

## Land Information Services on the Web

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**Abstract.** The presentation and demonstration is dealing with the experiences of a research project led by the Institute of Geodesy, Cartography and Remote Sensing (FÖMI). The main project partners are ESRI Hungary Ltd and University of Sopron, College of Surveying and Land Management (SE FFFK). The aim of the Hungarian National Committee for Research and Technical developments (OMFB) founded project (Web-based Land Information Services - FISH) is to support wide spectrum of the customers with land related data and information services on the Internet. The nation-wide geoinformation database managed by FÖMI is one of the basic component of the information infrastructure. The authors give an overview of the results of the FISH project.

### 1. Introduction

The FISH project was based on the unique-value spatial database of FÖMI, on the experiences, tradition in serving spatial data and the WEB-based geoinformation technology by ESRI. The wide scale-range of products and services were established (1:500 - 1:100 000) to support the users with public land related data and information.

The high resolution data of the land office network and FÖMI guarantees that the data, thematic products and services carried out by the FISH project resulted a basic geodata-inventory and public services, which serve the information society as integral part of the information infrastructure. The public land-related base data, other data and mapping services became widely known and easy to operate. The range of users will increase in the future because of 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 gives an easy access for public use of the geodetic control points, central land-ownership database, 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 helps citizens and institutions with services of precise scanning, geocoding, data transformations, thematic mapping, professional plotting etc.

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.

## 2. Background

Since 1972 the Ministry of Agriculture and Regional Development (MoARD) has been responsible, in its Land Offices, for both the land and property registration (detailed description of land parcels, ownership and other rights on the property sheets) and the updating of large scale cadastral maps to which they are referenced. Those maps show the authentic location of the properties. This unified Land Registry and Cadastre enables the Department of Lands and Mapping (DLM), which is responsible to the Ministry for the County and District Land Offices, potentially to offer a very efficient service to all users of land and property information. This potential is further enhanced by the Department's other responsibilities for land classification (valuation), land use monitoring and land protection. Mission of FÖMI is to give the basic research and development background to DLM and Land Offices (Land Registration sector).

The Land Registration sector is a key component of a free market economy whereby the safe and secure transfer of Title can be freely conveyed. In Hungary, as in many other European countries, the Government acts as the guarantor of title through the act of registration of property which records all required legal, administrative, financial and physical description information within the system of the register and upon the cadastral map. The map records are tied to the legal and property records by means of a unique identifier. In Hungary, this system is largely in place, and coupled with the decentralised nature of the Hungarian system, the system provides the large scale basis for the collection and recording of other land related data (land use and classification, land protection) and thus forms a true multipurpose cadastre, which gives the system great strength and forms a potentially valuable state asset (note that other European countries, including those from Western Europe are trying to move towards this kind of system). The conclusion is that the form of Land Registration System as practised in Hungary is fundamentally sound and should be retained.

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

The Hungarian Land registration is a modern multi-purpose system which performs the task of the 'Grundbuch' system, the Cadastre system, the land use and qualification systems and is also used for land valuation. The system has to deliver the following national requirements:

- Providing security of titles
- Supporting the Mortgage Institute
- Supporting Land Compensation and Privatisation
- Stimulating the Land Market
- Providing Data for Taxation Purposes
- Providing Data for Urban Planning
- Providing Data for Utility Registration
- Providing Data for Agricultural Planning
- Providing Data for other National Services (e.g.: Forestry, Hydrology etc.)
- Providing Data for the National Statistics
- Providing Data for the Local Authorities
- Providing 'Positive' registration and a guarantee of the registered data

In 1997 started the National Cadastre Programme, which aims to produce digital cadastral maps involving digital mapping 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 the National Cadastre Programme, from a loan guaranteed by the Hungarian Government.

The production of this huge amount of digital mapping data enables the Land Offices to integrate the maintenance and updating of the property sheet database created as a result of investments mentioned earlier, within the Land Office IT-systems (Phare funded TAKAROS - computerisation of a nation-wide cadastral

system). Furthermore, it serves other sectors of the national economy with a single comprehensive source of land information.

TAKAROS Network provides the Land Offices with Telecommunications and Network Infrastructure. This introduced a FRAME RELAY type supply of connection sockets into each Land Office and provision of the data carrying service. The hardware and standard software needed by the Land Offices to connect between their LANs and the telecom supplier's sockets as well as the installation of these systems. It also includes a security 'Firewall' system, a network management system and servers for setting up the external data services. It operates through an interface similar to that of the World Wide Web and some WWW based software applications.

