

## **REGIONAL LEVEL NETWORKING: IMPETUS FOR BETTER NSDI IMPLEMENTATION - THE CASE OF EUROGI AND HUNGARY**

Bino Marchesini

Secretary General, EUROpean umbrella organisation for Geographic Information (EUROGI)  
(mailing) P.O. Box 9046, NL-7300 BA Apeldoorn, (visiting) Hofstraat 110, 7311 KZ Apeldoorn  
The Netherlands

Tel: +31 55 528 5532 / Fax: +31 55 528 5032, Email: [eurogi@euronet.nl](mailto:eurogi@euronet.nl) , URL: [www.eurogi.org](http://www.eurogi.org)  
and

Gábor Remetey-Fülöpp

Secretary General, Hungarian Association of Geo-Information (HUNAGI)  
(mailing) 1860 Budapest 55 POBox 1, (visiting) Budapest V. Kossuth tér 11  
Hungary

Tel: +36 1 301 4052 / Fax: +36 1 301 4719, Email: [hunagi@hunagi.hu](mailto:hunagi@hunagi.hu), URL: [www.hunagi.hu](http://www.hunagi.hu)

### **ABSTRACT**

In Europe, regional networking in the field of GI actually started with the establishment of the interdisciplinary GI umbrella organization EUROGI. It was initiated by public and private sector representatives. And supported by the European Commission in 1993. Since that time, EUROGI became a major promoter and stakeholder in the development of the European GI. EUROGI articulates the voice of its members, which include 22 national and 2 pan-European GI associations which all have members of their own. Subsequently EUROGI encompasses a network of 6500 persons in the all GI-related sectors.

According to its mission to facilitate the access and use of Geographic Information, EUROGI paid attention to the needs of its national members since the beginning, provided consultancy and advice for European policy makers and paved the way for global co-operation to ensure interoperability in applications having global importance. Under the auspices of the US Government and the EU, the first GSDI Conference was hosted in Europe in 1996 where committed leaders of EUROGI were heavily involved and a series of GSDI Conferences followed. In 2002 the Global Spatial Data Infrastructure Association was formally established.

EUROGI has been actively involved in both the GI2000 initiative and INSPIRE (Infrastructure for Spatial Information in Europe). The GI2000 initiative and associated projects led to INSPIRE, which was adopted in mid-2004 by the European Commission after three years of in-depth preparation. EUROGI bundled its network of 6500 and participated in INSPIRE either directly or indirectly through expert and thematic working groups. If approved by the Council and European Parliament (anticipated in early 2007), INSPIRE will make a major legislative contribution to environmental policy and sustainable development by facilitating the use of Geographical Information in Europe.

The horizontal (interdisciplinary) and vertical (from local to global and vice versa) approach of EUROGI ensures effective knowledge transfer and exchange of experiences. All members of EUROGI benefit from the synergy, especially those in countries where the set-up of a national spatial data infrastructure (SDI) is under development. EUROGI's involvement in the project "GI Network in Europe" (GINIE) should be explicitly emphasized. The EUROGI action plan on:

- data issues (e.g PSI),
- applications (GMES, Galileo)
- as well as on investigating the impact of European legislation related to policy implementation and control in agriculture, environment and water management in the context of use of GI,

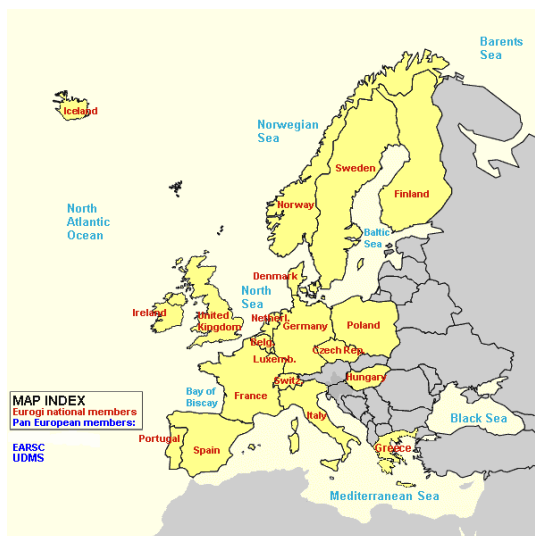
gives significant impetus to building SDIs on national levels.

Established in 1994 by 10 NGOs and academic institutions, the Hungarian GI Association (HUNAGI) joined EUROGI in 1996. Thanks to this regional network, HUNAGI actively participates in multilateral international, European and global activities. Some milestones of the achievements by the members include advanced, GI friendly legislation, operational countrywide annual crop monitoring, governmental acknowledgement of the core NSDI data, 4<sup>th</sup> EC GI Workshop, ISPRS Commission VII Symposium, a series of LIS related international events, the Phare supported advanced IT development of Land Administration including the National Cadastral Programme, EU accession related institution building (CORINE, CwRS, LPIS, VINGIS, DOP), Workshop on Cadastre as fundament of NSDI as well as several project participations (ABDS, PanelGI, OLLO, LIME, SDILA, PRONET,GINIE, GSDI6 Conference and NatureGIS).

