖMI based on the Standard ISO 9001:1996 was certified in 1999 by the Bureau Veritas Quality International (BVQI). The validity of the certification expired in 2002. The quality system of FÖMI was reconstructed by the new modified Standard ISO 9001:2000. After putting it into operation, it was certified by BVQI. FÖMI is responsible for numerous databases at different fields, including TakarNet, the nationwide real-estate-registration network service. The Institute had created an Information Security Management System (ISMS) by the British Standard BS 7799. Having regard to the coming expiration of QMS Certificate, FÖMI decided to create a new management system with the integration of the QMS and ISMS. The new IMS is carried out, and put into operation from January 2006 ([http://www.fig.hu/documents/Report\\_Sydney\\_2010\\_eng\\_fin.pdf](http://www.fig.hu/documents/Report_Sydney_2010_eng_fin.pdf)).

At FÖMI the quality management system and the information security system operate as an integrated management system (IMIR). It was successfully audited and certified by the Standards ISO 9001:2008 and ISO/IEC27001:2005 for 3 years (till 2012) in May 2009 also by SGS. At the end of the year 2000 FÖMI got the certification of the Gödöllő Base Line as an accredited calibration laboratory (K-GEO). The Hungarian National Accreditation Board (HNAB) issued the certification.

Quality is documented through metadata provided on-line.

#### **2.4.5 Interoperability**

Major GIS-software encompass ESRI-products (ArcView (3.0, 3.2), Arcinfo (7.1, 8.0), MapObject 2.0, ArcView Internet Map Server), Erdas (Imagine, Essential, Professional, Ortobase 8.4), Bentley Microstation (J 7.0, - Geographics 7.0,- Descartes 7.0, - Descartes 4.0), Microstation SE 5.0, Bentley Geo-outlook, Mapinfo Prof. (6.5, 5.5), Bentley Model

Server Discovery, Different Hungarian GIS software, Autodesk MapGuide 4, Digiterra 3.0.

Converters and interchange formats are available. On the homepage of FÖMI there is an on-line transformation service is available which performs transformations between EOVS and WGS-84 projection systems.

#### **2.4.6 Language and culture**

Metadata and accompanying documents are provided in Hungarian and mostly also in English (see reference list).

#### **2.4.7 Data Content**

No information has been found nor provided.

#### **2.4.8 Geographical names**

The gazetteer-database under responsibility of FÖMI contains 39 types of geographical names including the names of settlements, parts of settlement, landscapes, large units of the land, woods, nature conservation areas, relief and hydrography, names of remarkable points (ruin, look-out tower etc.) as well as the names of the most important objects of traffic. This is a Database of Geographical Names (FNT – Földrajzinév-tár).

The database has two versions. The first one (FNT1) corresponds in quantity of names approximately to a topographic map in scale 1:40.000. This database was produced by the use of 300 sources (maps, geographical literature, economical, statistical sources), and each municipality had the chance to complete, modify the database reflecting the local use of names. FNT1 covers the whole territory of Hungary, and is continuously updated.

The second version (FNT2) corresponds with respect to quantity and types of names roughly to the topographic map scale 1:10.000, with a readiness of 35%. It comprises the names of the database FNT1 with additions taken from large-scale topographic maps, cadastral maps, and other sources. The two parts of the database comprise 105.000 records.

#### **2.4.9 Character sets**

No information has been found nor provided.

#### **2.4.10 Conclusions of Component 3**

Already from the previous HU's SoP report Geodatasets existed which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components while the geodetic reference system and projection systems are standardised,

documented and interconvertable. The INSPIRE 2010 MR confirms the statement. 106 data sets have been reported most of which 54, 18 and 34 belong to Annex I, II and III respectively. Data quality reporting by the major data producers includes positional accuracy, positional precision, logical consistency, completeness of objects, temporal characteristics. Converters and interchange formats are available. On the homepage of FÖMI there is an on-line transformation service is available which performs transformations between EOVS and WGS-84 projection systems. Metadata and accompanying documents are provided in Hungarian and mostly also in English.

Based on these conclusions we score the indicators as follows:

- Geodatasets exist which provide a basis for contributing to the coverage of pan-Europe for the INSPIRE-selected data themes and components
- The geodetic reference system and projection systems are standardised, documented and interconvertable
- There is a documented data quality control procedure applied at the level of the SDI (Partially)
- Concern for interoperability goes beyond conversion between different data formats (Partially)
- The national language is the operational language of the SDI
- English is used as secondary language

## **2.5 Component 4: Metadata**

### **2.5.1 Availability of metadata**

Metadata are produced for a significant part of the spatial datasets.

