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Inventarisation of Hungarian landmarks - online cultural-natural landscape database development for landscape planners

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Abstract

In recent years, the protection of unique landscape features, cultural heritage, cultural and historical landscapes has received increased attention. Landscape elements and unique landscape features, landmarks relating to traditional farming, landscape structure, and cultural history are either rapidly perishing or have already partly disappeared altogether. Hungary is still extremely rich in unique landscape features or values but there is no overall, standardised and accessible source of such kind of information for landscape planners, developers, decision makers or for tourism experts. The overall objective of this project is the database development of a comprehensive Cadastre of Landscape Features (TÉKA) that contributes to the preservation of the country's cultural heritage. Hungarian authorities and organizations do already have databases that could be potentially connected to the Database of Unique Landscape Features (like Institute of Geodesy, Cartography and Remote Sensing, National Office of Cultural Heritage, National Parks). These separate data sets are, however, incomplete, fragmented (territorial coverage, detailedness) and have many overlaps. The goal of this project is to develop a standardised online metadatabase for integrating the various available data from different sources.

Introduction

It has long been the desire of landscape and regional planners to have all the data necessary for their professional endeavors (for work related to cultural landscapes, heritage sites and protected natural areas alike) in a comprehensive system, accessible online. With the emergence of GIS systems and the spread of territorial databases, the opportunity has arisen for the respective databases of these various professional areas to be collected and connected into a single source, available to planners and others who need them. The consolidation of natural and cultural ladnscape data into one system is not an entirely new idea. In the U.S., the National Historic Preservation Act of 1966 created the possibility for data on cultural and historical landscapes to be collected together (http://www.nps.gov/history/NR/). Publications by the National Register of Historic Places and National Historic Landmark aid in this endeavor with detailed typologies and instructions. In Europe, the oldest tradition for databases on natural and heritage landscape features can be found in England. The first law protecting built heritage (the Ancient Monuments Act) was created in 1882. The institute considered to be today's comprehensive authority on cultural heritage protection – English Heritage – came into existence in 1984. (http://www.english-heritage.org.uk) The advent of GIS databases did not automatically mean the integration of data into systems available to the broader public, as often separate governmental bodies kept separate databases that were not

readily accessible or usable in planning and decisionmaking. The emergence of interactive online maps, nonetheless, did mean the development of the first databases that were shared among governmental bodies, in which one could access multiple kinds of professional data. One of the first cases of this was in England, where in 2002 six governmental bodies created a metadatabase (MAGIC: Multi-Agency geographic Information for the Countryside, http://www.magic.gov.uk.) The development of GoogleMaps in 2005 gave a further boost to online mapping and online database development. Here anyone can build a thematic database (Mashup) using the basis and technology provided by Google. The application and rapid spread of complex online GIS systems and database development has been helped considerably by the availability of open-source code, free map servers (Geoserver, http://geoserver.org, Mapserver, http://mapserver.org/) and open databases (OpenStreet Map). Increasing environmental awareness as well as an increase in the importance of landscape-related information (landscape history, character and protection), the emergence of WEB 2.0, and the increase in participatory planning and decisionmaking are all factors that have contributed considerably to increasing the importance of the role of databases that are constructed by initiatives that come from below instead of by the traditional top-down approach. In the realm of online landscape feature cadastres we can see a good example in the German Kulturlandscahft-Wiki (http://www.kleks-online.de/), which primarily relies on the involvement of local residents and users to collect data and create an online database. In Hungary the inventarisations of historic gardens and statues have been helped by such community portals (www.historicgarden.net and szoborlap.hu).

The necessity of a landscape feature cadastre

Hungarian nature protection legislation has, since 1996, required the protection of both natural landscape systems and individual landscape features. According to the law, a landscape feature is defined as „such typical natural features, formations or manmade elements of a given landscape that are of broad social significance for natural, historic, cultural-historic, scientific or aesthetic reasons." The law protecting cultural heritage (2001, Decree LXIV) similarly prescribes the consideration and protection of cultural heritage. The government decree regarding the systematization of information systems for development and land use planning states that the data of individual landscape features must be integrated into territorial systems and made available for planners. The necessity of the consideration and recognition of landscape features is enshrined not only in domestic law but also in the European Landscape Convention, which requires the establishment of a landscape characterisation cadastre – the basis of which is an accounting of the landscape features (Van Eetvelde, 2009). Most recently, the regulation of European Union unified territorial-based subsidies and individual rural development subsidies made it possible to require support for such typical Hungarian vernacular landscape elements as the so-called crane wells, as well as various types of earthen mounds and formations that contribute to achieving what is commonly known as the proper agricultural and environmental condition. In spite of multiple domestic and EU regulations there still is not a comprehensive landscape feature cadastre that would

cover the entire country. The concrete objective of our current research and development is to establish the methodology for creating a landscape feature cadastre, forming the online database and creating the operational framework, maintenance and system for gathering site data. The project's goal is the creation of a completely unified, country-wide, online metadatabase and information system. The cadastre that we seek to create would integrate existing data on cultural and natural features as well as incorporate data from new surveys. We also intend to actively involve local communities and civil society as a resource for data collection.

