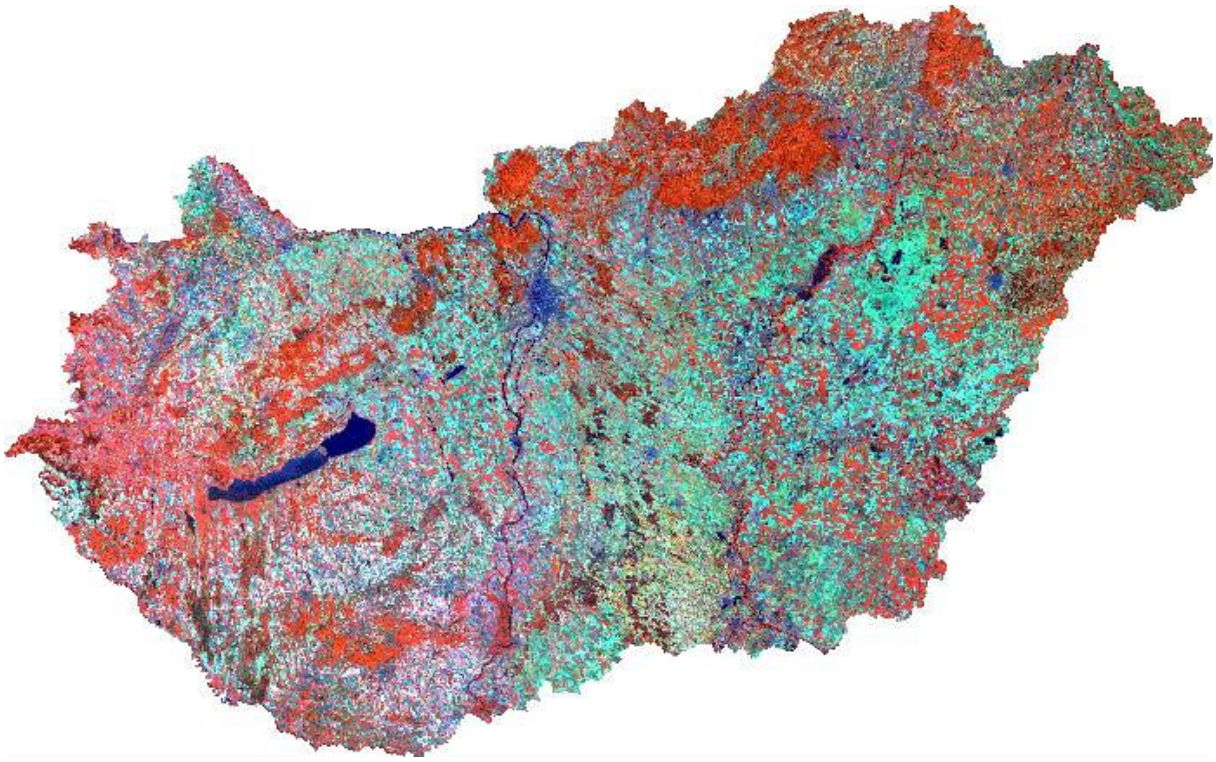
ANNUAL REPORT
OF THE HUNGARIAN NATIONAL MAPPING AGENCY

Status, Recent Activities and Follow-on Actions

1999



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Cover:
Landsat Thematic Mapper mosaic of Hungary

Data processing: FÖMI

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1. Institutional structure

The National Mapping Agency (NMA) in Hungary is represented by a governmental organisational framework acting under the supervision of Department of Lands and Mapping at the Ministry of Agriculture and Regional Development (MoARD/DLM). It is responsible for establishing, maintenance and supplying of the geodetic control networks, the large scale base maps including the cadastral ones, the land registry, land protection and valuation, the topographic maps of selected scales and the remote sensing.

The Department of Lands and Mapping is organised into three divisions:
- Division of Surveying and Informatics, which supervises the tasks relating to control point networks, national cadastral and topographic maps, technical upgrade of land offices and remote sensing.
- Division of Land Registration, which supervises tasks relating to real property registration, land area data supply, carries out legal measures pertaining the dept, and revises the appeals against land office decisions.
- Division of Land Protection and Land Valuation, which supervises the tasks relating to licensing of non-agricultural use of croplands, control of utilisation obligation of croplands, support of land restoration and land use as well as supervises tasks relating to land consolidation and related activities.

The above mentioned works are carried out by the following organisations (see Fig. 1.):
- Institute of Geodesy, Cartography and Remote Sensing (FÖMI),
- 19 County Land Offices and the Budapest Land Office,
- 115 District Land Offices and the Capital Districts Land Office,
- Office for National Cadastral Programme, as non-profit organization.

The FÖMI provides research and development, and also technical and administrative support to the institutional frameworks well as supervises the government contracts in mapping and surveying. Main activities of FÖMI are as follows:
- Development and maintenance of control point networks,
- Coordination, managing and budgeting of national mapping,
- Quality control and acceptance,
- Archiving and supply of land and mapping data,
- Quality management of lands and mapping section,
- R+D for geodesy, mapping, land registry, GIS and LIS as well as for remote sensing,
- Land offices system support,
- Training management and documentation for lands and mapping,
- National boundary survey,
- Remote sensing for agriculture and environment,
- Distribution and archiving of remote sensing data,
- Recording and supply of geographical names.

The County Land Offices and the Budapest Land Office are responsible for the budgeting, administration, quality control, and the hearing of appeals against District Land Office decisions. The main tasks for them are as follows:
- Managing and supervising of district land offices,

- Acceptance and quality check of cadastral data,
- Cadastral, land and survey data supply,
- Value added data supply.

Main tasks of the District Land Offices and the Capital Districts Land Office are as follows:

- Land and real property registration activity,
- Surveying and mapping maintenance,
- Tasks concerning land classification and protection,
- Public data supply.

In 1997 the National Cadastre Programme started to produce digital cadastral maps in digital form. This programme is being separately funded by the Office for National Cadastre Program (NCP) using credits guaranted by the Hungarian Government.

Total expenditure budget of the organisational framework of DLM is about 9.5 billion HUF (40 million ECU) per year. The total income is about 2.8 billion HUF. Governmental support is about 6.7 billion HUF. The total number of employees is about 4.600.

The number of independent surveyors are over 1000 being ready to perform production tasks for the Hungarian NMA. Close professional cooperation links the Hungarian NMA to the Mapping Agency of the Hungarian Defence Forces (MA of HDF), especially in the field of standardisation, topography and geodetic networks.

2. Status of the Geodetic Control Network

2.1. Reference system

A reference system called Hungarian Datum 1972 (HD-72) was introduced in 1972 based on independent readjustment of Hungary's astrogeodetic network was on the rotational ellipsoid of the IUGG Geodetic Reference System 1967. (IUGG-67: a=6378160 m, b=6356774.516 m, f=1/298.247167). The HD-72 is located and oriented relatively at the terrestrial point Szölõhegy. Based on HD-72, Hungary established

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

2.2. Projection system

A projection system for civil use called EOV (Uniform National Projection System) was introduced in 1972. The reference ellipsoid of EOV is the IUGG GRS-67. Type of the projection: oblique-axis reduced (secant) transversal cylindrical projection. The whole territory of the country is represented on one strip of cylindrical projection.

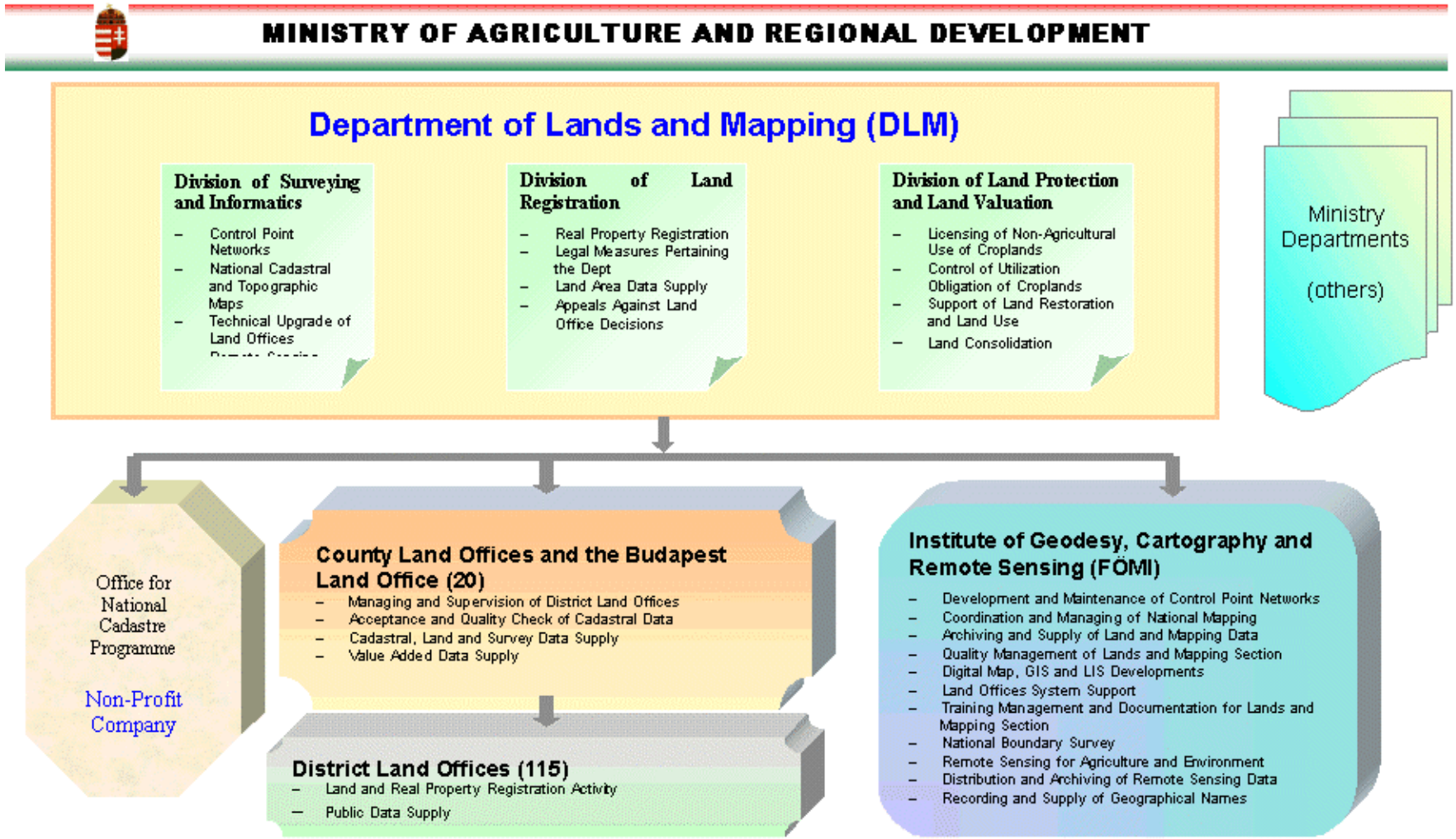


Fig.1. Organizational structure of the Hungarian cadastre

Recently old projection systems are in use, too:
a) three cylindrical projection systems: North, Median and South,
b) stereographic projection at cadastral maps with mapscale 1:2880, 1:1440.

To meet the requirements of the domestic and international professional community a Description Directory of Hungarian Reference and Projection Systems has been issued in 1995 by FÖMI. The Description gives an overview on the EOV parameters, the HD-72 definition, the Hungarian vertical system and the relation of HD-72 to the WGS-72 and the EUREF-89 (WGS-84) systems.