Based on nearly 3 decades of Remote Sensing, R+D and application experiences, the Hungarian GI/RS community receives acknowledgement by serving EUROGI, GSDI, FIG and ISPRS at high levels. Emphasizing the importance of information from imagery in the SDI context at the ISPRS Congress in 2000, Hungarians will be active in the ISPRS WG IV/1 devoted to SDI for the period 2004-2008. During the summer of 2004, HUNAGI received a mandate to elaborate its NSDI strategy from the Governmental Committee on Information Society. The work is underway and the proposal will be announced at a high-level international HUNAGI Forum in Budapest on November 17<sup>th</sup> 2004. All of this work provides Hungary with much experience and lessons learned. Hungary shares them with other countries. The lessons learned are disseminated via the Central-European Land Knowledge Center (CelkCenter) established in 2004 as an output of a 2 year project financed by the World Bank, the Hungarian Ministry of Agriculture and Rural Development as well as the FAO. The CELK Center aims to provide knowledge transfer services to countries in the Central, Eastern and South-Eastern regions of Europe.

## INTRODUCTION

Although European organisation handled GI topics in their specific professional activities (e.g. CERCO in mapping, GEIXS in geology/geophysics) already in the early 90s, the interdisciplinary networking in Europe in the field of GI started actually with the establishment of the EUROpean umbrella Organisation of Geographic Information. The need for such a forum was expressed in a study written by acknowledged representatives of the national mapping agencies and the private sector. EUROGI held its inauguration meeting in 1993 hosted by the European Commission's Directorate of Information Technology in Luxembourg. Since that time EUROGI became a major promoter and stakeholder in the development of the European GI. EUROGI articulates the voice of its members, which include 22 national and two pan-European GI associations which all have members of their own. Subsequently EUROGI encompasses a network of 6500 persons in the all GI-related sectors.



Parallely, at least 30 pan-European organisation are dealing with GI directly or indirectly. EUROGI plays a leading role to bring them together based on mutual interest having a stronger voice and yield the benefits of the synergy gained by the closer-cooperation. A pan-European advisory forum (PEAF) was established where secretary-generals regularly exchanged their views. Two years later at the 10<sup>th</sup> European Commission GI/GIS Workshop in Warsaw this summer, a joint initiative of AGILE, EuroGeographics and EUROGI was announced by Jean Poulit, President of EUROGI. The call to join the European GI Network attracted many interested players and the follow-on actions were subject of the recent PEAf meeting hosted by EUROGI at the IGN Belgium with the participation of organisations including the Association Geographic Information Laboratories Europe (AGILE), Council of European Geodetic Surveyors (CLGE), European Association of Remote Sensing Companies (EARSC), EuroGeographics (former CERCO), EuroSDR (former OEPEE), UNECE Working Party for Land Administration (WPLA), EuroGeoSurveys (former GEIXS) and the Urban Data Management Society (UDMS). GI/GIS experts and users have today at least three major networking support in the European arena i.e. the interdisciplinary EUROGI, the thematically specific organisations and the EU projects, where consortia bring different SMEs, labs and institutions together.

## GSDI INITIATIVE AS DRIVER

According to its mission to facilitate the access and use of Geographic Information, EUROGI paid attention to the needs of its national members, providing consultancy and advice for European policy

makers and paved the way for global co-operation to ensure interoperability in applications having global importance. Under the auspices of the US Government and the EU, the first GSDI Conference was hosted in Europe in 1996. Committed leaders of EUROGI Klaus Barwinski and Mike Brand were heavily involved and the series of GSDI Conferences started. Global Spatial Data Infrastructure Association was established in 2002 headed by Prof. Ian Masser, former president of EUROGI.

