

Methodology for Quantifying the Economic Impact of Land Policy (with Case Studies)

Steven Nystrom, (United States) and Chryssy Potsiou (Greece)

Key words: Affordable housing;Capacity building;Informal settlements;Land management;Property taxes;Real estate development;Risk management;Valuation;

SUMMARY

Methodology for Quantifying the Economic Impact of Land Policy (with Case Studies)
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Key words: real estate, macro-economic, informal settlements, land policy, best practices, GDP, economic recovery, real estate taxation, social economic impact, affordable housing, capacity building, land management, risk management. Steven Nystrom and Chryssy Potsiou are studying how land policy affects the economic and social structures within various countries. These policies lead to countrywide and regional GDP enhancement or restriction based on their scope, efficiency and impact. We are building a general model where the costs of inefficiencies can be quantified so that governments can make more informed decisions due to a greater understanding of the economic and social impact of their policies. Without an understanding of the impact of land policy from social and economic perspectives, it is all too easy to focus efforts and resources unproductively. Our study should help focus these resources on the most critical problems to maximize the benefits to governments and their citizens. The basic model will be explained along with the parameters for judging efficiency. These parameters will be discussed from an economic perspective but relate to land policy and social structures. A sampling of case studies will be performed to show how this basic model can highlight and quantify economic inefficiencies stemming from land policies within specific social and cultural settings. This model will provide a useful economic basis for the allocation of problem solving resources for both governments and aid agencies in these and other national settings. Steven L. Nystrom, MAI, Principal- NewStream Companies NSPS - National Society of Professional Surveyors, Delegate to the FIG Commission 9 Trustee of the IPMS, International Property Measurements Standards Coalition President of Peace By Prosperity NGO Working Representative to UNECE WPLA 5044 Cypress Trace Drive, Tampa, Florida 33624 Phone/Fax (813) 963-3510, Email: Nystrom@NewStreamCompanies.com Chryssy Potsiou, Associate Professor NTUA National Technical University of Athens, Greece, School of rural and Surveying Engineering Vice President FIG – International Federation of Surveyors FIG Task Force Chair on Property and Housing TCG Representative at FIG Bureau Member UNECE WPLA Board of Directors KTIMATOLGIO SA Email: chryssy.potsiou@gmail.com

The Problems of Expropriation Practice in the Republic of Armenia

Varazdat Hovhannisyan (Armenia)

Key words: Land management; Land readjustment; Real estate development; Valuation;

SUMMARY

The purpose of this paper is to examine the expropriation, valuation and compensation practice in Armenia. The present article concerns the expropriation institution, operation spheres of that institution and application conditions. It is mentioned that at the base of each legal norm is the notion of public interest because the law is formed in the public for making the lives of people as comfortable and as civil as possible. This paper tries to investigate how the law on expropriation and compensation are implemented when privately held real property is taken for public purpose. In the article the issues of social concussions arising as a result of expropriation operation and the challenge of avoiding them are also discussed. The short history and the past of expropriation in Armenia are also presented. The main finding of the paper is the gap between the actual practice of expropriation, valuation and compensation and the existing legislation, which creates situations of unfair valuation and compensation. The practical meaning of the paper is, that the living conditions and life standards of affected people before and after expropriation could be useful. The paper is valuable for government officials, real property valuers, investors and other interested people, because transparency, consistency and just compensation are useful for them.

Real Estate Market Development in Ghana: a Quantitative Approach

Wilfred Kwabena Anim-Odame (Ghana)

Key words: Professional practice; Real estate development; Standards; Valuation;

SUMMARY

Real Estate Market Development in Ghana: a quantitative approach Dr Wilfred K. Anim-Odame , FGhIS Paper to be presented at the XXV International Federation of Surveyors Congress, 16-21 June 2014 at Kuala Lumpur, Malaysia Real estate markets in Africa are products of different economic regimes with incongruent characteristics that determine their attractiveness to local and international investors. Each market is as a result unique in terms of development and maturity, and rather finds itself in a regional and global competition. This paper seeks to use results from hedonic models for the residential market in Ghana to examine its attractiveness as an investment vehicle. Further analysis using primary macroeconomic factors have also been undertaken to demonstrate its contribution towards national development. Overall, residential total returns measured in local currency (Cedis) from 1992 to 2007 have run at annualised rate of 37.2% per annum; made up of a relatively stable income return averaging 4.6% per annum and highly volatile capital growth at an annualised rate of 32.4% per annum. Measured in US\$, annualised total returns have been 14.6% per annum, with capital growth of 7.7% annually and average income return of 6.7% per annum. GDP growth and interest rates show a positive and negative correlation respectively with total returns. Linkages between the economic variables and nominal rental value growth, however, remain weak. More surprisingly, the expected relationships with economic growth and interest rates appear much stronger, with increased correlation coefficients and stronger statistical significance, if the dollar denominated performance measures are deflated by Ghanaian price inflation. The results suggest the drivers of dollar denominated residential prices are a complex process in an economy that has been exposed to high domestic inflation and large movements in exchange rates. There is clearly a scope for further research into the market dynamics of residential prices under these conditions. The basis for this research can be improved to determine the balance of domestic versus overseas and expatriate investors in the market.

Reconciliation Issues Around Development Induced Displacement in Bangladesh: a Study of People Affected Due to Kaptai Dam Construction

Nabayan Khisa and Tanjil Sowgat (Bangladesh)

Key words: Spatial planning; Development; Displacement; Rehabilitation; Reconciliation

SUMMARY

Construction of new infrastructure lead to displacement of people who used to reside in the development site prior to the development project. Such displacement is common in different parts of the world including Bangladesh. This study investigates the key issues in Bangladesh around the reconciliation of such displaced people. To do this, the study takes on of the most highlighted case of development which is the construction project of Kaptai Dam that initially displaced the many inhabitants including Chakma community. The study takes cases from the displaced community since they were known as the indigenous inhabitants in the Kaptai area and faced displacement. This study uses qualitative approach and conducts unstructured interviews with fifteen household heads which people were displaced during the construction of Kaptai Dam. Based on the literature review, the research analyses mainly three aspects: spatial issue, social issue and economic issue of displacement. Study reveals that there are limited efforts for spatial reconciliation of the displaced people and current initiatives are inadequate in satisfying the interests of the affected community, Issues around reconciliation include: low monetary compensation for the acquired land, lack of support regarding cultural integration in the new location, insufficient arrangements for alternative livelihood opportunities. Currently there are no resettlement policy in this area and limited institutional activities to safeguard the interests of the affected community. The study recommends that there should be specific policy guidelines for the spatial reconciliation of the affected community and ample attention should be given about: cultural reintegration, social cohesion with the other communities, sufficient monetary compensation for resettlement, security and safety.

Challenges and Relevance?

Paul Kenny (Australia)

Key words: Cadastre; CPD; Education; Legislation; Professional practice; Standards; Cadastral, Relevance, technology, challenges

SUMMARY

Challenges and Relevance? Paul KENNY, Australia SUMMARY It is a curiosity within the surveying profession in Australia that it is rarely outwardly praised, rewarded or acknowledged for the work that is undertaken and successfully completed. It is considered one of the challenges of the profession and at times the question is asked about the relevance of the profession in modern day society. There is no question that in the past surveyors were the explorers of the world, discovering new lands and providing details far beyond what we might provide today. Technology is changing at such a rapid rate, that our relevance in society may well be challenged and the work it facilitates can be completed by persons not trained as surveyors, but able to understand the processes using this new technology. Is this fair and reasonable to the trained surveyor or the clients they serve? It is a question we must ask and answer thoughtfully if the profession is to remain relevant in today's society and into the future. Ask yourself: Would you have a plumber train an electrician? To answer this question and others that may come out of it, it is important to list what might be considered to be the challenges facing the survey professional today. From this it may then be possible to determine the relevance of the profession into the future. It should be clearly noted that the surveying profession is not the only one scratching its head and crystal gazing about its future. This paper is designed to review what might be considered the challenges facing the profession and determining if these challenges can be overcome in order to make the profession relevant and worthwhile in terms of training new surveyors, offering value to the land property system, offering value to the engineering and construction industry and being a leader in the development of new technologies in 3D measurements and positioning. To some this may be a rehash of that in which surveyors are involved. To others it might be an opportunity to provide a service over and above what is considered normal today; and to others it might be a challenge to deliver newer technologies far above what we have today. Sit back and challenge this discussion and determine if what surveyors do has a future in society and if it needs to change course to maintain relevance! Key Words: Cadastral, Relevance, technology, challenges

The Property Tax: It's Future in the 21st Century

William McCluskey (United Kingdom)

Key words: Property taxes; Valuation; revenue, administration

SUMMARY

The Property Tax: it's future in the 21st Century The recurrent property tax is often heralded as a tax with significant but as yet untapped revenue potential. This has been the view over the last fifty years. This paper will look at the revenue potential of the property tax across a number of developed and developing countries. In addition, the paper will look at several of the administrative issues that have contributed to the decline in importance of the property tax. Finally, the paper will focus on several property tax reform projects and analyse how successful they have been in harnessing the untapped revenue potential.

The Eritrean Notary Public in the Context of Global Notaries System

Habttemicael Weldegiorgis (Eritrea)

Key words: Affordable housing; Cadastre; Capacity building; Cartography; Digital cadastre; Education; History; Land distribution; Land management; Legislation; Professional practice; Property taxes; Security of tenure; Spatial planning; Standards; Valuation; Eritrean notary public, transactions of immovable property, cadastre system, global notaries system, notarial functions and duties, professional ethics

SUMMARY

The Eritrean Notary Public was established, simultaneously with the cadastral system at the end of the 19th century during the Italian colonial administration. Both the public notary and the cadastre system were originally constituted with the sole purpose of guaranteeing security of property ownership for the Italian settlers in complete violation of the natives' property rights. But, later they were gradually transformed to embrace Eritrean citizens' property. Their complementarities continued during the several occupational administrations until Eritrea attained its independence in May 1991. Both the notary public and the cadastre offices, as mutually complementary institutions worked in close harmony. They played their roles, respectively in the authentication of legitimacy of titles as well as contracts of transactions, and the certification of ownership over land and immovable property erected overland. In due course, the two institutions had experienced difficult periods and survived attempts at their elimination, particularly during the Ethiopian military rule in the mid-1970s. Notary public has a long history of providing legal security for individual and legal person's property. And nowadays, its need has grown tremendously with the advent of globalization and internationalization of the market and businesses for use of legal services. However, the services it provides vary from country to country depending on the countries' historical traditions and policies. This paper provides an overview of the roles of notaries' public world-wide, states the role the Eritrean notary public has played in securing the legitimate title of ownership through ensuring lawful transactions of immovable property, and calls for reinstating the notary public offices in all regions of Eritrea as well as broadening the scope of its services beyond witnessing contracts of agreements of immovable property transactions.

GIS Integration to Plume Migration and Contaminant Tracing in Madala Area in Asa and Ilorin West Local Government Area of Kwara State Nigeria.

Alaaya Abdulhaleem Bolaji, Adetimirin Oluwafemi Idowu and Mustafa Abdulrazaq Kayode (Nigeria)

Key words: Geoinformation/GI; Hydrography;

SUMMARY

Water is a solvent for many chemical constituents. As a result, most ground water contains a wide variety of dissolved inorganic chemicals (and to a much more limited extent, natural occurring organic constituents) due to the dissolution of the leachates generated from waste materials through which it flows. The chemical make-up of ground water is a reflection of where the water has been, and what kind of material it has flowed through or over. It depends on whether it first fell onto a farmer's field, or onto an undisturbed forest or on a dumpsite. Ground water contamination is said to occur when the chemical constituent make-up of the ground water is altered as a result of man's activities, either directly, due to the spill or leakage of a liquid, or indirectly, through the alteration of the ground through which water passes, as is the case for leachate contamination from the dumpsite. In some cases, the alteration may raise the concentrations of dissolved chemical species already present. In other cases, the alteration may introduce new chemical species not formerly present in the natural background ground water chemistry. Ground water contamination causes degradation of water quality. It becomes important when the concentrations of one or more of the constituents reach levels that render the water unsuitable for its intended use. The critical chemical species and the maximum acceptable chemical concentrations depend on the intended use. The concentrations that define suitability are often encoded in water quality standards or guidelines. Standard Organisation of Nigeria and World Health Organisation standards. Geographic Information system serves a veritable tool for plume migration and contaminant point source tracing and modelling. Madala Area which lies within ASA and Ilorin West local Government Area of Kwara State Nigeria is our Study Area.

Land Reform and Its Result in Azerbaijan.

Divankhan Ahadov and Rovshan Ahadli (Azerbaijan)

Key words: Cadastre; Land management; Real estate development;

SUMMARY

Among the countries of the former Soviet Union for the first time in Azerbaijan in 1996 year carried out radical land reforms. On July, 16th 1996 year to the country “the law passes about land reform” and on August, 2nd enters validity. With the purpose carrying out of reform the regional and local commissions are created the State Commission on the Agrarian reform and also. Carrying out and the control over carrying out of Land reform is entrusted to the State Committee Land and Cartography. According to the Law on Land reform all the lands of the country are divided on state, municipal and private property. In the country by general complexity are accepted more than 100 laws, decision of the Cabinet Ministry and another standard legal acts provided agrarian reform carrying out. In 1999 of the new Land Code is accepted. Was adopted laws “About land tax”, “About land rents”, “About land market”, “About land cadastre, monitoring and survey”, “About land fertility”, “About land farm” and etc., In the main project lands in state property, given to municipality and the lands.

Distributed to the population are certain by contours. In state properties are left the lands under the state objects, and pastures of a general purpose, parks, streets, the lands under the areas, the unsuitable and of little use lands as a whole are given to municipality. Expert for this up to 5 % of the privatized lands have been allocated in fund of municipalities. The land areas for perspective development of settlements are switched off in reserved fund. All the remained lands have been given to a personal property. Arable lands have been given to a personal property, deposits lands, hayfields and lands under permanent groups. Expert for this personal plots used by citizens, the lands earlier allocated, under gardening’s also have been given to them him to a personal property. When carrying out land reforms takes into account all the elements of soil fertility and evaluated bonitos score. The basis criteria for soil that are dependent fertility. Among them the reserves of humus, nitrogen, phosphorus, texture, amount of absorbed bases, soil acidity. Pay special attention to water and physical properties of soils that are connected to the bioclimatic potential of soil. By calculation a point-hectares. Depending on quality of lands to citizens from the high-quality lands given out small, and from the lands of poor quality big areas. In case of even if the land areas received in the small or big, size depending on quality of the lands, their standard prices are equated. The local commissions of an agrarian reform of documents State Committee Land and Cartography prepares each family the State act on the property right of the land and shows to their citizens. In the presented State acts the scheme of the land area, the area, coordinates, the neighborhood, the basic parameters fertility, and standard prices are specified. All families are issued state acts (legal documents) on the ownership of land. On the official acts all parcels of land given coordinates, which are derived from satellites. All the present time all results of

land reform are shuffled on the Internet. You can easily find any land in the website of the State Committee Land and Cartography and specify its location and coordinates. In addition you can find out who owns the land, the quality, fertility and regulatory cost. During the reform of all lands of the former collective and state farms with a total area of 3,6 million hectares of land reform involved. Lands in the form of property are as follows: mln.hectares % The land, former collective farms and state farms 3, 93 100,00 From them: are transferred in a private property 1,70 43,26 are allocated to municipality 2,03 51,65 are left to the state 0,20 5,09 As a result of land reform 3,5 million people in villages of Azerbaijan or 875 thousand families was received in a personal property with the land areas. The size of the land areas allocated under the property varies depending on land resources of facilities if in villages of areas where by stocks to the land are limited, but differing high quality and growing up in put on the whole valuable fruit, on one person drops out from 0,3 up to 1,5 hectares. The land for that in the bank of the rivers Kur-Aras area and in north Shirvan of a zone this norm reaches several hectares. Expert for this in a personal property of citizens it is transferred used by them 300 thousand in yard lands and 3800 hectares garden sites. Thus the total area of the land transferred in a personal property makes 1,7 million hectares, that 43, 26% of the lands captured by reform are equal. In connection by carrying out of land reform 2028 collective farms existing in the country and state farms are liquidated. In territories of 41 facilities state farms have been created, allocated in the small size of the land. From the same facilities, the purpose of creation of state farms is maintenance of the population with perfect agricultural seeds and perfect breeds of animals. The results of land reform for the first time in Azerbaijan became creation municipalities-self- government institutions. Now in the country 1400 municipalities operate. The state acts on the property right to the land are given out to municipalities, and they independently operate the lands. A prevailing part of the lands of municipalities it is privatized by sale and purchase, other part it is leased by the legal physical person with the purpose of reception of profit. Municipalities real solve all the questions connected with development and management of territory. Taxes from the land and property collected in territory are used for need of municipality. For 15 years period carrying out of land reform in the country manufacture grain and leguminous cultures has raised 60%, manufacture of a potato in 5,8 times, manufacture of vegetable on 31%, and manufacture milk on 29%. All the became possible as a result of effective utilization of the lands which are being a personal property. Thus 97,2% of made grain and leguminous cultures, 99,8% of potato, 99,7% of a cotton, 99,3% of vegetables, 94,8% of grapes, 88,8% meat, and 99,9% of milk have been made on lands which are being a private property. During toss-ups for placing of the land we often applied first experiments of consolidation lands in the course land reform which started on 2nd of August in 1996. People created separate lands which consist of related close families and they asked allocate together their land shares. Basically brothers, sisters, fathers, mothers, sons, daughters and other relatives are united in these lands. The local agrarian commissions and their land areas it is related close families have allocated with a number from each other. It was the first fact consolidation lands in Azerbaijan. Consolidation lands have big advantages. First it's easier than processing of files, than small land areas. The small land areas not probably to use big labor-consuming tractors and other farms techniques. Such sites no tractors have only maneuver, and sometimes can't simply turn. United land owners don't a lot of indirectly and indirect expenses not have crop

education. These land owners everyone separately protect sites, everyone separately build auxiliary construction, warehouses and is mediocre is engaged in realizations of ready products. Land owners don't understand basically an agro technology, farm technicians they don't know as will apply herbicides, pesticides an fertilizer, they skills planning to manufacture and to spend accounting and etc. In incorporated economy, these entire questions dare small expenses. For example: if 50 land owners are united, it is the place of 50 warehouses but the it needs one warehouse, the place of 50 watchmen suffices 2-3 watchmen, enough one premise for work organization. In these economies 50 persons are engaged in question of realization ready products 3-4 worker to a place for 50 people. Processing's of large files agro technical advantages such files soil not be trampled down, when small sites it often happens. In these files are successfully applied an irrigation both other complex mechanical and chemical actions. In Azerbaijan last years consolidations of lands have got by mass character. For stimulation such economy it is carried out some actions. Parallels by process will be organized new large state enterprises for the account development of state land fund last year, it is mastered more than 200 thousand hectares. Scientifically-proved propagation of experts and bodies of central and local executive power a distance a push of these processes. In comparison with 1999 in 2013 number of the united economy has increased 22%. The present used to these economies of area of the lands has reached 300 thousand hectares.

Design of Survey Beacons Information System with Google Earth Being the Medium for Location Based Geo–Visualization; Case Study – Greater Accra Region of Ghana

Sebastian Botsyo and Kwabena Bofo (Ghana)

Key words: Education; Geoinformation/GI; Low cost technology; Web based database; survey beacons; Google Earth; spatial; cost-effective

SUMMARY

In the effective and accurate execution of any land surveying project in Ghana, there is the need for the use of existing, reliable, accessible and accurate survey beacons. Sometimes locating these survey beacons in an area for land surveying work becomes difficult and frustrating due to the several processes involve and lack of proper records of the beacons. You may find a survey beacon in an area only to realize that there is no record of it in the agency solely responsible for its records and maintenance. Even though carrying out reconnaissance (office and field) cannot be over emphasized, the cost, time and energy involved, makes it cumbersome. In the global world and in the advent of technology, time is of essence and therefore easy and quick access to survey beacons and their records is of uttermost importance, hence the need for a web base database to save time, cost and energy. Also locating these survey beacons on the Google earth will further enhance the use of modern and cost effective survey techniques to meet the rising demand for the land related positioning activities in the country. This paper discusses an approach to providing a comprehensive web based dataset of survey beacons (controls) with Google Earth being the medium for location based geo-visualization.

Seismic Vulnerability Classification of Urban Areas Using the Integration of Granular Computing and Induced Ordered Weighted Averaging

Azar Zafari (Netherlands), Fatemeh Khamespanah and Milad Moradi (Iran)

Key words: Risk management;

SUMMARY

Abstract—Tehran, capital of Iran, is located the number of faults which make this mega city exposed to huge earthquakes. Determining location and intensity of seismic vulnerability generally depends on various effective criteria including number of building floors, age and quality of buildings, slope, earthquake intensity and expert's opinions on seismic vulnerability potentials. So this problem concerns with uncertainty regarding inconsistency in combining different expert's point of views and extracting more consistent knowledge for the next predictions. To produce an estimate of seismic vulnerability and its reliability, in this paper a new approach for seismic vulnerability classification based on integration of granular computing and Induced Ordered Weighted Averaging (IOWA) is proposed. Granular computing is used as a granule tree to learn classification rules from a set of observations or training dataset and, IOWA is employed as a modelling tool to learn the criteria weights assigned by the experts to compare the effective in the seismic vulnerability. The proposed model is composed of two levels; including the constructing of granule tree by granular computing in which, IOWA operator is utilized to combine all of the experts' opinions in weighting criteria to select more consistent attribute-value and mining knowledge in the form of the decision rules.