2.3. Geodetic Control Networks

2.3.1. Uniform National Horizontal Network

The EOVA is based on the Hungarian Datum 1972, the network orientation is provided by 40 Laplace-points and the scale is maintained by 6 baselines and 17 EDM lines.

Parameters of connecting the Hungarian control network to the EUREF system have already been measured, computed and finalised.

For high order scaling and length accreditation, a National Calibration Baseline at Gödöllõ city (about 30 km from Budapest) has been measured with Väisälä interferometric method in cooperation with Finnish Geodetic Institute, for national and international use.

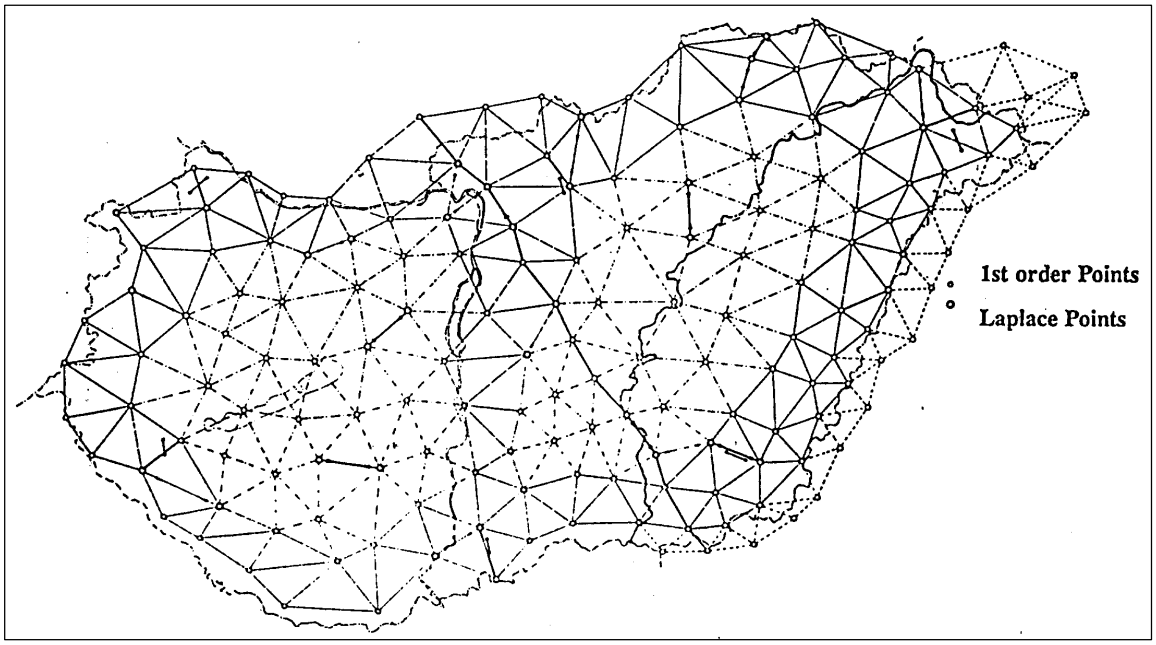


Fig.2

Sites of the 1st order Uniform National Horizontal Network

Pontleírás (Locational and descriptive data of site)

VAB (C) FÖMI 1994

EOV Pontszám : Site Number:	054-1060/1c		**Azonosító:** Identification:	
Település : Settlement:	Fehérvárcsurgó		**Rendûség:** Order:	7
Megye County::	Fejér		**Állandósítási mód:** Construction type:	Kõ
1:25000 sz.sz: Map sheet number:	054-12		**év:** Year:	1985
EOV Y, X:	590757.50	216615.19	**Koord. Minõség:** Quality of co-ordinate:	3
Vetület1,YI,XI: Projection:	St t. 59250.34	21486.71r	**Pont állapota:** Healthy of site:	HP kõ/közp./sérült
Vetület2,Y2,X2: Projection:	HKR t. 59249.27	-16272.64r	**Állapot év:** Year:	1998
Vetület3,Y3,X3: Projection**:**	-	-	**Meghatározás év:** Years of determination:	1985
Magasság felsõ: Height top:	-		**Katalogus-e ? :** Status of catalogue:	I
alsó: down**:**	142.65		**Helysz. Gyakor.:** Number of site checking:	2
f.alatti: under surface	141.50		**OP darabszám:** Number of orientation points:	0
vonatkoz.pont.: reference point, **felsõ:** top:	-		**Pontvédõ:** Site safety construction:	Torony(görög kat.)
alsó: down**:**	HP, vasszekrény	f.lapja	**Helyszínelés év:** Years of checking:	1989, 1991
föld alatti: under surface	Egyéb		**Helyreáll. év. Hó:** Date of reconstruction:	-
Rayon:	167	65	**Végzõ:** Reconstructor:	-

Változás megyénél, központiban :1990.12, 1998. 6 (Change of County Land Office)

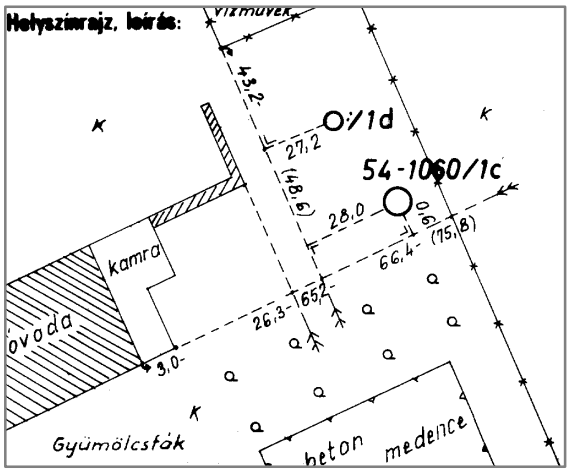


Fig.3
Example printout from EOVA Database
(masked with English translation)

The network (see Fig. 2) consists of:
- 139 sites of 1st order,
- 2120 sites of 3rd order,
- 4790 sites of principal 4th order together with 10306 -orientation sites.

Also more then 44000 sites of 4th order exist in EOVA.

An EOVA Database was created by FÖMI, containing the positional and descriptive data of horizontal control sites (1st, 3rd and 4th order) as well as their sketching. It contains: the number of the sites, the vertical and horizontal coordinates of the sites in the EOV and old projection systems, the location of the sites (county, settlement, sheetnumber), the date of determination and checking actions, sketch of approach (see Fig. 3).

2.3.2. Uniform National Height System (EOMA)

The EOMA has normal heights with Baltic Sea level. The reference point is Nadap with height in the EOMA system H=173.1638 above Baltic Sea level; (H= 173.8385 above the Adriatic Sea level in the old height system).

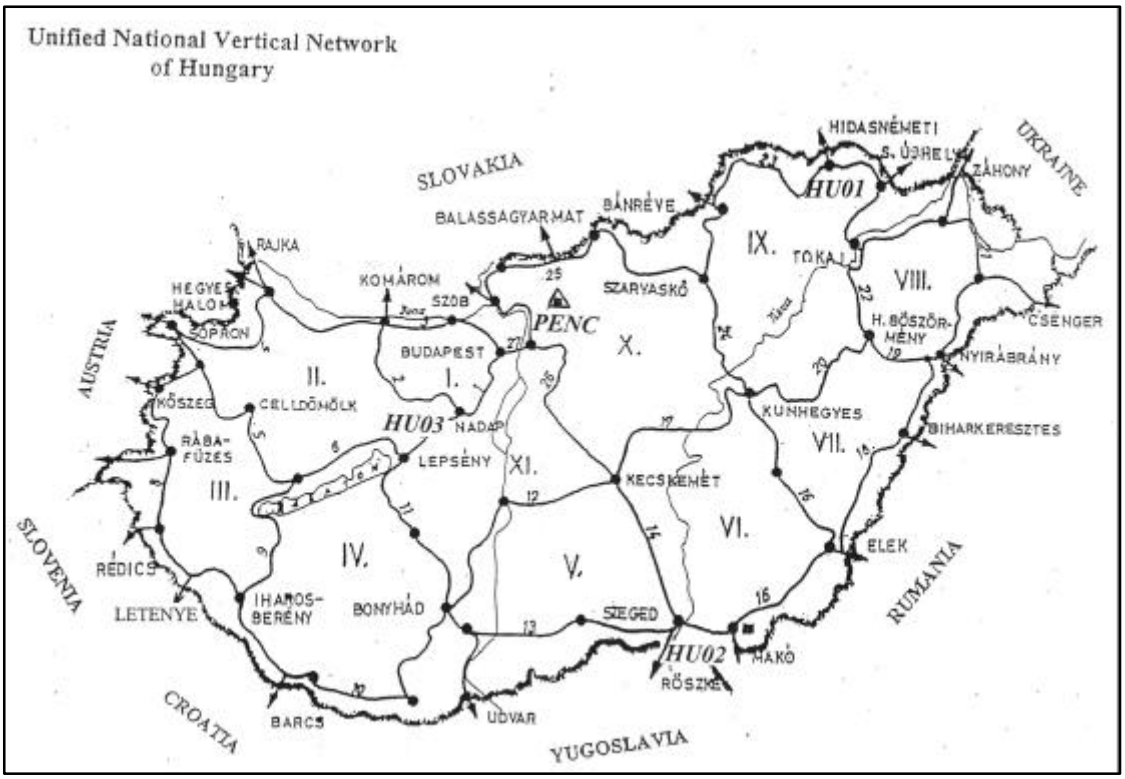


Fig.4
Sites of the 1st order Uniform National Vertical Network

EOMA consists of:
- 41 principal fundamental benchmarks,
- 5778 sites of 1st order,
- 2670 sites of 2nd order (ready at 50%),

- 5521 sites of 3rd order (ready at 50%),
- Hungary has a kinematic network containing about 1100 points along the 1st order leveling lines to study the recent crustal movements

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

A Database of Vertical Network contenting the data of height control sites (1st, 2nd and 3rd order) was created by FÖMI. These data are (see. Fig. 5): number of the sites, vertical coordinates, location of the sites (county, settlement, sheetnumber), date of determination, measurement and control of the sites, textual and scanned description of the surroundings.

P o n t l e í r á s MAGAB (C) FÖMI 1994

Locational and descriptive data of site

EOV Pontszám : Site number:	0001156-1	**EOMA magasság:** Height:	101.380
Elõzõ hálózati psz: Previous site number:	0456/I	**Elõzõ magasság:** Previous height:	**-**
Állandósítás módja: Construction type:	Csap	**Település neve:** Settlement:	Budapest XXII. Ker.
éve : year:	1973.	**Megye:** County::	Fõváros
Helyszínelés éve: Years of the checking:	1989., 1992.	**Szelvényszám:** Sheet number:	65-34
Mérés éve: Year of measurement	1976.	**Pont állapota:** Healthy of site:	rendben

Megjegyzés: **Helysz.r.leírás: XXII. ker. Nagytétényi út 325. sz. Gyümölcsös u. sarok Tichi Lipót és Szantoszky A. lakóép. gyümölcsös u. felöli oldalán, 6. sz. út 15.6 km-nél.**

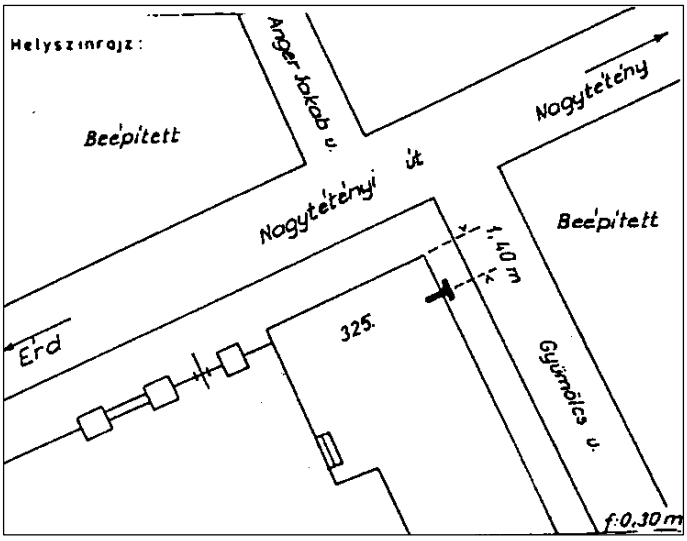


Fig. 5
Example printout from EOMA Database
(masked with English translation)

2.3.3. National GPS Network (OGPSH)

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

- 7 sites of Hungarian part determined in EUREF Network (1991 and 1997),
- 24 sites of the OGPSH (frame net) measured both in EOVA and ETRS-89 (1991),
- 1153 sites of the OGPSH measured all over the country (see Fig.6).