## EUROGI AS POLICY INFLUENCER

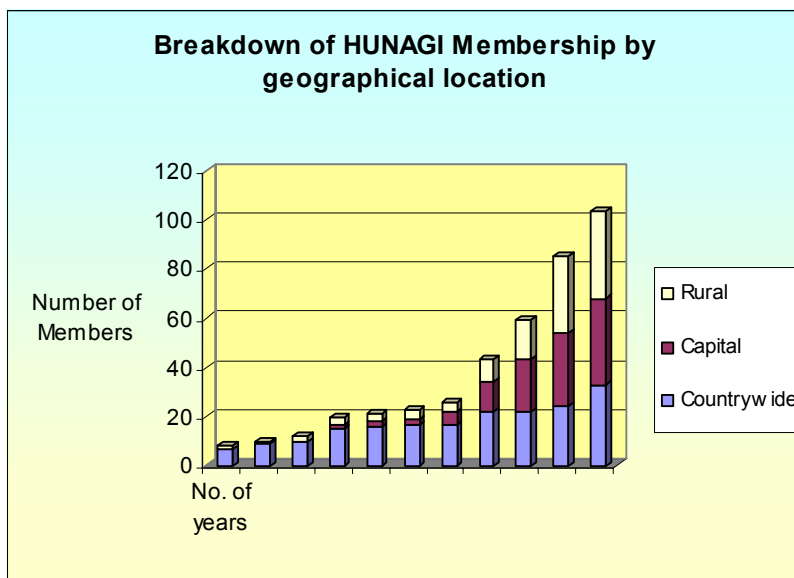
EUROGI has been actively involved in both the GI2000 initiative and INSPIRE (Infrastructure for Spatial Information in Europe). The GI2000 initiative and associated projects led to INSPIRE, which was adopted in mid-2004 by the European Commission after three years of in-depth preparation. EUROGI bundled its network of 6500 and participated in INSPIRE either directly or indirectly through expert and thematic working groups. If approved by the Council and European Parliament (anticipated in early 2007), INSPIRE will make a major legislative contribution to environmental policy and sustainable development by facilitating the use of Geographical Information in Europe.

## EUROGI STRUCTURE & ACTIVITIES

The horizontal (interdisciplinary) and vertical (from local to global and vice versa) approach of EUROGI ensures effective knowledge transfer and exchange of experiences. All members of EUROGI benefit from the synergy, especially those in countries where the set-up of a national spatial data infrastructure (SDI) is under development. EUROGI's involvement in the project "GI Network in Europe" (GINIE) should be explicitly emphasized. The EUROGI action plan related to

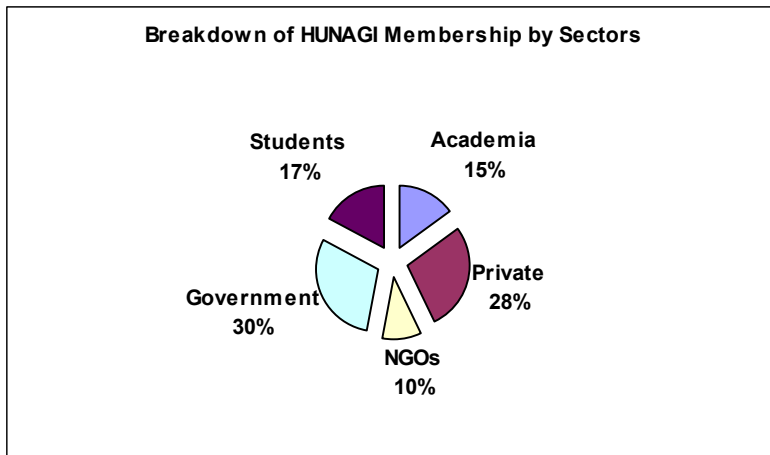
- data issues (e.g. use and re-use of Public Sector Information, ),
- applications (Global Monitoring of Environment and Security, GNSS Galileo)
- impact analysis of European legislation related to policy implementation and control in agriculture, environment, nature protection and water management in the context of use of GI, (e.g. Common Agriculture Policy Integrated Administration and Control System, Agro-Environment measures, Water Framework Directive)
- INSPIRE the gradual building plan of the European Spatial Data Infrastructure till 2013 gives significant impetus to building SDIs on national levels.

## THE HUNGARIAN GI ASSOCIATION (HUNAGI)



Established in 1994 by 10 NGOs and academic institutions, the Hungarian GI Association (HUNAGI) joined EUROGI in 1995. Thanks to this regional network, HUNAGI actively participates in multilateral international, European and global activities.

Due to the evolution during the past 10 years, the organisation has today 100 institutions, 8 nationwide project managements and 20 students as member, ensuring a broad representation of all disciplines where GI plays important role.



Some milestones of the achievements by HUNAGI members include advanced, GI friendly legislation (1996), operational countrywide annual crop monitoring(1997-2003), governmental acknowledgement of the core NSDI data (1997), 4<sup>th</sup> EC GI Workshop and ISPRS Commission VII Symposium(1998), a series of LIS related international events, the EU Phare supported IT development of Land Administration including the National Cadastral Programme, EU accession related institution building

(CORINE, CwRS, LPIS, VINGIS, MADOP), Workshop on Cadastre as fundament of NSDI as well as several project participations (ABDS, PanelGI, OLLO, LIME, SDILA, PRONET, GINIE, GSIDI6 Conference and NatureGIS). There are 4 national major GI journal, some major internet based portals (on metadata, products and services), annual conferences 5-6 per year referred as GIS Open, AM/FM, Agroinformatics, National GIS Conference (14<sup>th</sup> in September 2004) and GIS for Higher Education (the 13rd in October 2004)

### HUNAGI INVOLVEMENT ON EUROPEAN LEVEL: THE EC GI/GIS WORKSHOPS

In order to increase synergy between the ongoing GI related projects granted by the European Commission, a series of annual workshop have been implemented by the DG Industry of the EU. Later the DGs of Information Society and JRC were also involved. Today JRC and EUROSTAT plays important role in the continuation, which is excellent annual forum for know-how and knowledge sharing between the project managements and decision makers. The workshop objective changed considering the impact of the GI technology in a broader context as it was envisaged first by the GI 2000 document, later in line with the INSPIRE initiative.

