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Scalable Land Tenure Record Systems

Tech. Chron., Sci J.T.C.G., I, May – Dec. 2008, vol. 28, no. 3, pp. 11-18, tab. , 14 ref.

Land tenure information is vital for managing informal settlement upgrades. Multi-media data, such as video clips, have also been found to be useful in that information about rights and interests in land can be recorded and played back in a person's own language and the capture of the data is often a public record in itself.

The concept underlying the Talking Titler system of land records which incorporate a range of different data types, including multi-media data was developed in informal settlements in South Africa. Multi-media data hold an added advantage in that they may not require transcription to written form and the process is simple enough for a member of a community to capture the data.

Designing a land records system which is suitable to a particular set of circumstances, but which can be adapted as these circumstances change holds a number of challenges. In an informal settlement one may start off collecting information in an exercise book which may later be computerised and possibly provide the basis for registration. In this paper we describe the design of a system which allows a local office to start with a computer assisted hard copy (e.g. paper, photographs) and through an electronic evidence model move to a complex LIS in a series of stages. We also describe an alternative, but not incompatible model, using a word processor with hyperlinked files rather than a database.

(Authors)

K-W: Land Tenure Information, LIS, Starter Systems, Computerised and Computer Assisted LIS

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Comparative Thoughts on German and Hellenic Urban Planning and Property Registration

Tech. Chron., Sci J.T.C.G., I, May – Dec. 2008, vol. 28, no. 3, pp. 19-35, tab. , 27 ref.

Land-use planning and registration of property rights are considered to be the fundamental land tools to support sustainable development of land and thus to contribute to the control of informal urban development. This paper concentrates on the topics of land use planning, land registration and real estate cadastre including their mutual interrelationships, as these are applied in two EU countries: Germany (with practically no informal development) and Greece (with long experience in dealing with informal development). The procedures for the provision of residential land are described and compared, as is the role of the cadastral systems in the urbanization process. Examples of good practice and experience according

to the specific local historic, social, and economic situation of each country are given. Interrelationships of land use planning, of building construction and development activities and of land parcel documentation (parcel location, parcel size, building location) in the cadastral system, are shown. The German local land use planning and urbanization process which results in legally binding land use planning documents are discussed. A look is given to the technical developments which currently take place in all mentioned fields. Specific reference is given to ALKIS, the new German IT standard for the real estate cadastre system and the XPLANUNG, the new IT standard for urban land use plans which is currently under development. The Hellenic procedures for urban planning and the modern Hellenic Cadastre system and its current projects made to support the real estate market and sustainable land development are briefly investigated. The complex phenomenon of informal land development in the suburban areas and the coastal zone of Greece is thoroughly analyzed, and proposals for an improvement of the related administration and legislation are given. Similarity of procedures and regulations of the German and Hellenic systems and distinctness of results in the development of land, together with some proposals and lessons that may be useful for other countries facing similar informal development problems, are outlined in a concluding section.

(Authors)

K-W: Land-Use Control, Informal Urban Development, Spatial Planning, Urban Plans, Cadastre And Land Administration, Spatial Information Management

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The Role of Edge Detection Techniques for the Extraction of Linear Information in an Urban / Peri-Urban Environment

Tech. Chron., Sci J.T.C.G., I, May – Dec. 2008, vol. 28, no. 3, pp. 37-46, tab. 2 , 17 ref.

Photo interpretation of linear information is a subjective process and therefore there is a substantial need for automation of extracting linear information using automated techniques. Certain efforts were made in this direction including the application of edge enhancement and detection operators, wavelets, Hough Transform etc.