The 3D spatial coordinates of the OGPSH sites are referred to the EUREF-89 reference frame, as well as determined in EOV projection system for home mapping purposes.

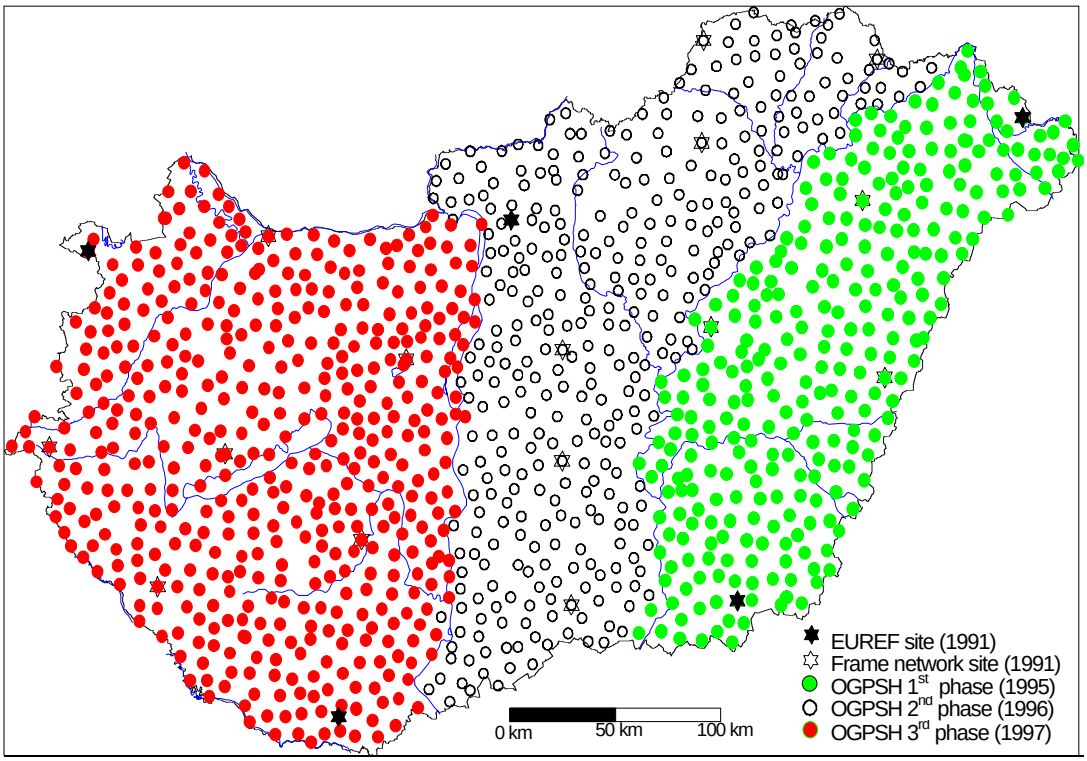


Fig. 6
Sites of the National GPS Network (OGPSH), Hungary

An OGPSH Database was created by FÖMI. The database contains the most important data of GPS control sites. These data are: number of the sites, the EUREF and the EOV vertical and horizontal coordinates as well as the location of the sites (county, settlement, sheet number), textual and scanned sketch approach (see Fig. 7).

GPS ALAPPONT PONTLEÍRÁSA

GPS SITE DESCRIPTION

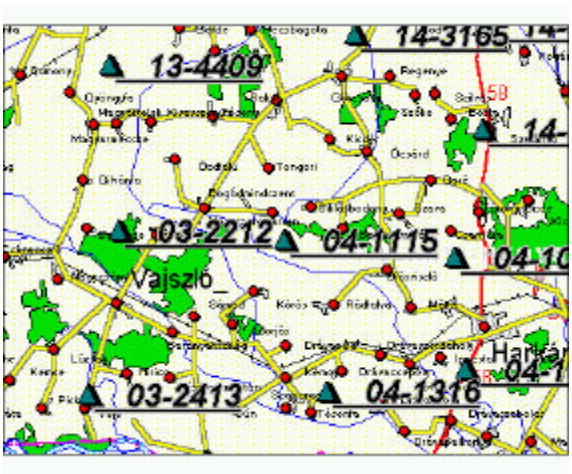
A pont EOV száma: 04-1115 **EOV number:**	**Település:** Hegyszentmárton **Settlement:**
Kiválasztotta: Paulik Sándor, 1997 Select by:	A pont jellege: HP Type of the site:
Pontvédelem: Safety construction::	Spec. info.:

EUREF89	X= 42300079,348	Y= 2381675,808	Z= 4556995,666
EUREF89 WGS-84	φ= 46-53-28.4097	λ= 10-6-2.3502	h= 215.953
EOV	y= 555501.39	x= 22270.24	H_{GPS}= 141.24

Megközelítési leírás (Description of approach)

Hegyszentmárton templomától a temetõ felé DK irányba haladva, 2.3 km után található a pont, az út mellett 7 méterre, a 47-es számú villanyoszlop közelében.

Megközelítési térkép 1 : 200 000
1 : 200 000 scale map for approach



Helyszínrajz
Site sketch

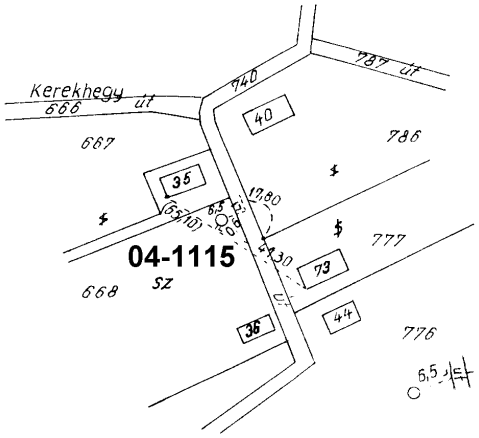


Fig. 7
Description of the OGPSH network sites *(masked with English translation)*

The superior accuracy of the GPS network (OGPSH) allows to analyse the traditional EOVA network as a whole. A comparison and analysis have been performed using a simplified 7-parameter Helmert transformation. The horizontal residuals after

transformation are shown in Figure 8. The maximal residuals are about 0.5 meters at the edge of the network.

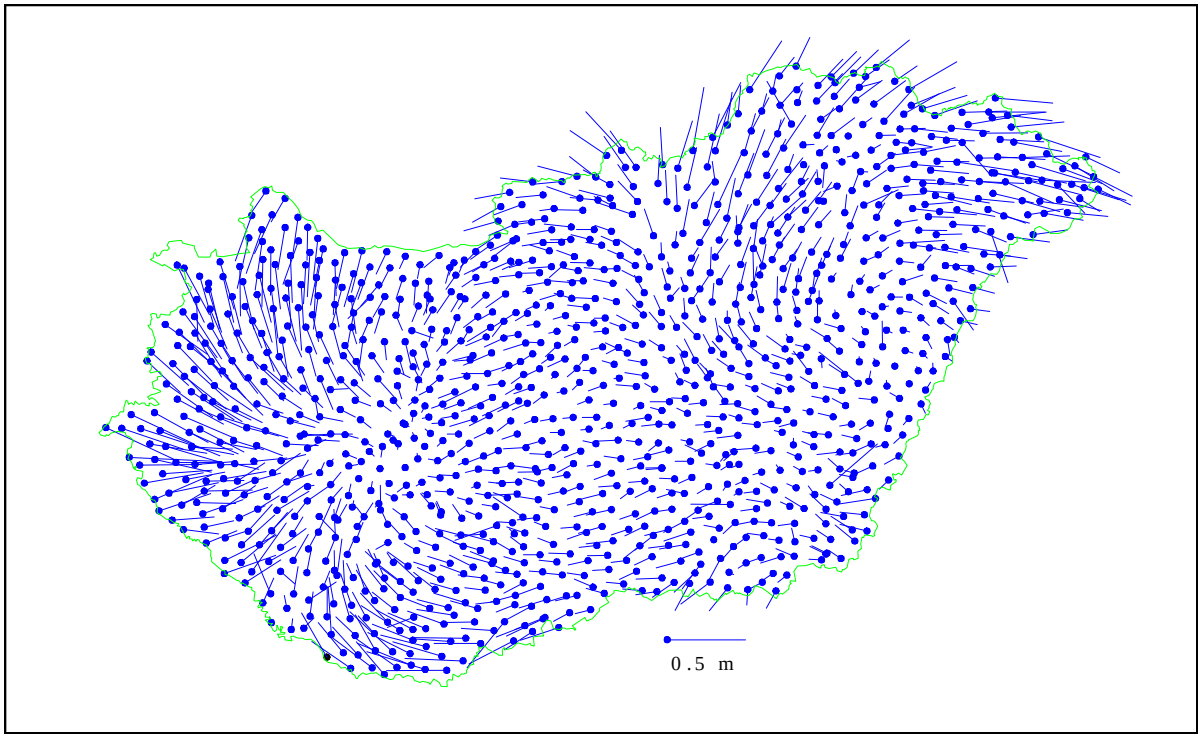


Fig. 8.
Horizontal residuals of the OGPSH and EOV networks

2.4. Geoid undulations

The latest gravimetric quasigeoid solution (HGR95C - see Fig. 8) has been derived in 1995. It refers to the GRS80 geocentric ellipsoid. The solution was derived from more than 380000 gravimetric measurements and the OSU91A geopotential model was used as reference. The geoid is available also in digital form on a 5 km by 5 km grid.

Supporting the GPS heighting activities the gravimetric quasigeoid has been combined with levelling and GPS data. The OGG98C GPS-gravimetric solution is planned to be used for GPS heighting.

