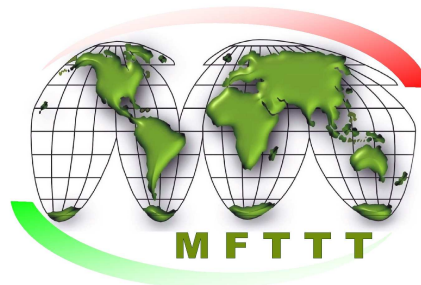


**FIG XXIV CONGRESS**  
**11-16 April 2010**  
**Sydney, Australia**

# **NATIONAL REPORT OF HUNGARY**

**2006-2010**

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**MAGYAR FÖLDMÉRÉSI, TÉRKÉPÉSZETI ÉS TÁVÉRZÉKELÉSI TÁRSASÁG**

HUNGARIAN SOCIETY OF SURVEYING, MAPPING AND REMOTE SENSING  
UNGARISCHE GESELLSCHAFT FÜR VERMESSUNGSWESEN, KARTOGRAPHIE UND FERNERKUNDUNG  
SOCIÉTÉ HONGROISE DE GÉODÉSIE, CARTOGRAPHIE ET TÉLÉDETECTION

**Hungarian Society of Surveying, Mapping and Remote Sensing**

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## NATIONAL REPORT OF HUNGARY

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### **1. Introduction**

Hungary has been a member of FIG for decades, and the Hungarian National Committee (HNC) of MFTTT Society has been represented in all the ten commissions. The Hungarian delegates have always been playing an active role in the organisation.

In Hungary and in several neighbouring countries, the slogan of the Congress in 2006 “Shaping the Change” can be interpreted more generally, because it concerns not only land surveying, but the whole social environment. In the recent period of the Hungarian land surveying, the current political and economic changes claim fast and well-prepared action from every member of our profession. This is necessary to keep track with the international trends of our profession and also follow the changes in our society and economy.

This is a great challenge also for the Hungarian Society of Surveying, Mapping and Remote Sensing, being the only professional-social organisation of the Hungarian land surveyors. The Society has to support its members in this new situation, in the age of new and challenging tasks (such as establishing the new bases for the registration of land and property data., bulding services for citizens and e-Governance), At the same time, we have to continue the activities coming from our FIG membership, thus our experts should stand the demands of a changing age.

The Hungarian Society of Surveying, Mapping and Remote Sensing tries to give help to its members in solving the tasks, and organises the work of the national departments in accordance with the FIG technical commissions by enforcing these trends.

Hungary has always been playing an active role in the organisation. Especially the Hungarian members of the Commissions 2, 3 and 7 have been very active. The Hungarian delegation worked very efficiently on FIG Working Weeks and Commission Meetings, especially in Commission 2 and 7. The Hungarian representatives, Mr. Béla Márkus of Commission 2, and Mr. András Osskó of Commission 7 are the chairs of their Commissions for the period of 2006-2010.

Beside the Hungarian Society of Surveying, Mapping and Remote Sensing, which is the FIG member association of Hungary we have an affiliate member, namely the Institute of Geodesy, Cartography and Remote Sensing (FÖMI), and also an academic member, the Faculty of Geoinformatics University of West Hungary.

### **1.1 Officials of Hungarian National Committee (HNC) for the FIG**

Prof. Dr. Béla Márkus, President of HNC for FIG  
Faculty of Geoinformatics, University of West Hungary  
Pirosalma u. 1-3. H-8000 Székesfehérvár, HUNGARY  
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Piroska Zalaba	Secretary of HNC for FIG
Dr. Péter Engler	Delegate of Commission 1
Dr. Rudolf Ottófi	Delegate of Commission 2
Dr. Szabolcs Mihály	Delegate of Commission 3
Dr. György Busics	Delegate of Commission 5
Dr. László Csemniczky	Delegate of Commission 6
András Osskó	Delegate of Commission 7
Dr. Eszter Hőna	Delegate of Commission 8
Dr. Zoltán Forgács	Delegate of Commission 9
Gyula Bíró	Delegate of Commission 10

### **1.2. Hungarian Society of Surveying, Mapping and Remote Sensing (MFTTT)**

In 1867, when the Hungarian Association of Engineers and Architects, the first professional organisation in technical field was set up, the Hungarian land surveyors were present too; they founded the Section of Land Surveying, while the cartographers have been active within the Hungarian Association of Geographers from its foundation in 1872. As a result of the development of land surveying technologies, the Hungarian Society of Photogrammetry was organised in 1929. Unfortunately, after the Second World War, the activity of these associations stopped under compulsion. Only the social movements directly prior to the revolution of 1956 made it possible to found the Society of Geodesy and Cartography on 20<sup>th</sup> April, following its professional organisations-predecessors. Similarly, reflecting the contemporary social movements in 1990, at the General Assembly of the Society, the members – answering to a spontaneous initiative – decided to change the name of the Society to the present one. In 1998, the Society became a Public Benefit Company. So, in 2006, we celebrated the 50<sup>th</sup> anniversary of the foundation of our Society.

The Society brings together all those professionals (public servants, state and other employees, entrepreneurs, pensioners, pupils and students) of the land surveying and land administration (registration, use, protection and classification of land), cartography, photogrammetry and remote sensing plus the related disciplines, who wish to act for the aims of this Society within its framework.

The main aims and missions of the Society to: help the development of science and disciplines mentioned above, support technological progress, raise the technological level, distribute the professional knowledge, organize and coordinate the professional

and social activities of the members, promote their cooperation in professional, scientific and public life, formulate, represent and enforce professional interests, elaborate and propagate the principles of the professional Code of Ethics, keep the traditions of professional history alive, maintain and strengthen the international relations and publicise/ promote our profession.

To realise all those aims, the Society recommends and has been maintaining cooperation with the organisations of public administration, enterprises, educational institutions of medium and high levels of the related professional fields, the Hungarian Chamber of Engineers and other civil organisations. The Society also makes proposals for issuing regulations concerning the land administration sector, prepares expertises on the draft regulations by request and represents the expectations of the Society members. It holds biannual itinerary congresses, organises presentations, meetings, conferences, exhibitions, study tours within and outside the country. The Society, together with the Department of Land Administration and Geoinformation of the Ministry of Agriculture and Rural Development has been publishing a professional monthly bulletin called "Geodézia és Kartográfia", in English "Geodesy and Cartography"

The Society is establishing and maintaining relations with foreign scientific and other professional-social organisations, with special attention to the home and foreign scientific achievements, their propagation and utilisation. The Society has been taking part in the work of the following organisations as member: FIG (International Federation of Surveyors), ISPRS (International Society of Photogrammetry and Remote Sensing) and ICA (International Cartographic Association).

All natural and legal persons and any other organisation with no legal personality can be member of the Society, as long as they accept the content of its Constitution and are ready to act in its interests.

A title of distinction is the *eternal membership* for a Hungarian natural person for his/her activity, based on the decision by the General Assembly. The Society yearly awards to people the *commemorial medal* „Lázár deák“ in recognition of eminent professional achievement or activity for the Society.

