

HUNGARIAN APPROACH TO THE MODEL OF DATABASE FOR UNIFIED LAND REGISTRY

by

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1. Short overview of land affairs in Hungary

Hungary has an area of 93 029 km² and 10.2 million inhabitants. In the middle of the 90's there were over 7 million property records and 60 000 cadastral maps. During the political and economical changes in the 90's, a land compensation programme has been enacted whereby land areas are redistributed to former owners or other compensation claimants. So, and effective 2.1 million new land parcels has been created on more than five million hectares. All these have been managed, auctioned, divided, set out, and the results assimilated into the Cadastre System. This situation required prompt activities, modernisation and computerisation of Land Offices network in the last decade. Now new land tenure trends and voluntary land consolidation procedure started – the legislative introduction of theirs are expected.

2. Real Estate Registration and Cadastral Maps as the Cadastre System in Hungary

There have been land book, land registration and cadastral maps 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 continuously been maintained and were unified in 1972 by the Act on Real Estate Registration. Later on modernised legislation become in force by the Act LXXVI (1996) on Surveying and Mapping and the Act CXLI (1997) on Real Estate Registration.

The modernised, already complex cadastre system (often called unified real estate registration) consists of:

- Real estate registration sheets. The parcels each having a unique parcel number in a given settlement and certain details are recorded on the „Property Sheets”. Property sheet consists of three parts: Page #1, #2 and #3
 - Page 1. Descriptive data (parcel number, address, area, cultivation, soil quality, etc)
 - Page 2. Titles i.e. data relating to the ownership (name, birth, address, etc.)
 - Page 3. All the other titles and deeds (mortgages, restrictions, easements, etc.)
- Real estate registration map, which is identical to the cadastral map and serves also for land surveying purposes.

3. Lands and Mapping Sector in Hungary

Recently, for registration of land parcels and other real estates (e.g. buildings), a full cadastre system (unified land registry) is in force in Hungary, identical with the concept introduced by FIG. It is a unified, multipurpose legal system, integration of the cadastral maps and the registration records including the traditional Land Records. The Hungarian Cadastre System is operated by the District Land Offices of the counties and the Capital Districts Land Office of Lands and Mapping Administration (See Fig.1.)

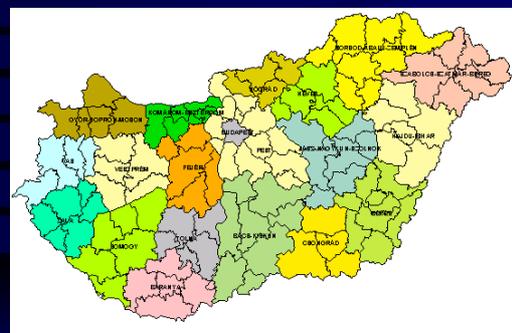
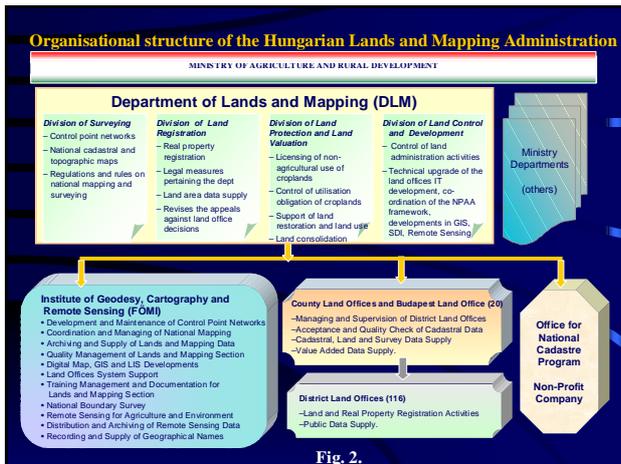


Fig. 1.
County Land Offices and District Land Offices, Hungary



The system has to fulfil the following national requirements for the interest of sustainable development

- Providing security of titles
- Supporting the Mortgage Institution
- Supporting Land Compensation and Privatisation
- Supporting Land Consolidation procedures
- Supporting and enabling the land tenure actions
- Stimulating the Land Market
- Providing Data for Taxation Purposes
- Providing Data for Urban and Regional Planning
- Providing Data for Utility Registration
- Providing Data for Agricultural Planning
- Providing Data for other National Services (e.g.: Forestry, Hydrology)
- Providing Data for the National Statistics
- Providing Data for the Local Authorities
- Providing „Positive” registration and a guarantee of the registered data

4. National Cadastre Programme

Approximately 60 000 cadastral map sheets cover the area of Hungary at scales from 1:1000 to 1:4000. A large part of the sheets are in different projections, mapping systems and datum (stereographical, cylindrical etc.).