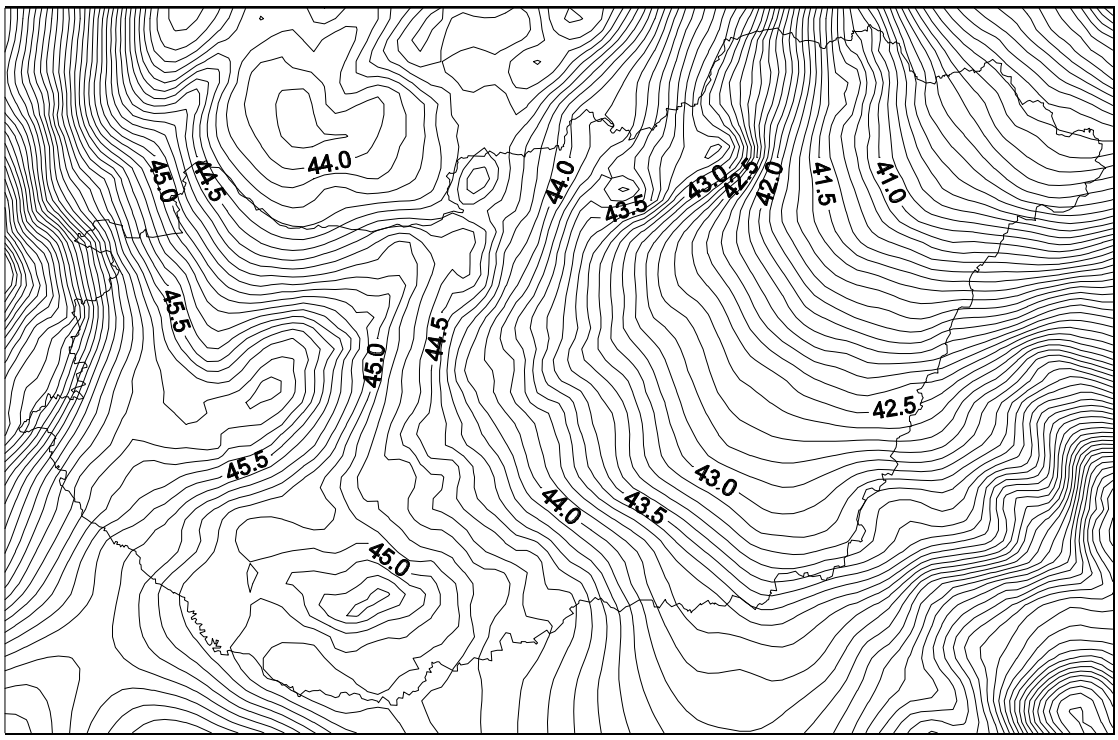


Fig. 9
The HGR95C gravimetric quasigeoid solution.
Contour interval : 0.1 m.

2.5. Control Networks recent and follow-on activities :

- Finishing the vertical network using GPS technology and levelling,
- The major actions to connect the Hungarian geodetic fundamentals to EUREF and UELN,
- National GPS Observation Service for use in different applications,
- Maintaining and analysing the Hungarian GPS Deformation Network,
- Participating the International GPS Geodynamic Service,
- Adapting GPS technologies for application in different survey tasks,
- Using the Hungarian Gödöllõ standard baseline for national and international calibrations,
- Participating in the European Vertical GPS Reference Network (EUVN) observation campaign,
- Improving of the present geoid solution for GPS-heighting applications.

3. The Cadastre and the Land Registration System

The Hungarian Land Registration System is a unified, multipurpose legal system, integration of the Cadastre and traditional Land Records (Grundbuch).

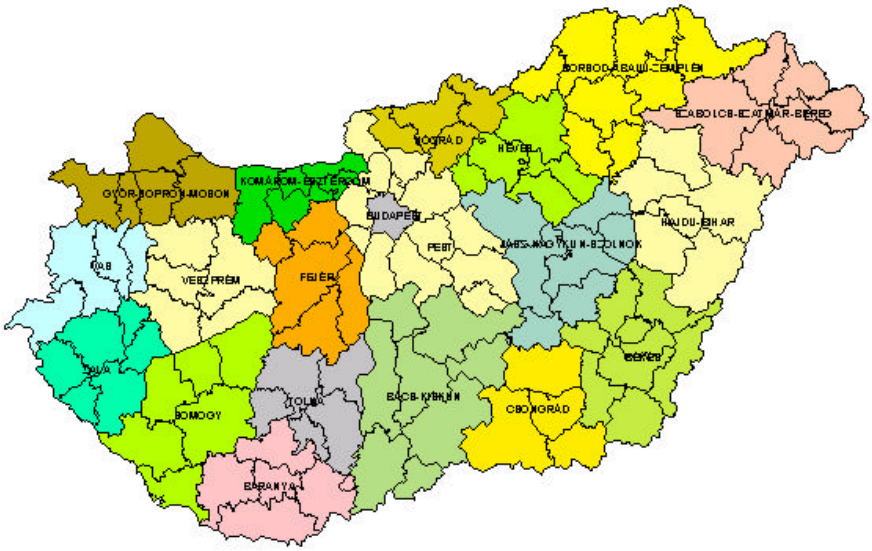


Fig. 10
County Land Offices and District Land Offices, Hungary

Hungary has an area of 93 000 km^2 and 10.2 million inhabitants. In the middle of the 90's there were over 7 million property records and 55,000 cadastral maps which were maintained by the District Land Offices and the Capital Districts Land Office (see Fig.9). In the 90's a land compensation programme has been enacted whereby land areas are redistributed to former owners or other compensation claimants and this has creating an effective 2.1 million new land parcels, with more than five million hectares. All these has to be managed, auctioned, divided, set out, and the results assimilated into the land register. This very heavy situation required prompt modernisation and computerisation of Land Offices network.

3.1. National Cadastre Programme

Approximately 60.000 cadastral map sheets cover Hungary from scale 1:1000 to 1:4000. Part of the sheets are in different projections, mapping systems and datums (stereographical, cylindrical etc.). Approximately 4 % of the sheets are available in digital form.

Land privatisation affects more than half of the territory of Hungary (5.6 out of 9.3 million hectares). The new parcels created during land privatisation are scattered all over the country making it impossible to keep the old cadastral maps up-to-date. Consequently, an overall map renewal data capture programme is necessary which takes place within the framework of the National Cadastre Programme.

In 1997 the National Cadastre Programme (NCP) was announced to produce digital cadastral maps involving digital data for an area of 3 million hectares coming from land privatisation. This programme is being separately funded by the Ministerial Commissioner's Office for National Cadastre Programme, from credit budget guaranteed by the Hungarian Government.
The NCP has started already. The performance is based on using a euroconform national standard MSZ 7772-1:1997 on digital base map and the respectively suited instructions.

The results of production of huge amount of digital mapping data will be integrated with land registry data in databases of the Land Office IT-systems — a Phare funded nation-wide computerisation of a map-based cadastral system called TAKAROS.

The technical and financial documents of the NCP have been elaborated focusing on the following items:
- Accelerating the data entry of the land registration records,
- Starting the renewal and new measurements needed for digital base map,
- Providing geometric template for land registration and for a wide range of applications,
- Education, training and management.

The implementation of additional planned actions, having impact on the NCP is scheduled using a priority scenario.
- Continuation of the pilot project on Land Re-organisation and Consolidation,
- Establishment of a Land-use Information System and Monitoring System based on pilot project and EUROSTAT/OECD nomenclatures,
- Large scale Digital Topographic Database (1:10000 scale range) development,
- Land valuation,
- Parcel-based Multipurpose Land Information System to support the Integrated Agricultural Control System to be introduced at the expected time of EU accession.

3.2. Land Registration System

There has been a Land Registration and Cadastre system operating in Hungary for over 150 years. This System was totally based on paper records consisting of cadastral maps (boundary information) and property sheet records which record the property description, ownership information, and any financial or other burdens on the property (i.e. the legal and administrative records). These records have been maintained more or less continuously and were unified in 1972. The unified Land Registration consists of:
1. Real estate registration map which is identical to the cadastral map and serves also for land surveying purposes.
2. The parcels each have a unique number and certain details are recorded on the 'Property Sheets'. Property sheet consists of three parts: page #1, #2 and #3.
   Page 1. with the descriptive data (parcel number, address, site area, features of cultivation, soil quality, etc.),
   Page 2. with the titles i.e. data relating to the ownership (name, birth, address, etc.),
   Page 3. with all the other titles and deeds (mortgages, restrictions, easements, etc.).
3. The land book contains the descriptive data of every real estate inside the community arranged according to parcel number order showing the extent of the total area as well.

Over the past six years the DLM, with the aid of the EU Phare Programme and, to a lesser extent, the Swiss and German Governments, has made considerable investments in the modernisation of the infrastructure for Land Management.

As result of the investments and of the counterpart funding from the Government budget, all of the Property Sheets (the Land Register) of the country have been loaded into PC based computer systems in the Land Offices by the end of 1997. This speeds up the management and updating processes as well as potentially makes them available for remote, on-line access by clients, banks, lawyers, public notaries and other interested parties.

3.3. Land Office IT-system

In the framework of the above task, the following actions are in effect or in preparation (realised or planned deadline in brackets):

- Installation of computerised Land Registration system (property sheet maintenance part) in decentralised form in the District Land Offices (1994) and in the Capital Districts Land Office (1996), connecting more than 2500 PCs in LAN.
- Loading of all real and land property sheets data (about 7.5 million properties) into the system (1994 - 1997).
- Installation of TAKAROS (TérképAlapú KAtaszteri Rendszer Országos Számítógépesí-tése – Countrywide Computerisation of Map Based Cadastre) system is one district in every county (till 1999 Sept.).The figure below shows the areas of the District Land Offices using the TAKAROS system (1999 Sept).

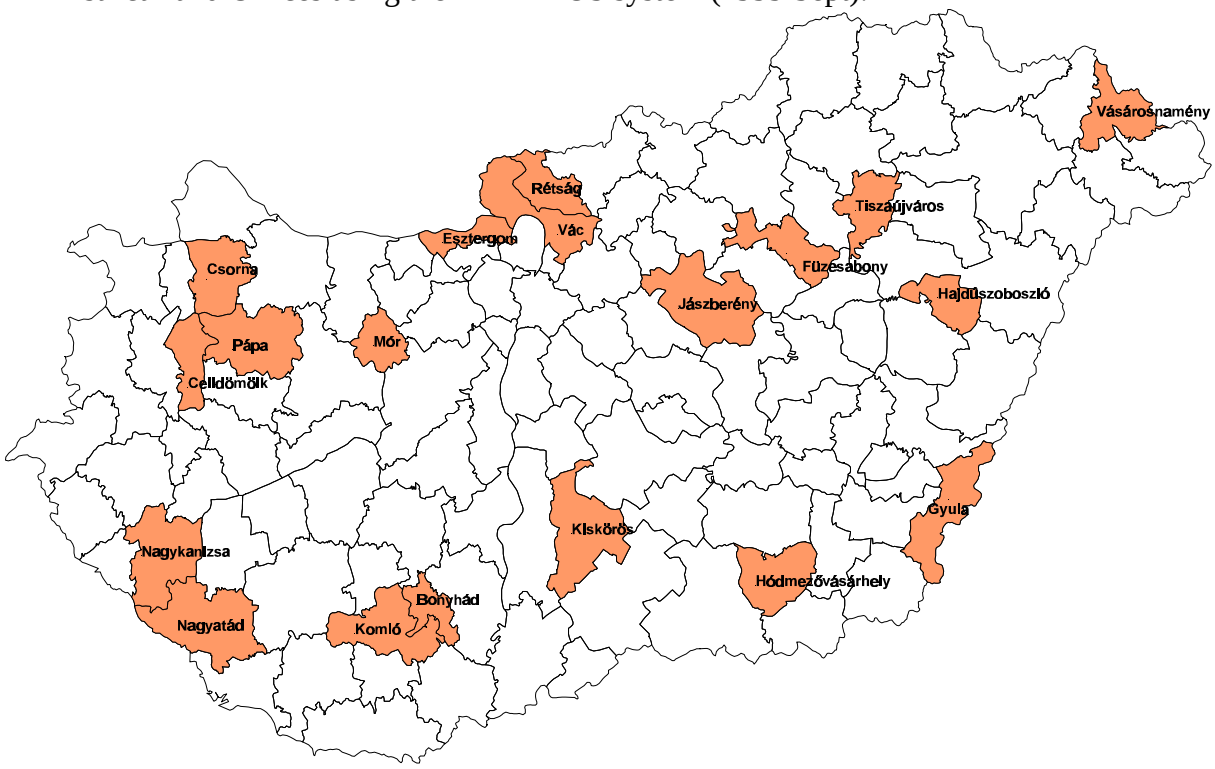


Fig.11. District Land Offices using the TAKAROS system

- Completing an intranet type wide area telecommunication network TAKARNET (TAKAROS NETwork) for countrywide data access/supply, by connecting the Land Offices with each other and with FÖMI and DLM (1997) as well as with external users (banks, public notaries, local governments etc.) respectively (1999-).