Figure 1: types of landscape features

Types of landscape features

The first step in creating the database is to determine the exact definition of a landscape feature – that is, what parameters we assign to the collection process. For this we have help from a Hungarian regulation (MSZ20381, Inventarisation of Individual Landscape Features), according to which landscape features can be divided into three main groups: **cultural-historical, natural** and **aesthetical** features. Within each of these groups there are several subcategories. For example, within the category of cultural-historical landscapes we can distinguish such subcategories as locally-valued landscape features (examples: manor houses, residences, bell towers, fortifications, castle gardens, memorial parks); transportation-related individual landscape features (roads, roadside tree allees); harvest or production-related landscape features (estate lands, cellars, fishing ponds, storage facilities, mills); individual landscape features connected with historic events or persons (memorial monuments, memorial plaques, burial grounds). Within the realm of natural formations we can recognize such distinctions as biologically-unique features (trees, tree populations, turf) and geographically-significant features (geological formations and configurations, moors and wetlands, etc.). Among the aesthetic landscape features we can find the lookouts, individual picturesque views and streetscapes. Within the types of landscape features there are even more subcategories and types to be found. Research thus far has identified about 400 separate types, but this number increases with ongoing surveys and data collection. Experience thus far has shown that those features not currently enjoying official protection far exceed in number those that are officially protected. Yet at the same

time we also have seen that the former's number is drastically decreasing owing to changing economic climate and lifestyle as well as lack of protection.

Data collection and integration

Owing to the diversity of landscape features there is no single unified domestic database that would collect and make available these data. Monuments-related data is handled, collected and kept on record by the Office of Cultural Heritage, archaeological topography by the Cultural Heritage Specialty Service, nature protection data by the National Park Authority, tourism-related features inventory by Hungarian Tourism Inc., local features by their respective municipalities. In addition to all of the abovementioned there is a significant number of landscape features that fall out of the authority of all of the above organizations and authorities, because they are not significant from either a nature preservation or a cultural monuments preservation standpoint. The various types of databases mentioned above differ from each other greatly both geographically and thematically. In general it can be said that the level to which the data has been processed varies and is generally fairly low-level. At the same time, in spite of this, all the various data can be tied into a centrally-coordianted system and be placed on a map. In GIS systems we show the landscape features with precise data, orthographic images and topographical maps. These maps are, in comparison to Google maps, more geometrically precise and are prepared according to accepted domestic standards and are of consistent quality for the entire country.

One of the most important goals of the TEKA database is that it links together all existing data and information, as well as initiating the process for collecting missing data by coordinating and linking surveys. The essence of the data integration is that each partner continues to maintain and care for its own information, maintaining an official, legally-determined database. General experience has shown that among these existing databases the connections or ability to transit from one to another is extremely limited. The various types of data do not allow any kind of cross-referencing. For example, one cannot use a land registry number or coordinate or other data to find out what landscape features can be found on that particular plot or property. It is not possible to know, from these data, whether a given monument actually exists, is protected, or under what local legislation it is regulated. For users it is an indisputable advantage to be able to see all data in one virtual space and not have to gain official access to and compare data from several different sources.. The project in this sense can be considered an experiment to see to what extent and for how long it can fill the data integration role among the different national organizations. The planned metadatabase is built upon the OpenGIS Standards, therefore, it can be integrated with any other database available on the web following these specifications (WMS). The map database in this way will be expanded with the integration of the first, second and third military survey maps of the Austro-Hungarian Monarchy. The landscape feature database (which is the main aim of the project) is based, too, on many different types of data collection that originate from individual initiatives. Also in this way, the information from

Hungary's most detailed statue collection and database – szoborlap.hu – will be incorporated into the landscape feature database.