The introduction of the TAKAROS and TAKARNET (nation-wide area network) systems allows an 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 the 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 involving Ordnance Survey (UK).

### 3. Aims

The aim of the FISH project was to support the information society with metadata and land-related base data (land ownership, geodetic, topographic, remote sensing data), land and geographic information products and services on the Web alongside with DLM's other initiatives.

### 4. Website Structure

In 1998 FÖMI issued a Website (<http://fish.fomi.hu>) in the frame of the pilot project to fulfill the needs of the users.



Fig. 1 - FISH homepage - English version

The structure of the site is as follows:

- News - Shop-window
- Products: Data warehouse - Registration - Data bases, maps, aerial photos, satellite images, software
- Services - From data collection, data integration to analysis and thematic mapping
- Search - What is available in the given location?
- Information desk - Frequently Asked Questions
- Search - Keywords
- Users - Ideas, catalyst role
- Proposals - Feedback
- Partners - Other data providers - Synergy, integration

## 5. Needs

Land Offices and the Institute of Geodesy, Cartography and Remote Sensing have promised the traditional map-based data provision for decades. The TAKARNET (WAN) network was brought into everyday use this year. TAKARNET took a qualitative change in the achievement of databases stored at the Land Offices. In connection with the EU accession of Hungary from both the foreign and the national economical, governmental users, researchers a considerable increase of information needs can be expected. We underline among them the following:

- local governments
- public utility corporations
- banks
- institutes of planning, environmental protection and regional developments
- decision support of investors
- tax offices (assessment, collection, controlling)
- scientific and educational institutes
- regional developments
- culture and hobbies.

## 6. Metadata description of products and services

The FISH project according to the National Information Strategy developed core metadata-base of products and services of FÖMI based on the Hungarian Base Map Standard. Meantime the Prime Minister's Office started a national clearinghouse project (METATÉR), which described soon a new EU compatible metadata standard (HunCore) used in the second phase of FISH.

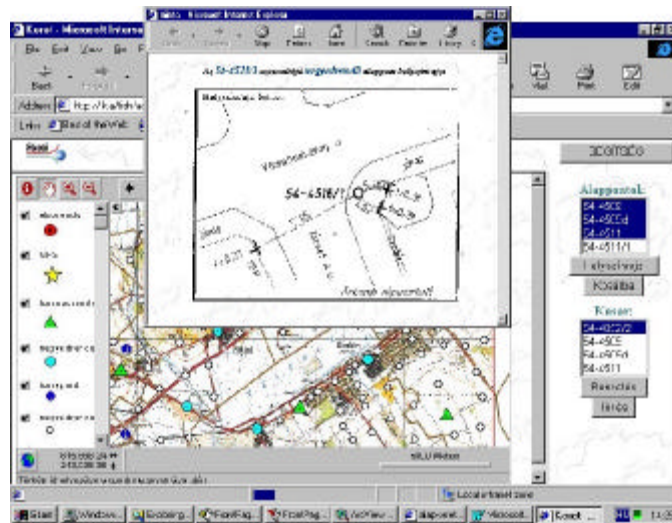


Fig. 2 - On-line Internet service on benchmark selection

The above mentioned structure allows easy access to the central land registration, to the public use of land related data, information for wide-range users. The project promotes the success of "one stop shop" approach. Data and information services by the consortium are as follows:

- property data of land registration, and statistical information derived from them
- authorized cadastral and topographic databases
- cadastral and topographic maps (paper and digital)
- Administrative Boundaries Data Services
- geodetic control points
- satellite images and aerial photographs
- CORINE Land-Cover Database
- Gazetteer etc.