- The introduction of the TAKAROS/TAKARNET systems gives opportunity for the Land Offices to transform their information service requirements into proactive suppliers of structured spatial information. The County Land Offices are to be developed as the regional centres for spatial information, and this will involve development of marketing skills, product development, project management, and the definition of goods and services to be supplied. A marketing strategy was prepared in 1996-97 for this purpose.

- Development of County Land Office's META system funded by EU Phare Programme (MEgyei TAKAROS – County TAKAROS). In the framework of META will be created among others a Management Information System for monitoring, analysing, controlling and directing all of the activities of the Land Offices (1999-).

- Investigation of demands and opportunities for new market oriented services, and estimation of the expected income from such services (1997-).

- Preparation of a business plan and budget for a partially self-financed land office network, based on the previously calculated income from services (1998).

- Support for establishing a land mortgage institution (1998-).

- Development and installation of a central and county-level land use monitoring system, supported by META that enables MoARD to harmonise the agrarian aid system with the EU Structural Funds (1998-1999).

- Completion and modernisation of the 1:10000 scale topographic map series in interest of agrarian regional development programmes and general rural development (1998-2000).

- Review the legal basis of land management to reflect the requirements of the free market economy and modern technology in use for technical and administration procedures. This required that the law on land surveying and mapping be passed (1996), a new law on land registration be passed (1997), the concept of a law on land consolidation be proposed (1997) and the relevant legislation will be completed (1998).

- Introduction of an up-to-date land consolidation procedure aimed at improving land property structure and increasing the competitiveness of agriculture (1999-).

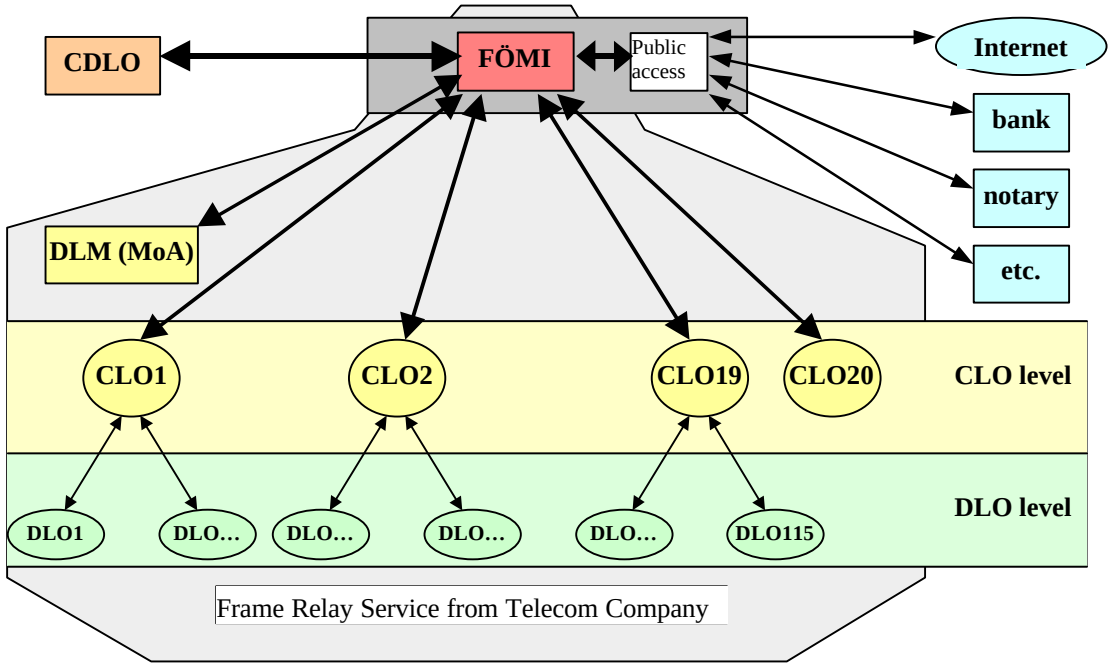


Fig. 12
Overview of TAKARNET

3.4. Land Valuation

In Hungary the system introduced in second half of past 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. However the system and its method became old fashioned, it is still in power and use. Its survival can be contributed to the fact that the arrangement of the land ownership conditions, the compensation by land, the reallotment of the land to the coop-members on basis of the original property value and, in general, the privatisation needed the value of lands in old golden crown system, since it is operating as a connecting tie between the past and present times. The golden crown system indicating the quality of the land promotes highly the rearrangement of the property conditions. Consequently, at least till the time when finishing that rearrangement, the validation of the golden crown system should be maintained.

3.5. Land Protection and Land Utilisation

The arable land is one of our nation's natural resources, which cannot be substituted but should be from time to time mended. Important economic interest is involved in its protection and its adequate utilisation. One prominent field among the activities of Land Offices is to perform tasks connected with protection of the arable land and with its proper use.

3.5.1. Land Protection

Arable lands can be used for purposes different from that of of agriculture only by leave of authority. To the utilisation of arable lands for industry, mining, water conservancy,

transport, community development and/or other purposes, a permission 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 the arable land, beyond the permission, a land protection fee should be paid, too.

3.5.2. Land Utilisation

In connection with land utilisation the Land Offices have double task. One is checking the obligation of land use, the other is promoting the land consolidation by means of spontaneous land exchanges.

As an undesired by-product of the land privatisation carried out in the recent years, scattered property patterns have been formed in our country, e.g. properties of arable lands belonging to a single land owner lie in 5-10 different field units, far from each other, and this fact is very disadvantageous from the point of economical production. To improve this situation, the present legislation offers only one possibility: the spontaneous land exchange. The arrangement of such exchanges, especially in 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.

3.6. National Standards and Regulations

The introduction of digital technology for the management of cadastral map requires standards. New and appropriate standards and regulations are created for 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 has been prepared by FÖMI and issued by the GIS Standardisation Committee (MB818) of the Hungarian Office of Standards and with support of MoARD/DLM.
- The technology development for the certification and quality acceptance of cadastral maps as well as the regulation for planning, creating and renewing maps, data exchange format, quality control and certifying of DAT (Digitális AlapTérkép - Digital Base Map) has been issued by DLM.
- National standard MSZ 7771:1997 Hungarian Data Exchange Format for GIS has been issued by Hungarian Office of Standards based on respective CEN TC 287 prestandard.

3.7. Legal Issues

There have been a number of changes in the Law relating to land issues in Hungary which have provided a framework for the land privatisation, supported the computerisation of land records and the adoption of digital technology. It was a good opportunity for examining the existing legal framework in terms of potential restrictive practices; simplifying the regulatory framework and reviewing the legal code; reviewing the credit

arrangements and resolving the issues concerning copyright and ownership. In the framework of this task, the following regulations are in effect or in preparation:

New laws:
- Act LXXVI (1996) on surveying and mapping activity.
- Act CXLI (1997) on Land Registration.
- Act XLVIII. (1999) amending Act LV.(1994) on Agricultural Lands.

New regulations:
- Directive No. 1/1998. (FVM. É. 19.) FVM. Subject: On cooperation of institutions participating in the National Cadastral Program (Ministry of Agriculture and Regional Development).
- Decree No.50/1999.(V.26) FVM amending Decree No.16/1997.(III.5.) FM. Subject: On execution of the Act LXXVI on surveying and mapping. (Ministry of Agriculture and Regional Development.)
- Joint Decree No.58/1999.(VI.18.) FVM-HM amending Joint Decree No.21/1997.(III.12.) FM-HM. Subject: On execution of certain parts of the Act LXXVI on surveying and mapping. (Ministries of "Agriculture and Regional Development" and "Defence".)
- Joint Decree No.63/1999.(VII.21.) FVM-HM-PM. Subject: surveying and cartographic national basic data management and supply. (Ministries of "Agriculture and Regional Development", "Defence" and "Finances".)

3.8. Creating of Quality System

The ministerial executive order of the Act LXXVI on Surveying and Mapping Activity says that all the surveyors creating so called Governmental base data must have a quality system covering the international quality standards. The Act also says the Land Offices managing the surveys and maintaining the maps and data must have an own quality system covering the international quality standards, too. The task of quality control of the cadastre belongs to the responsibility of Intstitute of Geodesy, Cartography and Remote Sensing (FÖMI) as a central surveying organisation. Certification audit of FÖMI on the ISO 9001:1996 is successfully over. Procedure for issuing the document about it is in progress. Creating a quality control system of cadastral activity of the Land Offices is planned in the next year. In addition we are going to get an accreditation for the Gödöllõ Base Line as an accredited calibrate laboratory.

3.9. Development of Human Resources

The modernisation tasks listed above are dependent on further development of human resources. High priority should be given to this problem, as the Land Management sector has more than 4600 employees. The training for the employees parallel with the daily activity can only partly be organised within the Land Offices themselves, so other forms of education should be applied.

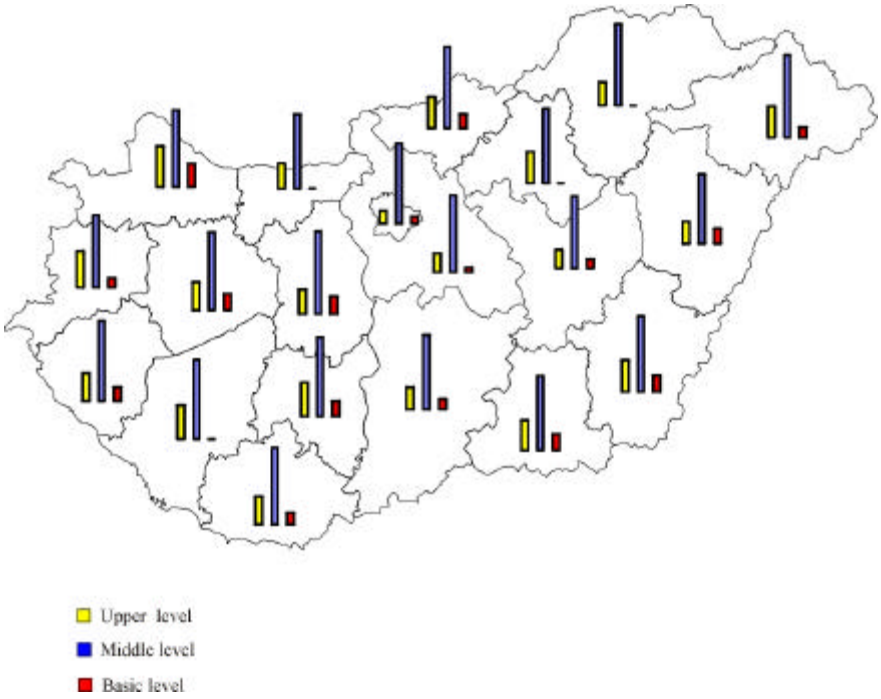


Fig. 13
The educational level of Land Office employees

The following actions are in effect or planned:

- GIS training for 800 land surveyors of Land Offices(1996);
- Training for Land Office employees in using TAKAROS system organised in various steps (1996 and 1997);
- Continuous training for county EDP managers (1995-);
- Preparation and start of a distance learning programme (OLLO - Open Learning for Land Offices) giving an academic level certificate (within institutional framework) for land surveyors. The programme is supported by EU Tempus Aid Programme (1996-);
- Preparation and start of trainings that give academic level certificate („Land Registration Secretary") for Land Registration employees within the NMA organisational framework. The programme is supported by the NCP (1996);
- Management training for District and County Land Office heads (1996-97);
- Training for Land Office employees on managing state acceptance and verification procedures for digital cadastral maps supported by the National Cadastre Programme (1997);
- Creation of Human Resources Development strategy for Land Offices (1998).
- Training for Land Offices 16 employees in using TAKAROS system (1998)
- Management training for 21 new system administrator employees of Land Offices in using TAKAROS system (1999).