Year	Venue	Topic	HUNAGI presentations	Hungarian players
1995	Brussels	EU projects, general	-	
1996	Genoa	EU projects, general	Papers on ongoing projects	FÖMI, HUNAGI
1997	Leuven	EU projects, general	Papers on ongoing projects	FÖMI, HUNAGI
1998	Budapest	EU projects, general	Host organiser, Papers on developments and results	Many
1999	Stresa	EU projects, general	Paper on the CAP preparation	MoARD, FÖMI
2000	Lyon		Paper on the Panel-GI	GISIG, FÖMI,
2001	Potsdam	European GI Infrastructure: managing the mosaics	Paper on	FÖMI, HUNAGI
2002	Dublin	European Spatial Data Infrastructure (ESDI): working in progress	Joint paper with JRC-EUROGI-HUNAGI on the Cadastral Workshop Poster on the IT development of the Land Office Network	HUNAGI, T-Systems
2003	A Coruna	ESDI: serving the user	Paper on the Web-based service of the Central European Land Knowledge Center	CelkCenter
2004	Warsaw	ESDI: State of the art	Paper on CelkCenter, Poster on advanced state boundary mapping service	HUNAGI FÖMI

The forging links on European level due to dominantly the EUROGI connection HUNAGI experts were invited to attend on numerous project conferences e.g. ESMI on the European Spatial Metadata Infrastructure, ETEMII on European Terrestrial Information Management Infrastructure, High level preparatory meeting on GIS organised by the German Parliamentary Society, EUROGI-AFIGÉO badged EU GIS Day in Paris devoted to Cadastre and NSDI, National Conference on Land Information System in India, FAO meetings eg. Bertinoro Initiative only few to mention. HUNAGI representatives were invited by FIG to the 8<sup>th</sup> Conference of the Turkish Surveyors and by DDGI to deliver a presentation on the integrated use of GIS/RS at the DLR Bonn Headquarters. HUNAGI and its members keep close contact to the Earth Observation sector via the Hungarian Space Research Office. Links with the European Space Agency, the European Satellite Center, and the commercial space imagery suppliers have to be mentioned.

In 2001, an EUROGI report has been published entitled “A study of alternative models for national GI associations”. For the comparative analysis as typical national interdisciplinary association AGI(UK), AFIGÉO (FR), DDGI(GER), RAVI (NL) and HUNAGI were selected.

Other successful co-operation has been established since the Foundation of HUNAGI with GISIG, the Genova based international GI networking group: joint projects with HUNAGI members could be mentioned: Well-GIS, Panel-GIS, and very recently Nature GIS. In the HUNAGI community the “flagship” Institute of Geodesy, Cartography and Remote Sensing (FÖMI) and the College of Geomatics of the West Hungary University has to be referred, who are frequent partners of GI related consortia (in projects related to R+TD and education and training such as CORINE, MERA, ABDS, TAMA, CORINE2000 and OLLO, LIME, PRONET, EUGISES, SDILA respectively)

As an example of the HUNAGI-EUROGI cooperation, the European wide Cadastral GIS Survey should be mentioned. Supported by the Secretariat of EUROGI, HUNAGI ExCom member presented the first results based on the questionnaire at the First Congress on Cadastre in the European Union held in Granada in 2002. Completed by 16 countries, the in-depth survey has been translated into Spanish by the host institution. Today, the survey has been completed and enhanced by 20 European countries, in the last case by Portugal. The updated version can be downloaded from the websites of EUROGI, HUNAGI. New entries are anticipated from South-East European countries. EUROGI and HUNAGI worked close together organising the first European Commission Workshop on “Cadastre as fundamental part of the Spatial Data Infrastructure”. The event focusing on the Cadastre’ role on the policy formulation, implementation and control was hosted by the Hungarian Ministry of Agriculture and Rural Development. Another success co-operation was to organise the 6<sup>th</sup> GSDI Conference in Budapest, second time in Europe. HUNAGI ExCom was representing EUROGI at the 4<sup>th</sup> Forum of the European program Global Monitoring of Environment and Security (GMES) attracted 400 scientists in Baveno, Italy in November 2003. This meeting made a progress report on the first years (2002-2003) and discussed the follow on action plan till 2008. HUNAGI ExCom delivered EUROGI Secretary General’s presentation at the 7<sup>th</sup> GSDI Conference hosted by ISRO in Bangalore this year.