Multi Source Data Integration to Prepare Interactive 3d Model of Kathmandu University

Biplov Bhandari, Archana K.C., Upendra Oli, Niroj Panta and Uttam Pudasaini (Nepal)

Key words: Geoinformation/GI; Geomatics;3D Modelling;Multisource;Data Integration

SUMMARY

Integrated analysis of spatial data from multiple sources is a field that has become increasingly important in the development of Geomatics, particularly its Geographic Information System components. More and more spatial data acquired from different heterogeneous sources are being input into a common data base. This project presents a work, where the aim is to prepare interactive 3D model of Kathmandu University, when there are several different data sources. The use of different data sources brings along many challenges. For example, multiple data formats, various accuracies, coordinate systems and level of details must be taken into consideration. In this project the data from AUTOCAD, Survey Department (Digital data), multipurpose cadastral data, Google Earth, and locally surveyed GPS co-ordinates are taken into the consideration. Interactive maps allows user to retrieve more information in efficient and convenient manner and allows the interactions like zooming, panning, link to the others web portals. In this work, ArcGIS package software is used in data integration and coordinate transformations, Google Sketch up for the creation of 3d buildings. The software is designed for the production of models, which can be directly take the input as .dwg and convert into COLLADA data format. In this project, the final model of the experimental work consists of ground surface, road, road structures like traffic lights and traffic signs, a building and vegetation. It is noticed that the 3D virtual model construction process is often complex and includes various phases when different data sets are integrated.

Case Study: Nepal–India Border Management and Its Challenges and Opportunities

Buddhi Narayan Shrestha (Nepal)

Key words: International Boundary Issues

SUMMARY

Case Study : Nepal-India border management and its challenges and opportunities - Buddhi Narayan Shrestha* Abstract Nepal and India has a very good relationship in people to people level since centuries. There is an open border regime between the two countries. Nepal-India border is unique in the world in the sense that people of both the countries can cross the international border from any point, many times a day, without any interrogation; despite the existence of border check-posts at 21 locations. The objective of this paper is to analyze the challenges and opportunities of free and unrestricted movement of people of Nepal and India across the international border, even after the subsequent demarcation. Convenience in movement, quick emergency response and medical services facility is the opportunities of the open border. On the other side of the coin, there are many challenges, such as criminals commit crime in one frontier and they easily cross the international border to hide on the other side of the border. Terrorists have succeeded in bringing small arms and gun-powder hiding on the border. Narcotic drug traffickers, smuggling of goods and machinery, girls and women traffickers have misused the open border. It is the ground truth that Pakistani, Bangladeshi, Afghan, members of Laskar-e-Taiba, and Mujahiddin terrorist member cross the international border to Nepal in the disguise of Indian citizens. Because their face, attire, habit, language and way of life are similar to the Indian nationals. They create disturbances, terror and horror to the local people. The purpose of this paper is to make a case study of Belahi-Nautanuwa, one of those international border crossing points. It examines how the international open border has been misused by unwanted elements, its negative and positive impact on both the countries, past incidents and analysis on the actions taken by the border authorities. This paper concludes that the existing open border regime has malfunctioned. Illegal cross-border activities have always shown special challenges to both the government. So it needs an alternative measure to resolve the challenges. These are- to introduce the Identity Card system, to densify border security forces, and to fence the frontier with the joint decision. This paper tries to suggest that both Nepal and India have to adopt these alternative measures in a phase wise basis to restrict the cross-border terrorists, control smugglers, arrest criminals, obstruct girl traffickers, and to check narcotic holders.

An Evaluation of Municipal Water Supply in Bosso, Niger State Using Geospatial Techniques

Kudu Dangana (Nigeria)

Key words: Remote sensing;

SUMMARY

AN EVALUATION OF MUNICIPAL WATER SUPPLY IN BOSSO, NIGER STATE USING GEOSPATIAL TECHNIQUES ABSTRACT The purpose of municipal water delivery systems is to transport potable water from a source to water treatment facility to residential consumers, for different uses. In most parts of Nigeria as in Niger state achieving this portable water delivery has been an issue of concern. This problem is in terms of quality and quantity of water which could be affected by the geological and geographical elements of an area. This research was set to evaluate municipal water supply in Bosso using geospatial techniques in order to identify the various sources of water for human consumption, evaluate the components of the existing system in use and to examine the problems associated with the available system. Questionnaires were administered, interviews, field observations, remotes sensing images as well as GIS analysis were carried out. The various sources of water were identified, to ascertain the extent of portable water supplied in Bosso, a part of Minna municipal area. The source point of the dissipated water were first identified then evaluated to ascertain its reliability by calculating the area covered. Similarly, the distribution was examined with respect to the terrain elevation. Various problems were identified and possible solutions were recommended. The analysis showed that a low percentage of the population receives portable water and the frequency of the supply is low. The existing system supplies from Bosso dam which is undergoing sedimentation thereby reducing its capacity. For a more efficient supply Tagwai dam also supplies Bosso. The digital elevation model shows that the terrain of the area is undulating and is partially responsible for the poor distribution of pipes. Routine monitoring of the dam as well as dredging was recommended, expansion of the existing system as well as designing of a better GIS system for the area among others was recommended. **Keywords:** Municipal Water Supply, Water Quality, Water Quantity

Infrastructure Provision in Developing Nations: Value for Money Approach.

Olufemi Oyedele (Nigeria)

Key words: Cost management;

SUMMARY

Developing nations, with constrained finance for development must adopt value for money approach in their infrastructure quest. This is because of the susceptibility of infrastructure procurement, especially construction infrastructure, to corruption. It is also to ensure adequate provision of infrastructure with scarce resources. Lastly, it is to make sure that infrastructure go round more agitators and lobbyists as much as possible. Infrastructure includes such goods and services as energy, telecommunication, roads, housing, oil and gas, health, education, bridges, transport, agriculture and security. Construction is a method of providing infrastructure for the end-users. Construction sector is a sector that expends major part of a country's budget because of the importance of hard and soft infrastructure in national development. A 2012 report by Transparency International listed the construction industry as the business sector most prone to bribery - ahead of industries like the arms, defense, oil and gas, and health industries. The National Audit Office in the United Kingdom estimates that £6.5bn per annum is lost to fraud in the construction industry. In a developing country like Nigeria, the amount lost to corruption, inefficiency and bad procurement methods of construction projects is more. Increase in infrastructure provision has been established to be directly related to increase in the provision of all factors of production and hence increase in production. Without ensuring value for money, the goals of infrastructure provision will not be met and tax-payers money will continue to go down the drain. Using metadata analysis method, this paper gives account of the value for money approach in infrastructure provision in developing countries. The paper concluded that the basis of infrastructure provision is value for money. It also emphasizes stakeholders inclusion in infrastructure delivery. The importance of the work is that it has shown that for every infrastructure challenge, there is a solution.

Assessing Climate Change Induced Displacements and Its Potential Impacts on Climate Refugees: How Can Surveyors Help with Adaptation?

Isaac Boateng (United Kingdom)

Key words: Capacity building; Risk management; Climate change, climate induced disaster, sea level rise, Disaster-Risk Management, climate refugee, adaptation

SUMMARY

Global warming and climate change pose severe threat to many countries, territories and cultural heritage of humanity on earth in the 21st century. One of the ensuing effects of climate change is the issue of climate induced displacements and the consequent migrant (climate refugees). Over the past two decades, the debate about “climate refugees” among experts, advocacy groups and social scientists has produced lots of different scenarios about environmentally induced migration. However, the term “environmental refugee” or “climate refugee” remains somewhat vague and has no international charter. Hence, a significant number of people who are climate refugees at the moment are not accorded the need support under the 1951 United Nations (UN) convention and 1967 Protocol on the Status of Refugees. This paper review literature and uses qualitative analysis to evaluate recent climate induced displacements, potential future scenarios (2050 as baseline), and international legal regime to assess global capacity to deal with the threat. In the past three years, long icy winter conditions at the polar and temperate regions have also caused significant displacements and migrations due to significant loss of livelihood. In addition, climate induced sea-level rise also threatens coastal settlements and low-lying small island states, particularly; those in the Pacific Ocean are vulnerable. It has been predicted by the Intergovernmental Panel on Climate Change (IPCC), 2007 that all these climatic conditions and their impacts are likely to intensify from now to 2050. These clearly highlight the need to build strong global capacity and strategies for managing the risk and impacts of climate induced displacements and climate refugees. Surveyors already have strong capacity and expertise in disaster risk management; therefore, they could be engaged in the planning and development of climate change adaptation strategies to accommodate the impacts of climate change, particularly, the issue of climate refugees.

Temporal Deforestation Assessment Survey of Wetlands in Port Harcourt City Local Government Area, Rivers State, Nigeria.

Godwill Tamunobiekiri Pepple (Nigeria)

Key words: Remote sensing; Deforestation assessment

SUMMARY

The Niger-Delta is one of Nigeria's four Geo-morphological zones (Nwilo, 2003; Uzoka, 2007) which have Port Harcourt as their major city. This region is rich in flora and is also a good habitat for fauna bounded by her adjoining zones; the mud coast to its north-west and strand coast to the east. The availability of this quality of land cover tends towards extinction as a result of urban drift from metropolitan areas to coastal landforms for about a century. Prior to wetlands conversion, activities along coastal fringes caused by increased land need of inhabitants, which accounted for the huge loss of 9209.05 hectares over the Niger Delta (Godstime et al., 2005). To effectively represent the loss of this particular land-use, an updated land-use map was created using the Geo-information technology framework (Fazal, 2008) as an application tool adopting the layer concept for each feature in a geographical perspective. This study accounts for "Wetlands Monitoring and Mapping in coastal cities: Historical and Local evidence of changes in the land use and sprawl of Port Harcourt City Local Government Area, Niger-Delta, Nigeria". The methodology of land-use classification and change detection mapping was employed using multi-sourced datasets (Lui and Mason, 2009; Bhatta, 2010). Population growth prior to rapid urbanization was identified as a catalyst for most deforestation activities while *Nypa* palm invasion has also resulted in a huge loss of mangrove plant at regions of lower salinity. Two index extraction images were produced using the NDVI algorithm to extract *Nypa* palm and mangrove vegetation while water ratio was used to extract water. These features were converted from raster to polygon, which were later used in creating an index classification map. Hence the computed wetland (*Nypa* Palm, Mangrove and Water body) 2003 was 4.696 hectares which is equivalent to 39% of the survey compared to the estimated 60% obtained from digitizing and that of the study area according to LSB (2007). The utilization of geo-information technique is crucial for addressing regional environmental studies i.e. wetland inventory and management as the most valuable approach (Pepple, 2012). Key words Change detection, Classification, Conversion, Land-use, Sprawl, Wetlands.

GIS Based Prescriptive Model for Solving Optimal Land Allocation

Mohd Sanusi S. Ahamad and Mohamad Yusry Abu Bakar (Malaysia)

Key words: Geoinformation/GI; Land distribution; Land management;

SUMMARY

GIS prescriptive modelling incorporates mathematical optimization techniques with geographic information systems. This paper described an integration of GIS based suitability model with zero-one linear integer programming for prescriptive modelling of land use allocation. The objective is to identify optimal regions for new residential land that minimized total development cost. The decision variables are formulated using feasible regions that were derived from GIS based suitability model. The constraints are spatial attributes representing the area, number of regions, land suitability value, proximity, and heights. The optimal solution will be combination of zeros and ones of the decision variables for which the objective is optimized whilst maintaining feasibility in terms of the constraints. A series of test was performed using mixed integer branch and bound algorithm to evaluate the optimal feasible sites for the residential land. The sensitivity test conducted on the model properties through changes in the input variables indicates consistency on the model outputs. The model can be easily integrated with GIS based suitability model in finding the optimal solution for other specific land allocation problem.

GNSS Receiver with a Open Interface

Dirk Kowalewski (Germany)

Key words: GNSS/GPS; GNSS; GNSS Receiver; GNSS Hardware;

SUMMARY

The navxperience company and the Fraunhofer Institute IIS developing together a new generation of GNSS receivers. This project is promoted by the Federal Ministry of Education and Research. The target of the project is a Base technology with an absolutely open Interface. It is completely different to the old manufactures of GNSS technology. The Software, for example the RTK engine, is closed and the end-user knows nothing about the mathematics and basic principle about the software. In this GNSS Receiver we have an open Interface, it means you have access to all basic signals and you can work with your own software directly on the board. It is the same principle as an Android operating system. The developing starts in January 2014 and in summer 2014 we have the first prototype boards. The receiver will receive all signals of GPS, GLONASS, Galileo and Beidou Satellites. The electronic hardware will have the highest standard of modern electronic with very fast processors and enough memory. The field of application is the high accuracy market of navigation and surveying.

Survey Requirements for River Flood Assessment and Spatial Planning: Experiences from LiDAR and River Hydrographic Measurements in the Philippines

Enrico Paringit, Louie Balicanta and Czar Jakiri Sarmiento (Philippines)

Key words: Engineering survey; Hydrography; Laser scanning; Risk management; Spatial planning;

SUMMARY

This paper propounds on the needs for surveying rivers and waterways for purposes of mapping, monitoring and managing riverine (fluvial) flooding. We proceed to relate experiences in actually performing end-to-end flood hazard assessment applications based on the fine-scale topographic data from airborne LIDAR surveys, river geometric and hydrometric measurements and numerical modeling for a river that recently devastated by severe flooding event in the Philippines. The paper argues that while survey accuracy and specifications are important, the data capture, collection and management processes must be sensitive to current and hydrologic modeling techniques, tools and capabilities in order to arrive at a reasonable results and interpretation. Results of flooding impacts from various options of spatial development including flood mitigation measures vis-à-vis levels of spatial detail are also clearly shown through generation of what-if scenarios. In engaging stakeholders, planners, and decision-makers, presentation and visualization of modeling results have been crucial components in communicating flood exposure and risks.

Land Registration in a Digital Environment

Emmanuel Tembo, Johnson Kampamba and Boipuso Nkwae (Botswana)

Key words: Digital cadastre; e-Governance; Land Registration; Digital Environment; Re-engineering business processes

SUMMARY

Developing a digital Land registration system requires re-engineering processes to enable e-submission of records and verifying the authenticity of such records. This requires changes at both technical as well as legal levels. The Government of Botswana in its drive to establish e-government services in various government departments has embarked on the computerisation of land records at the Deeds Registry. This computerisation is meant to improve the turnaround time for doing business at Deeds Registry. It can also be seen as one of the pre-cursors of achieving the goals of e-government. Doing business in any country is greatly enhanced if most of its services are automated or can be quickly accessed. As government embarks on the road to e-government there is need in the Land Sector to prepare infrastructure to make this achievable. One such exercise is the computerisation of Land records at the Deeds registry which will ensure that Land information is accessible and transparent to all citizens. This paper therefore addresses the possible challenges of e-registration of Land records and proposes a model for re-engineering the Land registration system. The system that is proposed will necessitate changes in the Law with regard to what and how land records must be submitted and what is admissible as evidence of submission.

Evaluation of Land Reform Policies in Turkey

Tayfun Cay and Nuh Toklu (Turkey)

Key words: Land distribution; Land management; Land reform; land regulation; use of rural land

SUMMARY

Development of rural areas to develop and complete the land and to regulate human relations within the reformist approach is necessary. On the threshold of the twenty-second century, as now all the world's global policies in a period are determined. During this period, no doubt that Turkey's agricultural policies of the European Union, World Bank, International Monetary Fund on a global scale, such as areas of activity by the organizations and groups, referral is made. One of the basic elements of agriculture as a means of exploitation of the soil on the use of social pressure as a result of this increased political repression. Because of this "land reform" permanent agenda remains. Since the early years of the republic in the country's land reform agenda which has different applications. In this study, land reform, according to the particular application in the world have studied the similarities and differences. A viable model for our country's land reform was formed.

A Method of Building the Local Geoid Model in Vietnam

Vu Dinh Toan (Virgin Islands (British))

Key words: GNSS/GPS;

SUMMARY

GPS points which were measured height by leveling (GPS/leveling points) are used to determine geoid undulation, following that, interpolating geoid undulation of another points to determine height by GPS. When using the global geoid model to determine geoid undulation, measured data at GPS/leveling points are used to assess the suitability of the geoid model with real surface geoid of measured area, not only that, these data can also be used to correct geoid model in the area exists GPS/leveling points. This paper presents a method to build local geoid models based on correction for the global geoid model from relative model of measurements at GPS/leveling points.

Coastal Community and Land Resources, a Case Study Of Kiwengwa Coastal Village –Zanzibar Tanzania

Azzan Mohammed Azzan and Said Salmin Ufuzo (Tanzania)

Key words: Coastal Zone Management;

SUMMARY

COASTAL COMMUNITY AND LAND RESOURCES, A CASE STUDY OF KIWENGWA COASTAL VILLAGE –ZANZIBAR TANZANIA Key words: Coastal community negotiation tools, land governance; spatial planning Other key words: Zanzibar, Kiwengwa Authors: 1: Mr. Ufuzo, Said Salmin, Department of Lands and Registration –Zanzibar. (Tanzania, United Republic of) Email: ufuzo_us@hotmail.com 2: Mr. Azzan, Rashid Mohammed, Department of Surveys and Urban Planning – Zanzibar. (Tanzania, United Republic of) - Email: rashidazzan.07@gmail.com. Abstract In developing coastal communities many indigenous/ community have firm rules on land and inheritance, and have deeply ingrained cultural traditions. Every government faces the challenge of land differently, with its vast array of laws and with varying degree of political will. This complexity is further compounded in Small Islands Development States (SIDS) where coastal resources are based on natural environment, competed highly for by foreign money and tourists; but foreign developers are arriving and are often displacing settlements to marginalized areas. Up until the 1980s, Zanzibar had a monoculture economy based on cloves. Following a fall in world clove prices and a decline in local production, however, the government rushed to diversify the island's economy, making investments in several other sectors, including tourism. Beach tourism is the most prominent type of tourism in Zanzibar (of which most development is on Unguja Island), and new tourism developments are springing up rapidly. This paper draws from a study (Dumashie, Ufuzo and Azzan 2010), in which the authors analysed the problem of land sale and land conflicts in the coastal villages of Zanzibar Islands. This paper outlines the original study and provides an update on how matters have progressed since the workshop. The study project has focused upon addressing access to coastal resources for low-income groups by seeking to develop community tools to negotiate with tourist land developers. In a pro – poor context it achieves this by considering how to engage with communities and how such tools may work. The data collected are based on workshops done in the Kiwengwa village (pilot for islands), interviews with local community and local leaders. Kiwengwa is the first coastal areas for tourism development attracting many foreign investors. It is 25km from Stone town, with long white beach. It consists of small three villages Kiwengwa Kairo, KiumbaUrembo and Gulioni, with population of about 2,800 people. The Study looked at the existing problem facing local communities especially in coastal areas on negotiating land sale. Though tourism has increased the number of hotels and GDP but also has created social conflicts more land conflicts and social problem. Few families has benefited from land sale from investors. The middle men in land negotiations do

not benefit the real owners, land speculations, cheating during signing of land sale. Although some of the existing legal instruments are outdated but also not well-known to many local communities that lead of selling land without following proper procedures. The study demonstrates that in the past two decades, the existing procedures of land sale in Zanzibar is at best misleads the local communities. Land especially along the valuable beach sites are being sold to agents for speculation. Land conflicts and land speculation started to emerge among the societies, while the smart ones bought land at low price from pro poor communities and sale at high price. Most of the coast land in Kiwengwa is either sold to the investors or owned by middleman.

Determination of Geoid in The Kingdom of Saudi Arabia Using Global Gravity Model and GPS/Benchmark Data: A Case Study.