3.10. Administrative Boundaries Database of Hungary

Data capture of administrative boundary sites (according to EUROSTAT compatible NUTS level) based on surveyed co-ordinates was completed in cooperation with Land Offices coordinated by FÖMI in 1998. The database can be used in statistics, regional planning, as well as agricultural and land related management. The database also acts in the INCO COPERNICUS program ABDS for the CEEC (Administrative Boundary Data Service for the Central and Eastern European Countries), which project is organised by FÖMI. Administrative Boundary Database of Hungary contents different products:

- MKH0 (surveyed coordinates of sites);
- MKH1 (generalized coordinates to 1 m resolution);
- MKH10 (generalized coordinates to 10 m resolution);
- MKH100 (generalized coordinates to 100 m resolution);
- MKH500 (generalized coordinates to 500 m resolution).

Each product contains the administrative boundaries of state, counties and settlements; the names and CSO (Central Statistic Office) codes of settlements.

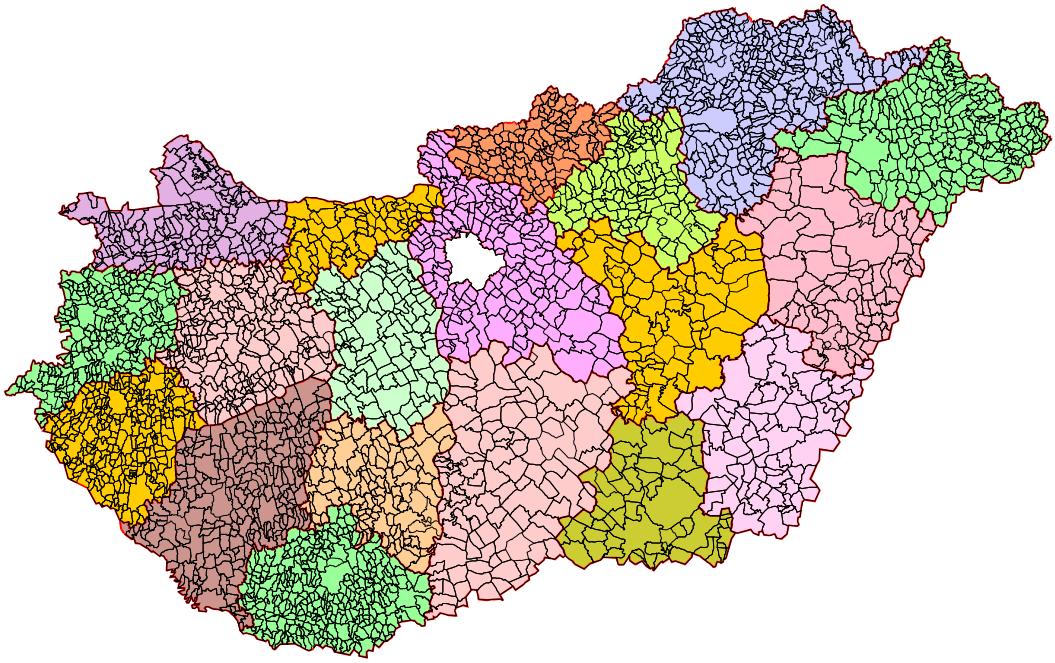


Fig. 14
Administrative Boundary Database of Hungary

4. Topographic and Cartographic Mapping

4.1. Topographic Mapping

In line with the Act on Surveying and Mapping Activities coming into force 1 March, 1997 the responsibility for topographic maps is divided between MoARD/DLM and the Mapping Agency of the Hungarian Defence Forces (MA of HDF) as follows:

- Scale 1:10 000:
  Department of Lands and Mapping, MoARD
- Scales smaller than 1:10 000 up-to 1:250 000:
  Mapping Agency of HDF

The status of the EOTR topographic map sheets of the Hungarian NMA is as follows:

- in scale 1:200 000: 23 EOTR sheets (100%),
- in scale 1:100 000: 84 EOTR sheets (100%),
- in scale 1: 25 000: 267 EOTR sheets (25%),
- in scale 1: 10 000: 3425 EOTR sheets (84%).

The status of the MA HDF topographic maps in UTM (WGS84) pojection is as follows:

- in scale 1:250 000: 6sheets (100%),
- in scale 1:100 000: 86sheets (100%),
- in scale 1: 50000: 319 sheets (100%),

In frame of the EU-Harmonisation Programme of the Ministry of Agriculture, the 1:100000 scale EOTR sheets have been digitized. Recently, the following products of the Digital Topographic Database (DTT-100) are available:

- raster data ofcontour lines (84 sheets, 100%),
  planimetry (84 sheets, 100%),
  hydrography (84 sheets, 100%),
  colour prints (84 sheets, 100%),
- vector data ofcontour lines (84 sheets, 100%),
  planimetry (58 sheets, 70%),
  hydrography (58 sheets, 70%),
- digital terrain modell for Hungary (DTM with 100m by 100m regular grid intervals).

A strategic plan of digitizing and receiving the 1:10000 scale topographic base maps of Hungary has been elaborated. The pre-standard MSZ 7772-2T on 1:10000 scale digital topographic maps has been prepared.

MA HDF has completed the development of the DTA-50 Digital Mapping Database, Version 1.0, for the whole territory of Hungary in 1996. The database, based on the 1:50,000 scale topographic maps with a total extent of 1.0 Gbyte, is available on CD–ROM in .DXF (AutoCad), .DGN (Intergraph), ArcInfo and MapInfo formats.

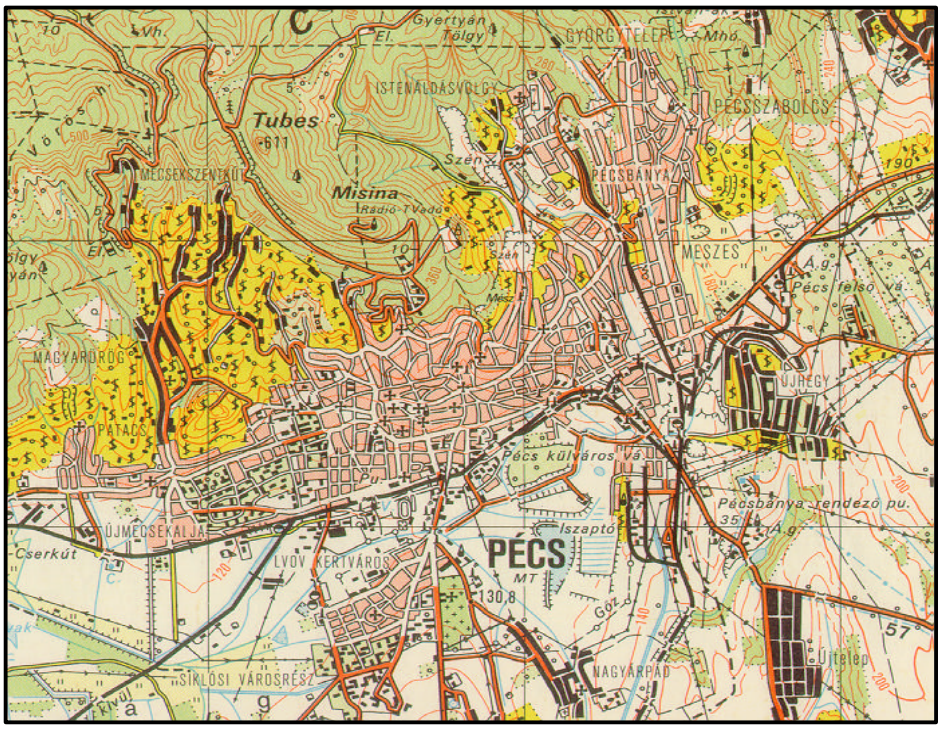


Fig. 15
Fragment from the 1:100000 Digital Topographic Map (© FÖMI)

4.2.Hungarian Topographic Program

Hungarian Topographic Program *(Magyar Topográfiai Program, MTP)* will be carried out in cooperation between civilian, military and some non governmental mapping organizations.

Keeping in view the present status, the emerging requests and the future demands for military and civilian topographic mapping as well as taking into account the creation of the juridical background, it has become necessary to develop of a modern, unified, digital topographic mapping system. Considering that almost all sectors of economy are concerned as user, this aim can be implemented by an independent, infrastructural development project, the *Hungarian Topographic Program*. The estimated duration of the program is six years, commencing on January 1, 2000.

The object of the Hungarian Topographic Program is the development of a topographic database and map series suitable for defence, administrative and national economic purposes as well as to fulfil the requirements of NATO and EU integration and Hungarian professional demands. It shall meet the complex requirements both in content and form and can became a uniform, interdisciplinary informatics base infrastructure of modern, informatics GIS systems. By this, the compatibility of systems of different purposes and content can be achieved.

As for its content, the Hungarian Topographic Program is a complex system designed for data capturing, data processing, data storing, product generating, change revising and data servicing tasks, putting classical topographic mapping on modern platforms. Its base technical component is the digital topographic database and map series, the parts of which can be utilized independently. Another integral part of the Hungarian Topographic Program is the creation and continuous maintenance of the digital topographic database and map series as well as the establishment and operation of the technology elaborated for servicing, and the organizational frame necessary to the fulfilment of the tasks.
In 1996 the Mapping Agency of HDF has completed the development of the 1.0 Version of its Digital Topographic Database (DTA-50) for the whole territory of Hungary with a total size of 1.0 Gbyte in .DXF (AutoCad), .DGN (Intergraph) as well as in ArcInfo and MapInfo formats, available on CD ROM, based on the 1:50000 scale topographic maps. The features in DTA-50 were separated in 13 categories. DTA-50 was produced in Gauss-Krüger Projection, but an EOV version is also existing. MA HHDF completed two types of Digital Elevation Model (DDM). The DDM-10 has a density of 10 by 10 metres and 2.5 Gbyte total size, while the DDM-50 has a density of 50 by 50 metres and 100 Mbyte total size. Both can be used in either Gauss-Krüger or EOV projections.

4.3. Database of Geographical Names (FNT)

The DLM is also responsible for the registration and supply of officially approved geographical names. The FNT database contains about 80000 names of administrative units, relief, hydrography, natural conservancy areas shown in the 1:100000 topographic series. Database is available in any RDBMS format.