A foreign natural person can be an *honorary member* of the Society, whose merits in deepening the Hungarian relations during the international cooperation are appreciated and if the General Assembly accepted him/her as one of the honorary members of the Society.

The members of the Society can also join its regional organisations. The regional organisations of the Society are functioning in counties and towns, and they can be set up at any state, social or economic institution, where at least 10 Society members express a wish like this. Beyond the regional organisations, the Society is operating in the following Professional sections:

- Surveying and Spatial Planning,
- Photogrammetry and Remote Sensing,
- Land Administration,
- Surveying Expertise,

- Geodesy,
- Cartography,
- Engineering Geodesy,
- Topography,
- Regional Development and Environmental Protection,
- Education and Youth,
- History of Profession,
- „Tóth Ágoston“ Seniors' Club
- Geoinformation.

The tables show the number of members of the Hungarian Society of Surveying, Mapping and Remote Sensing, classified by employment and principal specialisation and interested in FIG, 357 persons. (It worth mentioning that the full MFTTT members number is higher than 357 persons in which those over the 357 persons are in volved and interested in ISPRS and ICA.)

<b>Employment</b>	<b>Number</b>	<b>%</b>
Employed by land registration sector	86	24
Self-employed/in private practice	74	20
Teaching	40	11
Employed by military service	5	2
Pensioner	99	28
Employed elsewhere	53	15
<b>Total</b>	<b>357</b>	<b>100</b>

<b>Specialisation</b>	<b>Number</b>	<b>%</b>
Positioning/measurement	21	6
Engineering surveys	86	24
Hydrography	4	1
Cadastral/land management	201	56
Spatial planning/development	27	8
Valuation/real estate management	7	2
Quantity and building surveying	11	3
<b>Total</b>	<b>357</b>	<b>100</b>

Officials of the Hungarian Society of Surveying, Mapping and Remote Sensing:

Dr. Szabolcs Mihály	President
Dr. István Klinghammer	Vice-President
Zoltán Uzsoki	Secretary-General

Main bodies of the Society:

- General Assembly
- National Board
- Presidency
- Executive Committee
- Control Commission
- Professional sections

### 1.3 A Periodical for Professionals: “Geodézia és Kartográfia”

In 2009, we celebrated the 60<sup>th</sup> anniversary of the foundation of our periodical for land surveyors. With a short break after World War II, the bimonthly – since 1995 a monthly – has been continuously published with title “Geodézia és Kartográfia” and content extended to “Geodesy and Cartography”, by now, in 1300 copies.



Fifteen years ago, in 1995, the two owners (Department of Lands and Mapping and the Hungarian Society of Surveying, Mapping and Remote Sensing, both active under the auspices of the Ministry of Agriculture and Rural Development) of the existing bimonthly decided to perform radical changes in the life of the traditional, many-decade old professional bi-monthly.

The reason was shortly the following. Although the general aim is still to preserve and improve the professional and scientific level of the periodical, it has to give more efficient help to the daily practice of the profession and satisfy the demands of a wider circle of the readers by producing a publication that reflects up-to-date editorial principles with a more attractive exterior.

Preserving and improving the level, publishing the periodical every month instead of every second month, maintaining the “up-to-dateness” was and is still a great challenge. Papers submitted for publication are strictly selected, and professionals are checking the contents of the main articles. Now, looking back at these ten years, our specialised monthly and the work of the contributors can be considered successful. The ever growing circle of authors justifies the existence of the periodical. To writing, one needs first of all something to tell, but it is worth publishing only, when you have a receptive readership and there is a need for specialised literature of high quality.

## **2. Professional Standards, Regulations and Practice**

An important task of the special field of land administration is the regulation of land surveying, land administration and mapping on legal level. The regulations, laws affect the following professional fields: the *computerisation of land registration* needed an appropriate legal background; the preparation of *digital surveying base map*. The related changes of legal rules enable the land offices to handle both legal and digital cadastral map data of the land registration by computer.

There have been a number of changes in legislation relating to land issues over the past few years in Hungary, which provided a framework for the land privatisation, supported the computerisation of land records and the adoption of digital technology. Besides the Act on Surveying and Mapping and the amendment decree to it, the following laws on land affairs are noteworthy:

- Act CXLI (1997) on Real Estate Registration.
- Act XLVIII (1999) amending Act LV (1994) on Agricultural Lands. This act stipulates for the registration of users of land of over 1 hectar holdings in the land offices.
- Act CXVI (2001) on the National Land Fund. The aims of the law include the rational management of state-owned lands, improved land tenure and land use conditions, as well as support for the development of viable family farms and for those whose living is based on farming.
- Directive No. 1/1998 (FVM. É. 19.) FVM Subject: On co-operation of institutions participating in the National Cadastral Programme (MARD)
- Government Decree No. 184/1999 (XII.13.) on the detailed rules of Land Office registration of land users using land holdings of over 1 hectar.
- Decree No.105/1999 (XII.22.) FVM (MARD) on the detailed rules of land classification.
- Decree No. 109/1999 (XII.29.) Enacting clause of Act CXLI (1997) on Real Estate Registration, MARD.
- Government Decree 17/2002. (II.18.) Korm.: Detailed rules of property registration, property handling and utilization of National Land Funds.
- Decree No.176/2009. (XII.28.) FVM (MARD) on the administration service fee for supplying certain land registration data available through query from computerised database and on data supply through data transfer network.
- Decree No.98/2002 (X.17.) FVM (MARD): Modification of Decree 21/1995 (VI.29.) FM on creation and handling of digital base geodata.
- Decree 33/2002 (XII.17.) GKM. Modification of Decree 6/2001. (III.19.) GM on measuring the instruments and their metrological supervision.

The introduction of digital technology for the management of cadastral map 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 MARD/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/MARD 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 order of data supply in public land administration has been issued by DLM/MARD in 2002.

### **3. Professional Education**

The educational strategy for land surveying, topography and GIS is practically unchanged; however you can discover certain shift towards electronics, which makes new demands on the Hungarian education system.

The educational need brought four characteristic levels of education:

- General education
- Vocational education
- Higher education and
- Life-long learning, adult education.

Vocational level in the field of our profession means the public school system. The professional authority is the Department of Lands and Geoinformation of the Ministry of Agriculture and Rural Development (DLAG MoARD).

With the change of the Hungarian vocational secondary school system, the quality of education of surveying and mapping will hardly stand the test.

The Hungarian higher education system prepares itself for the change following the Bologna Process in Europe. Highly qualified professors, the equipment and the technological background guarantee the quality of higher education.

Affected by the Bologna Process, there are all levels BSc, MSc and PhD level within the Hungarian higher education. These type of courses has already started at the two basic institutions of higher education, The University of West Hungasry, Faculty of Geoinformatics, Székesfehérvár started a BSc course for Land Surveying and Land Management (210 ECTS), a BA Course for Land Administration (180 ECTS), an MSc course for Land Management,(120 ECTS) and a PhD course for Geoinformation (210 ECTS). The Budapest University of Technology and Economics, started a BSc course for Civil Engineering with a branch of Geodesy (240 ECTS), an MSc course in Geodesy and Geoinformation (90 ECTS) and continue its PhD course with 210 ECTS.