Ramazan Yanar (Turkey) and Ala Saad Alomar (Saudi Arabia)

Key words: GNSS/GPS; Geoid; Mean Sea Level; Surface Fitting; GNSS; Kriging; Orthometric Heights

SUMMARY

SUMMARY A Vertical Reference Frame forms the basis for all development projects in which heights are used. Heights are generally considered to refer to mean sea level (MSL) and most vertical reference frame attempt to approximate MSL as the datum for heights. In principle the geoid is the ideal datum. In practice both the geoid and MSL are approximated by taking tide gauge measurements at one or more sites over a limited time period. Nowadays most control survey are established using Global Navigation Satellite System (GNSS). The reference frame for GNSS is the WGS84 where heights are referred to GWS84 ellipsoid, not to MSL. Consequently, in order to reference GPS – derived heights to the geoid, the geoid – ellipsoid separation (N) must be known. Two models for this separation has been implemented using GNSS/Benchmark data for Saudi Arabia. Vertical reference frame of Saudi Arabia, established in early 1970's as first order vertical control network by spirit leveling based on tidal gauges along the Red Sea and Arabian Gulf, is analyzed for determination of GPS/Benchmark geoid of the Kingdom. The analysis is based on existing benchmarks and newly created benchmarks essential to places where there are no benchmarks. Thin Plate Surface Fitting using Least Squares Collocation and Surface Fitting based on Kriging Algorithm was used to derive the conversion surface throughout Saudi Arabia by differencing ellipsoidal heights and orthometric heights on leveled benchmarks occupied by GPS and geoid undulation of Global Gravity Field Model, EGM96 ($\Delta N = NMSL - NEGM96$) The accuracy analysis is based on comparisons of both cases of geoid (NMSL) and residual geoid () using two algorithms mentioned above. The RMS of surfaces determined by geoid fitting was found 0.123 and 0.088 meter respectively where as the RMS of differences of surfaces determined by residual geoid fitting was found 0.075 m. This results may indicates that refinement of undulation of Global Gravity Field Model with GPS/Benchmark data gave the preliminary values of geoid undulations acceptable for practice purposes for The Kingdom.

Retail Market Studies for the Capital Market: Form Versus Substance

Ting Kien Hwa (Malaysia)

Key words: Land management; Standards;

SUMMARY

The supply and demand conditions of the property market and the attractiveness of the property portfolios are among the key factors that investors evaluate before deciding to invest in the initial public offerings of real estate investment trusts (REITs). To meet this information need for decision-making, a real estate market study report is often provided within the prospectus for the purpose of initial public offering (IPO) and listing on the stock exchange. This paper examines whether these reports meet the property market information requirements of REIT investors by examining retail market study reports found in the REIT IPO prospectuses of Bursa Malaysia for the 2005 to 2013 period. The analysis of the retail market study reports are based on criteria derived from literature review on the criticisms of real estate market studies. Content analysis using the identified criteria is applied to examine whether there are weaknesses in the retail market studies. The analysis found that the general headings and contents of these retail market studies are generally the same. However a detailed content analysis reveals that there are weaknesses in the areas of data analysis and analytical techniques of these retail market studies. Hence the generally broad headings (i.e. form) found in the content of a market study may not necessarily provide enough information/data (i.e. substance) to assist investors in making their investment decisions.

Developing Infrastructure Framework to Facilitate the Malaysian Multipurpose 3d Cadastre

Tan Liat Choon and Looi Kam Seng (Malaysia)

Key words: Cadastre; land administration, land information, multipurpose 3D cadastre, National Digital Cadastral Database

SUMMARY

In the last couple of decades, there has been an increasing demand for property development in urban areas, resulting in the division of property ownership so that different owners can own a delimited space on, above or below ground surface. When multiple uses of space above surface was started by high rise constructions and aviation, it brought forth the question whether such space could be subdivided into separate units for individual ownership. Thus a situation has emerged where the dimensions above and below the ground surface, besides those on the ground, are important considerations in property ownership. Under 3D cadastre, the 2D cadastre management of data cannot meet the real land management of the three dimension space aspect and property. Therefore, it is essential to introduce the 3D cadastre of Three-Dimensional National Digital Cadastral Database (3D-NDCDB) management model. Since the individualisation of property has traditionally been concerned with the subdivision of land using on surface boundaries in the cadastral system, it is appropriate now to consider how three-dimensional situations should be handled from the legal, technical and organisational aspects, and how other countries have addressed similar issues. This paper solely concerned with the theoretical aspects of the study, particularly land administration system and cadastre system. It covers and explains the theory and framework of the Malaysian Cadastre System, good governance involved in land administration and cadastre. The present 2D National Digital Cadastral Database stored information in 2D planimetric. In order to achieve the objective, some of these matters must take into consideration, i.e. (a) Method of data collection, (b) Adjustment and calculation of observed data, (c) The products, and (d) Changes to the format and structure of existing system. In addition, the suitable Land Administration Domain Model base on 3D-NDCDB and some recommendations for amendments to the National Land Code 1965 as well as data information integration will be proposed. It is hoped that this study will provide a better understanding of the nature of 3D-NDCDB, besides adding new information to the available literature in the field. I envisage the main contributions of this study to the present knowledge to be in the cadastral survey and mapping, and land registration practices in the Malaysian Cadastre System from the legislative and technical viewpoints.

Application Research of Adaptive Estimation Procedure (AEP)in Mass Appraisal of the Real Estate Tax Base

Ran Zhang (China, PR)

Key words: Land management; Property taxes; Valuation;

SUMMARY

Mass appraisal (MA) is a commonly adopted method in international real estate tax assessment. Being the premise & foundation of real estate tax reform, MA has yet barely been studied or practiced in China. Calibration is the process of estimating or updating the prices, rates, or “coefficients” in a mass appraisal model. This article implements the calibration tool of AEP on MA in accordance to the special circumstances & characteristics of the real estate market in China. And then an empirical analysis is carried on, the results show that the AEP is worth of popularization for its precise & low-cost assessment.

The Unity Valuation Approach in Mass Appraisal of Real Properties: a Case Study for Shenzhen

Yan Li and Mengting Wang (China, PR)

Key words: Property taxes; Valuation;

SUMMARY

Mass appraisal (MA) is a commonly adopted technique in international real estate tax assessment. Being the premise and foundation of financial & tax reforms regarding real estates, mass appraisal has yet been barely been studied or practiced in China. This paper innovatively presents the concept of “Municipal Unity Valuation”, which is in accordance to the special circumstances & characteristics of the real estate market in China. In order to achieve high precision, low cost and easy updating in the valuation of municipal real estates in China, a unity valuation model is so constructed. An empirical analysis based on Shenzhen city is then carried out, and the robustness of its results shows that the model is applicable and pragmatic.

Geographical Information System Based Valuation Roll for Optimal Land Taxation in Nairobi City County

Gyneth Magiri and Geoffrrey Cheruiyot (Kenya)

Key words: Cadastre; Property taxes; Valuation; GIS; valuation Roll; Land Rates; Nairobi City County

SUMMARY

GEOGRAPHICAL INFORMATION SYSTEM BASED VALAUTION ROLL FOR OPTIMAL LAND TAXATION IN NAIROBI CITY COUNTY Gyneth Karimi MAGIRI, Kenya & CHERUIYOT Geoffrey, Kenya **Key words:** Geographical Information System, Valuation Roll, Land Rates, Nairobi City County Abstract Land taxation, in the form of Land rates, forms the basis of sustainable and equitable revenue source to facilitate service delivery in Kenya's local Governments. These land taxes, which are payable annually, are based on the market value of land. The basis for this value is anchored legally in the valuation for rating act. This provides for preparation of valuation roll every ten years (Valuation Act, 2012). However, most local governments have not been able to prepare Valuation Roll regularly. The roll in use in Nairobi City County was done in 1980. Consequently so many properties have not been captured in the valuation and rating record, denying the local government the enhanced revenue. The primary input into a Valuation Roll is the spatial property information. Thus Geographical Information System provides a powerful tool for land value estimation and superior location variable relative to the traditional straight-line distance assumption (Efsreatios et-al, 2009). This paper show how GIS will enable the Nairobi City County prepare Valuation Roll periodically as provided for in the law in a more economical and efficient way. The GIS will hold; adaptation of GIS database received from Survey of Kenya (SOK), production of digital base maps, collection of core valuation data of the properties in the county into a GIS based cadastral system, assessment of market unimproved site value of the properties, provision for continuous updates on changes in real estate and production of rate demand notes.

Spatial Information Management and Workflow at IGM GDB (“Latitud Sur Project” – 1:25.000 Cartographic Production)

Julio Neira (Chile)

Key words: Cartography; Geoinformation/GI; Remote sensing;

SUMMARY

The Chilean Military Geographic Institute constitutes the official authority, on a permanent basis and representing the State, in all matters relating to geography, surveying and mapping Chilean territory. In that sense, has been involved in a project called “Latitud Sur” that should create a new base Cartography at 1:25.000 scale for Chilean development and defense. The project works capturing cartographic information from satellite imagery and digital elevation models in order to map the whole national territory. To fulfill this objective the IGM Geospatial Database Department has generated a procedure to manage a database with geographic data derived from nationwide mapping capture process following the methodology proposed by the MGCP (Multinational Geospatial Co-production Program) and workflow tracking through a Workflow Manager application. In response to these new needs, has been implemented a cartographic information capture system in Windows environment on a platform Arcgis 10.0 with high-performance equipment for users and administration purposes. Workflow done by Capture operator: The user, in arcgis10 environment, connects to workflow manager where locates the task sent by the Supervisor and then runs the Edit Capture procedure, then opens the Capture program called Summit Evolution from the project integrating elevation models to do their daily capture. Workflow done by supervisor: The Supervisor connects to Workflow Manager in order to complete administrative fields of the task, mark the AOI place to capture and then sends it to the operator to capture their daily work. Conclusions The work procedure adopted for the capture and management of spatial information has allowed to organize workflows in an automatic and organized way, and thus begin capturing of the national territory with very good results in its initial phase from the north of the country using high-performance equipment and software, as well as a procedure aligned to the highest international standards of cartographic production.

Spatial Data Infrastructure, IDE–CHILE (SNIT)

Corali Gonzalez, Julio Neira and Colonel Riquelme (Chile)

Key words: e-Governance; Geoinformation/GI; GSDI; Spatial planning; Standards;

SUMMARY

The SNIT, National System of Territorial Information, currently IDE Chile, was created to optimize the management of geospatial information in Chile, and today permanently coordinates the various participating institutions. The main objective of IDE Chile is that citizens and public organizations, in their decision making processes, may have access to geospatial information. IDE - CHILE: Mission and vision "Coordinate, promote and define principles and strategies for plans and technical, technological and regulatory programs that contribute to the systematic and coherent acquisition of an efficient management of geospatial information in the public agencies, providing accurate, timely, reliable, standardized and quality geospatial information as a response to the needs of the country".

BASIC TERRITORIAL INFORMATION GROUP (GITB) Within the working groups of IDE Chile is the GITB, constituted by the organizations responsible for generating and developing fundamental geospatial data in Chile. Its objective is to study and implement standards for geospatial information and coordinate the response to national needs regarding geographical, topographic, nautical, and aeronautical information. On JUNE 6th 2012 the Minister of Defense named the Director of the Military Geographic Institute as the coordinator of the Thematic Basic Territorial Information area. The Military Geographical Institute, as a coordinator of the group, holds regular meetings with the various state institutions. Some years ago, the GITB defined the fundamental data, which are geographic data sets of national coverage or broad-coverage within the country, and are considered important for different types of applications. The geographic data can include topographic and thematic data and they are: Reference System, toponymy, Administrative political boundaries, transport infrastructure, hydrography, topography and Orthoimage. At present the GITB is working on two fundamental data: toponymy and political and administrative boundaries of the country that have been developed from the year 2007 up to date.

Land Cover Mapping of Pacific Island States

Tokalauvere Qionitoga (Fiji)

Key words: Capacity building; Land distribution; Land management; Remote sensing;

SUMMARY

Land Cover Mapping of Pacific Island States FIG International Congress in Malaysia, 16-21 June 2014 Engaging the Challenges, Enhancing the Relevance Vilisi Tokalauvere Qionitoga, SPC-SOPAC Land cover maps provide the necessary tools for development, planning and management of Pacific Island Countries. The Land cover mapping at SOPAC was initiated and made possible in late 2011 through the SPC and GIZ programme “Coping with climate change in the Pacific Island Region Programme”. The mapping was first done for Fiji at a scale of 1: 50, 0000 for Viti Levu and Vanua Levu. The 1:10,000 land cover mapping is currently underway and is financed by the SPC /USAID “Enhanced climate change, Resilience of Food Production System Project”. The same Project is also financing the 1:50, 000 land cover mapping of Solomon Islands. The visual interpretation was favoured due to several reasons. Firstly, the atmospheric conditions in the Pacific are very different to other parts of the world; in certain areas it is very difficult to get image data that is haze or cloud free. Secondly and most important, the interpretation is carried by the technical staffs from government departments namely Lands, Forestry and Agriculture as the technical field knowledge is vital in the mapping activity. The interpretation is carried out at the SOPAC Division by the officers as part of on-the-job training. At the end of the training, the imagery and data is used by the government ministries. The interpretation is carried out in map sections which are 10 x 10 km areas, where 12 of the sections cover one map sheet. The interpreter toggles between the natural colour, the false color IR, false color IR red edge and the vegetation index. Before the image interpretation atmospheric correction and ortho-correction is performed on the images. Atmospheric correction assists in reducing the atmospheric differences related to relief and local haze whereas ortho-correction is a geometric image correction which takes a DEM or a digital surface model DSM into account, which is essential to eliminate relief displacements. Visual interpretation was still necessary for parts of the images affected by haze. The pan-sharpening process, which joints the colour image information with the higher resolution black and white channel, is carried out in-house at SOPAC. This new task was necessary as atmospheric correction cannot be performed with pan-sharpened images. SOPAC now purchases original images, does the atmospheric correction and then pan-sharpens the image data. Through this way interpreter have better image data for the land cover delineation. The current mapping activity provides a standard baseline to use in determining effects of climate change on vegetation. With various government ministries and departments involved in the interpretation, this facilitates collaboration and product consistency important for aggregating multi-scale vegetation data from local planning units to regional and national scales. For example in the beginning of the

mapping, it was found out that the Department of Agriculture has been mapping the gallery forest as shrubs; this was corrected when liaising with the Department of Forestry. For the first time ever in Fiji, the Department of Forestry and Agriculture are collaborating to produce a same land cover map, after agreeing on a common forest and non – forest boundary. This further facilitates communication and data sharing of vegetation and land cover information between government departments. Very high resolution imagery means more detail and therefore longer time in interpretation. A solution had to be found in speeding up the mapping. As a result, we are currently using image segmentation in ERDAS IMAGINE 2013. However, visual interpretation is still of the process, the polygons produced in the segmentation will be checked and adjusted by the technical officers. A field verification exercise is carried out after analysis in the office, and this allows the interpreter to compare image data and what is really on the ground. The technical officers who have a vast knowledge and experience in field work are also involved in the field verification.

Establishment of Geogravitational Database in Vietnam Territory and Territorial Water Using Fully–Normalised Spherical Harmonic Coefficients of Earth Gravitational Model Egm2008.

Khac Luyen Bui (Viet Nam)

Key words: GNSS/GPS; Positioning; Geoid determination

SUMMARY

The height anomalies and gravity anomalies models of $10'' \times 10''$ grid have been established in Vietnam territory and territorial water by using EGM2008 fully-normalised spherical harmonic coefficients up to degree/order 2190. The height anomalies model shows the increase trend in the direction from North-West to South-East, but it is not the case of gravity anomalies model. The computation results at 816 points regularly distributed in Vietnam territory are compared with Alltrans EGM2008 Calculator 1.2 software derived geoidal heights which express a reasonable agreement with standard deviation of 4.1 cm. The discrepancy implies the difference in computation method, e.g interpolation method using $10'' \times 10''$ gridded database attached in Alltrans EGM2008 Calculator 1.2 compared with computation method using fully-normalised spherical harmonic coefficients of EGM2008. The results were also compared with GPS/levelling derived height anomalies with standard deviation of 0.296 m. The two models can subsequently be used for determination of gravimetric quasigeoid model in Vietnam.

Mapping and Modelling of Animal Diversity Index in Green Campus Using Integrated Geospatial Technique and In-Situ Camera Trapping

Mazlan Hashim, Mohd Syafiq Shukor (Malaysia), Shinya Numata (Japan), Samsudin Ahmad and Syarifuddin Misbari (Malaysia)

Key words: Geoinformation/GI; Animal, biodiversity index; remote sensing, World View2

SUMMARY

This paper reports a biodiversity index of ground animal species using the indirect remote sensing approach for large-scale mapping. Remotely sensed data acquired from World View 2 satellite data were used to obtain biophysical parameters, where all these parameters are then utilized for modelling of animal biodiversity mapping in a green landscape of Universiti Teknologi Malaysia campus. Three biodiversity indices, namely, species richness, evenness, and diversity were mapped and analysed against ground truth obtained from unmanned sensor-camera trappings. The biophysical parameters derived from the remote sensing and ancillary information for the mammal habitat heterogeneity was categorized based on relevancy to vegetation density and moisture presence within the canopy and vegetated areas. Results of this study demonstrate the utility of satellite remote sensing, especially with the new generation of fine spatial and spectral data such as World View2 data, for mapping animal biodiversity at large scale. The derived richness, diversity and evenness indices were shown to agree fully with the in-situ observations.

Preliminary Assessment of Biodiversity/Ecosystems Vulnerability by Climate Change of Hanoi City and Suggestion a System of Mitigation Measures for Them

Doan Huong Mai and Mai Dinh Yen (Viet Nam)

Key words: Capacity building; Education; Implementation of plans; Land management; Risk management;

SUMMARY

In the paper, the authors applied the following items in order to assess the vulnerability of ecosystems / biodiversity of Hanoi city caused by climate change and to suggest a system of mitigation measures for them: □ The concepts on vulnerability, resilience, exposure, sensitivity, adaptation, mitigation according to guidelines of IPCC (2007). □ The impacts of climate change on ecosystems/biodiversity according to the results of researches of CBD experts (2009). □ Analysis the impacts of the factors of climate change on ecosystems/biodiversity according to the principles of ecological sciences. □ The characteristics of all 13 main ecosystems/biodiversity of Hanoi city are research results of the authors and our colleagues. Preliminary assessment of ecosystems/biodiversity vulnerability by climate change of the 13 above main ecosystems/biodiversity of Hanoi city are: □ Group of ecosystems/biodiversity with high vulnerability: urban ecosystems, rural ecosystems, agricultural ecosystems, grassland ecosystems, land ecosystems yards outside the dyke. □ Group of ecosystems/biodiversity with middle vulnerability: nature lake ecosystems, dam ecosystems, wetland ecosystems, stream ecosystems, big river ecosystems. □ Group of ecosystems/biodiversity with low vulnerability: cave ecosystems, forest ecosystems. A system of 7 mitigation measures must be applied, such as: to increase the sustainability of biodiversity/ecosystems, to reduce current pressure on biodiversity/ecosystems, to enhance community awareness, to actively implement REDD program.

Geoid Model Estimation Without Additive Correction Using KTH Approach for Peninsular Malaysia

Saiful Aman Hj Sulaiman, Kamaluddin Hj Talib, Othman Mohd Yusof, Jasmee Jaafar and Mat Akhir Md Wazir (Malaysia)

Key words: GNSS/GPS; KTH, Geoid, LSMS

SUMMARY

Geoid model is the vital information in the determination of orthometric height using GNSS technology. Determination of precise geoid model is the main research agenda around the globe. There is several approaches in computing and developing geoid model. The present study investigated a procedure for combining a selected geopotential model and the available observed land gravity data in order to determine precise geoid model for Peninsular Malaysia by using KTH approach. The optimum combination of condition parameter ($M=L=120$, $\Psi_0=3.0\sigma$, $\Psi=0.4\sigma$ and $\sigma_{\Delta g}=1.0$ mGal) were used to compute the value of Modification coefficient parameters and then generate estimated gravimetric geoid model. The estimated gravimetric geoid model from Peninsular Malaysia are compared with the GPS/Levelling at selected control points and the result shown that the Root Mean Square Error (RMS) differences between orthometric height derived by GPS/Levelling and existing height value from local datum is ± 12.8 cm in the absolute sense. This result shows the preliminary geoid model for Peninsular Malaysia. Further refinement needs to be done especially in the additional of land observed gravity data at no data area and also impose related corrections.

Absolute & Relative GPS Orthometric Heights Using Regional Fitted Geoid

Kamaluddin Hj Talib, Saiful Aman Hj Sulaiman, Mohd Zainee Zainal, Jasmee Jaafar and Azahari Mohamed (Malaysia)

Key words: GNSS/GPS; Absolute, Relative, Heighting, Static

SUMMARY

Establishment of vertical datum for land related surveying works using conventional levelling technique is a tedious process. With the advent of GPS (Global Positioning System) technology, determination of heights value for vertical datum in engineering works and alike seems feasible. In this study, two approaches in height determination using GPS are explored. The two techniques involve the absolute and relative GPS heighting. In the absolute technique, the ellipsoidal heights obtained through GPS observation for the observed points are transformed to the orthometric heights (H) by applying the respective geoidal separation value (N). In this technique, only one GPS is needed for the observation. However, for the determination of horizontal position (x,y), the processing will integrate the MyRTKnet (Malaysian Real Time Kinematic Network) as base station. As for the relative approach, two GPS receivers are needed. One of the GPS receivers will be placed at a known point with known height value and the other receiver at an unknown point. In this study, it is found that for 14 tested points, the Root Mean Square Error (RMSE) for the corresponding heights obtained using the absolute and relative techniques proposed are $\pm 0.115\text{m}$ and $\pm 0.046\text{m}$ respectively. In this study, it is found that for height determination using the two GPS observation techniques, the relative GPS heighting approach seems to be more reliable.