### **2.5.2 Metadata catalogues availability + standard**

A metadata catalogue is available at the Institute of Geodesy, Cartography and Remote Sensing since 1997. It is organized according to the DAT-standard (Digital Base Map), based on ISO TC211 and CEN TC 287.

Another catalogue has been set up at the Geological Institute of Hungary: METATER. It contains metadata of the framework basic data; the territorial information system data; and the geological thematic data. The owners of this metadata set are the Prime Minister's Office, the Institute of Geodesy, Cartography and Remote Sensing, the Hungarian State Geographical Institute and the Urban Development Institute.

At the Prime Minister's Office, the building up of the metadata base called **KIKERES** (Search) for public administration is under way. It is going to take over the METATÉR and will include metadata of geodata sets belonging to governmental agencies, local governments and public administration.

The Dept. of Cartography and Geoinformations of the Budapest University provides metadata description information via its webpage (<http://lazarus.elte.hu/gis/gisindex.htm>) on the National GIS database, the database of Hungarian administrative boundaries and the Central Hydrological Database. Moreover provides links to a number of institutions and their metadata online services (in Hungarian).

### **2.5.3 Dublin core metadata standards for GI-discovery**

The DUBLIN-core set of metadata was used for the development of the METATER.

### **2.5.4 Metadata implementation**

No information has been found nor provided.

### **2.5.5 Conclusions of Component 4**

Metadata are produced for a significant fraction of geodatasets of the themes of the INSPIRE annexes. The 2010 MR reveals that for the reported datasets of INSPIRE (9%, 100% and 3% have metadata for Annex I, II and III respectively). However, we believe that the MR statement alone should not be a reason to downgrade the scoring of the indicator. A metadata catalogue is available at the Institute of Geodesy, Cartography and Remote Sensing.

Based on these conclusions we score the indicators as follows:

- Metadata are produced for a significant fraction of geodatasets of the themes of the INSPIRE annexes
- One or more standardised metadata catalogues are available covering more than one data producing agency (Partially)
- There is a coordinating authority for metadata implementation at the level of the SDI (No)

## 2.6 Component 5: Network Services

Such on-line access and other services are provided by The Institute of Geodesy, Cartography and Remote Sensing (FÖMI) via <http://www.fomi.hu/honlap/> (English version at <http://fish.fomi.hu/angolfish/> ). The aim of FÖMI's web site is to support a wide spectrum of customers with land related data and information services. Other web services exist as well (see <http://www.kvvm.hu>; <http://www.fvm.hu>; <http://magyarorszag.hu>).

The National Territorial Information System of Hungary (TeIR) contains the spatial data sets and spatial data services concerning territorial development and spatial planning. The data sets mentioned are included in the spatial data themes *Area management/restriction/regulation zones and reporting units* (INSPIRE Directive Annex III Paragraph 11) and *Land use* (INSPIRE Directive Annex III Paragraph 4).

The operating of TeIR is based on the regulation of the Hungarian Government 31/2007 concerning territorial development and spatial planning and the obligatory supplying of data.

The TeIR receives processes and stores in unified database structure the status of the regions, the data of regional subvention structures, digital maps of spatial data of territorial development and spatial planning.

The TeIR metadata for spatial data sets represents which spatial plans and local physical plans are available in the system. Currently, TeIR metadata structure is different from the metadata attributes required in the INSPIRE Directive, but can give a base for SDI.

The TeIR integrates the spatial data sets of other public authorities responsible for other spatial data themes, but the reference versions of those spatial data sets are operated by other public authorities or third parties.

TeIR is available free for government and public administration, regional development councils and authorities in the area of Hungary. Although there are public applications, civil users have to pay for using TeIR after registration on the Electronic Governmental Spinal Network. There is a web surface called TERPORT supported by TeIR serving information and documents (analyses, assessments, news, laws, guidelines, examples of best practice, glossaries etc.) of territorial data free for everybody.

For the spatial data sets a related metadata-base is available including origin, updating time, description and dimension, date of collection, reference territorial unit and its period as well as the related law of the collection of the spatial data set. It is also possible to transform and visualize spatial data sets on maps.