The reform of higher education announced in the autumn of 2006 - which replaced the previous quantitative development policy - made a commitment to a strategy based on the principle of quality.

As part of the quality-based strategy, a new admission procedure was introduced in 2007, within the framework of which higher education institutions can gain students based on the performance of applicants and the choice of institution that applicants make. Admission via the admission procedure in case of first cycle training is granted on the basis of education and knowledge acquired in secondary school, while in the case of second cycle training, admission requirements are determined by the higher education institutions.

The Memorandum of Lisbon formed six key messages in relation to knowledge-based society. The new services need highly qualified staff involved in Land Administration in different institutions of Hungary. However, the lack of developed

education and training facilities within the country in the specific areas of Land Administration and Land Information Systems could be an obstacle on the way to success.

Life-long learning system is supported by higher education. There are a lot of experts of new educational technology for open and distance learning, there are some good initiatives for e-Learning. Regional distance education centres operate at some higher education institutes that train our professionals.

The main field of professional education is the higher education. The activity of staff and students is the highest there. The fields of these activities are the Scientific Study Lab, and the diploma projects. For the professional staff, there are some events organized by MFTTT depending on-demand; the GISopen conference organized annually, a bi-annual conference roving around county capitals serving the needs of the profession.

The Hungarian Chamber of Engineers introduced a compulsory continuing professional development system (20 credits within 5 years). The members of the Chamber should update their knowledge on legal, fiscal issues, quality management, and standards. In the modular education system 1 modul needs 2 weeks study load. There are elective professional moduls, four-semester courses worth 20 credits, conference paper (5 credits), conference participation (3 credits) a study visit (3 credits). Within the Hungarian Chamber of Engineers a Surveying and Geoinformation section is operating. The MFTTT Society provides conferences with presentations selected and proved for obtaining those credit points by the audience.

The Hungarian delegate Béla Márkus has been active member of the Commission and also is chair elect for 2007-2010. Following a more than 10 years active work in Commission 2, Béla Márkus was elected to Commission 2 chair for the period 2007-2010. Chairing FIG Commission requires a lot of time and work. To fulfil the expectations Tamás Jancsó gave administrative support in this work.

#### 4. Spatial Data Infrastructure and Land Information Systems

Commission 3 of FIG is dealing with GIS management, within that, among others, with spatial data infrastructure, data models, standards, accessibility of spatial data, legal aspects, institutional structure, and with the question how to manage GIS in a way, which serves the aims of sustainable development. Chairman of the Hungarian section of the Commission 3 is dr. Szabolcs Mihály, General Director of FÖMI (Institute of Geodesy, Cartography and Remote Sensing). Under his leadership, the activities and R+D achievements of the Institute are focussed on the creation, maintenance and supplying data of the spatial reference base of GIS, providing basic data for the spatial infrastructure. He applied for the position of chairman of Commission 3 and 30 % of members voted for him.

In Hungary, in line with the Act LXXVI 1996 on land surveying and mapping activity and other rules of law, is obligatory to use state land surveying and cartographic basic data (*governmental geodata*) as a spatial reference for various geoinformation systems. In the world of information technology, it is a basic requirement to have these kinds of data being available in digital form. In the recent years, Hungary has produced significant results in creating framework for the spatial reference systems; the database of horizontal, vertical and 3D (GPS) basic network is ready now (2006) as well a Hungarian GNSS Service Centre has provide RTK correction for surveying use since 1998.

Nowadays the following maps are available in digital form:

- Cadastral map, rural area: out of the cadastral maps covering the rural area of 8,5 million hectares are already vectorised by September 2005.
- Cadastral maps, 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 vectorial form by 2007.
- Topographic map products:

Scale	Num. of sheets	Raster	Vector
1:10 000	4098	100% (whole Hungary)	100 %
1: 100 000	84	100%	100 %
1: 200 000	23	100%	
High-resolution digital elevation model (HUNDEM-5), based on vectorized contour lines of 1:10 000 scale topographic maps and stereophotogrammetric measurements for the whole country			
At the end of 2006 FÖMI finished the vectorization of planimetric- and hydrographic layers of topomaps at scale 1:10 000, constructing a vectorized data base for the whole country (DITAB-10v.0)			

- Satellite images and aerial photographs, manifold covering the country.
- Digital orthophoto 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 camera digital camera is applied for aerial data acquisition. Ground resolution of the

digital images 50 cm/pixel. In four parts of the Hungarian area makes a full coverage (2007, 2008, 2009, 2010).

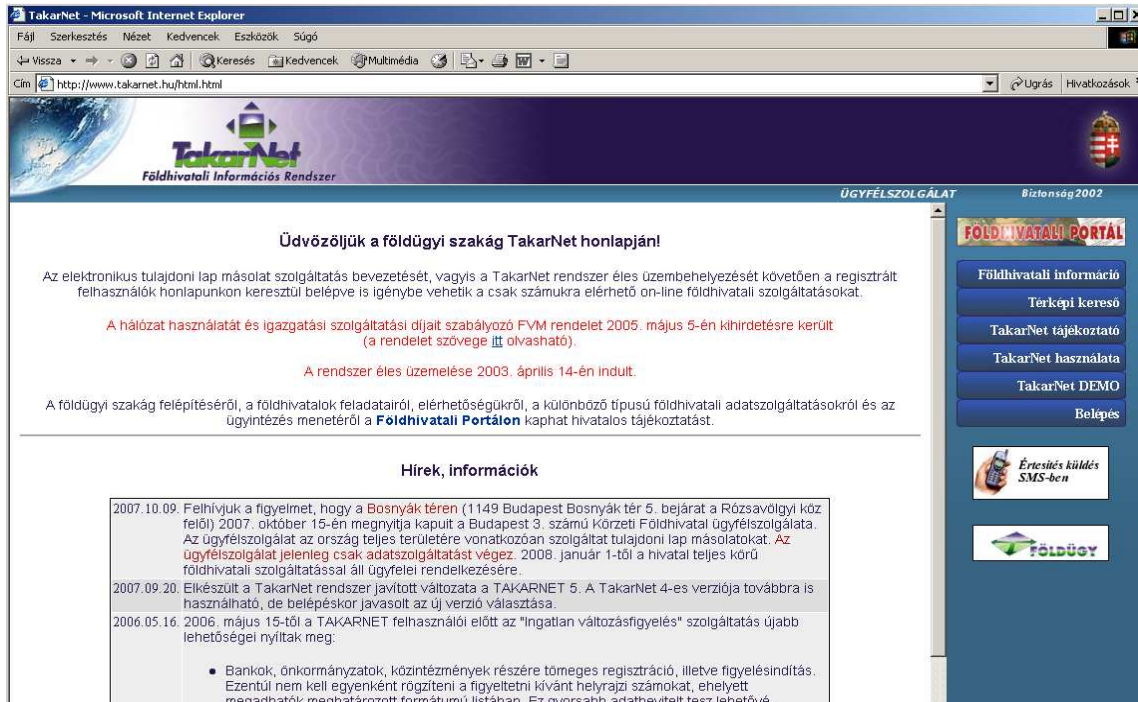
- Thematic maps, databases produced (among others) in the following topics:
  - CORINE Land Cover;
  - VINGIS vineyard register;
  - MePAR (Hungarian Land Parcel Identification System – LPIS-Hu) GIS database introduced in 2004: The system is based on physical blocks. Approximately 362 thousands physical blocks cover the entire area of Hungary. Since 2007 data recording and physical block system updating are completed annually for 25% of the country. LPIS integrates more and more thematic layers and data (Less Favoured Areas and the Environmentally Sensitive Areas, vulnerable water bases and nitrate sensitive areas, European Important Bird Areas, High Natural Value Areas);
  - Ragweed risk maps;
  - Flood and waterlog monitoring.