After the political and economical changes the land privatisation affected more than half part of the country (5.6 out of 9.3 million hectares). All efforts have been made to keep the old cadastral maps up-to-date during the land privatisation process. From the other side, a nation-wide map renewal (data capture) programme was worked out to realise the unification and updating the existing systems within framework of the National Cadastral Programme (NCP). New, EU-conform professional standard and instructions prepared by FÖMI for digital mapping were issued by the Hungarian Body of Standardisation and the DLM of MARD.

5. The Modernised Lands and Mapping Administration

Over the past decade, the DLM with the aid of EU PHARE Programme and, to a lesser extent, of the Swiss Government, as well as based on Hungarian government budget considerable investments has been made the modernisation of the infrastructure for Lands and Mapping Administration.

Actions:

- Installation of computerised Real Estate 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 supported by PHARE.
- Loading of all real and land property sheets data (about 7.5 million properties) into the system (1994 - 1997).
- Installation of a TAKAROS (TérképAlapú KATaszteri Rendszer Országos Számítógépesítése – Countrywide Computerisation of Map Based Cadastre) is completed by the end of June 2000 in all District Land Offices. A version of TAKAROS called BIIR is installed in the Capital Districts Land Office.
- 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.), 2002.

- Reconstructed version (2002-2003) of the BIIR software and database at the Capital District Land Office is now active.
- 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 under development to be regional centres for spatial information (this involves development of marketing skills, product development, project management, and the definition of goods and services to be supplied).
- Development of County Land Office's META system funded by EU PHARE Programme (MEgyei TAKAROS – County TAKAROS) and financed by MARD. In the framework of META – among others – a Management Information System for monitoring, analysing, controlling and directing all of the activities of the Land Offices is to be finished in 2003.



Fig. 4.
The physical context of the TAKARNET

11. STANDARD ON DIGITAL BASE MAP

MSZ 7772-1:1997 Digital Maps: Part one: Digital Base Map Conceptual Model

This standard is referred to in Hungarian as "DAT-Standard" by its Nick-name.

The DAT Standard gives prescription of the following main groups of information:

- Cadastral and Real estate data
- Natural and Man-made features

Prescriptions are formulated as adequate to resolution available in scale band 1:1000–1:4000. The data handling unit is the settlement.

11.1. DESCRIPTION OF THE CONCEPTUAL MODEL OF THE DAT STANDARD

The following chapters of the DAT Standard are describing the conceptual model:

- Terminology,
- Data model of the digital base map,
- Position (spatial referencing): Map projection system (Hungarian EOVS), Reference system (Hungarian Datum, HD-72), Height system (Baltic sea level, ortometric),
- Classification of objects and thematical structure,
- Spatial schema: Geometrical primitives, Topological primitives, Spatial view, Explanatory texts,
- Attributes,
- Relations: between nodes, between edges, faces and rings,
- Data quality: Source, Extent of application of data, Quality of geometric data, Quality of attribute data, Actuality, Completeness, Consistency of data, Technology for data collection, Data protection, Verification.

11.2. STRUCTURE AND OBJECT CLASSIFICATION OF DIGITAL BASE MAP STANDARD

The digital maps are represented in object-oriented relational database. The specific objects are described by their attributes, relations and data quality parameters.

At conceptual model level the specific objects are represented by their generic objects. Those objects for which the attributes are common are grouped into one object group. The object groups having common attributes at higher level are grouped into one object classes.

Three object types are distinguished by its geometry: point, line, surface objects. The objects are managed by their topology such that fulfilling the full-topology requirement. The topology elements distinguished are: node, edge and face. The nodes are divided into more specific types.

By geometry, the digital base map databases are 2-dimensional with planimetric coordinates. The heights are or can be given as attributes.

The attributes, relations and quality parameters are defined in the standard as generic. Their values are given in supplementary tables.

11.3. PHYSICAL MODEL OF THE DIGITAL BASE MAP – TECHNICAL REGULATION

DAT1. Instruction on "Planning, producing, renewing, documenting, checking, quality-checking, certifying and state acceptance of Digital Base Maps". Budapest, 1996.

DAT1-M2. Supplement Instruction on "Structure, data tables, exchange format and handling rules of Digital Base Maps". Budapest, 1996.