However it is difficult to choose among optimal algorithms since the complex scenes portrayed on satellite images are strongly dependent on the radiometric and physical properties of the sensors and on the illumination properties and topographic relief of each scene. Therefore, the category of information to be extracted (scale and context) determines the "suitability" of the method applied for linear feature extraction. In this context, the objective of this work was the implementation, evaluation and comparison of selected optimal edge detection algorithms combined with complementary remote sensing methods towards automated linear feature extraction (roads, land use boundaries, buildings, etc) in an urban / peri-urban environment. The test areas used were located in the extended area Attica Prefecture. A multispectral IKONOS image and panchromatic KVR-1000 imagery of two different

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dates were acquired for the case studies of Aghios Stefanos and Penteli, Attica, Greece respectively and processed by the following edge detectors: (a) The Canny edge detection algorithm, (b) The Rothwell algorithm, (c) The LOG-LIN algorithm, (d) The SUSAN operator, (e) The anisotropic diffusion algorithm of Black, (f) The Bezdek algorithm and (g) The EDISON algorithm.

The resulted edge maps were then compared to thematic maps resulted by applied remote sensing methods and techniques and assessed using statistical methodology. Finally, the performance and behavior of each algorithm for urban feature extraction was assessed as well as the sufficiency of the edge detection methodology for environmental change detection purposes.

(Authors)

K-W: Remote Sensing, Algorithms, Feature, Data Collection, Ikonos, Kvr-1000, Greece

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Modeling the Spatial and Legal Processes in a Land Readjustment procedure in Greece

Tech. Chron., Sci J.T.C.G., I, May – Dec. 2008, vol. 28, no. 3, pp. 47-55, tab. 2 , 11 ref.

The subject of the present paper titled “Modeling the Spatial and Legal Processes in a Land Readjustment procedure in Greece”, is the modeling of the Land Readjustment processes which occur during the Urban Reconstruction. These processes concern the spatial transactions that are carried out in the real properties located in the study area and the changes in the real rights. The base for the development of the model is the techniques of object-oriented designing and specifically the use of a common language of modeling, known as Unified Language of Modeling (UML).

In the particular study, the processes that are executed during the implementation of a Land Readjustment procedure (Implementation Plan) in Greece are described as well as the way of regulation of real rights, the way that spatial transactions are realized and the role of expropriations as an intermediate phase.

Continuously, the three phases of the Implementation Plan as they take place in Greece are described as well as the processes that follow in each individual phase. Moreover, the spatial transactions that are realized in the study area and their results are mentioned and extensively described (for example, changes in the area and the shape of the real properties, changes in the land values, changes in the land use, changes in the way that legal rights applied in the real properties, etc).

Furthermore, the designing of the database that is used to record the data that are collected during the Land Readjustment was carried out using the Unified Modeling Language. The visualization of the database is ascribed by the static model and specifically by the static structure diagram, which allows the description of the spatial and descriptive entities and their inter-associations. Thereby, a completed model of the database of the Implementation Plan was resulted.

Finally, the conclusions which resulted from the conceptual and

physical designing of the database of the Implementation Plan are formulated. Moreover, the direct benefits that emerge from the use of modern technologies (UML, XMI, GIS) and standards in the field of geosciences, are mentioned.

(Authors)

K-W: Cadastre, Data Modeling, Land Readjustment, Real Rights

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Informal Constructions within a Spatial Development Framework

Tech. Chron., Sci J.T.C.G., I, May – Dec. 2008, vol. 28, no. 3, pp. 57-72, tab. 1 , 17 ref.

This paper presents various forms of illegal urban development in Greece, as well as efforts by the Greek state to face the situation. The term “Illegal Constructions” (ICs) stands for illegalities in constructions (e.g. constructions beyond the permissible limits) or buildings not in compliance with current planning and regulations. Illegal Constructions are also considered changes in use of buildings or illegal conversion of public spaces (such as parks, coastal areas, pavements) into more profitable uses, regardless of the common good. Therefore, these ICs occur both on private and public land as well as on common use areas, either by individual developers and construction companies or by the state authorities themselves. In this procedure, the state often plays a negative role by tolerating and accepting illegalities or even acting as perpetrator of illegalities itself.