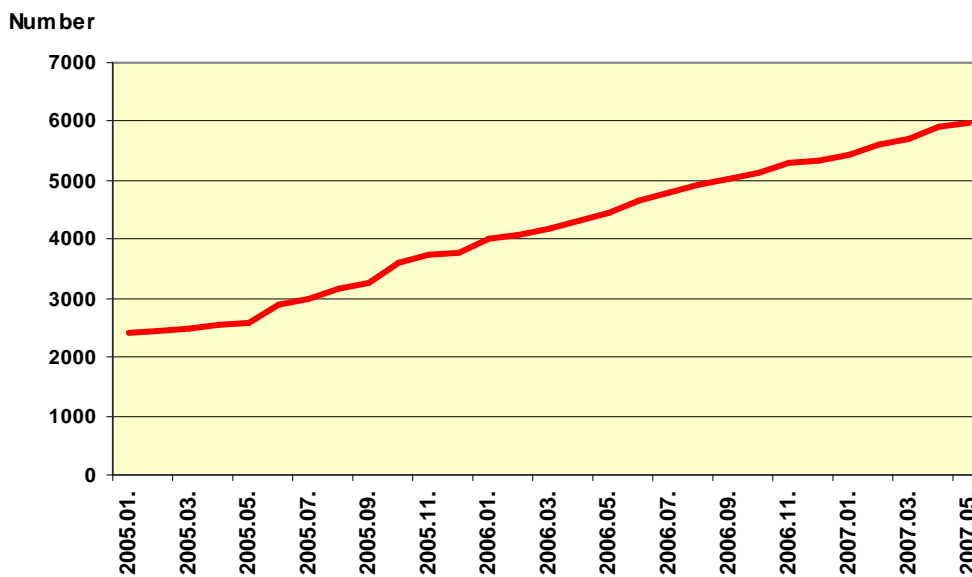
Production and use of digital maps need appropriate regulation; DAT (Digital Base Map) Standard and DITAB (Digital Topographic Database) serve this aim. The latter one was produced in cooperation with the Military Map Service (see also the formerly mentioned standards MSZ 7772-1:1997 and MSZ 7772-2:2002).

In the field of developing and operating the information technology in the Land Offices, the TAKAROS and a BIIR systems were installed in the framework of computerisation program of land registration. In 2000 the Land Registry IT system TAKAROS was completed. TAKAROS system contains an integrated real property registry with the digital cadastral maps. In this system each District Land Office can manage the changes in the legal part data (properties).

In 2003 an Intranet Network of Land Offices (TAKARNET) was carried out, therefore the Integrated Land Information Services have been available from 2003 via Internet for registered users. TAKARNET network connects all the member organisations of the Hungarian Land Management sector. However, there is a limited public access to the system via Internet. All the registered users of the TAKARNET have admittance to any data of the uniform real property registry.



*The entry page of TakarNet*



*Increasing number of TakarNet users*

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. The latest land information services started in 2005 on TAKARNET network. All services have been developed by FÖMI (copy of map extracts, watchdog system, change-monitoring, countrywide queries in land registry). Authentic electronic copies of property sheets have been serviced for TakarNet users since March 2008. The users can decide whether they need electronically authorized or non-authentic copies.

Within a predefined Digital Land Office Programme its first project, the so-called Central Land Office Non-Stop Service System (shortly the TakarNet24) started in December 2008, and will be finished by September 2010. The land registration databases are currently decentralized, i.e. they are kept – in accordance with the principle of territorial competency – in the District Land Offices of Hungary. On the TAKARNET – because of operational and security reasons – the external registered clients can have access to land registration data during eight work hours of the day only. In the TakarNet24 development it is planned to organize the data into a central land office database for data service and archiving purposes, so data maintenance and data supply will be separated. As a result of the TakarNet24 project, hopefully in September 2010, the electronic land registration office services will also be available for the citizens, the wide public. Accordingly, the individuals registered at the Central Client Gate will have access to all the same services (e-authentic and non-authentic electronic copies of property sheets, copies of cadastral maps, change-monitoring etc.) available currently only for registered TakarNet users requesting bulk data. The realisation of this development is the first step towards a modern countrywide hardware system of high technological level for the land registration network.



Hungary – by the Institute of Geodesy, Cartography and Remote Sensing (FÖMI) – takes actively part in international projects of European Union like HUMBOLDT, EURADIN, GIS4EU, ESDIN, etc.

## **5. Positioning and Measurement**

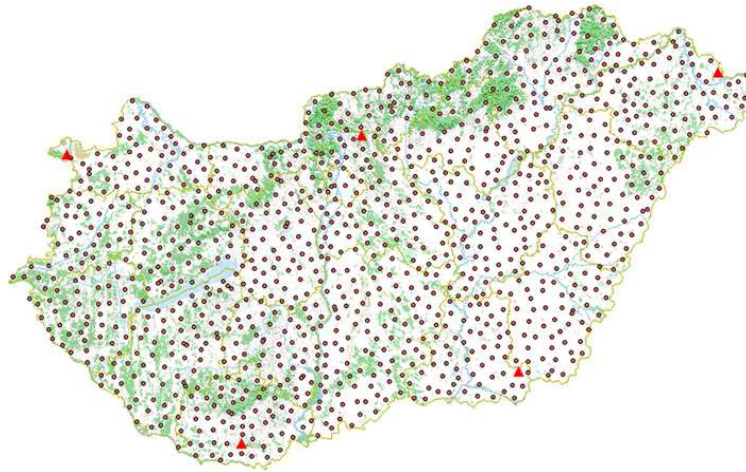
Hungary has got relatively up-to-date geodetic bases (reference systems), building out of which dates back to the 1970 years by redifinition of the old one and adding a lot of new elements at worldwide actualized level. In the past four years, two kinds of changes could be observed: the renewal of the reference systems started, making them more precise, while new measuring methods appeared in the everyday geodetic job. Both changes were supported by the Society of the professionals (MFTTT).

The countrywide Unified National Vertical Control Network (EOMA) was completed by 2006 in all levels (of first, second and third order). Though the network of first order had been completed in the 1980 years, the densification (1 point per 4 square kilometres) of the network of third order – that would have served the practical work – was delayed, mostly because of financial reasons. It is a peculiarity and Hungarian specialty that the levelling of third order was replaced by GPS technology on about the half of the territory of the country. The procedure worked out in FÖMI SGO (Satellite Geodetic Observatory) is based on an existing geoid model, set onto common EOMA-GPS points. With the same technology, they add EOMA-heights to the vertical controls determined in the earlier levelling network. The aim of this project is to have a vertical control that is determined in the new vertical reference system, in each settlement of the country.