Ensemble of Data–Driven EBF Model with Knowledge Based AHP Model for Slope Failure Assessment in GIS Using Cluster Pattern Inventory

Omar F. Alahuwaynee (Malaysia)

Key words: Geoinformation/GI; Remote sensing; Risk management; Landslide; GIS; Spatial Pattern Analysis; Nearest Neighbor Index; Ensemble method; Malaysia.

SUMMARY

In this study, an ensemble model was developed using a data-driven evidential belief function (EBF) and knowledge-based Analytic Hierarchy Process (AHP) model. The ensemble model was developed to overcome the subjectivity of the expert opinion in AHP model, as a semi-quantitative model and also to find the inter-relationship importance between landslide causative factors. Firstly, two different inventory patterns were used to compare its prediction accuracy, i.e. 1st random pattern, 2nd cluster pattern. For inventory mapping, a total of 220 landslide locations were collected using historical landslide location data, and classified into training and testing data. The training data were tested for randomness in previous study using nearest neighbour index (NNI) technique. The test results show a large percentage of cluster patterns in training data (88%). The cluster locations were used to train 14 landslide conditioning factors derived from various sources: topographic derived parameters, lithology, normalized difference vegetation index (NDVI) and landuse/landcover map. For model validation, an area under the curve (AUC) of ensemble prediction map, showed 83.5% with cluster locations, and 82% with random pattern locations. The proposed methodology enhanced the previous research's results to predict rainfall-induced susceptibility map in Kuala Lumpur city and surrounding areas using geographic information system (GIS). Based on the findings, one can infer that the clustered data can be effectively used as training data with ensemble model instead of random selection technique. As a conclusion, the final result can provide a valuable scientific basis for spatial decision making in planning and urban management studies.

Agricultural Forest Applications and Boundary Surveys Using Low-cost High Sensitivity GPS (HS-GPS) Receivers

Severin Heuboeck and Retscher Guenther (Austria)

Key words: GNSS/GPS; Low cost technology; Positioning; Professional practice;

SUMMARY

GNSS is employed in numerous situations and especially the use of low-cost receivers has become very popular. The use of GNSS receivers is already standard in many applications, e.g. for precise navigation and guidance of machines, for cadastral boundary surveys or to determine the size of agricultural land for European Union funding. Often modern HS-GPS receivers are used for these tasks because they have a better performance even under unfavorable conditions like urban canyons or forests. Their accuracy and reliability is usually determined for open sky conditions. Several studies exist in which the possibilities of HS-GPS receivers in urban canyons were investigated. On the other hand, nearly no tests have been performed to determine the limitations of these receivers in forests. This study investigates the practicability of using low-cost HS-GPS for usage under forest canopies. A test area with varying types of forests, such as broad-leaved forests, coniferous forests and young forests, was selected. Long-term observations over 24 hours in three different seasons were carried out on ten survey points. It was found that the availability of HS-GPS receiver measurements in forest areas is satisfactory and static single point positioning mostly perform well. In the case of carrier phase solutions from baseline observations to a virtual reference station, however, a significant reduction of signal quality can occur. Due to a large number of outliers the number of solutions, in which the ambiguities can be solved and in which a high positioning accuracy less than one meter can be achieved, is lower than expected. Using robust estimation outliers have been efficiently detected and eliminated. In Single Point Positioning (SPP) a scattering of about 8 m for single epoch measurements and 3 m for static measurements was determined. Single frequency differential positioning with robust estimation yields to a median of less than 10 cm with an inner quartile range (IQR) of around 3 m. It can be concluded that HS-GPS measurements in forests are applicable for applications like mapping, classification and boundary surveys in most cases in dependence on a careful selection of the suitable observation time and analysis method.

The Space Contamination through the Generation of Solid Urban, Hospital and Industrial Residuals, Space Garbage and Solid Fuels

Lic. Andrés Suárez Verdecia and Lic. Maiquel Serrano Rivero (Cuba)

Key words: Education; Geoinformation/GI; GSDI; Informal settlements; Land management; Land readjustment; Legislation; Marine cadastre; Professional practice; Risk management; Spatial planning; Urban renewal; contaminación espacial; generación de residuos, clasificación ambiental

SUMMARY

A nivel global una de las problemáticas fundamentales que enfrentan las organizaciones y países que tienen un Sistema de Gestión Ambiental es: ¿qué hacer con los residuos sólidos generados? Existen prácticas en algunas regiones del mundo que garantizan la adecuada gestión de algunos tipos de residuos sólidos. Estamos realizando una investigación descriptiva, analítica y observacional, desde febrero de 2013, la cual continúa mientras haya contaminación ambiental y espacial. En el presente trabajo pretendemos destacar y demostrar al mundo cuanta influencia negativa ejerce a la contaminación espacial el verter residuos sólidos y desechos peligrosos a cielo abierto aumentando la contaminación atmosférica y disminuyendo el esencial efecto invernadero para la vida del planeta afectando al cambio climático, y concientizar a la humanidad, industrias productivas, de cuanto hacemos en negativo contra el medio ambiente, llamarnos la atención y hacer una gestión ambiental libre de organismos y microorganismos infectados, plagas, epidemias y pandemias que siempre es posible evitar. La clasificación de los residuos sólidos, composición y peligrosidad, y etapas principales de gestión. La basura espacial y los combustibles sólidos son temas abarcadores en los que haremos énfasis con detalles y generalidades sobre la contaminación atmosférica provocada por el vertimiento de estos desechos debido a su mal disposición, utilidad y manejo. Como resultado más del 90% de la población a nivel mundial comparte el criterio que con esta implementación lograremos mitigar los impactos ambientales por inadecuada disposición de residuos sólidos y desechos peligrosos en el espacio, incremento de la cultura de los trabajadores a nivel global, disminución de enfermedades y esparcimiento de plagas que afectan a trabajadores, comunidad. Contribuir al saneamiento del medio ambiente y evitar la proliferación de vectores, cumplimiento de las legislaciones vigentes establecidas por organismos nacionales e internacionales, ganar prestigio Ambiental ante autoridades ambientales y población. Mejora la imagen del planeta. Llegamos a la conclusión que en Cuba y el mundo se recomienda a las organizaciones realizar producciones, más limpias, ofrecer controles sanitarios, evitando así la contaminación del medio ambiente, el vertimiento de basura espacial tanto tecnológica como industrial y la proliferación de vectores al medio ambiente. En general ejecutar acciones para el tratamiento a los residuos sólidos y desechos peligrosos en zonas urbanas, industriales, de producciones de primera y alta tecnología, y

demás. Acciones y Tratamiento final a los desechos. Tipos de desechos que se vierten al aire libre contribuyendo a la contaminación atmosférica. Estimaciones anuales. Manejo final definido. Tratamiento. Beneficios de la implementación. Legislación ambiental aplicable. Profundizaremos en el tratamiento de los residuos sólidos hospitalarios, su drenaje y destino, como ejemplo de esta masacre al medio ambiente y al área espacial. Esto significa que al aplicar estas acciones y tratamiento nos percatamos que todo lo positivo nos permite alcanzar resultados satisfactorios no obviando así el Concepto Basura Cero y lo establecido en el Consorcio de Asturias en España. Palabras claves: residuos sólidos, gestión ambiental, contaminación espacial, contaminación atmosférica, tratamiento, desechos peligrosos.

3d Visualization Through Planar Pattern Based Augmented Reality

Styliani Verykokou (Greece)

Key words: Cartography; Geoinformation/GI; Photogrammetry; Augmented reality; Computer vision; Features detection; Image matching

SUMMARY

Augmented reality is the scientific field that aims at an enhanced sense of the real world. Although it was first presented in the 1960s, actually in recent years it has begun to have practical applications on various fields and today arouses the interest of many researchers, scientists, as well as companies. The purpose of this paper is the presentation of an augmented reality application that allows the visualization of the three-dimensional anaglyph of a region. The application was developed through the use of methods and algorithms of photogrammetry and computer vision and is based on the recognition of an orthoimage of a region that is augmented with its digital terrain model on a computer screen. The SURF algorithm is used for the extraction of interest points in a photograph of the orthoimage and in every real world frame. The matched features between these images are geometrically verified by the RANSAC algorithm. The Levenberg-Marquardt optimization algorithm is used for the calculation of the homography between the matched images, pattern recognition is conducted and the camera exterior orientation for each frame is estimated. The latter, in combination with the camera intrinsic parameters, which are computed through a camera calibration procedure, leads to the augmentation of the real world scenes. The application indicates the very promising capabilities of augmented reality for the realistic visualization of the topography of an area and the detailed observation of the anaglyph, without the need of a three-dimensional printing of the terrain model.

The Potential of Geomatics in the Realization of a Map of Desertification Sensitivity Southern Massif Belezma (batna).

Hassen Benmessaoud, Fairouze Chergui, Razika Sahnouni and Chaouki Chafai (Algeria)

Key words: Land distribution; Risk management; Desertification, Massif Belzema, Geomatics, GIS, Cartography theme.

SUMMARY

Desertification is the gradual and sustained reduction in the quantity and quality of the biological productivity of arid and semi-arid land. The study area is located in the North Eastern part of Algeria, it has a rich heritage in its biodiversity, however weather conditions and adverse human reality, induce a degradation of the physical environment in the form of a regression of vegetation cover. To assess desertification in our study area map of desertification sensitivity is a tool for decision support. For the realization of this Map we used the ArcGis software applied a methodology which is inspired by the concept MEDALUS (Mediterranean Desertification and Land Use, 1999) by crossing four thematic layers that may have an impact on the process of desertification. The results of Cartography and statistical analysis permit the classification of our region in terms of sensitivity to desertification in four very important classes. (Not affected, Insensitive, Sensitive and Highly sensitive). More than 69.92% of the surface area were classified sensitive to very sensitive, For against 30.07% is classified in unallocated insensitive. Planning restoration work and the fight against desertification are expected to limit the risk of desertification in the study area perspectives.

Preparation of Database for Urban Development

Punya P. Oli (Nepal)

Key words: Digital cadastre; Geoinformation/GI; Spatial planning; Urban renewal;

SUMMARY

Preparation of Database for Urban Development Punya P OLI, Nepal Key words: Municipal Geographical Information System, infrastructures, metric house addressing system, cadastre data. 1. ABSTRACT Most of the municipalities of Nepal were formed prior planning of whole area. The land use plans are usually prepared to the settlements where it is growing and development taking place. It is required the detail data base/mapping of all the area of municipality for urban development and provision of services. The spatial coverage of Nepal is topographical maps at the scale of 1:25,000- 1:5,000 and cadastral map coverage of private land at the scale of 1:500- 1:2,500 which is insufficient for urban planning and development. The objectives of preparation of urban database or Municipal Geographical Information System(MGIS) is to carry out survey for data base including topography, infrastructures, socio economic situation, metric house addressing system, land and building ownership situation and link these data to tax system of the municipality. These data base will be use for sustainable urban development. Some time, these data base will contain simply topography and infrastructural situation for land use zoning of town areas. These activities are being carried out in almost all municipalities and land pooling programmes in Nepal. Most of the people in Nepal live in rural areas and only 17% of people lives in city areas with urban population growth of 3.38% per annum (Population Census, 2011. It is planning to develop additional 40 towns in addition to the existing 57 municipalities in different location of the country in order to avoid the developing megacities. The largest city of Nepal, Kathmandu has population of about 1.07 million. Most of the municipalities have now medium high resolution database. The map and data base provide the basic information for sustainable urban planning. It assisted to expedite the urban planning and sustainable development as well as urban data base preparation system in Nepal. It is generally carried out by public private participation on the basis of high resolution satellite imagery or aerial photography, ground surveys and existing data like cadastre data, infrastructural drawings. In this article, it is briefly described the objectives, contents of data base, methodologies the of data acquisition for MGIS and its contribution to sustainable urban development in Nepal. 2.

'margin of Error' in Property Valuations – Is There a Need for Safety Margins in Compulsory Acquisitions?

Juhana Hiironen, Kirsikka Niukkanen, Juha Ohrankämnen and Ari Laitala (Finland)

Key words: Land management; Valuation; margin of error; property valuation; safety margin; compulsory acquisition; compensation

SUMMARY

The ownership of real property is protected by the constitution in most countries. However, in many cases the “public” has reserved a right to limit the constitutional protection of property when it is necessary for the public good. In Finland compulsory acquisitions are allowed for public interest with full compensation. Compensation shall ensure that the affected party’s financial position is not weakened in the process of compulsory purchase. In the FIG recommendations market value is stated to be the basis of value for the assessment of compensation. The applicability of the market value as a basis of value for compensation has been criticized by stating that the use of market value leads systematically to too low values. This seems to justify a use of certain margin of safety which is the question that will be illuminated in this article. The study analyses the variation in property valuations which is estimated by giving the same valuation task to different property valuers. After each valuer has given his/hers opinion about the market value of the property, standard statistical methods are applied to analyze the results. Standard deviation in the market value estimates provided by experienced valuers was 32%. The overall variation was -68% and +113% from the median estimate. 50% of the valuations stayed within -16% and +33% from the median valuation. The results indicate that the valuation estimates don’t follow the normal distribution. It seems that the estimates tend to be more elastic to higher estimates than to lower ones. In this case the valuers were not familiar with the property market that the valuation task concerned. This means that they should have based their valuation judgement more on the input data and less on the “gut feeling”. The results however indicate the opposite. Based on the results it is undeniable that a compensation based on market value is not a guarantee that it will be possible to purchase an equivalent property as replacement for the compulsory acquired one. It is easy to understand why the market value is in many cases too low for a property owner to feel to have been fully compensated, and half are by definition entitled to feel so! On the other hand the level of compensation should result in a fair balance between public and private interests. The question remains, is the market value a fair balance?

Attitudes of Claimants' to Variation in Compensation for Compulsory Land Acquisition in Ondo State, Nigeria

Adejoke Oladapo (Nigeria)

Key words: Land management; Compulsory Land Acquisition and Compensation

SUMMARY

Abstract This paper presents the perception of claimants to land acquisition and variation in compensation paid for compulsory land acquisition exercise in some selected city in Ondo State in year 2012. This is a survey research which adopts a questionnaire design to elicit data from the claimants of the compensation paid during the period. Data collected employed descriptive analysis of mean scores and weighted mean scores with measure of dispersion to present the results. The research revealed a wide disparity between the mean of compensation paid and market value of the acquired property. Furthermore, this research revealed that the relative satisfaction index of claimants towards compensation paid were below acceptable satisfaction level. The study then recommended among others that, in order to have a peaceable society devoid of conflict and chaos, adequate valuation methods and payments of adequate compensation that will not make claimants worse off than they were, are essential.

Compensation for Expropriation in Ethiopia and the UK: a Comparative Analysis

Daniel Weldegebriel Ambaye (Ethiopia)

Key words: Valuation;

SUMMARY

Land expropriation is a common practice both in the UK and Ethiopia. The purpose of this paper is to compare and contrast the valuation systems and compensation methods used in Ethiopia and the UK in a bid to establish the level of amount of compensation paid for those who lost their property in the interest of society. The method of comparison employed is micro-comparison as opposed to macro level comparison which focuses on the general aspect of comparison. The findings of this study show that the principle of compensation as “the full recompense of the property lost” has been observed in the UK, while this has not been the case in Ethiopia mainly because land has no value to the holder. It is suggested that even if the UK and Ethiopia are found at different legal and economical development, it is possible to adopt some of the compensable interests used in the UK so as to create fairness in payment of compensation and in the long run tenure security on property holdings.

Multiple Use of Laser Meter & Innovation Techniques in Engineering Surveys

Ravindra Sharma, Manish Sacklecha and Santosh Kumar Mahajan (India)

Key words:

SUMMARY

One of the primary requirement of the engineering surveys is to determine the layout plans with boundary details, natural monuments or objects such as trees, large stones and other substantial, naturally occurring features, physical points on the ground that define angle points of boundary lines that divide neighboring parcels etc. are prominently marked on large scale drawing with North direction on a corner of the sheet. In past two decades field surveying equipment have undergone many changes. As late as the 1990s, the basic tools used in field surveying were a tape to measure distances, a level to determine height or elevation differences, and a theodolite to measure angles (horizontal and vertical), combined with the process of triangulation and trilateration. Starting from a position with known location and elevation, the distance and angles to the unknown point are measured. A more modern instrument is a total station, which is a theodolite with an electronic distance measurement device (EDM). A total station can also be used for leveling when set to the horizontal plane. Since the introduction of total stations, technological shift from optical-mechanical devices to fully electronic has taken place. Recently GPS systems with Real Time Kinematic are in use for precise surveying. Total stations are still used widely, along with other types of surveying instruments, however, because GPS systems do not work well in areas with dense tree cover or constructions. In this paper innovative techniques of engineering surveys with use of high range laser meters (60 m to 250 m) to prepare location plans for civil engineering projects have been discussed. It is also established through findings of this paper that a laser meter with innovative techniques alone can replace the use of all conventional field surveying equipment like a theodolite, tachometer, leveling instrument, plane tabling, chain, tape etc.

Quantitative Image Classification Accuracy Assessment Program for Sustainable Geospatial Technology Applications

Sunday Adefioye (Nigeria)

Key words: Capacity building; Geoinformation/GI; Remote sensing; Spatial planning; Computer programming; image classification; accuracy assessment; QiMAP

SUMMARY

Image classification is an important operation in remotely sensed data analysis. It involves the extraction of identified features and features of interest into themes or classes. The final map resulting from classification exercise is called thematic map. Both the raw data and final output – thematic maps are susceptible to machine and human errors. Therefore, the level at which a classified map represents the reality it portrays remains uncertain until its accuracy is determined. Accuracy assessment is the measurement of the rate and level to which classified image agrees with the reference (ground) data it represents. Accuracy of any image classification may be tested in four different ways - field checks at selected points, map overlays, statistical analysis of numerical data, and using confusion matrix calculations. The confusion matrix is the most widely used measure of image classification accuracy assessment. It is a simple cross-tabulation of the mapped class label against the observed in the ground or reference data for a sample set. Several measures of classification accuracy may be derived from a confusion matrix, this include, overall accuracy, producer's accuracy, user's accuracy, and Kappa co-efficient. In many studies, quantitative assessment of the accuracy of classification is often avoided due to the rigorous statistical methods involved. Development of standard computer applications eases the task of accuracy assessment. This paper presents the development and application of the Quantitative Image Classification Accuracy Modeling and Assessment Program (QiMAP). QiMAP was developed using the Microsoft Visual Basic 6.0 programming language for research and academic purpose. The program was used in evaluating the classification accuracy of data used in the analysis of land use/land cover pattern along river Benue channel in Adamawa state, Nigeria. The results revealed a system that simplifies the task of accuracy assessment of image classification. The paper conclude that to ensure a reliable application of geospatial technology - remote sensing, image classification accuracy assessment should be consider as prerequisite for acceptability of any thematic map derived from remote sensing data analysis. And the development of standard applications such as QiMAP would accelerate the appraisal of accuracy assessment for image classification.

Critical Analysis of Ethiopian Urban Land Lease Policy Reform Since Early 1990s

Zelalem Yirga Adamu (USA)

Key words: Legislation;

SUMMARY

In the early 1990s, the Ethiopian government launched urban land reforms. While maintaining public ownership of land of the previous era, Ethiopia has moved towards a system in which market forces shape the process of land allocation and utilization through the establishment of an urban land leasehold system. The aim of this paper is to critically review the limitations and implications of the Ethiopian urban land lease policy reform since early 1990s. Through reviews and analysis of international practices in an Ethiopian context, debates and challenges on land lease policies are assessed. The study blended practices of social research in which an overall approach of qualitative research is used in an investigation together with applied, descriptive and exploratory methods. The study findings revealed that despite the existing Ethiopian government considered urban land lease tenure as a tool to cure urban challenges , the lease policies have not formulated in such a way to meet many of their objectives. The study revealed that payments for the duration of the lease are not equal to what the market considered to be the value of the lease. The principles and practice of getting revenue from increasing land value is not addressed. The tools initiated to discourage speculators are controversial. Lessee's right of transferring and pledging use rights are restricted. The paper concluded that a more harmonized and legitimate urban land policy framework is needed. The government legislators should reconsider basic conceptual problems that have not yet been addressed and solve. The outcomes of this paper have important implications for legislators on how urban land lease policy reform is setting up.