An analysis of the numerous reasons for the emergence of ICs is also carried out, along with the presentation of planning and building regulations applied by the state in an effort to avoid these illegalities in Greece. The complex and often confusing legislative framework and the inadequate way, planning and building regulations are imposed, allow various degrees of illegalities in the majority of constructions in Greece. The paper includes preventive proposals and suggests corrective measures for the ICs cases.

To illustrate the ICs situation in practise, a case study is also presented, referring to a rapidly urbanised municipality in the East Attica region. The ICs reported in this area for the time-period 2000-2006, are classified by subject category and the fines levied on illegal constructions are evaluated. This represents a typical example of the incompetence of the administration to verify the correspondence of buildings to their permits issued as well as to effectively collect imposed fines.

(Authors)

K-W: Informal Constructions, Land Administration, Urban Development

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Mass Valuation Using Quantified Spatial Characteristics of Cadastral Parcels

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Each modern state needs to have a real estate valuation system for purposes of: fair real estate taxation, as a support to the real estate market, for better management of rural or urban environment or any other purpose. This enables a mass valuation system by systematic valuation of groups of real estate units performed on a certain date with the help of standard procedures and statistical analysis.

In order to be able to value real property its size and value-per-size factor are required. The product of the two multiplied by, for instance, the tax rate yields the amount of tax to be paid, but can also be used for other purposes. As opposed to the tax rate which is defined by legislative acts and the size which can be explicitly quantified (calculated) from its geometry, the value-per-size of real property must be determined based on a predefined set of rules and criteria. Generally, the more rules and criteria included, the more fairly the value can be determined. Furthermore, for this value to be as fair as possible, the rules and criteria need to be defined and tested for the entire jurisdiction affected.

Real property can generally be seen as land, buildings, and whatever is attached or affixed to the land. In this research we limit ourselves to land i.e. a part of it defined by a cadastral parcel. Besides the size which is defined by its area, there are other characteristics of a cadastral parcel which explicitly and unambiguously define it. No matter what its purpose may be, the three spatial characteristics which directly influence the value of a piece of land are its azimuth, slope and shape compactness.

In this paper we first give a theoretical background for the method for automatic quantification of the mentioned three characteristics, provided cadastral and DTM databases are available in digital form and managed using spatial database management systems (SDBMS) technology. The shape compactness of cadastral parcel is calculated using its area and perimeter. Slope and azimuth are calculated by spatially intersecting triangles from the DTM with the shape of cadastral parcel. Since we wanted a distinct value for the slope and azimuth of each parcel, 'per parcel' averages are calculated using the weighted mean of 'per intersection' values of slope and azimuth. The area of intersection was used as weight. Finally, a description of a test system based on presented method and implemented on top of Oracle10g SDBMS is given. Within the research a sample DTM and cadastral database have been loaded into the system, and response times to queries for a single cadastral parcel and for a set of 5100 parcels indicate that such a system should be able to function in real world conditions.

(Authors)

K-W: Mass Valuation, Cadastral Database, DTM database, SDBMS

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An Investigation on to 'Squat and the Exemption of Unauthorized

Buildings -Gecekondu' in Turkey

Tech. Chron., Sci J.T.C.G., I, May – Dec. 2008, vol. 28, no. 3, pp. 81-85, tab. 2 , 15 ref.

In Turkey, the gaining of immovable proprietorship is done by registration into title deed register. For this reason, contracts, that intent transferring immovable proprietorship, are arranged officially. In spite of this certain rule, also by the influence of various economic and social reasons transferring immovable proprietorship to another person is digressed from official way and the rule that is anticipated by Turkish Civil Code.