The next table shows the available services:



Services						
Service <sup>2</sup>	Organisation responsible	Type of service <sup>3</sup>	Metadata (N/Y/ISO) <sup>4</sup>	Open for Public (Y/N)	Free/Not free <sup>5</sup> (Y/N)	
1	GNSS <a href="http://www.gnssnet.hu">www.gnssnet.hu</a>	FÖMI	1,2,3	Y	Y	N
2	TAKARNET <a href="http://www.takarnet.hu">www.takarnet.hu</a>	FÖMI	1,2,3,4	Y	Y	N
3	MEPAR <a href="http://www.mepar.hu">www.mepar.hu</a> MEPAR GIS	FÖMI	1,2	Y	Y	N
			1,2,3,4	N	N	N
4	VINGIS <a href="http://www.vingis.hu">www.vingis.hu</a>	FÖMI	1,2	N	N	N
5	PIR Ragweed Information System	FÖMI		N	N	N
6	MAPNAVIGATOR <a href="http://www.topomap.hu">http://www.topomap.hu</a>	MoD Mapping Co.	Discover	N	Y	Y
7	<a href="http://geo.kvvm.hu/tir/viewer.htm">http://geo.kvvm.hu/tir/viewer.htm</a> <a href="http://geo.kvvm.hu/tir_en/viewer.htm">http://geo.kvvm.hu/tir_en/viewer.htm</a>	MoEW	1, 2	N	Y	Y
8	<a href="http://terkep.kvvm.hu/okir">http://terkep.kvvm.hu/okir</a>	Ministry of Environment and Water	Discover; view and download	N	N (not yet)	Y
9	<a href="http://www.taki.iif.hu/gis/agrotopo_info.html">http://www.taki.iif.hu/gis/agrotopo_info.html</a>	Research Institute for Soil Science and Agricultural Chemistry of the Hungarian Academy of Sciences (RISSAC)	Partly discover/ partly view	Y	Y	Y
10	<a href="http://www.taki.iif.hu/gis/dktir_info.html">http://www.taki.iif.hu/gis/dktir_info.html</a>	Research Institute for Soil Science and	Partly discover/	Y	Y	Y

<sup>2</sup> List the names/IDs and where possible the link (URL) of all the discover, view, download, transformation and invoking services that are part of your infrastructure

<sup>3</sup> Indicate the type (discover, view, download, transformation and invoking services)

<sup>4</sup> Indicate whether the service has no metadata (N), or metadata according to ISO 19119 (ISO).

<sup>5</sup> Whether or not the service is free for use.

		Agricultural Chemistry of the Hungarian Academy of Sciences (RISSAC)	partly view			
11	<a href="http://ilzer.rissac.hu/mtataki/index.html">http://ilzer.rissac.hu/mtataki/index.html</a>	Research Institute for Soil Science and Agricultural Chemistry of the Hungarian Academy of Sciences (RISSAC)	Partly view/ partly download	Y	N	
12	<a href="http://ilzer.rissac.hu/omtk/html/index.html">http://ilzer.rissac.hu/omtk/html/index.html</a>	Research Institute for Soil Science and Agricultural Chemistry of the Hungarian Academy of Sciences (RISSAC)	discover	N	Y	Y
13	<a href="http://ilzer.rissac.hu/html_taki_velence/">http://ilzer.rissac.hu/html_taki_velence/</a>	Research Institute for Soil Science and Agricultural Chemistry of the Hungarian Academy of Sciences (RISSAC)	view	N	Y	Y

### **2.6.1 On-line access service for metadata: discovery services**

The Institute of Geodesy, Cartography and Remote Sensing (FÖMI) serves metadata of the data components of the NSDI to the Internet: geodetic control networks, cadastral maps, topographic maps, aerial photographs and satellite imagery, as well as data about the institutional network of the Lands and Mapping Agency of Hungary. Metadata and accompanying documents are available in Hungarian and mostly also in English. TAKARNET is part of the Main Electronic Government Network (EKG). The external users (nowadays more than 9400 users) can reach the land office data and electronic land office services through this network. All services have been developed by FÖMI (copy of map extracts, watchdog system, change-monitoring, countrywide queries in land registry). The land registration databases are currently decentralized. However, via a new project (TakarNet24) it is planned to organize the data into a central land office database for data service and archiving purposes, making the electronic land registration office services publicly available ([http://www.fig.hu/documents/Report\\_Sydney\\_2010\\_eng\\_fin.pdf](http://www.fig.hu/documents/Report_Sydney_2010_eng_fin.pdf)).