4.4. Cartographic Mapping

According to the law, the small scale mapping belongs to the responsibility of Ministry of Defence in Hungary. Current status of topographic maps in scale 1:100000 and 1:200000 see before. The topographic map series in scale 1: 250000 for military and defence purposes is in compilation. Smaller scale maps, published by MA HDF, are also available for Hungarian territory in one-sheet variant and in international sheeting system as follows:

- in scale 1: 500000 9 sheets (100%),
- in scale 1:1000000 4 sheets (100%).

5. Remote Sensing

The two main mandates of FÖMI Remote Sensing Centre are:

- research and development of technologies for the applications of remote sensing primarily in the areas of agriculture and environmental protection/nature conservation;
- to provide an efficient service as National Distributor in the distribution, processing, archiving and utilization of satellite and aerial remote sensing data, plus consulting for the entire Hungarian users community in their RS projects.

FÖMI RSC distributes all European, American, Indian and Russian satellite images and has contracts with EURIMAGE, SPOTIMAGE, EUROMAP and the Russian Space Agency. The national archive of satellite images is maintained by FÖMI RSC. Hungary is totally and repeatedly covered by both SPOT and Landsat TM images. All digital satellite images of the national archive are on CD. FÖMI RSC serves also as basic institution of the Hungarian Space Office in Earth Observation.

5.1. Scientific activities and results

5.1.1. National Crop Monitoring and Production Forecast Program:

R+D plus operational applications

The Hungarian Agricultural Remote Sensing Program (HARSP) was launched in 1980. An entire decade (1980-90) was dedicated to the development of the basic image analysis, crop identification, crop area assessment, plus the remote sensing based yield modelling methods and techniques. The last period (1993-96) brought a substantial breakthrough: the crop monitoring and production forecast/estimation methodology was accomplished and validated by October, 1995 at a level that led to the operational applications of the developed technology. In 1996 the major R+D project got accomplished, while in 1997 an operational crop monitoring and production estimation project was implemented.

Since 1997, an operational crop monitoring and production forecasting program (CROPMON) has been performed in Hungary. It directly covers 9 counties, the 54 % of the Hungarian cropland and also provides extrapolated data for the whole territory of Hungary. Both the data and the crop and yield maps were very accurate and appeared earlier than the official, traditional (Central Statistical Office) data by 2-12 weeks.

From early 1997 another novel method has been developed for quantitative crop development assessment and yield forecast at the counties level and also for Hungary. This new method applies merely NOAA AVHRR satellite data series. The validation indicated a remarkable performance.

The CROPMON program is planned to expand to the whole territory of Hungary.

5.1.2. CORINE Land Cover project

The aim of the European Union’s CORINE Land Cover project is to provide up to date information on land cover at scale 1:100.000 for the whole Europe. The database includes 44 categories in accordance with a standard European nomenclature, organised into five large groups: artificial surfaces, agricultural areas, forest and semi-natural areas, wetlands, water bodies. Classification was done by visual interpretation using Landsat Thematic Mapper satellite image maps with the help of topographic maps as main ancillary material and field work. Following digitization the land cover information is stored in topological structure as ARC/INFO database. The project started in 1993 together with the neighbouring Central and East European countries and finished for Hungary in 1996. The final product has been integrated into the European database and is available for users.

Printed maps covering the whole country were produced at scales 1:500.000 and 1:200.000.

An experimental project to derive similar land cover at scale 1:50.000 was also carried out for selected areas. An experimental CORINE Land Cover–Level 4 nomenclature was formulated for Central Europe by experts of the participating countries (Czech Republic, Hungary, Poland and Slovakia) including 87 categories. Mapping was based on digitally merged Landsat TM and SPOT PAN satellite imagery. Two larger blocks have been mapped (Bükk-Nyírség and Kiskunság) covering about 15% of the country.

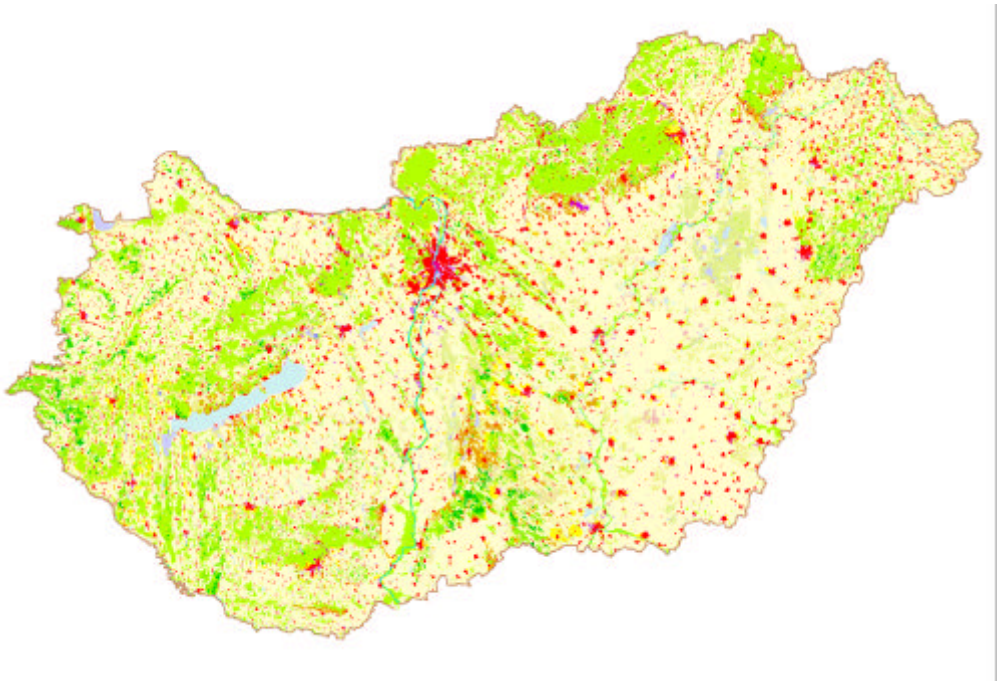


Fig.16.

CORINE Land Cover Database of Humgary

5.1.3. Danube Basin – Remote Sensing Demonstration project

The project demonstrated the possibility of the use of CORINE Land Cover data for practical applications in the field of hydrology and water management. Similar projects were implemented in Slovakia and Romania.

One of the most important pollutants in rivers is phosphorus. Phosphorus transport into the rivers of the Zagyva (Hungary) catchment was modelled in a two-year period using a raster GIS technology. The model (developed by WRc – Swindon, UK) uses several data components such as: topographic data (DTM), land cover data (CORINE Land Cover map) and related coefficients for modelling phosphorus export and evapotranspiration, soils data (hydrological parameters), meteorological data, phosphorus point source pollution data, time series of discharge data and phosphorus concentration data. The model predicts river discharge and produces phosphorus load data (phosphorus concentration in any point of the river network). The agreement of modelled parameters (discharge, concentration) and

measured data is acceptable. The model can be used in planning sustainable agriculture in the region.

5.1.4. ERS-SAR application R+D project

The aim of this project was to apply an integrated method for area estimation of four main crops covering an agricultural test area in Hungary on the base of the processing and analysis of multitemporal, weather independent radar (ERS SAR) and optical (Landsat TM, IRS-1C) satellite images. The test area (about 12 000 ha) is located in Szolnok county. The ERS SAR data (provided by ESA, monthly for the period of 1997), optical data used for national crop monitoring project, real time in situ ground truth data and digital cadastral maps were processed and analysed. The results of the project confirmed that the use of ERS–SAR data improve significantly the effectiveness of optical satellite remote sensing techniques.

5.1.5. Delimitation of the urban agglomeration of Budapest

The project – within the programme “Remoter Sensing and Urban Statistics” of EUROSTAT – was carried out with the collaboration of Hungarian Central Statistical Office and the Local Government of Zugló. The potential of Earth observation data were tested for establishing the standardised digital coverage of urban agglomeration of Budapest according to European nomenclature CLUSTER and the possibilities were analysed to detect changes over time. High-resolution satellite images (IRS-1C and COSMOS KVR-1000) together with digital cadastral boundaries of 78 settlements of the agglomeration were processed and analysed. The CORINE Land Cover technology was adapted and extended for this purpose. Data base according to CLUSTER–level II was created for the entire area of the agglomeration and according CLUSTER–level IV for Zugló district. Based on the results of the computer aided visual classification the delimitation of urban morphological zone has been created.

5.2. Users’ service, consultancy

Commercial agreements have been upgraded with EURIMAGE and SPOTIMAGE. The agreements provide possibility for FÖMI RSC to purchase and deliver Landsat, ERS, SPOT etc. data for Hungarian and foreign users. New commercial agreements have been made with EUROMAP for distribution of IRS-1C data, with SOVINFORMSPUTNIK for distribution of TK-350 and KVR-1000 data. A new agreement is under preparation with Nuova Telespazio for reselling fine resolution products of the first EarthWatch satellite.

According the commercial agreements FÖMI RSC distributes in Hungary raw or pre-processed satellite data (Landsat, SPOT, ERS-1, IRS-1C etc.) for research centres, university departments and profit oriented companies. Members of the RSC staff provide methodological and technical consultancy for end users of remote sensing data and take part in producing value-added products.

6. International Activities

The Hungarian NMA takes part in the work of a lot of international associations, unions, organisations. Some of them are as follows:

6.1. Membership in CERCO

Being represented in the CERCO since the 1991 Plenary Assembly held in Southampton, the Hungarian NMA agrees with and takes part in fulfilling the goals, mission, principal objectives and strategy plan of CERCO as well as actively joins its working groups on References, on Marketing and Copyright and on Quality in 1999, too.

6.2. Membership in MEGRIN GIE

Hungary is founder member of the MEGRIN GIE through FÖMI. The Hungarian Administrative Boundaries Database (in scale 1:500000) is part of MEGRIN's SABE.Database. Hungary takes part in the up-to-date process of SABE. Changes in administrative boundaries as well as the shore-line of lake Balaton were sent to MEGRIN, in SABE format. The description directory of the Hungarian geodetic references, as well as descriptions of different databases of the Hungarian NMA (DTT-100, Gazetteer, Database of Administrative Boundaries, CORINE, National Archive of Satellite Data, Database of the numerical points of the Hungarian State Boundary, Database of height control points, Database of horizontal control points) have been elaborated and submitted to MEGRIN GDDD. Their updating is also solved and provided by FÖMI. The PETIT project of MEGRIN is prepared to provide with Hungarian contribution using the 1:100000 scale digital topographic map. One of the auditors for MEGRIN GIE is provided by the Hungarian NMA.

6.3. Membership in FIG

Hungary has been a member of FIG for decades and has been always playing an active role in the organisation. The Hungarian National Committee (HNC) is represented in all of the nine commissions. Annual meeting of Commission 3. will take part in Budapest, 20-23 October, 1999.
A Hungarian paper presented on FIG's Working Week in South Africa between 30 Mays and 4 June was titled "Multipurpose Unified Land Registry as one of the Essential Pillars of Developing and Active Land Market in Hungary".

6.4. Membership in ICA

Hungarian membership in the International Cartographic Association dates back to 1964. This activity, carefully followed by the Department, has been marked by ICA's Budapest conference in 1989, a Hungarian Vice President in 1987-95, as well as participation in most of its commissions. A Hungarian presentation on its Ottawa Conference of 14-21 August, 1999, dealt with the transition from paper maps to digital technology in small-scale map publishing.

6.5. Membership in ISPRS

Hungary has been a member of the International Society of Photogrammetry and Remote Sensing (ISPRS) since decades. The Hungarian National Committee of ISPRS participates in all of the seven Commissions and provides Presidency and Secretariat for Commission VII devoted to Resources and Environment Monitoring. Budapest hosted the International Symposium of ISPRS Commission VII in September 1-4, 1998 (ECO BP'98).