On-site data collection for landscape feature database

On-site data collection for landscape features began in Hungary in the 1990s, but a deficient methodology, irregularities, lack of unified instructions, reduction of and eventual complete disappearance of available state resources brought it quickly to an end. Further problems were brought about by the fact that surveys done until then were not processed in any kind of unified way nor were they electronically systematized. Frequently there was no available information on where and within what parameters surveys were done. Some of the surveys were not properly geocoded, which meant they were later very difficult to identify. Many of them were documented on paper only, with no electronic record. This is why in the course of the project all earlier surveys were revised and thoroughly checked. In addition to the 450 settlements that were previously surveyed 500 more new were added, which means that data covering a third of the country will be completely processed and available. The inventarising process includes the surveys and assessments of the missing individual landscape features as well as the GIS mapping of archaeological sites and geologically-significant sites. The surveys is carried out by landscape architects, geographers, architects, preservationists and biologists. In addition to the comprehensive settlements surveys listed above, there are already some specific landscape features that have already been completely surveyed for the entire country (for example stone crosses, statues, crane wells and Kun earthen mounds.

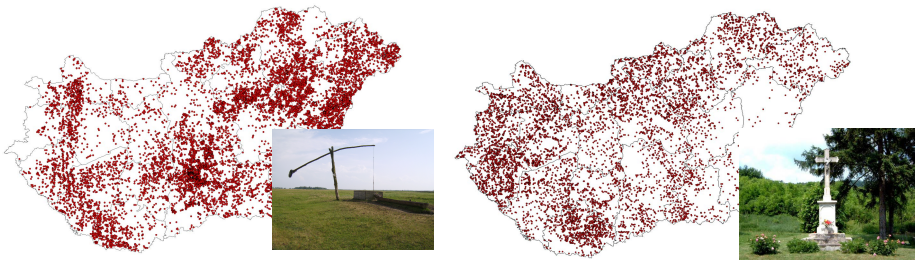


Figure 2: Nationally-catalogued landscape features: crane wells (left), stone crosses (right)

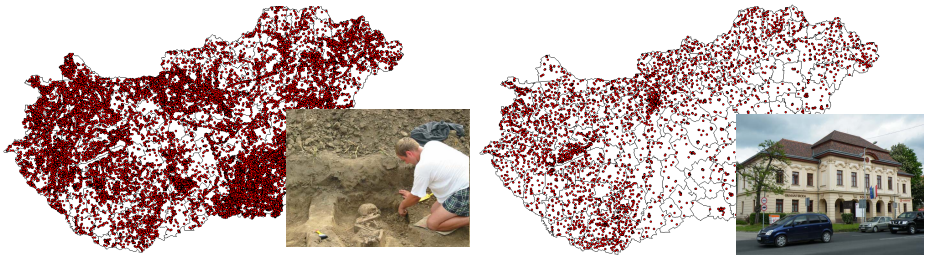


Figure 3: Nationally-catalogued landscape features: archeological sites (left), historic monuments (right)

The surveys and GIS database construction are helped by the fact that the Hungarian Surveying and Remote Sensing Institute (FÖMI) provided use of their 1:10 000 topographic map in vector format as a coordinate identification system for landscape features. Some of the sites identified through this system (stone crosses, crane wells, fountains, church towers, springs, caves, etc) will end up in the database, while others require further site inspection (for example bridges, towers) in order to determine whether they really constitute a valid landmark. The 30 chosen thematic layers contain 120,000 objects (Figure 2.) Later the database will include archaeological sites (50 000 sites) and cultural monuments (12 000 sites) (Figure 3.). The surveying process as well as the creation of a unified database are promoted by the fact that the geometric and descriptive data and identifications of specific sites that originally came from the various separate databases (cultural monuments, archaeological sites, statues, etc) we initially kept and shared in a common on-line database. This was based on a MySQL database management system and GoogleMap.(Figure 4.). The on-line mapping database contains all preloaded landmarks points derived from partners, the coordinates collected to date, as well as a simple online upload and editing interface for all surveyors. Through this interface the surveyors can fill out pre-set data fields, modify the data or upload supplementary documents or photographs.