In the past couple of years, there were professional agreements on the re-measurement of the EOMA network of first order. An ad hoc subcommittee was formed within the Geodetic Scientific Committee of the Hungarian Academy of Sciences to discuss this issue; they received recommendations that were published in the monthly bulletin GK of the MFTTT. The work also started: through 2008-2009, the precise levelling of three polygons of first order with large area was performed, where also gravimetric measurements were going on. The plan of the re-measurement of the whole first order network is ready, but its completion by deadline is doubtful because of the current economic crisis.

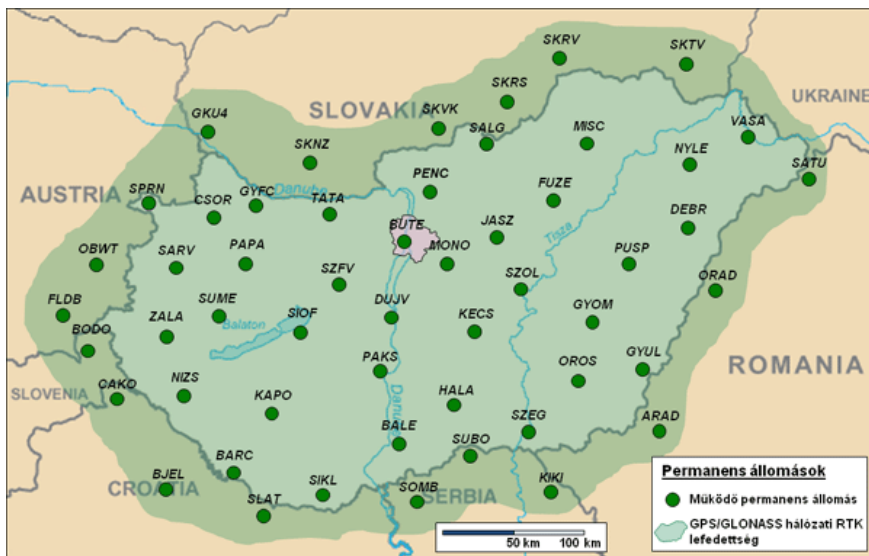
The Uniform National Horizontal Control Network (EOVA) of high density (1 point per 2 square kilometres) covers the whole country and this way it represents the local vertical reference system (Hungarian Datum, 1972: HD72).

The National GPS Network (OGPSH) consists of 1153 passive points. As all of them are EOVA points at the same time, they also serve as common points of local transformation between ETRS89 and HD72. The refinement of the Hungarian spatial reference system had happened on 25 October 2007, because of the change of the ETRS89 coordinates of the OGPSH points, as a consequence of the conversion to ETRF2005 realisation. This implicated the change of the centrally provided (partly freely available) transformation software (EHT, VITEL) as well.



*1153 points of the Hungarian National GPS Network (HGN)*

In Hungary, the Satellite Geodetic Observatory (SGO) of FÖMI (Penc) is responsible for the Hungarian GPS Network activities. Using the new long-time GPS measurements, they computed the new GPS reference frame called HGN2002, connecting the Hungarian frame to ETRS89 with 9 points. This new epoch is not in practice; there is a discussion now, how to use this new frame in practical applications.



*RTK networking coverage of Hungary towards the end 2009 ([www.gnssnet.hu](http://www.gnssnet.hu))*

The most significant change that has the greatest impact on professional practice took place in the building up of the Hungarian active network through the recent years. Using financial resources coming partly from state budget, partly from competition, 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 is able to receive the signals of Glonass-satellites too. The central software (GNSMART) of the German firm Geo++ provides not only real-time data, but also virtual RINEX data for after-processing in

any part of the country – this supports the use of older receivers. The EUPOS initiative signed by Eastern Central European countries some years ago proved to be useful; Hungary has been maintaining a mutual data exchange contact with all its neighbours, excepting Ukraine.

Recently the question arises that – similarly to other countries – the maintenance of the control points cannot be solved in the traditional way anymore and the geodetical user approach is different from the traditional one. A good answer to this question will be the integrated network! Nowadays, the planning of the so-called integrated network is under way. It is expected to have geodetic control points, the positioning data of which will be determined by several reference systems. Suitably, EOMA first order well numumented sites (with convenient old or new marking) will be selected for this purpose. On these sites, parallel with precise levelling, precise gravimetric and static GPS 3D measurements will happen.

In the field of geodetic measuring techniques, the conquest of GNSS and the real-time networking methods can be observed. More and more private entrepreneurs and firms invested in GNSS tools and learned the new methods.

In the accounting period, the integrated instruments (GNSS total stations) appeared that allow GNSS measuring together with traditional direction finding and distance measuring. Compared with the more developed countries, their spreading in Hungary is slower because the purchase means a disproportionately huge investment for the entrepreneurs. The replacement of paper-based maps with digital ones also happened in the accounting period. The primarily applied technology (because its speed) was digitization; the other typical technology was map renewal through field measurements mostly built on GNSS and total stations. At investments, construction projects (e. g. motorways becoming more frequent in the past years) also technologies based on GNSS and total stations were used first of all.

Terrestrial laser scanners have recently appeared in Hungary as well. Nowadays this is a very expensive technology, and here the application opportunities are not fully investigated yet. The movement examination built on terrestrial laser scanner was successfully performed at the tolerance tests of two new Danube-bridges.

There are opportunities to calibrate the instruments in own laboratories or in contractual form. With the aim of working out test methods and procedures, experiments were performed in the Research Institute for Geodesy and Geophysics of the Hungarian Academy of Sciences. The distance measuring instruments and GPS antennas can be calibrated in the accredited laboratory of FÖMI SGO.

The adaptation and setting into practice of modern knowledge and new technologies were supported by the professional Society (MFTTT) with proposals of regulations, recommendations, initiatives, several events, meetings and training. The articles published in the monthly bulletin, the conferences and short training courses also contributed to be familiar with the new professional information. The credit system – worked out by the Hungarian Chamber of Engineers – and the obligatory membership connected to credits have significantly increased the number of participants at conferences and courses.

## **6. Engineering Surveying**

The past four years has not brought any important progress in terms of significant engineering geodetic projects. The economic state of the country did not allow starting national projects or huge investments. In the field of construction, the office buildings and residential communities stand on the first place, followed by constructing investments connected to transportation. In the present economic situation, the continuation of some motorways of European importance (M0, M3, M6, M7) and the establishments connected to them (Megyeri Danube bridge, viaduct of Köröshegy, tunnel system on the motorway M6) are considered as significant projects. Apart from the very slowly progressing Budapest metro construction, no important investment can be mentioned in the capital. In the field of industry, the assembling factories and large workshops of some foreign investors do not mean special engineering geodetic tasks.