Spatial Modelling for Flood Tide Predictions Puddle of Sea Area in the City of North Jakarta Coastal Area

Syachrul Arief (Indonesia) and Yoshino Konihiko (Japan)

Key words: Coastal Zone Management; Risk management;

SUMMARY

SPATIAL MODELLING FOR FLOOD TIDE PREDICTIONS PUDDLE OF SEA AREA IN THE CITY OF NORTH JAKARTA COASTAL AREA Syachrul Arief a,*, Konihiko Yoshino b a Graduate School of Life and Environmental Sciences, University of Tsukuba, Tennoudai 1-1-1, Tsukuba, Ibaraki 305-8577, Japan – syachroel@gmail.com b Faculty of Engineering, Information and Systems, University of Tsukuba, Tennoudai 1-1-1, Tsukuba, Ibaraki 305-8573, Japan – sky@sk.tsukuba.ac.jp This study aims to determine the potential flooded areas in the tidal area of study and predict the extent of use of land affected by the flood inundation area of North Jakarta. The method used in this research is to use iterative techniques contained in ILWIS software as spatial analysis. Data sources used to create the DEM using LiDAR image having contour intervals (Ci) of 1 meter. Expectations of the results of this study is to determine the flood inundation predictions with hydrological processes in land use impact area affected, the government made suport system for taking decisions, in the construction tackle flooding. Keyword: Lidar, DEM, North Jakarta, Tidal Flood Inundation

Malaria Risk Assessment Using GIS a Case Study of Adama District, Ethiopia

Kibrom Hailu Tafere and Daniel Alemayehu Demissie (Ethiopia)

Key words: Geoinformation/GI;

SUMMARY

Author: Kibrom Hailu Tafere E-mail: kibrom.hailu23@gmail.com Position: Lecturer, Adama Science and Technology University, Ethiopia General Secretary, Ethiopian Surveying Professional Association Bachelor degree, Surveying technology MSc, Geodesy and Geomatics Engineering Title of the paper: Malaria Risk Assessment Using GIS a case study of Adama District, Ethiopia Abstract Malaria as one of the parasitic diseases, caused by plasmodium was discovered in 1880. Taking head of malaria infection and transmission as a problem gap due to lack of geo-referenced spatial information to assess malaria hazard and risk level for administration units was observed in Adama district. Therefore, The objective of this study was to assess malaria risk areas in Adama District using GIS. The most important determinate factors used to analyze malaria risk and hazard were population density and slope. The multi-criteria evaluation of malaria risk assessment has been studied based on Risk Computation Model developed by Shook. This approach uses three parameters (hazard, vulnerability, and element at risk) to predict malaria risk. These three parameters are combined together by assigning some rescaling weights 1, 2, 3, 4, and 5 to the three parameters. These numeric weights reflects the relative contribution of each parameter to malaria risk: weighting factors 1, 2, 3, 4, and 5 corresponds to very low, low, moderate, high, and very high respectively. Low hazardous areas (78.91ha/0.1% of the area) were categorized to be less in terms of malaria prevalence due to soil and slope factors. High hazardous areas (66017.49ha/84.87% of the area) were categorized to be high to very high hazardous level due to soil and Agro ecology zone factors. The result of Risk Assessment show that areas with low, moderate and high malaria risk were (53641.75ha/68.97%), (22951.41ha/29.51%), and (1136.51ha/1.46%) respectively. In terms of malaria hazard and risk levels, 2 kebeles were found to be non-hazardous and the rest 39 kebeles were hazardous and 1 Kebele was found to be at higher risk, 11 kebeles at moderate risk and the rest 29 kebeles at low risk of malaria. Areas in the district with steep slope are found to be less hazardous due to reduction of the suitability of the areas for the breeding of mosquito. Besides, the area with higher population density in Wonji Gefersa Town compared to other neighboring kebeles increase the risk for malaria infection. Key Words: Malaria, Vulnerability, Element at Risk, Hazard, Risk, GIS, Model, Prevalence

New Chilean Reference Frame: Three Years After the Maule Earthquake

Lautaro Rivas and Julio Neira (Chile)

Key words: Deformation measurement; GNSS/GPS; Positioning; Reference frames;

SUMMARY

The particular geographical situation of Chile has transformed the country into a very seismic region. Chile is located just above the subduction zone between the Nazca and the South American plate. In this zone the Nazca plate moves underneath the South American plate causing a drift of 2 cm/year in the north east direction. This physical phenomenon is the responsible for all the seismic, geological and volcanic activity that characterizes the region. Chilean reference frame is based on the GNSS technology. A total of 66 continuous GPS stations programmed to record data every 30 seconds, for 24 hours a day and distributed all over the country has form the skeleton of the horizontal network that provide the frame on which all the national geospatial infrastructure is develop. The February 27 2010 Maule mega thrust earthquake involved surface displacement that range for 0.3 to 5 mt in the horizontal coordinates, meaning the total destruction of the quality of the reference frame both active and landmarks. The analysis of all the information gathered during this 3 years period has provided a clear picture of the deformation during the earthquake and specially the deformation produced after the event. From the information and analysis of the data gathered during this period, it was possible to develop an approach to measure, process and rebuilt the national reference frame. This work has contributed to the national territorial develop through the use of an standardize modern and global geodetic reference frame.

Compressive Strength of Green Building Concrete

Jayant Supe and Mohan Kumar Gupta (India)

Key words: Capacity building; Education; Quantity surveying; Real estate development; Valuation;

SUMMARY

Green Building concrete is recognition and interdependence of eco-friendly building material to use minimum energy, water, and other natural resources. Why Green building concept of constructing homes and buildings is the need of today? Because it is the approach to save energy in mining building materials and keep them reserved for future generations, by finding new resources? In the new world of sustainable building, information about the strength, durability, and indestructible nature of concrete as a resourceful building material is emerging. Amid the teardown-and-replace mentality still pervasive in the world today, concrete stands out defiantly. Coarse aggregate obtained from ruined structures produce concrete with an alternative green building material, possessing the same thermal qualities, design flexibility, and permanence. Fortunately, a paradigm shift is taking place in attitudes about resource conservation and sustainability. More builders and homeowners are now embracing green building, and concrete is emerging as a champion rather than a rebel. Technology is developing fast to find out how to use concrete to build environmentally responsible homes without compromising beauty, comfort, or economy. It is observed that the construction and operation of buildings accounts for approximately 40 per cent of all emissions of greenhouse gases. The coarse aggregate from ruined buildings in making concrete, could drastically reduce, and ultimately even eliminate, the carbon footprint of new building construction. The main aim of this research paper is to utilize RCA in making green building concrete and conclude whether the replacement of C.A. & F.A. is inappropriate or acceptable. **KEY WORDS-** life cycle assessment, Green building concrete, renewable energy of concrete, RCA (Recyclable Aggregate)

Population Density Mapping Based on Build up Area using GeoEye Image and GIS Technique: Saltlake City, Kolkata.

Rukhsana - and Humayun Sarkar (India)

Key words: Geoinformation/GI; Remote sensing; Population

SUMMARY

Population density is the number of people per unit of area usually per square kilometer. It can be measured by the new developed methods like counts of dwelling units, measurements of land areas, land use classification and spectral characterization of images. The quantitative revolution in remote sensing and GIS technology used to collect the new and reliable data for population explanation or analysis purposes. In this research population data of 2011 and GeoEye imagery of 2010 with 0.6 m resolution were used to get the final Population Density Map based on build up area/square km of Saltlake City. whereas Arcgis v10.1 were also used for on screen digitization and for data management. GeoEye image for saltlake city is suitable for accusation of build up area because of 0.6m resolution and secondary population data were designed with Personal Geodatabase (PGDB). The high population densities were found in 4, 19 and 20 block that is 103.58, 103.34, and 119.77 Sq Km/Person, where the area were measured 187.81, 288.49, 161.89 sq km respectively. The block no.9, 15 and 21 were found as medium density. Rest of blocks was found as low density. It was highly appreciate that block no 19 is a slum and having highly dense build up area with 9336 population. But for block 4 and 20 buildup areas are highly dense with arranged multistory building but having 8161 and 7927 population. For medium category population density block 9 and 15 are fitted but for 21 block where maximum build up areas for offices and recreation purposes was not fitted because of low dense population. For low population density all blocks are in acceptable category. However the experiment over Saltlake city can be explained statistically with four relationship i) Where number of population is higher/sq km, administrative area and build up area relatively lesser the Population Density is experienced high ii) Where the number population is higher/sq km, administrative and build up area is also relatively higher, the Population Density is low. iii) Where the number of population low, administrative and build up area is relatively medium, the population density is low. iv) Where the number of population, administrative and build up area in medium range, the population density also experienced medium. Even there is a hurdle to produce population density map based on build up area but still can be used and tested for other cities of India and this will consume the time and finance for the government authorities for national level Census. Key Words: Remote Sensing, GIS, Population Density Mapping.

The Fourth Layer in Collaborative Navigation – Going Underground

Guenther Retscher (Austria)

Key words: GNSS/GPS; Low cost technology; Positioning;

SUMMARY

Collaborative navigation is the method for determining the location of a group of users or sensor platforms absolute and relative to each other. Thereby users are equipped with different sensors of varying quality in terms of performance and achievable positioning accuracies. The concept arose from and follows up the multi-sensory approach where one user has different sensors, such as GNSS receiver, IMU, accelerometers, digital compass and gyro, barometric pressure and step sensor, image sensors including digital cameras and Flash LiDAR, as well as UWB receivers, Wi-Fi and RFID. Now a network of user groups is located and they share their information among each other. In the beginning of the concept development, only two layers have been considered for collaborative navigation which were the ground level where the group of users had to be navigated, next came spaceborne satellite navigation systems. Due to the recent introduction and use of Unmanned Aerial Vehicles (UAV's) or other flying objects, such as helicopters or light aircrafts, this concept has then been extended with a third layer – the airborne layer in between the ground and the satellites. The author of this article proposes to introduce an additional fourth layer into the concept, namely the underground. In cities a branched network of tunnels such as underground public transportation tunnels, road tunnels, subways, sewer canal systems, etc. is present. In this paper the question is raised why we are not using these underground structures, for instance, to guide emergency crews to the affected area and rescue people when it is not possible to perform this task above ground. In this paper, possible underground structures are identified and suitable localization technologies for the underground environment in conjunction with users above ground are elaborated and discussed. Thereby, special emphasis is placed on the use of RFID as an easy to deploy absolute positioning technology. As the author believes that the underground will play an important role for such application scenarios, he calls upon the research community of geodesists and researchers in related fields for international collaboration and participation to develop this idea further. His call is formulated as: Let's extend the layers of the collaborative navigation concept with "Going underground"!

Mapping the Outermost Small Islands Utilizing Uav–Based Aerial Photography

Catur Aries Rokhmana (Indonesia)

Key words: Low cost technology; Photogrammetry; Professional practice; Outermost Small Islands; UAV-Based Aerial Mapping

SUMMARY

This paper shows some experiences in mapping the outermost small islands near Indonesia boundary line that utilizing UAV (Unmanned Aerial Vehicle)-Based aerial photography. Some notes that should be emphasized are described, which are practical advantage and disadvantages in operation; automation in production; geometric accuracy, and potential for future applications. The UAV's aerial platform is made from the regular R/C-Aeromodeling that can carry point and shoot camera type for capturing aerial photo in certain formation with 85% overlap and 20% sidelap. The aerial platform has avionic system (ardupilot open source) that use for auto piloting during photo flight. Those instruments are keeping the aerial sub-system cost less than 2500US\$. The GPS Surveying with OEM UBLOX-GPS receiver is used for Ground Control Survey and record raw data tracking during photo-flight. More than 300 amount of aerial photos captured in each flight. Furthermore, the structure from motion algorithm is used for processing aerial photo to produce basic Orthophoto and Digital Surface Model (DSM). Then, both of Orthophoto image and DSM information are used for producing vector map and contour map. This technique can produce accuracy less than 2 times Ground Sampling Distance (GSD) for Horizontal position and 4 times GSD for DSM information. Aerial Photography with GSD number 15cm is enough produce map scale up to 1/2500. From those experiences can be founded that aerial photo that captured in the daylight afternoon is more advantages than in the morning, because in the clear shallow water near the beach, some underwater object can be seen. One of the challenges in working at the small islands with the UAV-based is the windy condition. In future, the UAV's system manufactures are increase and the tele-control range is more long distance also. This make UAV-based mapping can be operated in more big area coverage and more stable also.

Impact of Public Procurement Procedures on Delivery of Maintenance Works

Catherine Mutava (Kenya)

Key words: Real estate development; Public procurement

SUMMARY

ABSTRACT The public procurement system in Kenya has been undergoing reforms consistent with the global trend since the mid-1990s, most notably within the periods covering 1997-2001 and 2005. The delivery of maintenance projects in Kenya is highly dependent on the efficacy and efficiency of the public procurement and tendering procedures. The procurement procedure leading to tender awards is too long depending on the choice of procurement method which cannot arrest an emergency. Maintenance has very unique characteristics especially for corrective maintenance which is never planned and yet it is an emergency which is supposed to be addressed as it occurs. This is one of the many challenges faced by Public Institutions posed by Public Procurement and Disposal Act (PPDA). In addition equipment failure can create safety hazards, costly downtime while waiting for parts, and increased costs due to the associated disruptions. If parts are hard to find, out of service times can be greatly increased. The intent of this paper is to expose the challenges posed by PPDA on procurement for emergencies or unplanned maintenance in Kenya. It would explore the effects of the PPDA on the delivery of unplanned maintenance projects; the challenges faced while carrying out public maintenance projects as well as determine the best and most suitable procurement and tendering system for emergencies. While this study may be of value to any person interested in, procuring any service in Kenyan public sector, it is hoped that it will specifically benefit the following groups of people. i. The Government and the Policy Makers The Government and the policy makers stand to benefit from as they will gain insight on methods to apply to while procuring for maintenance services in public institutions. ii. Academics The study is expected to contribute to the existing literature in the field of procurement and more specifically for maintenance purposes. Future scholars can use this research as a basis for further research in the area of procuring maintenance services. iii. Estates and Maintenance Officers The study stands to benefit all the estates and maintenance officers in the public institutions as they will understand the best way of procuring services for maintenance purposes. In Kenya there is no comprehensive study done after the introduction of public procurement act on its effect on the tendering and procurement procedures by government institutions whether it has improved the performance management of maintenance projects. And thus this would be a significant exposure

Improvement of the Ellipsoidal Heights Obtained by GNSS Observations

Seyit Ali Yilmaz (Turkey)

Key words: GNSS/GPS;

SUMMARY

Troposphere is the lowest part of the atmosphere that contacts earth. It's climater is about 8 km above poles and 18 km above equator, and changes according to the season. Compares to the other parts of the atmosphere it is the most intensive parts. Therefore, it is a quite important source of error in determining positions of points precisely. On the contrary of the ionosphere layer, its effect to the Global Navigation Satellite Systems (GNSS) signals can not be eliminated by using the combinations of L1 and L2 carrier phases. Tropospheric delay is function of temperature, relative humidity and pressure, and it is related with the height of the measurement point closely. Tropospheric delay is described as the effect of non-ionized atmosphere to the electro magnetic waves that are broadcast in radio frequencies.(Kahveci, 1997) This effect causes electromagnetic wave slow down and curve. In GNSS processing, Saastamoinen and Hopfield models are used quite commonly together with the parameters that are independent from time and meteorological conditions. Meteorological applications, the spatial and temporal distribution of atmospheric water vapor is very difficult to be represented accurately. Precipitable water vapor in turn (Precipitable Water: PW) as a numerical estimate to determine the correct type of information depends on the quality of the atmospheric humidity (Glowacki et al. 2006). In the beginning; the military field positioning and navigation (navigation) are designed for multipurpose use Global Positioning System (GPS), Other application uses of, along with the high temporal resolution can also be used to calculate PW (Bevis et al. 1992). PW values are calculated with the help of GNSS measurements can be used for meteorological purposes. In this study; the troposphere layer of the last to see the effect of the point coordinates of the GNSS signals; Meteorological Sensors for different seasons of the year 2012 and 2013 in terms of static GNSS readings from outside the account having been described the improvement work Height coordinates. This study is unique as it was before any Turkey; untested method. This method, first kind of its in terms of modeling the use of an instead of meteorological measurements This study is not an instance of any earlier; untried in Turkiye; Modeling is a first study instead of meteorological measurements. Meteorological parameters are set 10 pieces in working point, depending on the season, in order to determine, or at least have an idea changes for purposes of "winter measure" and "measure" was carried out separately in the form of the GNSS observation.

Ship-Based Oceanwide Observation of Sea Surface Heights in Consideration of Hydrodynamic Corrections

Jörg Reinking (Germany)

Key words: GNSS/GPS; Hydrography; Sea Surface Height

SUMMARY

The latest development in GNSS PPP processing allows observing the heights of moving antennas aboard seagoing vessels with accuracies up to 5 cm and it is foreseeable that the quality will be improved in the future. Considering some essential hydrostatic and hydrodynamic corrections makes it possible to use these antenna heights as a good basis to derive ocean wide precise in-situ data of sea surface heights (SSH). If only a small portion of the more than 60.000 ships that sail the ocean at any time can be used for the determination of SSH a significant amount of additional ocean wide data could be obtained independently from remote sensing techniques. These data sets would have a very high resolution along the track of the ship and might be used to increase the sensitivity of satellite altimetry over short wavelengths in a combined analysis. Additionally, this data would provide a continuous validation of altimeter biases over vast areas in almost all oceans. The results of two experiments in the Atlantic and Pacific Ocean will be presented. The first one shows in a case study on a cruise vessel the necessary methods to correctly determine and consider the squat of a moving ship and to derive the correct GNSS antenna height above the water level. The second one will present an ocean wide determination of SSH from measurements on a cargo ship. The results from this experiment were compared with those from the Jason-2 altimeter and an altimeter bias was calculated from cross-over points with the ship track. Additionally, the quality of the spatial resolution will be shown for the crossing of the Hawaiian-Emperor seamount chain.

A Practical Deformation Monitoring Procedure and Software System for Cors Coordinate Monitoring

Mengchan Lim and Halim Setan (Malaysia)

Key words: Deformation measurement; CORS monitoring; deformation analysis; IWST; Bernese; S-transformation

SUMMARY

This paper illustrates the combination of continuous GPS measurement with robust method for deformation detection to GPS station position change. A software system named Continuous Deformation Analysis System (ConDAS) has been developed at Universiti Teknologi Malaysia. It was specially designed to work with high precision GPS processing software (i.e. Bernese 5.0) for coordinate monitoring. The main components of ConDAS are: parameter extraction (from Bernese output), deformation detection (via IWST and S-transformation) and graphical visualisation. Two assessments were included in this paper. Test results show that the system performed satisfactorily, significant displacement can be detected and the stability information of all monitored stations can be obtained. This paper highlights the architecture, the design of the software system and the results.

Determining the Maritime Baseline for Marine Cadastre

Robin Seet (Malaysia), David Forrest and Jim Hansom (United Kingdom)

Key words: Cadastre; Marine cadastre; Positioning; marine cadastre, low water line, maritime baseline, digital terrain model

SUMMARY

A fundamental component of any marine cadastre is the accurate positioning of the baseline since this defines the landward limit of marine parcels. Typically the maritime baseline is based on some form of Low Water Mark (LWM). However, it is notoriously difficult to determine the location of the baseline since within the highly dynamic coastal environment, the LWM is constantly shifting. The primary aim of this research is to develop a methodology to efficiently determine the baseline by acquiring an integrated terrestrial Digital Terrain Model (DTM) using DGPS and a marine DTM based on near-shore bathymetry and tidal data, in order to derive the location of the baseline at a particular time. Fieldwork was carried out at Millport, Scotland using DGPS coupled with marine radio-echo sounding to generate DTMs, which were then compared to DTMs using DGPS, SRTM, ASTER GDEM and NEXTMAP. This established that the method adopted produced more robust results than those derived from existing datasets. Low-water lines (eg MLWS: Mean Low Water Springs, LAT: Lowest Astronomic Tide) were generated and compared to their locations shown on the current Ordnance Survey and Admiralty maps and charts. Results show highly accurate low-water lines (LAT) were produced using this method and demonstrated the movement of LAT inland, likely due to a combination of sediment loss and sea level rise. A second objective was to review maritime baseline policy of other coastal countries, especially those neighbouring Malaysia. It was found that most coastal countries have a multitude of coastal management policies and initiatives to manage their coastal environment sustainably but policies designed to sustain the integrity and position of the maritime baseline are almost non-existent. Such a finding also applies to Malaysia's land and marine related legislation and coastal zone management initiatives. The principal conclusion is that the approach demonstrated here is an efficient and repeatable way to derive the low-water line along small segments of coastline for the needs of a marine cadastre but that there is an overriding need for an integrated and sustained policy to establish and regularly update the maritime baseline in Malaysia.