## **HUNAGI INVOLVEMENT IN THE EUROGI ACTIVITIES**

Year	Venue	Event	HUNAGI participation and presentations
1994	Luxembourg	General Board Meeting	Observer, taking part in discussions
1995	Luxembourg	General Board Meeting	Elected as member, taking part in discussions
1996	Luxembourg	General Board Meeting	Full members status, taking part in discussions
1997	Luxembourg	General Board Meeting	Taking part in discussions
1998	Luxembourg	General Board Meeting	Taking part in discussions, elected into the ExCom
1999	Luxembourg	Assembly and Members’ Day	Taking part in discussions

2000	Luxembourg	Assembly and Members' Day	Hot issues in Hungary: flood mapping
2001	Luxembourg	Assembly and Members' Day	Presentation on the GSDI 6 preparation
2002	Luxembourg	Assembly and Members' Day	
2003	Brussels	Assembly and Members' Day	Paper on the Web-based service of the Central European Land Knowledge Center
2004	Brussels	Assembly and Members' Day	Introduction of the Permanent Committee on Cadastre in the European Union

Initiated by the Italian EUROGI member and accepted by the Assembly, an Extra Member Meeting (EMM) will be held in Rome between 7-9 October 2004 devoted to hot topics in the different EUROGI member states. The meeting of the GSDI Board of Directors has been scheduled for the same venue and date. HUNAGI's contribution to the EMM focus on the hot topics in Hungary summarised later in this paper.

A widely acknowledged and appreciated project called Geographic Information Network in Europe (GINIE) was participated by EUROGI (together with OGC Europe, Sheffield University and JRC). The project was formally completed in late 2003 by a Closing Workshop, where especially the EU pre-accession countries including Hungary, were represented by Minister or State Secretary level. The project was a success and excellently documented. Chapters on Data policy, SDI, Impact on new EU accession countries, Local to global, e-registries, GI in the Mediterranean, Dynamic GI portfolios and EU contribution to GSDI were elaborated mobilizing over 150 experts of 30 + countries.

Between 2002-2004 HUNAGI members took part in the preparation of the INSPIRE initiative in Working Groups devoted to Common Reference Data & Metadata, Architecture and Standards, Impact Analysis as well as Strategic Planning. In the European Commission' INSPIRE Expert panel a Hungarian participant was also invited, acknowledging the success of the GSDI6 Conference, which was attended by high profile EC representatives at the start of INSPIRE actions. After Hungary joined to the European Union, the representation both of the environmental and GIS sectors were possible.

## **HUNAGI INVOLVEMENT ON GLOBAL LEVEL: GSDI CONFERENCES & MEETINGS**

Year	Venue	Topic	HUNAGI participation
1996	Bonn-Königswinter	Germany, Europe	Taking part in the discussion, representing also ISPRS Commission VII
1997	Chapel-Hill	NC, USA, North America	Taking part in the discussion
1998	Canberra	Australia	Introductory presentation on the Hungarian NSDI
1999	Cambridge	United Kingdom	Advisory Committee meeting participation
1999	Cape Town	South Africa	HUNAGI was represented by its President, staff member of the Prime Minister's Office
2001	Cartagena	Colombia, South America	Introductory presentation on the venue of the GSDI 6 Conference
2002	Budapest	Hungary, Europe	Hungarian presentations include the Operational Crop Monitoring, Nationwide Orthophoto Program, the 1:50 000 Corine Land Cover project and activities of HUNAGI
2003	Cambridge	United Kingdom	Advisory Committee meeting participation
2004	Bangalore	India, Asia	Introduction of the EUROGI Cadastral Survey in Europe
2005	<i>Santiago de Chile</i>	<i>Chile, South America</i>	

## INVOLVEMENT IN OTHER INTERNATIONAL ACTIVITIES

Based on nearly 3 decades of Remote Sensing, R+D and application experiences, the Hungarian GI/RS community receives acknowledgement by serving EUROGI, GSDI, FIG and ISPRS at high levels. In FIG, representatives of two HUNAGI core member institutions have been elected as Presidents of the Spatial Information Management as well as Cadastre respectively. Emphasizing the importance of information from imagery in the SDI context at the ISPRS Congress in 2000, Hungarians will be active in the ISPRS WG IV/1 devoted to SDI for the period 2004-2008.