6.6. Membership in IUGG and IAG

The Hungarian community in geodesy and geophisics are systematically represented in Study Groups and conferences of IUGG and its associated organization IAG. The Hungarian National IUGG Report gives a comprehensive overview on the Hungarian activities, including the IAG ones.

6.7. Membership in EUROGI

The Hungarian Association for Geo-Information (HUNAGI) was founded in 1994 and applied for EUROGI membership in 1995. Now, HUNAGI is full member in the European Umbrella Organisation for Geographical Information established by the support of the European Commission DG XIII. In August 1997 HUNAGI had 19 member organisations and associations including acknowledged representatives of the academic, governmental, non-governmental and private sectors. HUNAGI keeps regular contact with the European institutions and plays active role in international co-operations, e.g. the East-West Linked GI Laboratories Network coordinated by GISIG in frame of the COPERNICUS Programme of EC. The 4th EC GIS Workshop was hosted by HUNAGI in Budapest, June 24-26, 1998.

6.8. Participation in the CEN TC 287 and ISO TC 211 activities

According to the recommendations of the CERCO Advisory Board meeting held in Bad Godesberg,in 1994 the Hungarian Office of Standards established the Technical Committee MSzT/MB 818 devoted to digital mapping and GIS standardisation (a Hungarian mirror committee of the CEN/TC 287). As part of the activities in frame of the National GIS Project — as advised by CERCO — the professional surveying and mapping branch via FÖMI staff members are authorised to delegate to the meetings of the relevant European Technical Commission. The chairmanship of MSzT/MB 818 is provided by FÖMI of the Hungarian NMA. Two standards (MSZ 7772-1:1997, MSZ 7771:1997) and one pre-standard (MSZ 7772-2T) are the results of MSzT/MB 818 activity so far.

6.9. Participation in CORINE Land Cover Programme

The European Union's CORINE Land Cover project has been executed in Central and Eastern Europe as part of the PHARE Regional Environmental Programme. FÖMI Remote Sensing Centre is responsible for the implementation of the CORINE Land Cover project in Hungary. Details of the programme see in paragraph 5.1.2.

The programme manager of CORINE Land Cover – Hungary takes part in the work of the international supervisory board of European CORINE Project, Land Cover Technical Unit.

Experts of FÖMI RSC took part in the training of the CORINE photointerpretation team of the Macedonian Republic and Bosnia. The two countries started in 1998 the implementation of their CORINE Land Cover project within the regional PHARE Programme. FÖMI RSC is responsible for the technical management and control of these two projects.

6.10. Membership in EARSeL

In 1984, FÖMI RSC became observer member of the European Association of Remote Sensing Laboratories (EARSeL) and in 1990 obtained full membership in the Association, as the first organisation from Eastern Europe. In 1992 FÖMI organised the annual EARSeL Conference and General Assembly, as the first such event in Central and Eastern Europe. The head of FÖMI RSC is a full member of the EARSeL Bureau as treasurer.

6.11. OLLO — an international project

The education project supported by EC TEMPUS and MoARD/DLM is called OLLO (Open Learning for Land Offices). This special educational programme is designed to meet the needs and requirements of the staff in the Land Offices. The main project is run by the College of Surveying and Land Management at Székesfehérvár. Other domestic participants are the Department of Lands and Mapping, Ministry of Agriculture and the University of Veszprém. Co-operative partners are the School for surveying, University of East London (UK) as well as the Open Learning Centre, the Catholic University of Leuven, Belgium.

OLLO developed a course of 12 distance learning modules that cover a number of key subject areas related to land registration and compensation, surveying, data handling technology, management, and the use of these data in different applications.

Students are able to study the OLLO course in a number of ways. Firstly, students can take a single module as a special study course. Secondly, students may study a set of 3 or 4 modules as a special course of learning. Finally, the College hopes to be accredited all 12 modules studied together as a part of an postgraduate/MSc course. All modules can be studied by "distance learning". A project proposal called OLLO 2000 is in preparation to provide technology and know-how transfer for third parties in abroad.

6.12. Membership in UN standardisation of geographical names

Hungary has served the chairmanship of the East Central and South-East Europe Division of this activity between 1992-1998. It continues to be actively involved in the present period of Slovenian chairing which started with the last session of the Division in Ljubljana in April, 1999.

6.13. Participation in EUREF

In 1991 Hungary joined EUREF with GPS observations at five sites. The Satellite Geodetic Observatory of FÖMI in Penc is an EUREF station of which GPS data is available for everybody.

In the last years Hungary made her contribution to the geodetic integration of Europe. We are active member of the Technical Working Group of the EUREF Subcommission of IAG and the respective working group of CERCO.

6.14. The Administrative Boundary Data Services (ABDS) in the CEE Countries – Hungarian Initiative

In preparation of the 2nd Forum between the European Commission and the Central and Eastern European Countries (CEEC) on the Information Society in Prague, September 1996, the Hungarian National Committee for Technological Development (OMFB) has proposed to formulate a GIS initiative for the region. To underline the importance of the Geographical Information some continental, regional, national and local GIS was shown with success during the Forum as part of the Information Technology Presentations. The Forum has adopted this initiative named EGIS (later renamed to ABDS) within the number 19 in the action plan.

After the Forum the OMFB together with FÖMI began to start a definition phase of this initiative: discussions with colleagues from Poland, Czech Republic, Slovenia, with representatives of the National Mapping Institutions from the EU member states, from the CERCO/MEGRIN, EUROGI, EUROSTAT and different DG's of the European Commission were initiated. The original idea was refined into the Administrative Boundary Data Services (ABDS) for the CEEC. The ABDS should be an extension of the SABE dataset of CERCO/MEGRIN to the region as a new digital on-line service. The ABD coming from large scale mapping databases - conforming to new geometric and thematic generalisation rules to be set up by the competent organisations - and provided in the frame of the Memorandum of Understanding to be elaborated will be the core of the initiative. ABDS will be an important activity embedded in the European Commission's initiative to establish the Information Society in the European Union and the CEEC. It is part of the more general European Spatial Data Infrastructure as documented in the European Commission's GI2000 initiative. This Spatial Data Infrastructure will inevitably include the CEEC, and this more general frame is prepared simultaneously to ABDS.

Since the beginning of the Information Society initiatives, OMFB has been involved, and has received a mandate from the European Commission to continue the preparation and definition of activities in relation to the Spatial Data Infrastructure, based on their experience in project funding and management in digital large scale and topographic mapping, in GPS-application, image processing and Municipality Information Systems. Further steps had been taken in order to involve all relevant organisations from all CEEC

countries, and so establish the necessary co-operation with all these partners. The Hungarian NMA supported this OMFB's initiative, which was discussed in Budapest 14th March 1997 meeting with the participation of representatives of the partner countries as well as of the EC DG III, DGXIII, DGXVI, EUROSTAT, CERCO, EUROGI, CEN TC 287 and MEGRIN GIE.

In the frame of the INCO-COPERNICUS programme of the European Commission 10 organisation concluded the project contract for implementation of preparatory work for a database of administrative boundaries in the Central-Eastern European countries. 8 more associated partners and 6 experts joined the project. The co-ordinating organisation is the FÖMI.

The project started on the 1st of December 1998. It is implemented according to a well defined project program, where the work is divided into 5 work packages, 4 of them supporting the implementation of the deliverables of the project, while the horizontal activities, such as the project management, the activities of the steering committee and the board, networking are assigned to the 5th package. The large number of partners required establishing a special working methodology. Every task is elaborated by a smaller group of contributors, called workgroup. During this initial phase of work the documentation of the task is circled among the members of the workgroup. At the second phase, the whole project consortium has the opportunity for remarks and improvement.

The first work package of the project is the Inventory. The aim of the country inventories is to give a description of the administrative system in each country. This task is solved by a questionnaire to be answered by a documented data collection. The process of documented data collection means, that the question must be not only answered, but must contain the source, e.g. the links to the legal regulation and the data owners and providers. The questionnaire is intended to clarify the recent situation of the GI infrastructure and the circle of potential users of the database of administrative boundaries.
The questionnaire and the inventory in case of several countries are ready, now it is the turn of analyses of these results and implementation of the final county inventories in case of Estonia, Latvia, Lithuania, Poland, Czech Republic, Hungary, Romania, Bulgaria and Greece. There are also negotiations about the implementation of the county inventory in case of Scandinavian countries, to be carried out by the Finnish partner.

The Generalisation work package has started with the review of the methods in order to select that one, which is most suitable for our purposes. A dataset was provided for testing generalisation methods, but there are negotiations about developing new methods too.

The flow of information between the members of the project consortium was provided by the project secretariat. In the first period this flow was provided mostly by e-mail in addition to the traditional methods (phone, fax, mail). Because of the geographical separation and the large number of partners this task was rather difficult. In order to improve the circulation of information, a new method of work was developed on the Web (http://www.abds.fomi.hu), on the base of a special groupwork, where the member of consortium according to their role in the given phase of work can read or modify the documentation of the project.

In the future the work packages for preparation of Memorandum of Understanding and Standard Conformity checking will be opened.

At the end of each period Progress and Financial Report must be presented to the Commission. The preparation of the first reports are under way now.

The project will be completed by 31 May, 2000.

6.15. Land Information Services on the Web - FISH

FISH is a project of a consortia led by the Institute of Geodesy, Cartography and Remote Sensing (FÖMI). The project partners are Geocomp Ltd (ESRI dealer) and University of Sopron, College of Surveying and Land Management (SE FFFK).

The aim of the OMFB-IKTA founded project ("Web-based Land Information Services - FISH") is to support wide spectrum of the customers with land related data and information services on Internet. The geoinformation database supervised by FÖMI is one of the basic component of the information infrastructure of the information society.

The FISH project is based on the geoinformation technology by ESRI through its Hungarian company. The wide scale-range of products and services are going to be established (1:500 - 1:100 000) to support the wide range of users with public land related data and information.

The high quality data of the land office network and FÖMI guarantees that the data, thematic products and services carried out by the FISH project will result a basic geodatabase-inventory and public services, which serve the new information society as integral part of the information infrastructure. The public land-related base data, other data and mapping services will become widely known and easy to operate. The scope of the users will increase with the easy and flexible access to the land registry, surveying, mapping and geographic data, information or IT services. Services will help the everyday work of professionals in surveying, mapping and will also support land data users, map users or decision makers.

The FISH project will give an easy access for public use of the geodetic control points, central land-ownership data, metadata of analogue and digital maps, aerial photos and satellite images of FÖMI database according to the National Information Strategy. FISH promotes the principle of "one stop shop". The project will help citizens and institutions with services such precise scanning and geocoding, data transformations, thematic mapping, professional plotting etc.

In 1998 FÖMI issued a Web site (http://fish.fomi.hu/) in the frame of the pilot project to fulfil the needs of the users. The structure of the site is as follows:

- ✧News - Shop-window
- ✧Data warehouse
- ✧Registration
- ✧Products - Data bases, maps, aerial photos, satellite images, software
- ✧Search - What is available in the given location?

- ✧Services - From data collection, data integration to analysis and thematic mapping
- ✧Information desk - Frequently Asked Questions
- ✧Search - Keywords
- ✧Users - Ideas, catalyst role
- ✧Partners - Other data providers - Synergy, integration

The project is targeting a wide range of users. We underline among them local governments, decision-makers, banks, institutes for regional planning and development, environmental protection, public utility companies, scientific and educational institutions, culture and hobbies etc.