“Valuation of Buildings with Greenness Perspective”

Manish Sacklecha and Samir Bajpai (India)

Key words: Education; Engineering survey; Professional practice; Quantity surveying; Valuation;

SUMMARY

India has progressed since independence (15th August 1947), through two important revolutions viz: Green Revolution and White Revolution. The green revolution was meant to grow more food so that everyone would have stomach full food. The white revolution was implemented from 1980 to increase growth of milk and its products so that everyone may get healthy food. Green building materials consumes less energy associated with the excavation, extraction, transport, processing of virgin materials. Therefore "a green building is one which uses less water, optimizes energy efficiency, conserves natural resources, generates less waste and provides healthier spaces for occupants, as compared to a conventional building." Major benefits of Green Buildings include: • Energy savings to the tune of 40-50 % • Water savings to the tune of 20-30% • Intangible benefits which includes: enhanced ventilation, better views and day lighting which significantly improves the productivity of the occupants • Green corporate image and commitment of environmental protection A number of green building professional articles and studies emphasize the importance of greenness cost analysis to explain the cost benefits, however, there is little evidence whether it is actually being performed, and to what degree the studies undertaken are influencing project stakeholders. The objectives of this research paper are: i) To explore existing greenness criteria and modify them for determination of market value of different buildings. ii) To identify green building materials and products to conserve natural resources, besides being cost effective, energy efficient etc. iii) To promote green building practice in the country. The authors have developed a mathematical model on the basis of LEED Ratings laid down by USGBC to determine market value of buildings without ignoring its greenness aspects. In present practice the valuers' do not include greenness factors in their valuation reports meant for Investment, Bank finance or Capital gains purposes etc. The model will be of great help to architects and valuers to account for greenness aspects while determining the market values of buildings. **KEY WORDS-** Green building materials, LEED, LCC, Greenness assessment model

GIS Modeling of Impact of Forest Fire in Runoff Pattern in a Mediterranean Catchment

Dhakal Shital (Nepal)

Key words: Geoinformation/GI; Hydrography; Remote sensing; Risk management; Spatial planning; Hydrological Modeling; GIS ; RS

SUMMARY

This study developed and used a partially distributed hydrological modeling system, to examine the effect of forest fire in a Mediterranean Catchment called 'Giscle' in Southern France. After GIS treatment in ArcGIS, a semi distributed hydrological model was set up for this purpose with the help of HEC HMS. Required parameters were either calculated or estimated and later calibrated for best fit in all situations. Precipitation and discharge data were available from 1975 to 2005 of which many instances were modeled and calibrated. Only two events were selected for analysis in this paper, representing heterogeneous conditions and their corresponding future scenarios were predicted acknowledging forest fire. Remote sensing was also used for estimating parameters for forest fire scenarios. It was found out that, after forest fire, the peak discharge increases by 10 % to 50%, highly depending on other factors, although the time of concentration and other over all pattern of flow didn't vary much. In some instances, a discharge rate was not observed to be in sync with the precipitation rate. The soil moisture conditions, amongst other factors, were looked upon as the possible cause. HEC HMS was found to produce better curve, in respect to the precedent rainfall of the event i.e. the software was found sensitive to the precedent precipitation of the event. This sometime produced a result almost different from the observed data. Also, there was a need to alter the Curve Number for wet and normal conditions, even after calibrating it. The project has valuable implications in predicting the flood as well as it has some rooms for future maneuvers. Correct estimations of parameters for achieving a curve very close to the observed data can be done. Also, the modeled can be further improved by acknowledging the effect of soil moisture conditions before the respected event.

A Concept of Urban Poverty Area Identification Using Spatial Correlation Studies on High Resolution Satellite Imagery

Nazirah Md. Tarmizi, Noorita Shahrman, Ismail Maarof and Abd Manan Samad (Malaysia)

Key words: Remote sensing; Spatial planning; Urban renewal; Urban poor, high resolution satellite imagery, visualization, spatial correlation study, urban poverty area.

SUMMARY

Identification of the slum using high resolution satellite imagery and environmental data set has been widely used in many countries to estimate, detect and identify urban poverty areas. By using visualization approach on high resolution remote sensing images the identification of poverty area can be investigated earlier before any site visit work being conducted. Due to the increasing cost of life expenses at urban area in Malaysia presently, the investigation of urban poverty in dense areas becomes much essential especially in showing the relationship and impact of rapid development towards poor people at urbanized area. In this study, justification of 'poor people' is referred to the people who acquire gross household income lower than poverty line income declared by the government. Therefore in delineating urban poor, several physical criteria like the layout and characteristic of squatter and type of housing in Malaysia has been identified. Other contribution factor like location of industrial estate, commercial area and public transport network are also important in intersecting and downsizing the scale of the urban poverty area which indirectly reflect to the needs of the poor. This paper discusses an ongoing study in determining the urban poverty area of Puchong Town, Selangor by using visual interpretation correlation study on high resolution IKONOS satellite imagery dataset in generating a new urban poverty map. The accuracy of the identified location through the finding will be verified through ground sampling at the actual site.

Modernising Compensation Principles for the Regeneration of Land Uses in Highly Urbanised Locations

Vince Mangioni (Australia)

Key words: Urban renewal; Valuation; Reinstatement, Solatium, Disturbance, Traditional Purposes, Economic Development

SUMMARY

This paper examines the principles which underpin compensation in the acquisition of land in Australia, and the evolving complexities in determining parity of compensation to the dispossessed party. Surveys used and cases are examined in outlining the purposes for which land is acquired as well as the types of acquisitions which impact dispossessed parties. This provides a basis for establishing a framework which better supports the option for reinstatement and asks whether expanding other heads of compensation which underpin reinstatement is an option. The paper makes its primary contribution through the development of options for reinstatement and articulates factors which should be included under the heads of disturbance and solatium as distinct from market value. It further builds a case for a share in the uplift in value between the dispossessed party and acquiring authority resulting from economic development as the purpose of the acquisition.

A New Zealand Strategy for Cadastre 2034

Don Grant, Mark Dyer and Anselm Haanen (New Zealand)

Key words: Cadastre; Digital cadastre; 3D cadastre; dynamic cadastre; cadastral strategy

SUMMARY

New Zealand has an AAA (accurate, authoritative and assured) digital cadastral system, based on an accurate geodetic system and supporting a digital land registration system. Landowners in New Zealand have a high level of confidence in cadastral boundaries. Despite these advantages, it is clear that the current cadastral system will not be optimal for the next 10 – 20 years. The rapid development of positioning and geospatial technology, together with increasing expectations of the general public to be involved and well informed, mean that changes will be required. A cadastral strategy has been developed in New Zealand to prepare for changes over the next 10 – 20 years. This matches the date of 2034 which has been proposed for an update of the FIG Cadastre 2014 strategy. The New Zealand strategy proposes a number of significant changes including broadening the scope of the cadastral system to cover the boundaries and extents of all rights restrictions and responsibilities in land and real property, and making information consumable (readily understood) by the general public. This, in turn, will require the cadastre to be fully 3 dimensional as well as responsive to changes over time, so that cadastral information matches the 3 dimensional and dynamic world in which people live.

Identification of Suitable Site for Solid Waste Disposal in Yola, Nigeria Using GIS Method

Muhammad Zumo Isa and Ahmad Vokna Saidu (Nigeria)

Key words: Geoinformation/GI; waste, disposal, site, analysis.

SUMMARY

Solid waste management is a global environmental problem. There is an increase in commercial, residential and infrastructural development due to the population growth and these have negative impact on the environment. Urban Solid Waste Management is considered as one of the most serious environmental problems confronting all levels of governments in Nigeria and the developing countries at large. One of the main causes of this problem is not having a suitable site for solid waste disposal. This paper involves the application of GIS techniques in identifying suitable site for waste disposal in Yola, Nigeria.

Health and Safety Management on Construction Project Sites in Kenya

Grace Muiruri and Cornelius Mulinge (Kenya)

Key words: Legislation; Standards; Health; safety; construction Site

SUMMARY

Health and safety at construction sites deals with both physical and psychological well-being of workers on construction sites and other persons whose health is likely to be adversely affected by construction activities. It is of primary concern to employers, employees, governments and project participants. Health and safety therefore is an economic as well as humanitarian concern that requires proper management control. This Paper set out to study the health and safety management on construction sites in Kenya. The objectives included; investigating the health and safety measures used on construction sites; evaluating the enforcement mechanisms of health and safety regulations on construction sites and examining the challenges encountered in the management of health and safety. The findings indicate that health and safety measures on construction sites are inadequate and effective enforcement mechanism of health and safety measures is lacking. Various challenges are faced in the management of health and safety, the major being inadequate enforcement mechanism. Consequently, health and safety are often neglected on construction project sites and rarely managed. In conclusion the enforcement mechanism for health and safety is weak since there lacks clear and well-defined supervisory authority in most construction sites. The paper recommends that the existing health and safety laws enforcement mechanisms be reviewed. The Directorate of occupational health and safety services should step up inspections and penalise those who fail to observe the provisions of the Act. Further, all parties in construction project site must work together and contribute their rightful parts towards making construction sites healthy and safe. The output of this paper contributes to improvement of the health and safety management for construction projects. The findings are useful for construction managers, policy makers, contractors and construction employees to increase their understanding of the health and safety management practices. In addition, the accrued knowledge on health and safety management forms a base for theoretical knowledge for further research and training in the construction health and safety body of knowledge. This paper also hopes to bridge the knowledge gap and provide a guideline to improving health and safety on the construction sites.

Prediction of Dam Deformation Using Kalman filter Technique

Raphael Ehigiator - Irughe, Jacob Ehiorobo and Mabel Ehigiator (Nigeria)

Key words: Deformation measurement; GNSS/GPS;

SUMMARY

ABSTRACT In Dam Deformation Monitoring, repeated observations are carried out to determine either relative or absolute deformation of the Dam Structure. In some instances, factors beyond the control of the observer or instrument may make it impossible to obtain reliable results continuously. In such cases, it may become necessary to resort to some other means of predicting the expected deformation at some future date. Advances in GNSS Technology have increased the potentials for real time monitoring of structures. Time dependent monitoring of the structures can be carried out using kinematic and dynamic models in the results analysis. Such time and position dependent measurements can be processed using the Kalman Filter equation. The Kalman filter equation estimates measurement parameters using time updates and measurement update equations. The time update equation predicts the results for the next epoch measurement while the measurement update equation serves as correction equation for the next step of the deformation measurement epoch. In this study, Kalman Filtering technique was used in predicting current estimates of Dam deformation using two previous measurements, carried out in 2007 and 2008 respectively. The Kalman filter equation was then used to estimate velocity and acceleration of the Dam object from where coordinates and coordinates changes were estimated for 2009, 2010, 2011 and 2012 respectively. Analysis of the results indicated that there is a correlation between the measurement update results and the predicted deformation results. It can therefore be concluded that the Kalman Filter equation can be used to fill in gaps in deformation measurement where continuous monitoring may not be possible. Key Words: Kalman Filter, Deformation, GNSS, Continuous Monitoring, Kinematic

Effects of Heritage Sharing Problems in Land Registry on the Rural Areas:(tarsus Yanikkişla and Kizilçukur Villages Sample)

Sabahattin Akkus, Tayfun Cay and Ismail Hakki Cicek (Turkey)

Key words: Family, Land, Heritage Sharing, Heritage Sharing Problems, Land Registry

SUMMARY

One of the most important problems about real estate is sharing the inheritance in Turkey. Turkish civil law, zoning law, soil conservation, land consolidation law and regulation is effective in heritage sharing. The scope of this legislation in our studies, effects of heritage sharing problems in land registry on the rural areas are examined and tried to find solutions. The towns of Yanikkışla and Kızılçukur in the Tarsus District of Mersin Province, Turkey, were chosen as a study area. The families living on the study area are chosen and their parcels which are subject to the heritage problem is examined and digitized. The surface area of these parcels are measured and controlled whether they are suitable for the current allotment conditions. Also, residual parcels after the heritage sharing are dealt with. A survey is made about the sharing the inheritance in the study area and, bitterness and resentments between the inheritors were interviewed. Due to the heritage sharing problems, be unable to seed plant according to the structure of soil in rural areas, unavailability of arable fields due to long trial duration, damaging the state due to the loss of tax and separation of the families in socio-cultural aspect due to the inheritance sharing are observed in the study area. In this study, effects of heritage sharing problems in land registry on the rural areas were investigated. The evaluation of the study was done, the results are determined and possible solutions were proposed.

Using Bare Valuation Method in Valuation of Rural Area

Mehmet Ertas (Turkey)

Key words: Land management; Valuation; Valuation of rural area, local capitalization rate, Bare Valuation Method

SUMMARY

In today's Turkey where the migration from the village to town has been experienced, real estate valuation in fields is tried to be organized as discipline, act and model. Thus, some public and corporate institutions issued regulations and circulars regarding to the part of valuation that concerns to them. F subsection of 11th item of Publicizing Law numbered 2942 has been applied in publicizing agricultural areas, selling lands belonging to General Directorate of National Real Estate and real estate valuation in order for bank credit. In this subsection, this state is written: "Committee of experts estimate disposable income that real estates and source bring with the report they arranged in the situation of using real estate or source in lands according to place and conditions on the publicizing date and using them as what they are". Income method is used in accordance with this provision. Those who want to make valuation in rural areas in our country face many models and data deficiencies such as criterion and method of valuation, land planting plan and annual disposable income belonging to that agricultural field. What is more, because most of those who deal with valuation focus their energy on urban areas, the valuation of rural areas is not cared about much. Also, it cannot be said that those dealing with the valuation of rural areas develop valuation standard (and weight) and method in accordance with village conditions. Without considering the land in terms of doing irrigated or dry farming in the applications done up to today, interest rate of local capitalization was estimated and from this point, the value of real estate was reached. However, there exist watery and barren fields in an agricultural zone and these are divided into groups as 1st, 2nd, 3rd and so forth according to their yield inside. Thus, instead of calculating just one interest rate of local capitalization for the whole area, it is more accurate to estimate separate rates for each different fields of that whole area. Furthermore, in this study valuation standards used in the calculation of interest rate of local capitalization that are estimated depending on annual disposable income of the land are divided into two as yield and positional valuation standards in valuation of agricultural fields.

The RayCloud – a Vision Beyond the Point Cloud

Christoph Strecha (Switzerland)

Key words: Cadastre; Engineering survey; Low cost technology; Mine surveying; Photogrammetry; UAV/Drones, Aerial image processing

SUMMARY

In traditional photogrammetry, 3D points are measured by means of stereo in a similar way humans use their eyes to recover 3D info from the environment. Taking 2 images and their precise orientation, stereo stations implement a virtual plane sweeping through space. Both images are projected & blended onto that plane. If the images are in correspondence, ie the point of interest is sharp in both blended images, the virtual plane position corresponds to the 3D location of the Point Of Interest. Similarly, the Point of Interest can be measured in both images. The 3D location is then computed by the intersection (aka triangulation) of the 2 rays starting from the respective camera centers and go through the measured pixel coordinates. The accuracy of the 3D point estimation procedure is the same for booth methods and is proportional to the distance/ baseline ratio. This means that 3D points at a certain distance from the camera can be more precisely measured when the baseline (the distance between the two camera centers) gets larger. The novel rayCloud concept, that we introduce here, is a generalization of the stereo or two view triangulation towards multiple views. The final 3D point is computed from the intersection of many rays that all start from the camera centers and intersect the respective images at corresponding pixels. Due to this technology the accuracy of the 3D point estimate can be increased substantially. In this presentation we show the rayCloud concept on real examples for the modelling of buildings in centimeter range. We justify the approach by combining the results to the classical two view and stereo techniques and make the relation to LiDAR point cloud reconstruction. Speaker biography (69 words): Dr. Christoph Strecha received a PhD degree from the Catholic University of Leuven (Belgium) in 2008 under the supervision of Prof. Luc Van Gool for his thesis on multi-view stereo. He then worked as a post-doc and was co-chair of ISPRS Commission III/1. In 2011 he founded Pix4D, a Swiss company which develops and markets software for fully automatic production of 3D models and orthomosaics from UAV and aerial images.

InaCORS : Infrastructure of GNSS CORS in Indonesia

Arif Aditiya, Joni Efendi and Mohammad Arief Syafii (Indonesia)

Key words: GNSS/GPS; GSDI; GNSS, CORS, Infrastructure, Technology

SUMMARY

Global Navigation Satellite System (GNSS) observations are increasingly used for a wide range of applications, and networks of Continuously Operating Reference Stations (CORS) are being rapidly installed in Indonesia by several institutions to provide high level positioning and practice needed users. One of the Indonesian government agency responsible for the management and operating of CORS is Geospatial Information Agency-BIG (former BAKOSURTANAL). BIG currently manages and operates 124 CORS. 19 of them in collaboration with GeoForschungsZentrum (GFZ) Germany in support of the Tsunami Early Warning System. 4 GNSS Stations in collaboration with TU Delft Netherland. Indonesian Continuously Operating Reference Stations (InaCORS) is GNSS network that covers the territory of Indonesia. GNSS-based technology began in 1995 with the establishment of IGS stations BAKO. In 2007 GNSS CORS infrastructure developed rapidly until today. Infrastructure development of InaCORS is financial supported by the national budget and is managed by Geospatial Information Agency (BIG). Communication technologies used include virtual private network and radio. InaCORS divided in different groups by using virtual server for sites management in a variety of areas in Indonesia.

Usability of Cholesky Factorization Method in the Determination of Horizontal Deformations: a Case Study, Ermenek Dam

Sercan Bulbul and Cevat Inal (Turkey)

Key words: Deformation measurement; Engineering survey; Land management; Positioning; Risk management; Cholesky factorization; Deformation analysis; MATLAB 7.6.0

SUMMARY

Last and the most important task of deformation analysis is evaluation of data and interpretation of results. Different methods are used in evaluations of measurements. In this study, Cholesky Factorization Method, which is one of the static evaluation methods used in the determination of deformations in the horizontal direction, is theoretically examined, using direction observations and ranging data measured in Ermenek Dam for two periods and deformation measurements were conducted by analytical method. Geodetic network consists of 13 reference points and 10 object points which were located on the crest. Evaluation was made separately both for direction observations and for direction observation + ranging data. With 95% statistical confidence, any deformation was not observed on 4,5,6, 7, 8, 9,13 reference points and 104, 502 object points in the evaluation according to direction observations and on 3, 6,7,8,9 reference points in the evaluation according to direction observation + ranging data. In the points exposed to deformation, movements were under 6mm. In the computations, a program prepared MATLAB 7.6.0 Release 13.0 M-File was used.

Computer Assisted Mass Appraisal(CAMA)Application for Property Tax Administration Improvement in Malaysia

Norhaya Kamarudin and Dzurlkanian Daud (Malaysia)

Key words:

SUMMARY

Property tax is one of the most important source of income for local authorities to manage their administrative areas. Efforts to improve property tax administration should be given priorities and one way to increase the administrative capacity of the organisation is through the application of the CAMA system. This paper evaluates the application of the CAMA system in assessing property tax administration in Malaysian local authorities. A survey on 49 local authorities was carried out to assess the administrative capacity of local authorities in terms of human and technological resources and knowledge on the CAMA system as well as the benefits they gained from the system. Response from the questionnaires indicated that although there are limited capacity, most of the local authorities are willing to adopt the system.

Egyptian Geoid using Ultra High–Degree Tailored Geopotential Model

Hussein Abd-Elmotaal (Egypt)

Key words: tailored geopotential models; harmonic analysis; window technique; Egypt; geoid determination

SUMMARY

In the framework of the remove-restore technique, the residual field should be unbiased and have a small variance. Hence, an ultra high-degree (complete to degree and order 2160) reference geopotential model tailored to Egypt is developed within this investigation. The local and global data sets, in terms of isostatic gravity anomalies, are merged and used to estimate the harmonic coefficients of the ultra high-degree tailored reference model by an FFT technique using an iterative process to enhance the accuracy of the obtained harmonic coefficients and to minimize the residual field (Abd-Elmotaal, 2004). This tailored geopotential model has then been used to compute a gravimetric geoid for Egypt in the framework of the remove-restore technique. The window technique (Abd-Elmotaal and Kuehtreiber, 2003) has been used to avoid the double consideration of some of the topographic-isostatic masses in the neighbourhood of the computational point. The commonly used Airy-Heiskanen isostatic hypothesis is applied. For the sake of comparison, the EGM2008 global geopotential model has also been used. The gravimetric geoids are computed for Egypt using Stokes' integral in the frequency domain by 1-D FFT technique. The computed geoids are scaled/fitted to the GPS/levelling derived geoid. The results show that the tailored ultra high-degree geopotential model created in this investigation gives better residual gravity anomalies (unbiased and have smaller variance) as well as better geoid accuracy. The variance of the residual gravity anomalies has dropped by about 35%. The external accuracy of the fitted geoid has improved by about 20 %.

The Effect of Land Consolidation Components on Parcellation Plans

Turgut Ayten and Tayfun Cay (Turkey)

Key words: Rural development , Land Consolidation, Interview, Parcellation

SUMMARY

Rural development is one of the key themes that occupy the agenda of Turkey . Land consolidation operations are also important components of rural development. Ownership structure in Turkey is dispersed, fragmented and in sufficient size to perform economical agriculture. Present lands should be reconsolidated and modern aggriculture should be applied in order to increase ther diversity of agricultural products and their profit. There are many steps in land consolidation work . one of them – may be the most important- is to make new parcels towards the interviews of land owners. In this paper the factors that effects making new parcels in land consolidation area will be investigated. In this context, components of land consolidation that effect the parcellation e.g. the institutions and organizations responsible for the control of land consolidation work, contractors that make land consolidation and land owners whose lands are to be consolidated.