Hungary offered the topic “EU enlargement – impact on the land administration” for the 55 country strong UN Economic Commission for Europe’s Working Party on Land Administrations. The event is scheduled tentatively for March 2005 and the following issues were proposed for discussion:

- Institutional developments in the land administrations (inc. Structural changes, Change management, Capacity building, Knowledge transfer, Networking),
- Land Administration and the Information Society: cadastre as basic element of the spatial data infrastructure. Progress in the NSDI taking into account the INSPIRE pre-directives,
- Land registry and cadastre – their role in the implementation and control of policies in agriculture, environment and rural development.

## CORE DATA ELEMENTS OF THE NSDI

INSPIRE nomenclatura (2004) and the Core Elements of the Hungarian NSDI (1997)

INSPIRE Annex I	CE NSDI H	INSPIRE Annex II	CE NSDI H
Coordinate reference systems	Yes (indirect)	Elevation	Yes (topo map)
Geographical grid systems	-	Identifiers of properties	Yes (geo-ref addresses)
Geographical names	Yes (topo map)	Cadastral parcels	Yes (cadastral map)
Administrative units	Yes (NUTS 1-5)	Land cover	Yes
Transport networks	Partly (topo map)	Orthoimagery	Yes
Hydrography	Yes (topo map)		
Protected sites	-		

## HOT TOPICS

During the summer of 2004, HUNAGI received a mandate to form an intersectoral Task Force and elaborate the NSDI strategy for the Strategic Analysis Subcommittee of the Governmental Committee on Information Society. Supported by the Ministry of Informatics and Communication the work is underway and the INSPIRE friendly proposal will be announced at a high-level international forum organised by HUNAGI in Budapest. Scheduled for November 17<sup>th</sup> the event will be attended by high profile NSDI experts from all over Europe including EUROGI President Jean Poulit.

Taking into account the potentials of satellite positioning and navigation by the launch of the GNSS’ Galileo System, the elaboration of an impact analysis and recommendation for governmental decision is the task of the Satellite Navigation Subcommittee under the framework of the Governmental Committee on Information Society. The Task Force on NSDI strategy and the Satellite Navigation Subcommittee are working closely together accepting each others’ recommendations.

The hot topics can be summarized as follows:

- Elaboration of the NSDI strategy with recommendation on coordination and roadmap to meet the European INSPIRE directive (anticipated date for enter into force: 2007).
- Gradual implementation with international co-operation e.g. in standardisation/specifications
- Completion of a countrywide digital database at cadastral and topographic scale and starting with the provision of metadata services for all INSPIRE Annex I and II category data

- Introduction of the ground segment of the Hungarian GNSS infrastructure (sat. nav, LBS etc)
- Multipurpose use of the integrated technologies developed and provided by the FÖMI Remote Sensing Centre to support agriculture, advanced rural development, disaster mitigation etc.

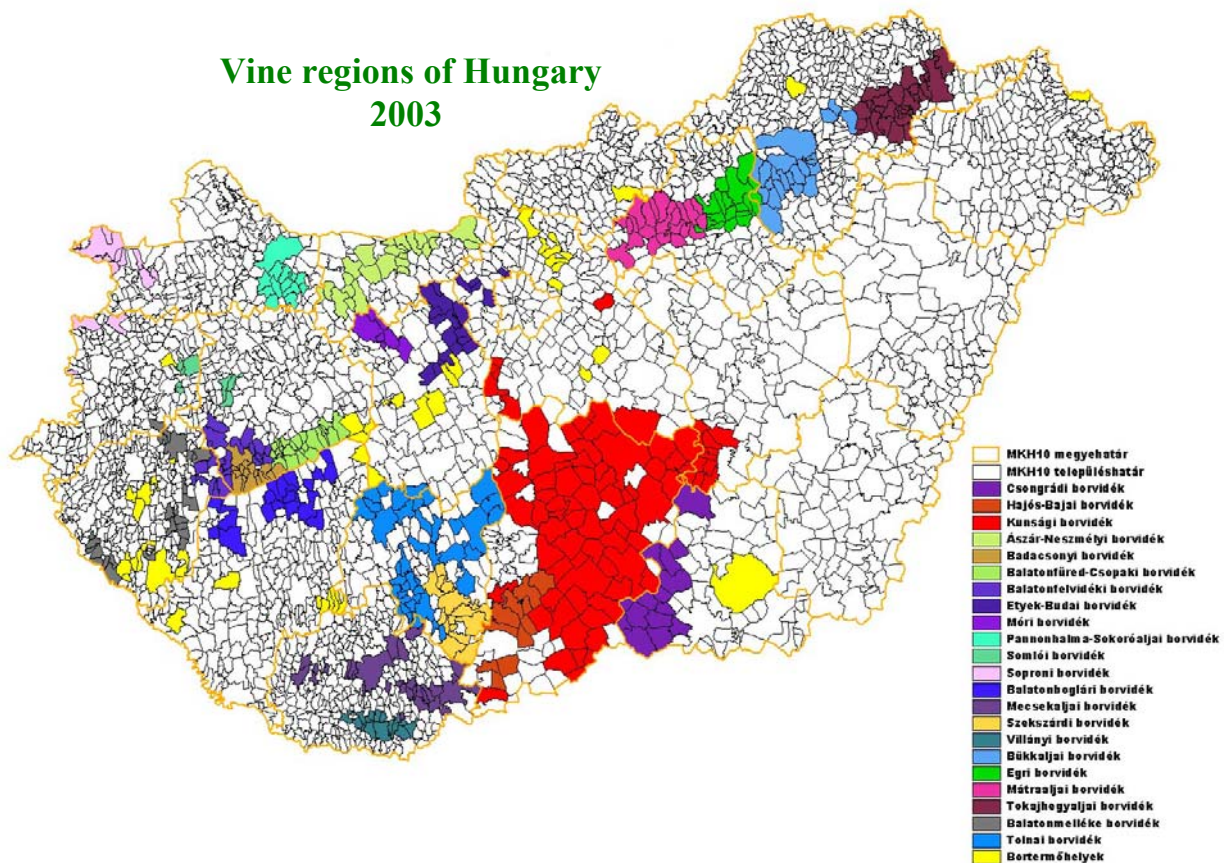
All of this work provides Hungary with much experience and lessons learned. Hungary shares them with other countries. The lessons learned are disseminated via the Central-European Land Knowledge Center (CelkCenter) established on 1<sup>st</sup> October 2004 as an output of a 2 year project financed by the World Bank, the Hungarian Ministry of Agriculture and Rural Development as well as the FAO. CELK Center aims to provide knowledge transfer services to countries in the Central, Eastern and South-Eastern regions of Europe. Its portfolio covers property right and land market development where also GI/GIS tools are inevitable. Also interregional exchange of experience is envisaged using the framework of international donor organisations such as World Bank, FAO, GTZ and others.