On the places that are subjected to public or private proprietorship illegal active usage types and immovable transfers without having a title deed could not be prevented despite all taken precautions. In order to get rid of this situation, starting from 1948, in 55 years, 17 squatter and development exemption laws were approved. By squatter law dated 1966 and issued as 775 that was the most comprehensive arrangement on that topic, nevertheless problems were not solved. Thereafter squatter and development exemption law were put into effect in 1983 issued as 2805, 2981-3290-336.

Therefore applications and executions of squatter and the development exemption law has been an important part of working fields of municipalities, directories of cadastre, title deed register offices and surveying private sector for last 20 years (1983-2003). By these applications, eliminations of immovable transfer without title deeds, illegal land usages in certain periods, realization of all operation in cadastre and title deed register have been intended. Nevertheless, neither in urban areas nor in rural areas the purpose has not come true. The sales, transfers of immovable without title deeds could not be prevented.

In this paper, the processes that cause to squat and the exemption of unauthorized buildings are considered. The subject of squat and the exemption of unauthorized buildings is investigated by means of surveying engineering approaches. Moreover Istanbul is one of the cities that suffer due to squat and the exemption of unauthorized buildings; it was the capital of many empires in the past and now is the greatest nominee of being Cultural Capital of Europe. In this study Istanbul is taken as a specific and perfect example for investigating such situation, therefore all are discussed, the problems highlighted and recommendations made based on mainly Istanbul pattern.

(Authors)

K-W: Squat, Exemption, Unauthorized Buildings, 'Gecekondu', Municipalities, Cadastre, Urban Planning, Title Deed Registry

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Registration of Informal Buildings in Croatia

Tech. Chron., Sci J.T.C.G., I, May – Dec. 2008, vol. 28, no. 3, pp. 87-93, tab. , 9 ref.

In the Republic of Croatia 87% of families live in houses or flats owned by people who live in those houses or flats. The problem,

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inherited from the past period, lies in fact that a lot of houses and flats are not registered in the cadastre and land register. Multipurpose housing stocks which were built during the socialist period in most of the cases are not registered because of unsolved legal relations. Another important problem lies in the fact that during the socialist period a lot of buildings were built without building permits (especially on the Croatian coast) and those buildings are treated as informal (illegal). Until recently those buildings could also be registered in the cadastre and land register, but with registration of the fact that the building is informal. Of course, buildings which are not registered or registered as informal have less market value. New legal framework for newly built buildings clearly defines all necessary steps in the building process, including registration in the cadastre and land register, and there are no problems for newly built buildings. Today in Croatia buildings and flats which are not registered or registered as informal are very rarely subject to legal transfer of real estate because nobody is willing to buy such property, and banks and other financial institution are not willing to release loans for the purpose of buying such properties. In this text there is a description of the Croatian legal framework for registration of unregistered and informal buildings, description of the protected coastal area, description of the problem of informal extensions to the buildings, description of the legal framework for registration of newly built buildings and basic information about the program for removing (tearing down) illegally built buildings.

(Author)

K-W: Cadastre, Land Register, Registration, Informal Buildings

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The Hellenic Positioning System (HEPOS) and its foreseeable implications on the Spatial Data Infrastructure in Greece

Tech. Chron., Sci J.T.C.G., I, May – Dec. 2008, vol. 28, no. 3, pp. 95-103, tab. , 9 ref.

In the last few years, Greece has responded to and participated in various European Spatial Data Infrastructure (ESDI) initiatives. This has made many government organizations to increasingly realize that spatial information has an important role to play in the development process of the country, mostly by providing an economic value and also contributing to several policy areas concerned with environmental and social needs. Most relevant initiatives in this direction have focused so far on developing, mainly through the Hellenic Cadastre Project, the legal framework needed to underpin the creation of a national SDI (NSDI), starting from priorities aiming to utilize many applications relying on geospatial information for the development of national or regional social benefit programs and services, and in supporting the shared objectives of various national surveying and mapping authorities.