An Evaluation on the Urban Transformation Application Done by the Leadership of Meram Municipality in Konya

Hasan Cagla and Ismail Hakki Cicek (Turkey)

Key words: Urban renewal; Sprawl Urbanization, Local Governments, Urban Renewal

SUMMARY

The planning agenda of Turkey has been focused on urban transformation since the 2000s. The validity of the current laws after 2004 has changed all of the statements on the urban transformation of the country. In today's world, urban transformation has been perceived as an era of revision of the approaches for urbanization, forming continuous and healthy places in a city, giving a new content to the current reconstruction plans by revising the plans and their applications. Illegal and uncontrolled construction in our country experienced during the last 50 years, revealed the fact of "today's city". This process takes its place in the history of the city as occupation of the areas that are not opened to development plan, illegal and uncontrolled construction in spite of the development plan. In this study, suggestions will be put forth about the transformation projects that will be carried out in Yenice and Hacı İsa neighborhoods where the illegal construction and sprawl urbanization took place by the leadership of Meram Municipality with the co-operation of Housing Administration Presidency in Konya.

Fiji Mahogany Survey

David Chang (Fiji)

Key words: Cadastre; Land management; Reconnaissance survey"; demarcation";

SUMMARY

The Fiji Mahogany is a globally categorized timber due to its unique appearances therefore greatly in demand and is predicted to bring forth great returns upon maturity. Originally initiated by the British Colonial Government in the early 1950's, the afforestation program was carried out on vacant Itaukei Land whereby stumpage payment was exercised. Depending on size and quality, payments were deduced on the volume of timber extracted from tree stumps. Leasing arrangements were still in place with duration of 99 years on an annual rental of thirteen cents per hectare. The ideology of surveying existing forest land to determine extent of area cultivated, for relevant documentation and leasing is the current government's initiative towards facilitating the availability of land for productive purposes through the implementation of a market – based standard of utilizing land whereby both landowners and tenants enjoy justifiable returns. The Lands department was delegated to carry out the survey of the mahogany plantations in Fiji. Declared as a government commercial company under the Public Enterprise Act and incorporated under the Companies Act, transformed into a privatized company for the purpose of developing the Mahogany Industry in Fiji, including the harvesting and processing of mahogany forest, the proposed allotment designing were solely at their discretion. Considering the afforestation program undertaken by the mentioned firm, the proposed lot designing were mostly determined by the scheduled planting timetable hence a lot consist of young trees planted within the same period convenient during the harvesting whereby logging would particularly be in operation within the tentatively defined boundary making it easier for machineries involved to focus at a specified block. The government surveyor was tasked to commence with the survey of the Mahogany Forest in Fiji with a period of approximately 10years. Naturally bounded in the form of creeks, rivers the lots concerned generally comprised of more than hundred hectares of land covering the most part of Fiji. The survey enhances skills and knowledge, whilst exploring new technological platforms to deliver quality services and contributing to the nation building success.

A Multi-Criteria Performance Assessment Model for Cadastral Survey Systems Assessment

Zhang Haodong and Tang Conrad (Hong Kong SAR, China)

Key words: Cadastre; Cadastral survey system; Land boundary; Performance assessment; Multi-criteria analysis; Qualitative scale

SUMMARY

Many countries refer cadastre as the legal evidence of land boundaries. Other societies may have equivalent legal and administrative systems to handle cadastral functions. The performance of one's land boundary system (cadastral survey system) is an important indicator of the overall efficiency of its land administration system. Surveyors of different jurisdictions know too well about their own system advantages and weaknesses. However, rarely research projects are focused on the assessment of the major performance of the cadastral survey system across different jurisdictions, knowingly each cadastral system is created and functioned under individual legal and institutional systems. Nevertheless, there are several common quantitative elements that can be compared directly (e.g. survey accuracy and costs). Likewise, there are plenty of qualitative information (e.g. boundary security, survey applicability in land administration operations) cannot be appropriately compared due to the lack of satisfied criteria and agreeable qualitative scales. This project aims to form an assessment model to evaluate any land boundary system upon its major performances. The initial proposed performance assessment criteria on the land boundary system are accuracy, security, cost, time and applicability. This set of initial assessment criteria will be weighted by world-wide surveying related experts using the general methodology of analytic hierarchy process (AHP). In addition, the scale of qualitative information under different criteria will be defined by related experts from different characterized jurisdictions. Finally, each cadastral survey system can be evaluated and compared in the selected multi-criteria analysis method. This paper describes the applied methodology to formulate that performance assessment model and the expected benefits and outcomes of that formed model.

3D Generalization of Boundary Representation (B-Rep) of Buildings

Siddique Ullah Baig and Behnam Alizadehashrafi (Malaysia)

Key words: Cartography; Geoinformation/GI;

SUMMARY

Different organizations, users or applications demand different levels-of-detail (LoDs) of generalized buildings. Enhancement of relevant information and suppression of irrelevant information based on the applications or the user's demand is still subject to the research. Therefore, the size and shape of generalized models varies due to differences and incompatibility of data sets (models); generalization operators and rules. This shows that outcome of generalization strategies can be influenced by the type of input data model, generalization process (operation) and the intended LoD. Characteristics of spatial models and building blocks, based on which certain generalization strategy operate need to be specified. In this paper, generalization of 3D buildings represented as boundaries out of three categories of 3D representation: cell models; Constructive Solid Geometry (CSG); and boundary representations (B-Rep) is carried out. Additionally, characteristics and compatibility of 3D city models with certain generalization strategy, 3D representation and visualization standard for output, types of building models and level-of-details (LoDs) are taken into consideration. Results show that 3D generalization of B-Rep of buildings is simple and straight forward. Furthermore, reduction of data volume based on self-perceptual rules, generalization operators can affect size and shape of generalized objects and neighboring segments.

Tidal Datum Consistency for Marine Cadastre Littoral Zone Commencement in Malaysia

Rasheila Rahibulsadri, Abdullah Hisam Omar, Ashraf Abdullah, Wan Muhammad Aizzat Wan Azhar and Chan Keat Lim (Malaysia)

Key words: Hydrography; Marine cadastre;

SUMMARY

Marine cadastre is the key in managing a complex marine administration. The rapid development of coastal areas in Malaysia for economic generation activities and public interests has triggered the needs for a new system of marine administration. A tidal datum is a standard elevation defined by a certain phase of the tide. Tidal datum is also the basis for establishing privately owned land, state owned land, territorial sea, exclusive economic zone, and high seas boundaries. This paper reviews some concepts and issues pertaining to the delineation of the tidal line for marine cadastre in Malaysia. This study will assess the use of Lowest Astronomical Tide (LAT) as reference datum in marine cadastre. Tide data acquired from Department of Survey and Mapping Malaysia (DSMM) will be processed using Total Tide Solution (TOTIS) to compute the LAT as the reference datum for marine cadastre. From the tidal data observed, tidal analysis can be made on sea levels, chart datum, types of tide and tidal constituents. This paper aims to produce the tidal lines and littoral zone for use in marine cadastre procedures and practices. Based on the analysis, it can be concluded that the LAT is consistent and can potentially be used for marine cadastre reference level in order to improve the effectiveness of implementing the marine cadastre.

Development of a New Msc in Geospatial Engineering

Audrey Martin, Kevin Mooney and Eugene McGovern (Ireland)

Key words: Capacity building; Education; Geoinformation/GI; Geospatial Education, Spatial information Sciences, Masters, Geomatics

SUMMARY

To meet the changing needs of the Spatial Information Sciences industry and cognisant of the declining numbers of undergraduate students in Geomatics, the Spatial Information Sciences Group at the Dublin Institute of Technology, Ireland, has recently developed a new conversion Masters (MSc) programme in Geospatial Engineering. Conversion Masters programmes facilitate the horizontal movement of graduates with a cognate degree into Geomatics domains and thus cater to a wide audience. The aim of the MSc in Geospatial Engineering is to prepare innovative graduates to work with high competence, using specialised skills and deep knowledge, as producers, managers and users of geospatial information, at the forefront of developments. The conceptual and technical complexity of the MSc in Geospatial Engineering were primarily aligned with the new developments in measurement science technologies including modules in point cloud data acquisition, manipulation and modelling, whilst also encompassing some fundamental building blocks of Geomatics education. The MSc in Geospatial Engineering programme was accredited by the Dublin Institute of Technology in May of 2013 and in September 2013, the first intake of students were inducted. It is offered in both full-time and part-time modes to graduates and professionals, in addition, individuals with particular up-skilling requirements can avail of discrete modules. The provision of this new MSc programme in Geospatial Engineering should help to address an identified educational deficiency in the Spatial Information Sciences both in Ireland and internationally.

RFID–Based Cadastral Boundary Mark System (RCBMS)

Tajul Ariffin Musa, Abdullah Hisam Omar, Ivin Amri Musliman, Siti Syukriah Khamdan and Yip Kit Meng (Malaysia)

Key words: Cadastre;

SUMMARY

The cadastral system in Malaysia needs to utilize appropriate technology such as innovation in Information & Communication Technology (ICT) to efficiently support modern cadastral system and infrastructure. Ubiquitous positioning by integrating multi-sensor and mobile database management system is an ICT innovation, which can provide benefits to the cadastral surveying community, such as aiding users in finding and/or updating information on cadastral boundary mark on site. In this paper, a RFID-based cadastral boundary mark system (RCMBS) is discussed. The main aim of the RCBMS is to modernize the conventional cadastral boundary marks with lighter, robust, easy to locate and capable to perform spatial/non-spatial cadastral information on site. The RCMBS contains few subsystems and each component of the subsystem needs to be developed in order to execute the system. A prototype platform of the RCBMS has been produced to gather more information, demonstrate the functionality to help solidify requirements and technically understand the problems of the system. It is expected that the RCBMS will provide a valuable support for cadastral practice in the country.

The Development of Marine Cadastre Conceptual Model for Malaysia

**Ashraf Abdullah, Abdullah Hisam Omar, Chan Keat Lim, Zakaria Mat Arof and Hasan Jamil
(Malaysia)**

Key words: Hydrography; Marine cadastre;

SUMMARY

Dependence of Malaysia, a country surrounded by ocean, to maritime environment is undeniable. Malaysia has a wide range interest in the surrounding ocean which include among others trade, employment, transportation, food, recreation, fishing, marine engineering, aquaculture, tourism, oil and gas, marine protected area itself which acquires proper administration and management. The United Nations Convention on the Law of the Sea (UNCLOS) institute a comprehensive jurisdictional regime where Malaysia can claim, manage and utilize its maritime territories. The law and regulations for a marine area is indistinct till today despite the use of marine spatial planning for administrating and managing. This is due to the issue on boundary description in marine area that is vague, inaccurate, or incorrectly represented on a map. Therefore the law and regulations for a marine area are not effective. The objective of this paper is develop the marine cadastre definition and marine cadastre model conceptual from Malaysian perspective using Langkawi Island as a case study. The methodology used in this study includes direct interview, discussion and examination of marine national law associated to marine spatial matters. This study also conducted through colloquium activity with marine institution of Langkawi Island. Finally, this result is establish the marine cadastre definition and conceptual model where consist of main entities and attribute for support the it's implementation. As the conclusion , this marine cadastre model it is hoped will be can be used for marine spatial administration in Malaysia.

Inventory and Monitoring the Evolution of the Quarrying Exploitation in the Region Tangiers–Tetouan (Morocco) in Order to Design a Gis Tool for the Management of Useful Geomaterials

El Kharim Youness (Morocco)

Key words: e-Governance; Geoinformation/GI; Mine surveying; geomaterials;quarrying;région Tangiers-Tétouan

SUMMARY

The northern region of Morocco has experienced in the last decade an increased economic growth and made much progress developing of the infrastructure, public works, urban and industrial area's. This development lead to an increased demand for useful geomaterials , which has caused uncontrolled mining exploitation caused by the lack of regulation and deficiency in legislation. This paper introduces the current capabilities of Geographic Information Systems (GIS) with all data for the diagnosis of needs and optimal prediction of the needs of industrial geomaterials. This study presents an overview of the mining activity in the region of Tangier- Tetouan, based on: - the inventory of quarrying, - land mapping , - evolution of exploitation sites and kinds of usful minerals. This study will also lead to solutions for decision makers in the management of quarrying and an optimal choice of sites by : -using an interactive localisation of useful materials in the region Tangiers- Tetouan. - Consideration of all parameters that will be all integrated in the GIS application.

Land Policy of Russia – Millennium Experience

Sergey Volkov and Galina Kovalevskaya (Russia)

Key words: Land readjustment; Land; surveying; land use planning

SUMMARY

The purpose of this work is presentation of Russian land use planning as a social and economic phenomenon in the course of its historical development, from the first geodetic actions in the Old Russian state to land tenure and land use planning conditions in modern Russia. The result of this research is revealing the objective regularities of land use planning development as a basic mechanism of land relations regulation and the main part of land administration in the state at regional and local levels.

Hydrographic Survey of the River Drava Branches in the Process of Revitalization, Flood Control and Morphological Monitoring

Dino Dragun and Ana Gavran (Croatia)

Key words: Hydrography; Young surveyor; methodological monitoring, forecast system

SUMMARY

Hydrographic survey of the river Drava branches in the process of revitalization, flood control and morphological monitoring Abstract: Under the IPA cross-border project 'Morphological monitoring and methodological guide of the Drava river' as the first in a series of steps, hydrographic survey of branches of the Drava river is performed. This hydrographic survey is contribution to the preparation of the draft guide for revitalization and improvement of watercourses and forecasting system upgrading for the better defense against the ever more frequent flooding. Furthermore, this project is a part of the process of establishing good environmental water quality through morphological monitoring of the river branches. Most of branches are usually covered with lush vegetation and represent a very important habitat for flora and fauna and with that, they should be carefully managed. In effort of its revitalization and promoting balanced and sustainable economic development of the border areas of the Republic of Hungary and the Republic of Croatia, this survey is performed using modern methods of surveying and data processing. Properly focused application of the project results obtained by combining terrestrial and hydrographic survey (single-frequency echo sounder) will form a good basis to converse dynamic processes of rivers, the survival of the most valuable habitat and endangered species, and slowing down the process of eutrophication, which will enable the survival of man in these areas.

Valuing Land for Land Tax Purposes in Highly Urbanized Cities

Kaudo Viltanen (Finland) and Vince Mangioni (Australia)

Key words: Valuation; Land Value, Highest & Best Use, Property Taxation

SUMMARY

Land is the base on which the property tax is assessed in a number of countries around the world. Its tradition stems from a rural context and was the most common basis for assessing this tax during the industrial revolution where demand for land was at its greatest. The transition from a rural to urban use highlighted the importance of land value to be determined and taxed on highest and best use. This paper examines the relevance of land as the base of the property tax in the 21st Century and the challenges confronting valuers in the valuation of land in highly urbanized locations. Surveys are used to examine the valuation practices of valuers in highly urbanized locations where vacant land transactions are rare. It examines the challenges of valuing land for taxation purposes and the criteria valuers use to determine the highest and best use of land in the absence of vacant land transactions. The paper concludes that while issues exist in the determination of any basis of value, the practices valuers use are most important in the determination of a consistent basis of value on which to assess this tax.

A TIN Based Terrain Feature Points Generation Method

Jianjun Liu, Wenhao Zhao and Xi Kuai (China, PR)

Key words: Cartography; Remote sensing; triangulated irregular network; terrain feature points; terrain refinement; digital elevation model

SUMMARY

This paper provides a method of how to extract terrain feature points based on a triangulated irregular network, which can automatically conduct terrain analysis, terrain feature extraction, determination of terrain positive and negative trends, the water relationship coordination, water elevation calculations and terrain details optimization. The method solves the problem of accuracy lack and loss of terrain detail in the process of creating irregular triangular when using the contour as data source. The method could be widely used in the DEM data refinement optimization, hydrologic and geoscience analysis.

Consideration of Emission Ratios in Sustainable/Integrated Municipal Solid Waste Management Planning

Macheda Uche Michael-Agwuoke (New Zealand)

Key words: Process generated emissions; emissions inventory; emissions inventory model; Municipal Solid Waste Management; sustainable/integrated municipal solid waste management.

SUMMARY

The treatment and disposal of Municipal Solid Waste (MSW) may cause environmental pollution and expose humanity to harmful substances and bacteria that affects human health and the ecosystem. Therefore, accurate quantification and detailed documentation of emissions data from Municipal Solid Waste Management (MSWM) will enables a city or region to demonstrate transparency and enhance the credibility of its corporate environmental and climate change strategy. Establishing a comprehensive corporate emissions inventory is an important first step in developing an environmental and climate change strategy. This is justified if adequate resource utilization and environmental implications are considered in planning the collection, transportation and treatment/disposal of MSW, hence developing a city wide, regional or national sustainable/integrated MSWM system. This paper presents a methodological approach for emissions inventory with case study in conducting a baseline emissions inventory using Life Cycle Assessment Model (LCAM). The paper presents best practices in establishing the organizational and operational boundaries of a MSWM scenario emissions inventory in a sustainable city, region or national environment using three active landfills in Waikato Region of New Zealand. In this study, site-depended data for the landfills together with regional waste composition are used with associated collection, transportation and treatment/disposal data, to determine the emission levels associated with the landfills. Hence the environmental profile of the three MSW landfills were evaluated and compared in relation to their total waste intake over twenty years period (19720157.6 tonnes, 3533333.528 tonnes and 43538.452 tonnes for Hampton Downs, Tirohia and Taupo landfills respectively). Using the impact categories as classified in EASEWASTE, the emission ratios per tonne of waste are compared to assess the contributions of the landfills to the emissions associated with MSWM in the region. Finally, the paper provides guidance on continuous improvement and maintenance of the emissions inventory in the MSWM sector to guide stake holders in reducing the impact of MSW through a sustainable/integrated manner. The need for zoning MSW collection/transportation system using available disposal/treatment sites as focal points is therefore advocated. A modified generalized emissions inventory model for the MSW sector is suggested.

MyGeoOntology – An Information–Focused Geospatial Ontology for SDI towards Knowledge Interoperability

Mohd Sidek Abd Ghafar and Fuziah Abu Hanifah (Malaysia)

Key words: Geoinformation/GI; GIM; GSDI; Geo-ontology, knowledge interoperability, geo-knowledge

SUMMARY

In the context of spatial information management (SIM) for spatial data infrastructure (SDI), Semantic Technology can assist in geo-knowledge discovery in a data sharing environment by providing knowledge interoperability in the use of geospatial data. Knowledge interoperability is about enabling ready and correct use of the knowledge contained in spatial data, allowing enrichment of the spatial data with relevant information thus enhancing the knowledge that can be associated with the spatial data, as well as enabling the use of information which at the first glance seems not to be relevant spatially. This opens up information from various sources to be analyzed spatially. Geo-knowledge that can be conveyed through this knowledge interoperability can be described as knowledge of an issue from spatial perspective to explain the issue. Furthermore, spatial perspective can be explained as a viewpoint that addresses questions by employing information about location, circumstances of a place, connections and comparison among places, cognizant of an area as a unit, hierarchical relationships of areas, recognition of patterns across areas, and insights into processes that spread spatial patterns across areas. In this aspect, geo-ontology that is placed within SDI can be used to enhance the interoperability of spatial data and consequently enable interoperability of geo-knowledge contained in the data. Currently SDI facilitates the sharing of geospatial data through a catalogue of metadata coupled with connected systems for data producers to register their data and for users of data to access the information. Using geo-ontology, interoperability can be achieved by utilizing the capability of Semantic Technology and the knowledge model in a geo-ontology to mediate the possible different meaning of schemas employed by different data producers in their classification of the geospatial data. A Semantic application with a geo-ontology can use this catalogue to achieve steps in data exploration in similar ways that a user would, with further functionality that it simulates a situation where the user knew about the composition of the schemas used by the different data producers for the various geospatial data contained in the catalogue. Hence within SDI, a geo-ontology can be used to exchange geospatial information unambiguously, to bring out further knowledge related to the geospatial data, and to enable integration of the knowledge with other information from various sources to analyze them using geospatial context.