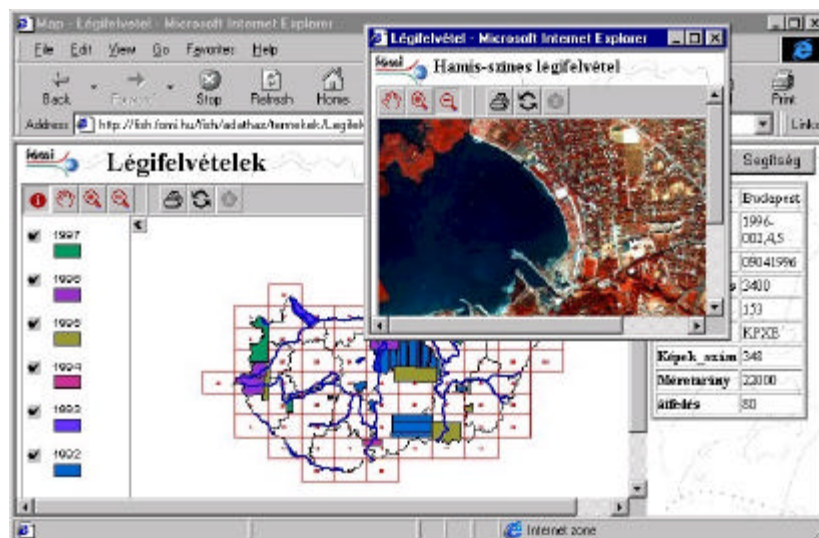


Fig. 3 - Thematic search in the Aerial image database

Execution of purposes was based on the information infrastructure established within the frame of PHARE, TEMPUS, OMFB, OTKA etc. projects. The project translated a world-leader technology into the Hungarian practice, establishing such products and services, which supported the indispensable base data, so called "public utilities" of the information society.

The wide scale-range of products and services which were established makes possible that the users can utilize public information with higher order efficiency and benefit than in the ordinary case.

## 7. Development

In the international market of geoinformatics there is a change-over to the cheap and easy-to-learn systems from the "traditional systems" both the area of products and the attitude. Services are often based on the Web technology.

There is no such a complex service in Hungary as described in the FISH project. The services open the access mainly to the metadata of public land management, mapping and geodetic data.

We ensure wide access on Internet, which technology allows that the users, interested in our data, can be connected to the server besides the professional users. A Web server is the base of the service, where a relational database management system (RDBMS) with a geographic information system (with a suitable Web interface) in the background, which can handle the geographic data and attributes simultaneously. Data searching and selecting can be execute with the help of interactive Web sides. The language of the Web sides at the beginning of the project had been Hungarian. English version was available in the second phase. The data and information services and the use of the database resulted electronic commercial actions. We planned also limited free data services (e.g. for educational institutions and marketing purposes).

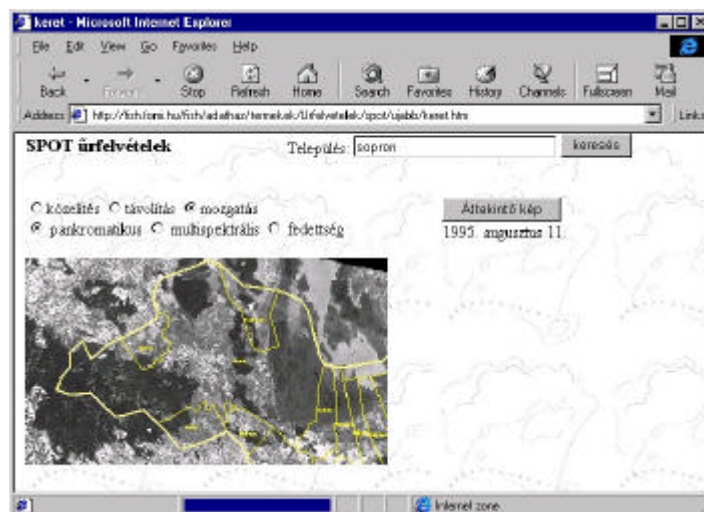


Fig. 4 - Thematic search in the Satellite image database

## 8. Expectations

High quality data-treasure of the Land Offices and the Institute of Geodesy, Cartography and Remote Sensing guarantees, that the products and services carried out by the project will become an integral part of

the information society. The public state base-data, other mapping data services will be more widely known and used remotely in a user-friendly way. The number and range of the users will increase with the easy and flexible access of land ownership, management, mapping and geodetic information. Services help both the beginners and professionals in GIS. FISH supports wide-range of users from citizens, small private companies to local governments, decision-makers etc. The metadata services decrease duplications for the benefit of the whole society.

## 9. Future plans

The project will be finished in October 1999. FÖMI is planning to continue developments on the area of E-commerce targeted by FISH in the frame of other projects and co-operations. The following main directions are proposed by the project team:

- Extension the range of value-added data
- Extension the geographic and time-dimension of the data
- Development of new land market-oriented services
- Advanced electronic commerce based on TAKARNET experiences
- Integration of other applications and partners
- Harmonisation with the EU standards
- Connection to the similar systems in other countries

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