### **2.6.2 On-line access service data: download services**

Data which are available on-line include geodetic control points, central land-ownership data, analogue and digital maps, aerial photos and satellite images.

### **2.6.3 Inter-linkages of on-line access services for metadata and data**

Access to geodatasets is organised through the metadata.

### **2.6.4 OpenSource software and access services**

No information has been found nor provided.

### **2.6.5 Availability of viewing services**

see 2.6.

### **2.6.6 Availability of catalogue services to regulate access**

No information has been found nor provided.

### **2.6.7 Availability of catalogue services that perform payment operations**

No information has been found nor provided.

### **2.6.8 Availability of catalogue services to extract and send data to a user application**

No information has been found nor provided.

### **2.6.9 SDI user applications**

[www.fomi.hu](http://www.fomi.hu) is set up to provide to citizens and institutions services such as precise scanning and geocoding, data transformations, thematic mapping, professional plotting etc. Several applications exist in the fields of agriculture and land (Land Parcel Information System, vineyard register, land consolidation, crop monitoring, ...) and environment (disaster mitigation, agro-environment, ...). It is not clear however how these applications are delivered to the users and whether they are fully implemented according to INSPIRE principles. The Land Information Services on the Web provided by FOMI are available at: <http://fish.fomi.hu/termekek/honlap/angol/>.

One particular project is Nature-GIS in which the MoEWM together with other partners set-up a series of WMS and WFS using IONIC software for monitoring Ailanthus.

### **2.6.10 Availability of geo-processing services**

No information has been found nor provided.

### **2.6.11 Conclusions of Component 5**

Access and other services are provided by The Institute of Geodesy, Cartography and Remote Sensing (FÖMI) via <http://www.fomi.hu/honlap/>. The MR states that there are 9 and 18 discovery and view services respectively. However it is not clear if they are CSW and WMS type of services. Furthermore, there are several download services reported, but since it is not clear if they are WFS type we do not change the scoring of the indicator. Similarly the MR states 1 transformation and middleware service but no ID is given.

Based on these conclusions we score the indicators as follows:

- There are one or more discovery services making it possible to search for data and services through metadata
- There are one or more view services available for to visualise data from the themes of the INSPIRE annexes
- There are one ore more on-line download services enabling (parts of) copies of datasets (Not so clear)

- There are one or more transformation services enabling spatial datasets to be transformed to achieve interoperability (No information found)
- There are middleware services allowing data services to be invoked (No information found)

## **2.7 Component 6: Thematic environmental data**

The Ministry of Environmental Protection and Water Management is an important producer of environmental GI. It is involved in the implementation of the NSDS and the elaboration of the NSDI.

Access to environmental data is organised through the website of the Ministry of Environment and Water. Thematic environmental data are available about: water quality – including a water quality warning system -, environmental risk, pollution accidents, etc. Functions include: searching of data, visualisation (including zooming), etc.

A general statement is that the legal framework and funding principles set out in section 2.2 are also applicable to thematic environmental data.

### **2.7.1 Conclusions of Component 6**

Access to environmental data is organised through the website of the Ministry of Environment and Water. Although important efforts are done at the environmental level, the INSPIRE MR does not describe many data sets in annex III yet.

Based on these conclusions we score the indicator as follows:

- Thematic environmental data are covered by the described SDI-initiative or there is an independent thematic environmental SDI (Partially)

## **2.8 Standards**

Within the framework of the Hungarian Standardisation Board, a Technical Committee on GIS Standardisation started to work in 1994. As a result of this standardisation activity, the following documents were elaborated:

- General requirements on military digital topographic maps, 1996;
- Hungarian GIS data exchange standard, 1997;
- Conceptual model of the digital base map, 1997;
- Definition of digital topographic database, 2000.

The regulation system of digital base maps is built on the Digital Base Map Standard (DAT), 1997. The regulation system of digital topographic map is based on the Digital Topographic Database Standard.