Though the relatively few construction activity did not need any special engineering geodetic improvements in technology, but the technical progress of the engineering geodetic enterprises can be considered as significant. By now it can be stated that the equipment park of the Hungarian engineering geodetic enterprises is similar to that of the entrepreneurs in more developed economies, and they are ready to carry out engineering geodetic jobs also under the conditions of a much more active construction investment activity. Regrettably, the foreign investing and building companies do not trust the Hungarian partners specialised in geodesy. For example, in the construction work of the Budapest metro, only one firm represents the Hungarian geodesy; foreign companies are employed to provide geodetic background for tunnel building.



All well-known geodetic enterprises apply the most modern electronic tacheometers and the GPS RTK (GNSS) technology, and those who deal with engineering geodesy, possess all other instruments that are needed to perform vertical and horizontal controlling and directing measurements. They are waiting for the start of important projects, e. g. the modernization of the outdated railway network that was a great promise directly after Hungary joined the EU. It is to be feared that the start of this project would bring success to foreign geodetic experts again, while, in turn, well-trained Hungarian professionals and companies cannot undertake jobs abroad, due to lack of capital.

Due to the present economic situation of Hungary and also the international economic crisis, the other large field of activity for engineering geodesy, the surveying and registration of public utilities cannot satisfy the ever growing demands. Hungary has introduced a uniform public utility registration already in the 1970s that was rare at that time even in international relations. In traditional form, more or less it was completed during the past 30 years. Now, when the land surveying profession is already able to provide digital land surveying base map system for the whole area of the country, it would be timely to introduce the digital public utility registration step-by-step, based on uniform principles. Those public utility owners/providers having better financial background do their steps towards this direction, but the local governments being in difficult financial situation do not have this opportunity.

It is necessary to work out a uniform technology through further development of the public utility registration regulation that was once up-to-date. The new technology should be independent from software providers. There were some coordinated actions in this direction taken by the Hungarian Society of Surveying, Mapping and Remote Sensing, the Association of Enterprises in Geodesy and Geoinformatics, the Hungarian Chamber of Engineers and the Hungarian Agency of the international gita, the gita Technical GIS Association. At present, VÁTI Budapest Planning Office is also dealing with this theme.

The dramatic progress in CAD technology and GIS significantly affects the engineering geodesy. Nowadays all planning offices are using CAD systems for planning, and all entrepreneurs perform engineering geodetic marking out and control measurements based on those plans.

The documentation of realisation produced by digital technology is frequently being considered a part of the GIS also in Hungary. Respectively, the GIS itself becomes a part of a large public utility provider's compact directing system, comprising the total plant organization, administration, decision preparation and dispatching service.

Some local governments enjoying good financial background are able to establish digital technical map system of the given public area, by the help of which the technical units prepare their specialised cadastres. These cadastres serve as a basis for the operation of the settlement, issuing permits for investments and for their monitoring. Indirectly, those cadastres have a remarkable impact on the engineering geodetic tasks.

## 7. Cadastre and Land Management Issues

The current system of the Hungarian unified land registration was created in 1972, when the two registers – the Cadastre and the Land Records (“Grundbuch”) – were integrated based on legislation and realised on institutional level; the land office network was formed. As a result of the unified system, parallel practice of updating was cancelled: both legal and mapping changes concerning the landed properties are recorded practically at the same time, in the same institutional system. The Department of Land Administration and Geoinformation of the Ministry of Agriculture and Rural Development directs and supervises the land offices. FÖMI, as a background institution provides technological support to them, besides its main duties of land surveying, mapping and remote sensing. The Hungarian unified land registration system keeps about 10 million landed and other properties, including condominiums, etc. The cadastral maps at scales 1:1000-1:4000 cover the whole territory of Hungary.

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. In Hungary, the annual number of applications submitted to Land Offices for changes to update is about 4 million.

The data carrier of all legal data registered in the system, the property sheet is already in digital form, and by now, also 100% of the cadastral map content is digitised. The data are available through internet, too.

The screenshot displays the TakarNet web application interface. The main window shows a search for a cadastral map. The search criteria are: Földhivatal: Fővárosi Kerületek Földhivatala, Helyrajzi szám: BUDAPEST IV KER. belterület 70240, and Cím: Berezinyi Gyula utca 14. The results table shows one entry with the same details. The map viewer displays a cadastral map of the area, showing property boundaries and lot numbers. The map is titled 'FŐVÁROSI KERÜLETEK FÖLDHIVATALA Budapest, XI. Budaörsi ut 59. 1139 PE - 415.' and shows a grid of lots with numbers like 70248, 70244, 70242, 70241, 70240, 70239, 70238, 70237, 70236, 70235, 70234, 70233, 70232, 70231, 70230, 70229, 70228, 70227, 70226, 70225, 70224, 70223, 70222, 70221, 70220, 70219, 70218, 70217, 70216, 70215, 70214, 70213, 70212, 70211, 70210, 70209, 70208, 70207, 70206, 70205, 70204, 70203, 70202, 70201, 70200, 70199, 70198, 70197, 70196, 70195, 70194, 70193, 70192, 70191, 70190, 70189, 70188, 70187, 70186, 70185, 70184, 70183, 70182, 70181, 70180, 70179, 70178, 70177, 70176, 70175, 70174, 70173, 70172, 70171, 70170, 70169, 70168, 70167, 70166, 70165, 70164, 70163, 70162, 70161, 70160, 70159, 70158, 70157, 70156, 70155, 70154, 70153, 70152, 70151, 70150, 70149, 70148, 70147, 70146, 70145, 70144, 70143, 70142, 70141, 70140, 70139, 70138, 70137, 70136, 70135, 70134, 70133, 70132, 70131, 70130, 70129, 70128, 70127, 70126, 70125, 70124, 70123, 70122, 70121, 70120, 70119, 70118, 70117, 70116, 70115, 70114, 70113, 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The digital cadastral maps were mostly prepared within the National Cadastral Programme. The idea of National Cadastral Programme was born in 1994, the implementation started in 1996. From professional aspects, the necessity of starting the programme was that the majority of the maps were in different projections and mapping systems, nearly all of them in analogue form. The first measure was to ensure the digitisation of existing analogue maps starting with the rural areas. Since January 2004, the process also included the county seats, major towns and other settlements. The rural areas was completed by December 2005, the urban areas by the end of 2007. As the first step (measure), vectorised maps covered the whole of the territory of the country by the end of 2007.

In the second measure, the aim was to make digital maps that correspond to DAT Professional Rule System using modern field methods of data collecting, and field measuring techniques. This step was made in 2008 and all the district land offices migrated their cadastral map databases to DAT by the end of 2009.

In Hungary, documents generating changes in the facts and rights in land can only be issued by lawyers. Cadastral land surveying or mapping jobs can only be performed by registered land surveyors possessing special permit for that activity. Mostly the private sphere is producing digital cadastral maps and are performing cadastral measurements.

In Hungary, the property reform – started in 1990 – has resulted in a great increase in the number of properties and parcels. From the previously homogeneous large estates, hundreds of thousands of small parcels were created. The use of the arable lands mostly does not coincide with the ownership rights. For that reason, the most important provision of the amendment to the Act on Arable Land was the introduction of the land use registration on 1st of January 2000.