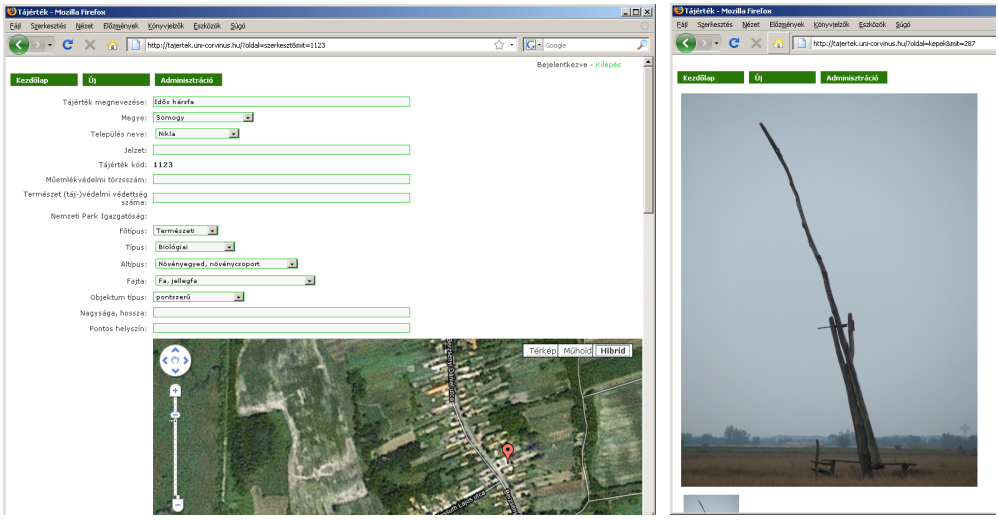


Figure 4. Corvinus University Inventory (http://tajertek.uni-corvinus.hu)

The planned layout of the TÉKA system

The database's IT system's final form will be an integrated database (Figure 5.) The system ties together several institutions and operates on an open-source code GIS system. The system consists of the OSGEO MapServer motor, Apache webserver, PHP applications server, PostGIS and PostgreSQL database server, OpenLayer web mapping client, and GDAL translator library for raster geospatial data formats.

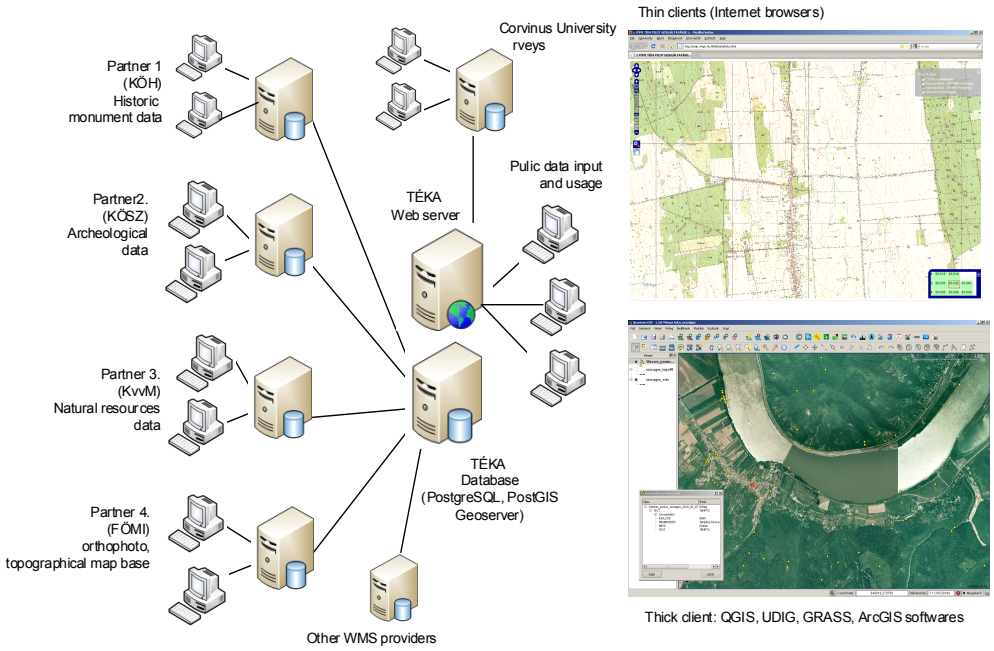


Figure 5. The project database's IT system

Data received from the partner organizations are integrated with the help of MapServer-based WMS and WFS services. Data exchange takes place among the partners in .xml format . The data also flows back to the partners through WMS and WFS services. The database consists of three interfaces (partner, expert and public). The public page is a web browser, in which the data are available only in a limited form. The expert version of the database will be available only through registration but provides access to all the data, including with the use of various GIS programs such as ArcGIS, MapInfo, OGC softwares: QuantumGIS, uDig and Gaia. (Figure 6.).