The introduction of digital technology for the management of cadastral maps requires standards. Appropriate standards and instructions are created in Hungary for the definition of map content, their acceptance and quality control, and the digital exchange

of this information, mostly harmonised with the respective CEN TC 287 and ISO TC 211 GIS standards. Issued standards and regulations are the following:

- National Standard MSZ 7772-1:1997 on Digital Base Map, Conceptual Model (often referred as DAT standard) has been prepared by FÖMI and issued by the GIS Standardisation Committee (MB818) of the Hungarian Body of Standards and with support of MoARD/DLM. This standardises the digital cadastral maps.
- National standard MSZ 7771:1997 Hungarian Data Exchange Format for GIS has been issued by Hungarian Body of Standards based on the respective CEN TC 287 pre-standard.
- Derived from the MSZ 7772-1:1997 standard, a series of technical instructions (often referred as DAT instructions) has been issued by DLM/MOARD in 1997. They prescribe the certification and quality acceptance of cadastral maps, as well as the regulation for planning, creating and renewing maps, database content and structure, data exchange format, quality control and certifying of DAT (Digitális AlapTérkép - Digital Base Map).
- National Standard MSZ 7772-2:2002 on Definition of Digital Topographic Database, has been prepared by FÖMI and MS HDF, issued by the GIS Standardisation Committee (MB818) of the Hungarian Body of Standards.
- A modified version of the earlier regulation No. F2 on performing certain cadastral survey works using cadastral base maps and related public proceedings, as well as on the institutional background and data supply in public land administration has been issued by DLM/MOARD in 2002.

The institute of geodesy, cartography and remote sensing (fömi) via <http://www.fomi.hu> (English version at <http://fish.fomi.hu/angolfish/>) provides the document on digital maps that deals with competent standards, legal rules, instructions, standard drafts, studies and glossaries.

### 2.8.1 Conclusions of Component 7

Within the framework of the Hungarian Standardisation Board, a Technical Committee on GIS Standardisation started to work in 1994. As a result of this standardisation activity, a number of documents were elaborated. Appropriate standards and instructions are created in Hungary for the definition of map content, their acceptance and quality control, and the digital exchange of this information, mostly harmonised with the respective CEN TC 287 and ISO TC 211 GIS standards.

Based on these conclusions we score the indicator as follows:

- The SDI-initiative is devoting significant attention to standardisation issues

## **2.9 Use and efficiency of SDI**

There is significant coordination between different spatial data providers and users. Some geodatasets can be downloaded from or ordered through the internet. Special services can be provided upon request. The development of the information society is one of the driving forces for the NSDI.

The Nature Conservation Information System supports for a correct implementation of the EC Directives and could serve long term goals of the nature protection such as the better management of the Natura 2000 sites and areas under protection of different Hungarian regulations.

One of the Hungarian Environmental Minister's tasks is to collect process and disseminate data on the status, use stress of the environment. For this reason the NEIS has been developed.

The Environmental sector has various data collection and dissemination tasks. To permit the systems of different areas to connect to each other it was necessary to create a unified identification system. Thus the NEIS is based on an Environmental Base Register which contains basic data relevant to all areas. In the Base Register each customer and each site has a unique identification code (Environmental Customer Number; Environmental Object Number) which serves as a connection field for the system of different areas.

The NEIS provides data on all relevant Environmental issues, using relational databases and GIS technologies. The data collected at regional level is processed and entered into the database of the relevant field. Through the unique identification fields all data are spatially referenced. The data appearing in NEIS are provided on the fly from the different relational databases.

With the use of the NEIS the Environmental planners, policy makers, legislative officers, engineers, scientists can easily access data.

### **TAKI**

Soil information is used for land evaluation, farm and management recommendations, prediction of potentials, limitations, problems, management needs, degradation processes etc. and is applied by land users, planners, policy makers, legislative officers, engineers, scientists. Recent soil related databases are integral part of rural land management planning, agro-environmental programs, environmental modelling as well as land resource assessment and risk evaluation.

Habitat mapping, regional extension of results of modelling work on impacts of different climate change scenarios on soil water regime; applicability of physical soil properties for the estimation of more complex hydrological properties of soils; base information source within the various task packages (land management planning, water management modelling in the territories of future water reservoirs etc.) of the Action Plan on Flood Prevention and Protection for the Tisza River; basis for various further soil related expert systems.



Furthermore, a number of examples of services run by FOMI include:

The Drought Assessment and Drought Alarm Mapping that shows precise details of drought both in time and space based on remote sensing plant canopy examination. The system gives the opportunity to create Drought Alarm Map.

Hungarian GIS Register of Vineyards (VINGIS) which is the GIS background of vineyard registry. It is a basis of checking and supervising subsidy allocation for vineyard uprooting, planting and restructuring. VINGIS web server is available for authorities to control subsidy claims, to maintenance local databases and to find specific key information.