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## Appendix: An example from Hungary

Project: *GI infrastructure development supporting the countrywide vineyard register in Hungary (VINGIS)*



**Organisations:**  
**Department of Lands and Mapping**  
 Head: Director General Géza Apagyi  
**Ministry of Agriculture and Rural Development, Hungary**

**FÖMI Remote Sensing Center**  
 Head: Gábor Csornai  
 Project leader: Dr.László Martinovich  
**Institute of Geodesy, Cartography and Remote Sensing, Hungary**  
 Head: Director General Dr.Szabolcs Mihály

**Description of Application:** *In order for Hungary to be eligible for the EU funds, the MARD, as the coordinating institute of the wine-sector, is required to set up a vineyard based up-to-date database covering all the winegrowing areas of Hungary.*

*A task list has been therefore developed within the frame of the National Program of Adoption of the Acquis communautaire. One of the main goals of this program (Department of Lands and Mapping, Ministry of Agriculture and Rural Development / FÖMI National Program of Adoption of the Acquis I/A/5 "GI infrastructure Development of the Vineyard Register on the Basis of the Current Register of the Vineyard Communities") is to develop the GIS based data structure of the Vineyard Register in accordance with the present and future national and EU requirements.*

**Benefits:** *According to EU Council Regulation (EC) No1593/2000, the Member States are advised to keep the records of the agricultural parcels, including vineyards, in GIS, at the latest from the 1 of January 2005.*

*From the EU point of view, the most important question is whether the administrations of the EU Member States are prepared to follow and make the agricultural subsidies of the wine-sector (distillation-, restructuring premiums, production quota management) controllable by the use of GIS.*

**Issues:** *In the first phase of the project (2001-2002) approximately 20% of the total area was covered, including 4 wine-growing regions, 48 vineyard communities and 70 settlements. The second phase (2002-2003), which has been completed, covers 6 wine-growing regions. In conjunction with the National Orthophoto Program, FÖMI is planning to extend its resources with the use of orthophotos in order to increase the accuracy of the register.*

*The planned national extension of the project already includes the first updates (May 31<sup>th</sup> is the date of the annual update), the preparation for the integration of the orthophotos, which are strongly recommended by the EU, and the creation of regional summaries on the level of winegrowing-, and wine regions.*

**Data Used:** *In the already covered vineyard communities, FÖMI installed a map-viewer program with a map package, including the vector layers of the vineyards with the attached database, and in one vineyard community in each winegrowing region, as an experiment, also the Slope-, Aspect-, Height Interval maps were provided and the map of the potentially eligible areas for winegrowing has been added.*