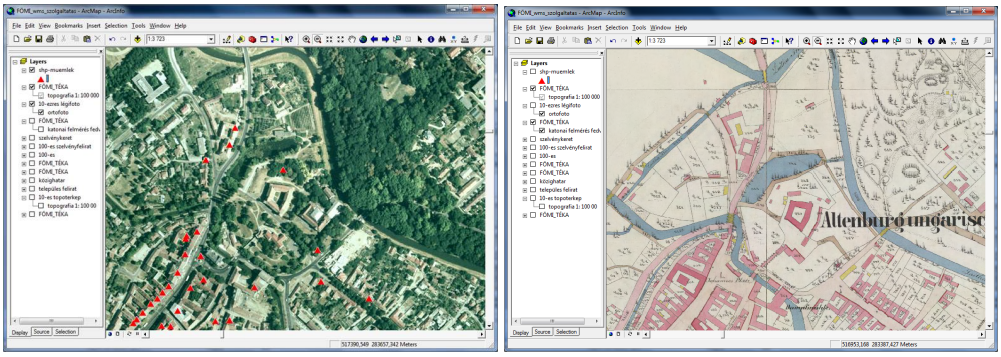


Figure 6: The mapping base displayed on an ArcGIS (orthophoto, historical map, topographical maps)

The public user interface displays maps using an OpenLayer JavaScript solution, which integrates the WMS and WFS services, that is, the handling of data received from the project partners, as well as the raster layers constructed through TileCache (aerial photos, topographic maps and historic maps) technology.

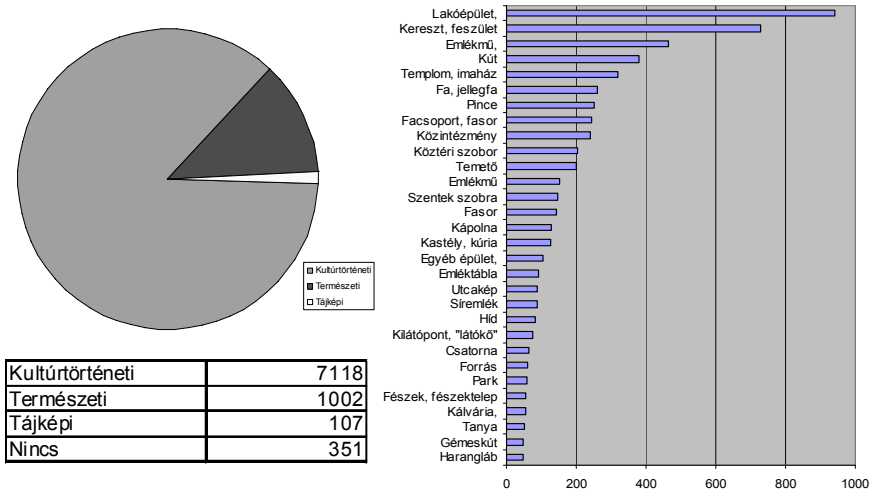
Results

The project's most significant results to date are the following:

— Typology and surveying criteria were established the to be used for the database, which will help connect data from disparate professional branches into a metadatabase.

— Metadatabase (TÉKA, tajertektar.hu) was successfully created, which means that decisionmakers, experts and laypersons now have access to a massive store of information about cultural and natural landscape features. This contributes significantly to strengthening local identity and helps create a greater sense of stewardship on the part of the population in general.

— The research yields a comprehensive picture of landscape feature types, as well as their relative proportions and their endangerment, which can be used in landscape protection and landscape planning as well as by the authorities. Analysis of the initial surveys shows clearly that of the 400 various types of landscape features, the most dominant are residential buildings, crosses, memorials, fountains/wells, churches, wine cellars, tree stands, allees, public statues, cemeteries, castles, streetscapes and outlooks. It will come as no surprise to landscape architects that to date there are seven times as many cultural landmarks identified as natural landmarks (Figure 7.)



Kultúrtörténeti	7118
Természeti	1002
Tájképi	107
Nincs	351

Figure 7: Distribution and proportion of site-surveyed landmarks in the database.

— The creation of the database contributes to the landscape character mapping required under the European Landscape Convention, providing an assessment of not only the natural attributes but the landscape cultural heritage value as well.

— Landscape features, thanks to the project, are receiving greater public attention. In addition to the development of the database several information campaigns were initiated, which both print and digital media have picked up countrywide. A „landmark hunt" competition was initiated, in which anyone can collect and upload landscape features to the website. The winner receives award. We publicized the competition particularly in the schools, muncipalities and the NGO sector, and created a separate award for most beautiful photograph submitted.

— In calling greater public attention to our wealth of landscape features, we have hopefully also contributed to better public appreciation and understanding of landscape architecture as a profession in Hungary.

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