Waterlog and Flood Monitoring which gives an objective picture of the regional and territorial waterlog and flood situation through the up-to-date maps based on satellite images. This monitoring system creates an effective cooperation with the affiliated authorities to take quick necessary action (Gabor et al., 2008).

## 3 ANNEXES

### 3.1 Building blocks of the Hungarian SDI

Name of initiative	Purpose of initiative	Data type	Area coverage	Resolution	Status	Responsible organisation
National Cadastre Program	Producing cadastral maps in digital database form	reference	country	0,5-1 m	ongoing	MOARD
TAKARNET service	Authentic real estate e-commerce data service operating the computerised distributed databases of the Land Offices (TAKAROS) and the networking them together TAKARNET by FÖMI	reference and thematic	country	–	operational	MOARD
DTA50	Producing medium scale topographic maps in digital form (including the respective DEM, too)	reference	country	1:50 K	ready and operational	MOD
DTA50 restitution	Updating the DTA50 and its reconstruction to meet the GI standard	reference	country	1.50 K	started	MOD
DTA100	Producing small scale topographic maps in digital form (including the respective DEM, too)	reference	country	1:100 K	ready and operational	MOARD
DTA10	Producing large scale topographic map layers in digital raster form	reference	country	1:10 K	ready and operational	MOARD
DTA10 restitution	Updating the DTA10 and its producing in digital database form	reference	country	1:10 K	started	MOARD
DEM10	Producing of high resolution digital elevation model database	reference	country	1-2 m (5 m gtid)	ready and operational	MOARD
MADOP	Airborne Survey of Hungary and Producing of high resolution digital orthophoto	reference	country	1 m	ready and operational	MOARD
EGM/HU	Producing the Hungarian segment of the European Global Map	reference	country	1:1 M	ready	MOARD MOD
ERM/HU	Producing the Hungarian segment of the European Regional Map	reference	country	1:250 K	started	MOARD MOD
DTA200	Producing small scale topographic maps in digital form	reference	country	1:200 K	ready and operational	MOD

<b>Name of initiative</b>	<b>Purpose of initiative</b>	<b>Data type</b>	<b>Area coverage</b>	<b>Resolution</b>	<b>Status</b>	<b>Responsible organisation</b>
VAB & MAG database	Supplying geodetic reference network data, including 78 000 sites of the horizontal and vertical geodetic reference network as well as 1052 sites of the 3D National GPS Network	reference	country	1;10 mm 0,5m-0,5m	operational	MOARD
ABDS/SABE database	Producing and supplying the administrative boundary data for each level of NUTS. Also providing the Hungarian segment to the SABE	reference	country	from 1:2 K to 1:4 M	ready and operational	MOARD
National Metadata Service	The National Spatial Metadata Service and Clearing house involves metadata on reference data and core thematic data being supplied for GI users on internet, free of charge	reference	country	–	ready and operational	PMO MIT
FISH	Supplying web information on land, mapping and geodetic data, to be used in Hungary to built GIS: metadata on all existing digital and analogue reference data as well as data supply of selected reference data	reference	country	–	ready and operational	MOARD
MATERIA	Supplying web information on selected statistical data mostly used for geoinformation (metadata and the data merely)	thematic	country	–	ready and operational	HSO
TEIR	Supplying digital data and information on and for rural and built-in area planning	thematic	country	1:10 K 1:1 M	ready and operational	MOARD
Road database	Supplying digital data and information on motor ways including the 3 <sup>rd</sup> order roads	thematic	country	1-5 m	operational	Hungarian Road Authority