The main ordering principle of the land use registration and that of the land registration is different. In land registration, the property is the basic item – it means that all additional data are gathered into groups around these items. The land use registration is managed in each District Land Office for its territorial competence. The land use sheet contains all the parcels of a land user on the territory of the given Land Office. The land use sheet consists of two parts. The first part contains the land user's data; the second part contains the used land's data. No registration of land use is required for a land property with a size less than 1 hectare.

The land use registration system called FÖNYIR has been elaborated and installed at the District Land Offices by FÖMI in 2000. From this year on, the land users have been registered at the District Land Offices. The tasks of the Land Office network concerning land use registration are as follows: to register the changes continuously, to detect those who failed to register and to increase the correctness of the registration. From February 2010, the copies of land use registration sheets are also available on the internet via the TAKARNET system for registered users.

In Hungary, the land valuation system introduced in the second half of the 19th century called Golden Crown system is still in power for expressing the value of the land. Since its introduction, this system had served its original purpose more or less well. Recently, the system and its method became outdated, however, it is still in

power and use. The land parcels are registered by District Land Offices, using the Golden Crown system. Its survival might contribute to the fact that the arrangement of the land ownership conditions, the land compensation, the re-allotment of lands to the co-op-members on the basis of the original value of the given property and, in general, the privatisation needed the value of lands in old Golden Crown system. In fact, it has been connecting the past and the present. The Golden Crown system indicating the quality of the land highly promotes the rearrangement of the property conditions. Consequently, at least till the completion of that rearrangement, the validity of the Golden Crown system should be maintained.

Arable lands can be used for non-agricultural purposes only by the leave of authority. To the utilisation of arable lands for industry, mining, water conservancy, transport, community development and/or other purposes, a permit has to be granted by the Land Offices. However, the utilisation of arable land under permission does not provide preventing force all by itself and further, the areas should be compensated, which inevitably have to be used to investments. Therefore, in case of non-agricultural utilisation of arable land, besides the permission, a land protection fee should be paid by the user, too.

As an undesired by-product of land privatisation carried out in the last decade, scattered property patterns have been formed in Hungary, e.g. properties of arable lands belonging to one single landowner dispersed in 5-10 different field units, far from each other. This situation is very disadvantageous from the point of view of economical production. To overcome this, the present legislation offers one possibility: spontaneous land exchange. Arrangement of such exchanges, especially in the case of several property owners, needs much skill and proficiency. Therefore, since the possibility is legally given, those intending to exchange their lands would rather do request the assistance of the competent land office. In connection with land utilisation, Land Offices have a dual task: checking the obligations of farming the land and promoting land consolidation by means of spontaneous land exchanges.

Commission 7 is the flagship and most active Commission of FIG. Since 15 years, Commission 7 has organised Annual meetings in different country, separately from major FIG events. The generally one week meeting includes 1-2 days open symposium in a selected topic relevant to Commission 7 activities and also important in the host country.

The Hungarian delegate András Osskó has been active member of the Commission since 1995, chairing Working groups during the 1998-2002, 2002-2006 period and also is chair elect for 2007-2010. Concerning the FIG activities, the 2007-2010 period was very important for the Hungarian profession. Following a more than 10 years active work in Commission 7, András Osskó was elected to Commission 7 chair for the period 2007-2010.

Chairing FIG Commission 7 requires a lot of time and work. To fulfil the expectations we formed a Hungarian team to support Commission 7 activities. The members of the team Gyula Iván vice chair administration and Mária Tóth secretary. They contributed a lot to the success of Commission 7 activities. The Commission 7 continued its tradition, organising Annual meetings, including International Open symposiums, separately from major FIG events in every years.

Commission 7, through its Working group activities, has been dealing with important issues like:

- the development and ISO acceptance of “Land Administration Domain Model”, LADM, and development of “Social Tenure Domain Model, STDM.
- Open source software, FLOSS, for Cadastre application
- State and Public Land, Property management

Commission 7 is always the major contributor to the FIG Working Weeks, conferences, not only with participation, but also presentations, papers. András Osskó chair and Gyula Iván vice chair administration of the Commission 7 presented many papers during Commission 7 Annual meetings and major FIG events.

## **8. Spatial Planning and Development**

The Hungarian Commission 8 undertakes a dual job. On the one hand, they discuss the questions of the Hungarian practice of planning at professional forum; on the other hand, following the themes of Working Programme of International FIG Commission 8, they monitor the achievements, and try to make use of them in the national planning activity.

In the past period in Hungary, the spatial planning activity has mostly been determined by the answers to be given to the global challenges concerning the themes of climatic change and sustainability. With the aim of working out a national sustainability strategy, several research themes have been started and supported by the Government or the Academy. The issues of those strategic research works are reflected by the aims of concrete spatial planning tasks in a given region.

The preparation to climatic change is one of the major challenges also for Hungary. Concerning its impacts on the spatial structure, the issues of energy strategy and water management can be underlined.

To reduce the CO<sub>2</sub> emission, the utilization of the renewing energy is the main aim. Hungary can be considered as a biomass super power because its conditions, so among the different sorts of renewing energy, the use of biomass stands on the first place here. One of the most important sustainability issues is to keep the correct proportion of producing food or products with energetic purposes or animal husbandry within the agricultural sector. As a positive example of natural resources management, there are many places where they established energy plantations and invested in village heating installations based on wood. Several bio ethanol and bio-Diesel plants were set up, mostly based on Hungarian maize, sunflower and rape as base materials, and there are good examples for establishing biogas-factories with environment-protecting aims and complex utilization. Of course, first of all, complex spatial structure examinations were performed and feasibility studies were prepared that handle all issues of nature, society and economy as one single unit and serve the sustainable rural development.

The International Frame Directive of Water (2000/60/EK) marked the sustainable water management as a key factor also for Hungary. As a consequence of the climatic change, the requirement of keeping waters in good condition, conserving the natural ecosystems, agricultural utilization of water-reserves for decreasing aridity and also establishing irrigation systems – suddenly all became urgent tasks. Hungary has participated in an international in a model project ([www. cadses-warema.net](http://www.cadses-warema.net)) of this theme, having the task to demonstrate in a protected natural conservancy area the correct way of sustainable regional development. They had to take care about the protection of the natural resources, satisfy the demands of society and economy, and also assure the conditions of regional development at the same time. As a result of the international division of labour, Hungary – presenting a methodological solution – prepared a development plan for the catchment area around Lake Velence (Western Hungary).

## **9. Quality Management Issues**

The ministerial executive order of the Act LXXVI of 1996 on Surveying and Mapping Activities says that all the surveyors producing so-called national base geodata must have a quality management system covering the International Quality Standards. The Act also says that the Land Offices managing the land surveying and maintaining maps and data must also have their own quality management system covering the International Quality Standards. The quality control of cadastre is the responsibility of Institute of Geodesy, Cartography and Remote Sensing (FÖMI) as a central surveying organisation.

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 very valuable databases at different fields, including TakarNet, the nationwide real-estate-registration network service. That is why it is very important the security of the datasets both in physical and legal aspects. To save and guarantee it, the Institute has created an Information Security Management System (ISMS) by the British Standard BS 7799. The management system was certified in 2003 for three years by Society General of Surveillance (SGS) Hungary Limited.