**Relevant background information:**

**Progress of countrywide coverage**

<b>Designation</b>	<b>Phase 1 (2001-2002)</b>	<b>Phase 2 (2002-2003)</b>	<b>Phase 3 (2003-2004)</b>
<b>Winegrowing Regions</b>	Eger winegrowing region Mátraalja winegrowing region Villány winegrowing region Pannonhalma winegrowing region	Etyek-Buda winegrowing region Balatonboglár winegrowing region Szekszárd winegrowing region Sopron winegrowing region Somló winegrowing region Badacsony winegrowing region	Csongrád winegrowing region Hajós-Baja winegrowing region Kunság winegrowing region Ászár-Neszmély winegrowing region Balatonfüred-Csopak winegrowing region Balatonfelvidék winegrowing region Mór winegrowing region Mecsekalja winegrowing region Bükkalja winegrowing region Tokaj winegrowing region Balatonmellék winegrowing region Tolna winegrowing region
<b>Degree of Completion</b>	20%	45%	100%

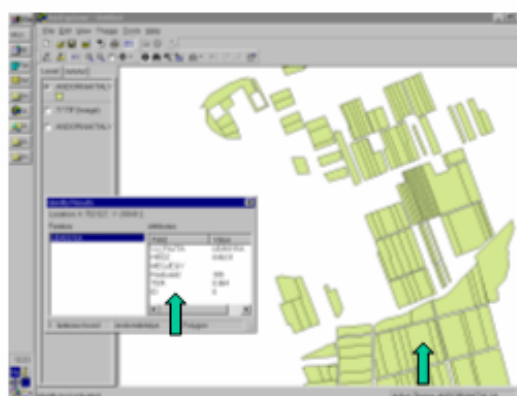
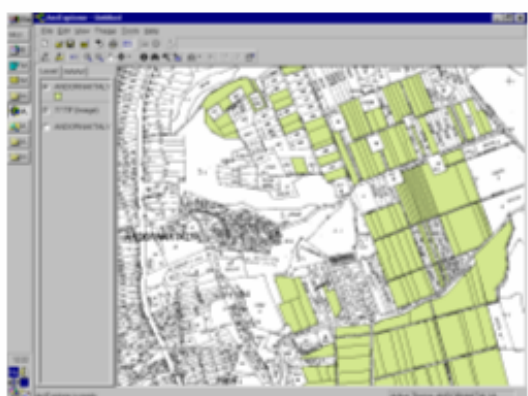
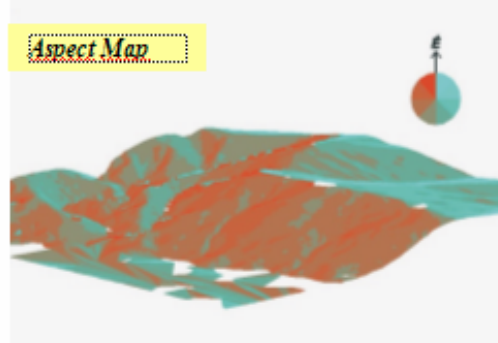
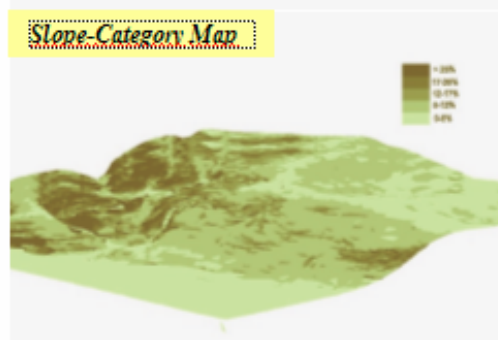
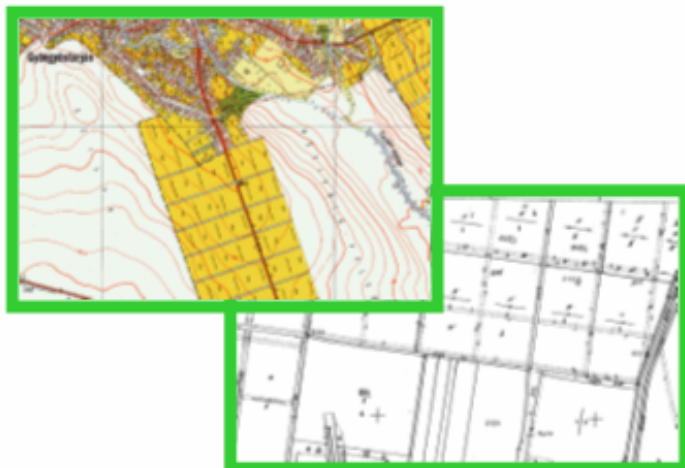
Number of FÖMI staff participating in this work on a part-time job basis: **30**

*Spatial Data Infrastructure support for local application in agriculture: GIS for the countrywide vineyard registry*



*Digital orthophoto of a wine region at Somlóvásárhely*

*Topographic and cadastral maps at scale of 1:10 000 and 1: 2000*



*VINGIS layers (vector map and database of vineyards) provided for the Vineyard Communities for use on their workstations*