<b>Name of initiative</b>	<b>Purpose of initiative</b>	<b>Data type</b>	<b>Area coverage</b>	<b>Resolution</b>	<b>Status</b>	<b>Responsible organisation</b>
Forest database	Producing, updating and supplying digital map data and information on forest matters	thematic	country	1:10 K	operational	MOARD
Soil database	Supplying digital map data and information on soil	thematic	country	1:10 K	operational	HAS and MOARD
CLC-100	Producing and supplying digital and analogue data on land cover element database build in the frame of and as part of the European CORINE Land Cover program	thematic	country	1:100 K	ready and operational	EC MoEW M and MOARD
CLC-50	Producing and supplying digital and analogue data on land cover element database build in the frame of and as part of the European CORINE Land Cover program	thematic	country	1:50 K	ongoing	EC MoEW M MOARD
CROPMON	Database and information collection on yearly monitoring of crops and yield prediction	thematic	country	–	operational	MOARD
FLOOD	Flood and waterlog real-time monitoring by digital method and remote sensing	thematic	country (by selection)	10 m – 1 km	operational	MOARD
Vineyard Assessment and Cadastre	Vineyard assessment and cadastre and database using remote sensing, cadastral and topographic data as well as the respective thematic information	thematic	vineyard areas	10 m	ongoing	MOARD and HSO
Streets/ Addresses	Digital database supplying data on street names and numbers of the settlements in Hungary	thematic and reference	country per settlements	house number	ongoing operational	GEOX

### **3.2 List of SDI addresses / contacts for Hungary**

Table: SDI contact list			
	Web address	Organisational mailing address	Over-all contact person: tel./fax/e-mail
National			
Institute of Geodesy, Cartography and Remote Sensing	<a href="http://www.nls.fi/www.fomi.hu">http://www.nls.fi/www.fomi.hu</a>	<a href="mailto:szabo@fomigat.e.fomi.hu">szabo@fomigat.e.fomi.hu</a>	Dr. Szabolcs MIHÁLY +36-1-222-5111 +36-1-222-5112 <a href="mailto:szabo@fomigate.fomi.hu">szabo@fomigate.fomi.hu</a>
HUNAGI	<a href="http://www.hunagi.hu">www.hunagi.hu</a>	<a href="mailto:hunagi@axelero.hu">hunagi@axelero.hu</a>	Dr. Gábor Remetey-Fülöpp +36-1-301-4052 +36-1-301-4719 <a href="mailto:gabor.remetey@fvm.hu">gabor.remetey@fvm.hu</a>
Ministry of Environment and Water	<a href="http://www.kvvm.hu">www.kvvm.hu</a>	H- 1394, Budapest P.o.Box 351. HUNGARY	<a href="mailto:info@mail.kvvm.hu">info@mail.kvvm.hu</a> +36-1-457-3300 +36-1-457-3354 Dezső Mikus <a href="mailto:mikus@kvvm.gov.hu">mikus@kvvm.gov.hu</a>
National Environmental Spatial Information Coordination Committee	<a href="http://inspire.kvvm.hu">http://inspire.kvvm.hu</a>		Dezső Mikus +36-1-487-8585

### 3.3 List of references for Hungary

Table: list of references used to compile the Country Report	
<b>Web sites:</b>	
	<a href="http://www.fomi.hu">http://www.fomi.hu</a> (English)
	<a href="http://www.hunagi.hu">http://www.hunagi.hu</a> (English)
	<a href="http://www.fvm.hu">http://www.fvm.hu</a>
	<a href="http://www.kvvm.hu">http://www.kvvm.hu</a>

<b>Publications :</b>	
	Annual Report on the Lands and Mapping Activities prepared by FÖMI. Budapest, 2002
	Proceedings of the EC-GI/GIS Workshops (Budapest 1998, Stresa 2000, A Coruna 2003)
	Proceedings of the GSDI Conferences (Sydney 1998, Budapest 2002)
	Remetey-Fülöpp and Bozo Pal, 2004. Relevant issues about SDI and ongoing

	developments of SDI-like initiatives in Hungary. Presentation at the INSPIRE for enlargement countries workshop held at JRC, Ispra on 13-14 May 2004.
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	G., Remetey-Fülöpp, S., Mihály, B., Márkus and P., Zalaba, 2008. SDI supported land administration and management: the single agency model of Hungary. GSDI 10, St. Augustine, Trinidad 2008.
	ePSIplus, National Meeting Report Hungary. <a href="http://www.epsiplatform.eu/content/download/14597/182632/file/Hungarian%20National%20Meeting%20Report%20(final).pdf">http://www.epsiplatform.eu/content/download/14597/182632/file/Hungarian%20National%20Meeting%20Report%20(final).pdf</a>
	Tamás Tomor, 2010. INSPIRE implementation pilot project Implementation of INSPIRE directive in Hungarian e-environment sector. KEOP-7.6.3.0-2008-0020. Budapest 2010. 03. 10.
	Márkus, B., and Zalaba, P, 2010. NATIONAL REPORT OF HUNGARY 2006-2010. FIG XXIV Congress 2010, Sydney.