One fundamental component of these efforts has been identified as the urgent need to establish a robust modern geodetic framework that will rely on the establishment and operation (before the end of 2007) of the so-called Hellenic Positioning (Services) System (or HEPOS), to be based on a network of some 100 continuously

operating GPS reference stations which will be broadcasting and storing signal and positional correction information to be used by suitably equipped users. HEPOS will be capable of delivering centimetre-level positioning accuracy in real-time throughout Greece, thus allowing all data and observations that form the basis for geographic information systems to tie all geographical features to a common, nationally used horizontal and vertical coordinate system, for all layers of information while maintaining seamless stability for both the geodetic and cadastre frameworks.

This paper looks at the many practical implications, for the providers and users of SDI in Greece, which undoubtedly will be brought about by the improvements foreseen from the establishment of HEPOS and the combined advances anticipated by the ongoing developments of the next generation GNSS systems. The discussion will present the current HEPOS activities in Greece and the critical underlying factors which will contribute toward a convergence between the Geodesy and the Cadastre frameworks. The latter can act as a significant layer of the SDI for Greece, as well as improving efficiencies and advancing new and innovative spatial applications, such as integrated surveying techniques supported by the HEPOS network, thus allowing the modern professional surveyors to provide value-added services and expand their business activities into non-traditional surveying engineering areas.

(Authors)

K-W: Hellenic Positioning System, Virtual Reference Network, Geodetic Framework

Móller, Y.
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Illegal construction in Montenegro

Tech. Chron., Sci J.T.C.G., I, May – Dec. 2008, vol. 28, no. 3, pp. 105-110, tab. 1, 10 ref.

Illegal constructions are a significant problem in Montenegro. Especially in areas of municipalities facing a certain economic development, namely the capital, Podgorica, and the coastal area sub-urbanisation and an increasing amount of illegal objects can be observed since the mid-1990-ies.

Inadequate planning documentation as well as long and expensive procedures for permits and licenses are identified as the major reasons for today's illegal constructions. The paper gives recommendations how to deal with them and to prevent future illegal objects without claiming their applicability in other countries with different prevailing conditions.

It is concluded that due to extend of illegal objects only legalization of those constructions in combination of an efficient prevention of future illegal objects can stop the further environmental degrading of Montenegro and ensure sustainable urban and economic development. Process of legalization needs to be carefully adjusted in order to motivate the citizen in participation, but instruments for enforcement have to be operationalized as well. Mandatory precondition is provision of necessary financial resources by both the Government and the local self-government units.

(Authors)

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Suburban Informal Building Control

Tech. Chron., Sci J.T.C.G., I, May – Dec. 2008, vol. 28, no. 3, pp. 111-123, tab. , 25 ref.

The problem of informal settlements is of significant importance worldwide and has similar causes whether in regions of Europe, Africa, Central and Latin America, or Asia. The type and quality of constructions vary, however. In Greece the majority of informal buildings are good constructions and do not resemble dense slums. Their number is estimated to be almost 1,000,000 all over the country. It can be said that it is actually a social and economic issue, that must be faced by a combination of measures. In this paper, a proposal to face this problem is developed, at technical and administrative level, taking into consideration the criteria of least possible cost and maximum benefit from usage of modern

technology. Its basic idea is the development of a system for periodic automatic monitoring and detection of new buildings in large areas. With field control on specific locations, the immediate detection of informal construction becomes possible even before their completion, when measures against their development can be taken more easily. The suggested procedure is based technically on the use of high resolution image stereopairs and the application of automatic change detection, by computation and comparison of Digital Surface Models (DSMs), and building extraction techniques. Over the last twenty years research has been done in the field of automatically detecting and monitoring man made objects, mainly roads and buildings, with promising results and accuracies of 1 pixel or better. The proposed procedure is accompanied by a cost estimate for its application on eastern Attica, which is one of the Hellenic prefectures with a great number of existing but also emerging informal constructions.

(Authors)

K-W: Informal Settlements, Photogrammetry, Building Extraction, Change Detection