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 expected advantages of integration the different management systems are: reducing management costs, increasing the management efficiency, reducing the live inputs for management activities, to provide bigger capacity for productive works.

The new IMS is carried out, and put into operation from January 2006. A tender was called to certify the Integrated Management System. The winner of the tender is SGS Hungary Ltd., the same company who earlier certified the present ISMS. The certification audit of IMS was in April 2006.

At the end of the year 2000 FÖMI got the certification as an accredited calibration laboratory for the Gödöllő Base Line. The Hungarian National Accreditation Board issued the certification. In possession of the certification, FÖMI is authorised to calibrate distance measuring devices and total stations used for creation of national basic geodata. The activity of the Calibration Laboratory was extended in 2002 for calibration of GPS devices. The Hungarian National Accreditation Board issued the certification of the Calibration Laboratory for the extended activity.

## 10. Events

The Annual Meeting jointly organized by the Commissions 2, 3 and 7 took place in Budapest, 27-29 April 2006.

Commission 2 introduced an annual workshop system, in-line with its workplan and based on its working groups.

- 2007 – Curriculum issues, Prague, Czech Republic
- 2008 – a joint FIG Commission 2/ Commission 7 and ITC International workshop in, Enschede, The Netherlands on “Sharing Good practices on E-learning in Surveying, Geo-Information Sciences and Land administration”
- 2009 – Educational Management and Marketing, Vienna, Austria

The Commission 7 continued its tradition, organising Annual meetings, including International Open symposiums, separately from major FIG events in every years.

Annual meetings:

- 2007 Seoul, South Korea
- 2008 Verona, Italy
- 2009 Kuala Lumpur, Malaysia
- 2010 Karlovy Vary, Czech Republic

Besides the Annual meetings, the Commission 7 co-organised and supported many other events, among others

- Joint FIG/UN FAO International Seminar 9-10 September 2008, Verona, Italy on “State and Public Land management
- Joint FIG World Bank Conference, 9-10 March, 2009, Washington DC. USA on “Land Governance in Support of the Millennium Development Goals: Responding to New Challenges”
- Conference, supported by Commission 7 and Commission 3, 30. November-1 December 2009, Chisinau, Moldova on “Citizens’ Right to the Real property”

### **10.1. Hungarian papers presented in FIG Conferences, Working Weeks and other events**

FIG Working Week 2007, Hong Kong, SAR China

- Dr. Szabolcs Mihály: The Hungarian SDI Strategy
- András Osskó: Cadastre Land administration systems and e-Government
- Gyula Iván: Integrated Land information Services in Hungarian Land administration

FIG Commission 7 Annual meeting, International Open Symposium 2007, Seoul, South Korea

- András Osskó: The Roles of Cadastre in the Future, keynote paper
- Gyula Iván: Unified Land administration for a Better Spatial Infrastructure

FIG Commission 3 Workshop, Spatial Information Management Toward Environmental Management of Mega cities, Valencia, Spain, February, 2008.

- Dr.Szabolcs Mihály: Budapest Megacity with its Agglomeration

FIG Working Week 2008, Stockholm, Sweden

- Szabolcs Mihály and Piroska Zalaba: Evolution towards the Digital Land Office
- András Oskkó: The Multipurpose Hungarian Unified Land registry system
- Gyula Iván: A Complete Free Solution for Cadastral Map Management

International FIG Workshop - Sharing Good Practices: e-Learning In Surveying and Land Administration, organized by FIG Commission 2 and 7, and the International Institute for Geoinformation Science and Earth Observation (ITC), Enschede, The Netherlands, 2008

- Bela Markus: Thinking about E-Learning
- András Oskkó: The importance of changes in land surveyors' education
- Laszlo Kottyan: Sharing the student knowledge in exchange programs
- Tamas Jancso: Development of E-learning Packages in the Blackboard Learning System

FIG/FAO workshop, Verona, Italy, 2008

- Fülöp Benedek-András Oskkó: The Hungarian National Land Fund and its role in State Land Policy

FIG Commission 7 Annual meeting, International Open Symposium, Verona, Italy, 2008

- András Oskkó: 3D Cadastre
- Gyula Iván: Cadastral parcels in the Context of INSPIRE

FIG Working Week 2009, Eilat, Israel

- Gábor Csornai, Erika Bognár, Gábor Mikus and Csaba Wirnhardt and Szabolcs Mihály: Maintenance and Development of the Hungarian Land Parcel Identification System (LPIS-HU) for IACS
- Szabolcs Mihály, Gyula Iván, Gábor Szabó and Zoltán Weninger: Land Administration Standards and Their Implementation in Practice
- Bela Markus, Hungary and Liza Groenendijk: e-Learning in Surveying

FIG Commission 7 Annual meeting and International Open Symposium "Towards Ubiquitous Cadastre", Kuala Lumpur, Malaysia, 2009

- Gyula Iván: TAKARNET 24 project towards e-Land administration in Hungary

FIG 7<sup>th</sup> Regional Conference, Hanoi, Vietnam, 2009

- András Oskkó: Questions on Sustainable Land administration

## **10.2 Conferences, Workshops organised in Hungary**

### 2006:

- GISopen 2006 (16-18 March 2006, Székesfehérvár)
- 9th AGILE International Conference on GI (20-22 April 2006, Visegrád)
- FIG Commission 2 workshop (27-29 April 2006, Budapest)  
[http://www.fig.net/commission3/reports/budapest\\_minutes\\_2006.htm](http://www.fig.net/commission3/reports/budapest_minutes_2006.htm)
- National Conference on Geoinformation (September 2006, Szolnok)

### 2007:

- GISopen 2007 (12-14 March 2007, Székesfehérvár)

### 2008:

- GISopen 2008 (12-14 March 2008, Székesfehérvár)
- Cadastral maps of the 21st century (29-30 May 2008, Budapest)
- Land policy and land use issues (26-27 June 2008, Székesfehérvár)
- Seminar on Geomatics (6-7 November 2008)

### 2009:

- “Towards INSPIRE” International Workshop (18-20 March 2009, Székesfehérvár)
- GISopen 2009 (18-20 March 2009, Székesfehérvár)
- Geospatial Infrastructure Conference (7-8 May, 2009, Balatonalmádi)
- Day of Geoinformation Technology (18 November 2009, Székesfehérvár)
- Workshop on The future of land surveying (2-4 July 2009, Nyíregyháza)
- Day of Surveyors (26 November 2009, Békéscsaba)
- Forum on the quality of cadastral maps and the methodology of improving their quality (7 December 2009, Székesfehérvár)

### 2010:

- HUNAGI Conference on Spatial Data (25 February 2010, Budapest)
- GISopen 2010 (17-19 March 2010 Székesfehérvár)

For more information visit:

[www.fig.hu](http://www.fig.hu)

[www.geo.info.hu/gisopen](http://www.geo.info.hu/gisopen)

[www.foldhivatal.hu](http://www.foldhivatal.hu)

[www.fomi.hu](http://www.fomi.hu)

Budapest, March 2010

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