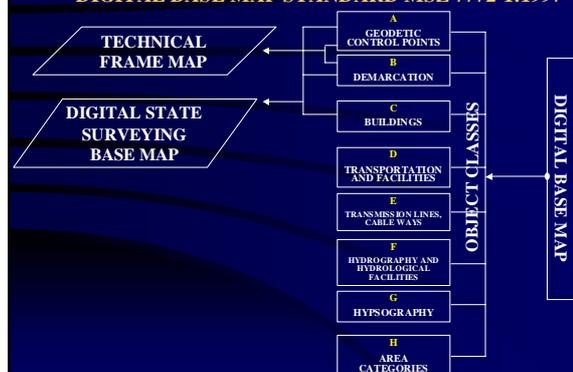
DAT1-M2. Supplement Instruction on "Legends for printing the Digital Base Maps". Budapest, 1996.

DAT1-M3. Supplement Instruction on "Checking and certifying the inner consistency of data of Digital Base Maps". Budapest, 1996.

DAT2. Instruction on "Digitizing the multipurpose analog cadastral maps and its quality checking." Budapest, 1996.

DAT2-M1. Supplement Instruction on "Transformation between different projection systems used in Hungary, with special emphasis on transformation to the regular projection system EOVS." Budapest, 1996.

THEMATIC STRUCTURE DIGITAL BASE MAP STANDARD MSZ 7772-1:1997



OBJECT CLASSIFICATION DIGITAL BASE MAP STANDARD (MSZ 7772-1:1997)

- A GEODETIC CONTROL POINTS**
 - AA Horizontal and 3D geodetic control points
 - AB Vertical geodetic control points
 - AC Survey points

- B DEMARCATION**
 - BA Administrative unit boundaries
 - BB Administrative sub-unit limits
 - BC Parcels I. (public domain)
 - BD Parcels II. (non-public domain)
 - BE Subparcels and branches of cultivation
 - BF Quality classes of arable land

- C BUILDINGS**
 - CA Buildings
 - CB Accessories of buildings
 - CC Fences, sustaining walls
 - CD Ground objects, special buildings
 - CE Statues, monuments, memorial places

- D TRANSPORTATION AND FACILITIES**
 - DA Identification points of transportation facilities
 - DB Roads and facilities of built-in areas
 - DC Roads and Facilities of rural areas
 - DD Railways and fixed track ways
 - DE Facilities of air traffic
 - DF Construction works (I.)
 - DG Construction works (II.)

- E TRANSMISSION LINES, CABLEWAYS**
 - EA Axis of conduits, cableways
 - EB Construction works of conduits, cableways

- F HYDROGRAPHY AND HYDROLOGICAL FACILITIES**
 - FA Flowing and still waters
 - FB Water public utilities
 - FC Hydrological engineering structures

- G HYP SOGRAPHY**
 - GA Contour lines
 - GB Relief configurations
 - GC Digital terrain model

- H AREA CATEGORIES**
 - HA Areas of data capture actions
 - HB Base map handling units
 - HC Special areas

EXAMPLE ATTRIBUTE TABLE DIGITAL BASE MAP STANDARD MSZ 7772-1:1997

Code of attribute table: ATTRBC
ATTRIBUTE TYPES OF PARCELS (PUBLIC AREAS)

Identifier	Name of the attribute type
1.	Object identifier number
2.	Code of object type
3.	Geometry description identifier of the object
4.	Parcel number
5.	Postal address
6.	Name of enframing settlement
7.	Code of enframing administrative subunits
8.	Code of area type
9.	Volume of registered land (m ²)
10.	Land valuation value
11.	Market value of the parcel when acquiring
12.	Economical sector code
13.	Legal type code
14.	Easement descriptor
15.	Legal status descriptor
16.	Data relating to the legal title of acquiring
17.	Data relating to charges, mortgage
18.	Line of cultivation (also area out of cultivation)
19.	Name and address of the owner organization
20.	Property share of the owner organization
21.	Name and address of trustee or land user
22.	Legal status of demarcation procedure (preliminary, final)

Data relating to changes producing the parcel:

Identifier	Name of the attribute type
23.	- Date
24.	- Registry number of the decision
25.	- Form of change (e.g. union, sharing, easement)
26.	- Storage address of sketch of updating
27.	Date of abolition
28.	Code of visualization legend
29.	Identifier of the related unit of data capture action
30.	Centroid of the parcel (x, y [H])

Description of object in DAT