Development of Land Administration in South Sudan

Bhuwleshwar Prasad Sah (Japan) and Robert Lado Luki (Sudan)

Key words: Cadastre; Land management; Legislation; Customary tenure and tile registration

SUMMARY

Republic of South Sudan became the newest country to join the world community on July 9, 2011 after referendum to secession from Republic of Sudan. However, its historical existence has long been recognized, which was formally mentioned as policy for the Southern Sudan by then colonial power in year 1930. Regarding land administration, for the first time, the colonial power enacted Land Settlement and Registration Ordinance Act, 1925, which was enforced for land registration in big settlement areas; such as Juba, Malakal; only. For rural area of the country, it was under traditional practices of communal land ownership under the customary practice. After independence of Sudan, the colonial system was still in place, including communal land ownership specifically in rural areas of Southern Sudan. However in 1970, Unregistered Land Act enacted with the provision of all unregistered land would automatically belongs to the state, meaning communal land ownership under customary practices was abolished and ownership transferred to the government. It was further strengthen by enacting Civil Transaction Act of 1984. From late 1980s until Comprehensive Peace Agreement (CPA), 2005, it was period of turmoil, and one reason was communal land ownership related issues. Signing the CAP; between Government of Sudan and SPLM/SPLA (Sudan People's Liberation Movement /Sudan People's Liberation Army); restored the communal land ownership. Furthermore, enactment of Interim Constitution of Southern Sudan (ICSS), 2005, further clarify it under the article 180 (sub-article (1) to (7)), with the notion that ownership of communal land, and related traditional practices, under customary law should be managed and protected by law in Southern Sudan. After the peace, several laws enacted including Land Act, 2009 and Local Government Act, 2009, which further defined and elaborated the land ownership. Most recently, after independence, the Transitional Constitution of the Republic of South Sudan (TCRSS), 2011, article 169 (sub article (1)) states that all land owned by the people of South Sudan and its usage regulated by the government in accordance with law. The TCRSS has provision (article 171) of NLC (National Land Commission), which is focal body for devising necessary policies and acts. Being in transitional period, the Land Administration (LA) is still not streamlined fully, but there are substantial encouraging developments as mentioned earlier. According to new provision, both cadastre and registry will be maintained by the Ministry of Housing and Physical Infrastructure under the policy guidelines prepared by NLC.

Geodesy and Geomatics Engineering Curriculum at the Institute of Technology, Bandung, Indonesia

Poerbandono Poerbandono, Kosasih Prijatna and Hernandi Andri (Indonesia)

Key words: Curricula; Education;

SUMMARY

Compliance to international standard, tie to national qualification framework, and employment opportunities are factors in the external environment that have transformed foundation for development of geodesy and geomatics engineering curriculum at the Institute of Technology, Bandung (ITB), Indonesia. This paper comes out from elaboration of conceptual link between factors in external environment and approach for developing composition of courses. The need to provide broad-based and fundamental competences is highlighted. While there have been widespread applications of geodesy-geomatics, spatial aptitude and mathematical skill are still maintained as core focus of learning. We spot selected points from previous curriculum and elaborate them to indicate how they reflect transformed foundation in curriculum development. The resulting set of course structure introduces new subjects, sharpened learning roadmap, as well as branding of compilation of conventional learning materials.

Bridge Monitoring Using TLS, Accelerometers and Groud Based–Radar Interferometry

Imrich Liptak, Jan Erdelyi, Alojz Kopacik and Peter Kyrinovic (Slovakia)

Key words: Deformation measurement; bridge monitoring; TLS; ground-based radar interferometry; accelerometers; data processing;

SUMMARY

The paper deals with long-term and dynamic geodetic monitoring of a steel bridge construction - the Liberty Bridge. The bridge allows join for pedestrians and cyclists between Bratislava city district Devínska Nová Ves (Slovak republic) and Schlosshof (Austria). For the dynamic monitoring of the construction was used the technology of ground-based radar interferometry and accelerometers, for the long-term monitoring the technology of terrestrial laser scanning. The monitoring, the data processing using Fast Fourier transformation (for accelerometers and ground-based radar) and Singular Value Decomposition of matrixes (for TLS) and the results are described. Results are compared with model frequencies calculated for the bridge by FEM.

Land Resources as a Basis of the National Wealth and Economic Growth

Vasily Nilipovskiy (Russia)

Key words: Land management; Valuation; Land resources; national wealth; economic growth

SUMMARY

The national wealth and economic growth are the most acute macroeconomic problems. The tasks of the paper are the investigation of such aspects as sources of creation of the Russia's national wealth and especially the attempt to estimate influence of land and natural resources on the value of national wealth. For the Russian economy which is striking now for the full functional market system, the significant importance has rational use of the natural resources in all economy branches, and especially increase of efficiency of the use of land resources in agriculture. The result of the conducted researches is the justification of the directions of the sustained economic growth of Russia under the conditions of the difficult financial situation in the world.

Building Information Model (BIM) and Measuring Techniques

Christian Clemen, Robert Ehrich and Chris van Zyl (Germany)

Key words: Digital cadastre; Laser scanning; Spatial planning; Urban renewal;

SUMMARY

CAD delivers digital drawings made with lines, surfaces or solids in order to specify the dimensions of a building. Layers are used to specify the meaning of graphical elements. In contrast to CAD, the BIM method offers a rich semantic model of building elements. Typical object types are wall, door, ceiling, etc. Using BIM, dimensions of building element are specified by parametric modeling. Parametric modeling hardly uses coordinates, whereas engineering surveyors love point coordinates and tend to derive all graphic elements of higher dimension (line, face, solid) from measured points, which are imported to the CAD software. In case of as-built-documentation the BIM method will change the way measurements are used to derive digital models: This paper shows how point-clouds (both, structured form total station and unstructured from laserscanner) can be used to draw buildings elements directly in Autodesk Revit, as an example of a widely used BIM software.

Surveying and New Technologies for Sustainable Development

Adama Sarr (Senegal)

Key words: Bridge surveying; Capacity building; Education; GNSS/GPS; Land management; Laser scanning; Low cost technology; Professional practice; Risk management; Young surveyor;

SUMMARY

The rapid development of new technologies has revolutionized the land surveyor's profession. As the surveyors have always been at the avant-garde of territory management, it is therefore crucial for young surveyors to adapt themselves to the new technologies and old surveyors to update their old skills in order to play a key role in the sustainable development. Thus, young surveyors must receive a suitable and appropriate training so that they can keep on playing their role and also perpetuating the profession in the future. This why i need to do this presentataion during the next FIG congress in kuala Lumpur which is going my modern contribution.

Drying Area: An Empirical Study of the Missing Link in High–Rise Residential Buildings in Malaysia

Hung Sek Leong (Malaysia)

Key words: Affordable housing; Low cost technology; Spatial planning; Urban renewal; External Built Form

SUMMARY

The syndrome of the “Hanging Flag Poles or Hanging Laundry” so synonymous in Asian high rise residential buildings such as urban cities in Singapore, Shanghai, Hong Kong, Bangkok and Kuala Lumpur to name a few, highlighted the general dilemma where cities planners’ and architects fail to resolve. The weakness in resolving a simple yet a necessity part of daily living in providing an adequate area or space for drying clothes indicated no foresight and thought process of the overall planning and design analysis. The blatant flaunting “hanging laundry” syndromes are becoming an eyesore which constantly encapsulates the building envelopes of many Asian high rise residential cities. To date neither the designers, architects, developers nor the authorities has given due attention to this phenomenon especially in the external building envelope. How to ensure the external built form with this hanging syndrome able to complement and not creating an eyesore will be the topic of this research. The research explores the importance of domestic spatial design layout for high rise residential housing by focusing on the dry yard or drying area. This unassuming area so often neglect and overlooked by developers’ and designers will be the contentious subject to explore. The goal for this research is not to set out to produce new theory, instead to offer new approaches and assumptions by reviewing different perspective from diverse literatures, methodologies and existing “new” built buildings types to ascertain the possibilities to overcome the weaknesses. The findings will either bring together or make contents of each approaches applicable (if applicable) to its original intention.

Sustainable Development of the Rural Territories and the Social Demographic Aspects of the Land Management

Vasily Nilipovskiy, Ekaterina Ananicheva (Russia), Yu Zhang (China, PR) and Txi Kim Dung Le (Viet Nam)

Key words: Land management; Sustainable development; Rural territories

SUMMARY

Under modern conditions when the economic crisis, lack deficiency of the food, climate change and other problems there are in the world, it is necessary to pay special attention to social demographic factors of development of agriculture and rural territories. In order to move the sustainable development of the rural territories such questions as increase standard of level and quality of life, improvement of the welfare of the population, quadrates employment on the basis of effective demand development of agricultural production, crafts and service sector, construction of the sufficient volumes of objects of cultural and social purpose, development of necessary social infrastructure, improvement of the rural landscape, are needed to be solved. In many countries the main social demographic problems of development of the rural areas are solved insufficiently. Development of the rural territories has to be considered as the most important component of the state strategy for the sustainable development. Social stability and ecological safety of the rural territories have to be guaranteed by inclusion of the land and property complex in to the active economic circulation, and also by complex development of the system of land management. The territorial planning has to be carried out on the basis of complex (comprehensive) approach that will allow to use the mechanism of the purposeful regulation of the land relations in agriculture and the mechanism of management of the land resources of the rural territories according to the demands of their social and economic development.

Earthquake Precursor from Satellite Imagery: Signals or Just Noise?

Shattri Mansor and Habibeh Valizadeh Alvan (Malaysia)

Key words: Remote sensing; Earthquake precursor, disaster management

SUMMARY

Pre-earthquake physical and chemical interactions in the Earth's ground may cause anomalies in latent heat flux, air and surface temperature. Changes in latent heat flux and temperature, on and above the earth's surface can be detected with thermal infrared sensors such as NOAA-AVHRR, MODIS and Landsat TM. Geophysicists developed theories about the earthquake mechanisms and the underground geophysical and geochemical interactions involved in the process of ground shakes, and the related phenomena that might be detected as pre-earthquake signals. Earthquakes are triggered when the energy accumulated in rocks releases causing ruptures in place of faults. Elastic strain in rocks, formation of micro-cracks, gas releases and other chemical or physical activities in the earth's crust before and during earthquakes has been reported to cause rises in sea surface temperature (SST), surface latent heat flux (SLHF), and sea surface height (SSH). Spatio-temporal distributions of SLHF, SST and SSH before and after recent earthquakes in Indonesia have been studied. Anomalous patterns of higher SLHF formed few days before the earthquakes of 20 Feb 2008 (7.4M) and 25 Feb 2008 (7.2M) occurred in Simeulue and Kepulauan disappeared after the main events. These changes were also in accordance with the abnormal relative humidity over the region. Data analyses revealed at least 1–3°C rises in air temperature along the nearby fault zone, as well. The anomalous patterns started developing two weeks to a few days before the earthquakes and disappeared after the main shocks. Significant rises in SLHF and air temperature may lead us to understand the energy exchange mechanism during the earthquakes. These anomalies prior to impending earthquakes can be attributed to the thermodynamic, the tectonic blocks and micro-fracturing in the rocks especially along area's active fault. Continuous monitoring of these potential pre-cursors helps in differentiating earthquake related variations (signals) from seasonal changes and atmospheric effects (noise).

Cadastral and SDI Updates in South–Eastern Europe

Vukan Ogrizović, Zoran Krejović, Jelena Gučević, Siniša Delčev and Saša Đurović (Serbia)

Key words: Cadastre; Real estate development; Reference systems; NSDI, CORS

SUMMARY

Harmonizing cadastral and spatial data is a complex matter, especially in the situations when the data is not up-to-date, as in most cases in the South-Eastern European (SEE) countries. To complete the technical part of data processing, all countries should adopt their legislative acts covering this field, improve the capacities of the involved organizations, and make the data compatible to international standards. Here we present a research regarding the updating of relevant cadastral and Spatial Database Infrastructure (SDI) data in the SEE. The data that we used are obtained from the institutions that were involved in the INSPIRATION project. The analysis of collected data shows that the participating countries made a big step forward on harmonizing their National SDIs (NSDI) to the INSPIRE directive, together with updating the graphical and alpha-numerical cadastral data, making them available through web interfaces.

Deformations and global forces: Seismic and Hydrostatic Leveling records in the « Mont Terri » rock laboratory (Switzerland)

Edi Meier (Switzerland), Rudolf Widmer-Schmidrig (Germany) and Christophe Nussbaum (Switzerland)

Key words: Deformation measurement; Engineering survey; Mine surveying; Broadband seismometer, hydrostatic leveling system, high-precision ground deformation, long-term stability, vertical displacement, synchrotron, Earth tides

SUMMARY

The Mont Terri rock laboratory is a research facility in the Jura Mountains of Switzerland. Investigations are being carried out in the ‘Opalinus Clay’ rock formation, which is a potential host rock for a future deep geological disposal of radioactive waste. The rock laboratory has been excavated from the safety Gallery of the Mont Terri motorway tunnel. In 1998, Gallery 98 was excavated parallel to the safety gallery. At the southern end of Gallery 98, a fault zone intersects the rock laboratory. This zone is called the Main Fault, and reveals a decametric displacement that took place during the folding and thrusting of the Jura mountains about 10 Ma years ago. It is not known yet whether the Main Fault is still active. A feasibility study, using the best commercially available monitoring instruments, was performed to investigate possible movements. A 50m long hydrostatic leveling system (Type PSI-SLS) was installed across the fault zone together with a broadband seismometer (STS 2.5). The combination of both instruments allows recording submicron-displacements within a large frequency range up to quasi steady state deformations. The global gravity forces due to Sun and Moon (expressed as Earth tides) and the micro-seismicity due to the waves in the Atlantic Ocean generate larger “noise” signals than the nearby motorway. This regular background noise is well known and can be used as a perfect calibration signal

Modelling Surface Runoff and Mapping Flood Vulnerability in Lagos State from Digital Elevation Model.

Joseph Odumosu, Oluibukun Ajayi and Ekundayo Adesina (Nigeria)

Key words: Coastal Zone Management; Hydrography; Remote sensing; Spatial planning; Hydrology; Flood

SUMMARY

Flooding in recent times has become a critical problematic phenomenon of spatio-temporal order and of a considerably high frequency of occurrence world over, most especially in coastal nations / states. Lagos State of Nigeria; one of these Coastal States has witnessed and is still witnessing multivariate cases of flooding which peaks in the rainy seasons (May-October) of every year. An hydrological-model-based solution is thus herein presented using a downloaded Digital Elevation Model of the study area to delineate water shed, model flow direction, contributing areas and flow path/Channel. Similarly, surface runoff was simulated for an eight hours heterogeneous rainfall and the resulting gauge readings from eleven (11) fictitious gauge stations distributed across the state was obtained. The study was able to produce a map categorizing Lagos state into three (3) zones on the basis of their vulnerability to flood. Quantum GIS (QGIS) software was used for the analysis and simulation.

Transparent Valuation as a Planning Support for Just Land Management System (LMS)

Hrvoje Tomić, Siniša Mastelić, Ivić and Miodrag Roić (Croatia)

Key words: Cadastre; Land management; Land readjustment; Spatial planning; Valuation; mass valuation

SUMMARY

Effective spatial resources management is one of the main features of healthy economic growth of a region. Although traditionally divided among several administrative bodies, the technological progress enables the integration of all space-related attributes, creating spatial information support that can service all more complex social communities. The paper considers the possibilities of the mass valuation application in the procedures of land management in the Republic of Croatia, views all legal frameworks and gives an overview of information of land administration, and especially cadastre, on which every mass valuation system is based. Through the overview of the existing state of information and the descriptions of abandoned mass valuation systems, the paper explains the problems of rural and urban land valuation. It explains the choice of Multi Criteria Decision Analysis helped by Rule-based Expert System methodology with the purpose of developing functional, practical, consistent and adaptable mass valuation system on a national level, applicable on the area of the Republic of Croatia and states with similar LAS.

Societal Drivers in the Geospatial Arena

Martin Salzmann and Dorine Burmanje (Netherlands)

Key words: Cartography; Digital cadastre; e-Governance; Geoinformation/GI; GIM; GSDI; Low cost technology; Professional practice; VGI

SUMMARY

In recent years we have witnessed enormous changes in society. These range from changes in technology, user interaction, web-based working processes, eGovernment, open data, SDI's and – above all – changes in the way of working and attitudes of our customers and society at large. Being an integrated agency these changes have a large impact on our business, which ranges from being a key player in our national (and European) SDI up to modern land administration. In this contribution we will discuss the elements we see as driving forces. We experience a shift from spatial and legal security as a cornerstone to a broader spectrum including the concept of trust. Furthermore users (including businesses and public sector bodies) work increasingly based on communities taking initiatives for the issues at hand. The user is increasingly in the lead. From a more technical point of view interoperability has become a central issue. The changes in the spatial arena are irreversible. These changes have a large impact on the geospatial arena we work in. At a somewhat slower pace we see similar patterns emerge in land administration. We discuss the impact on our operation by illustrating how we interact with user communities based on open data, advanced technology, and shared spatial information nodes. These issues not only affect our products and services, but also our relations with partners in business and users. Being agile also requires that our organisation has to find a sound balance between agility and society's for trustworthy information. The perspective we have to take is thinking and operating from the user's view and demands.

Indonesian Geospatial Reference System 2013 and Its Implementation of Positioning

Arisauna Pahlevi and Dyah Pangastuti (Indonesia)

Key words: Positioning; Reference frames; Reference systems; Geodetic Datum; Coordinate Change

SUMMARY

Since National Coordinating Surveys and Mapping Agency (BAKOSURTANAL) established on October 17th, 1969, Indonesia has many datum for mapping and surveying. Nowadays, after BAKOSURTANAL has been transformed to Badan Informasi Geospasial (BIG), we have released a new datum, that we called Sistem Referensi Geospasial Indonesia 2013 (SRGI 2013). An old datum, Geodesi Nasional 1995 (DGN 1995) has been replaced by SRGI 2013. These datums are different, SRGI 2013 has coordinate changes with time function that included on it's calculation, while DGN 1995 has no coordinate changes with time function. SRGI 2013 consists of horizontal and vertical geospatial reference system. This datum should be used easily and able to be accessed by users, then the access and service system for SRGI 2013 has established on April 2014. All geospatial activity must be refer to SRGI 2013, furthermore the deformation model should be included to get the coordinate on certain epoch.

3D Model Generation and Visualization of Archeological Remains in World Historical Sites: Santiago Bastion (wilhelmus), a Famosa, Malacca.

Ismail Ma'arof, Mohd Saporina Ab Talib and Khairil Afendy Hashim (Malaysia)

Key words: Low cost technology; Photogrammetry; Terrestrial Close Range Photogrammetry

SUMMARY

This is a summary on the paper on 3D model generation and visualization of archeological remains in world historical sites: Santiago Bastion (Wilhelmus), A Famosa, Malacca. Conservation of historical archaeological sites, being important parts of cultural heritage documentation, model generation and visualization of the historical sites is one of the main operations. Digital close range photogrammetry is currently an effective system providing both vector and raster data type. This paper describes a study, which aims to generate and to visualize the 3D models of archaeological sites and surrounding place. For this, the data set of the Santiago Bastion documentation project, which achieved by using digital close range photogrammetry and topographical survey has been used. In addition, differential rectified images of Santiago bastion surfaces have been generated. 3D digital photogrammetric model and rectified photographs of the Santiago Bastion archaeological remains site and surrounding place were used for 3D modelling and visualization. The data set of the Santiago bastion from digital close range photogrammetry and topographical surveying of the bastion and surrounding place were combined to acquire 3D true information. Finally a precise and an accurate 3D model of Santiago Bastion remains was generated.

Accuracy Comparison of Digital Elevation Models Generated from Different Sources

Wan Mohd Naim Wan Mohd, Mohd Azhafiz Abdullah and Suhaila Hashim (Malaysia)

Key words: Geoinformation/GI; Remote sensing; ASTER; IFSAR; LiDAR; Digital Elevation Models (DSM;); Digital Terrain Models (DTM)

SUMMARY

Digital elevation model (DEM) is a digital representation of ground surface topography and have been used in various applications. The introduction of global coverage DEM available for free or at reasonable cost was a new phenomenon in mapping. The issue is how accurate are these datasets and can it be used for topographic mapping. This paper aims to evaluate the height accuracy of DEMs generated from different sources. Results presented in this paper is part of a study to evaluate the suitable use of different DEMs and high resolution imagery such as Quickbird, Worldview, GeoEye, Ikonos or SPOT 5 imagery for topographic map updating. For this paper, Advanced Spaceborne Thermal Emission and Reflection Radiometer Global Digital Elevation Model (ASTER GDEM), Intermap Airborne Interferometric Synthetic Aperture Radar Digital Terrain Model (IFSAR DTM), IFSAR Digital Surface Model (IFSAR DSM), digital topographic map (with a 5m contour interval) and Light Detection and Ranging (LiDAR) datasets are used to generate the contours, height points and height profiles. LiDAR dataset is used as reference DEM to evaluate the accuracy of IFSAR DTM and DEM generated from digital topographic maps acquired from the Department of Survey and Mapping Malaysia. ASTER GDEM is compared with IFSAR DSM to determine the vertical accuracy. The Root Mean Squares Error (RMSE) of the heights generated from IFSAR DTM, IFSAR DSM, digital topographic map of the non-vegetated areas within the study area are 1.060 m, 5.158 m, and 3.229 m respectively. For the vegetated area, the RMSE of IFSAR DTM and digital topographic map are 5.603 m and 10.790 m respectively. The accuracy of ASTER GDEM in the vegetated and non-vegetated areas are 16.740 m and 50.140 m respectively. Visual comparison between the contours generated from IFSAR DTM and LiDAR has shown promising result. ASTER GDEM can be used to capture the general characteristic of the terrain. Future work will include the evaluation of factors that contribute to the accuracy of DEMs generated from different sources.

The IGS in a Multi-GNSS World

Chris Rizos (Australia)

Key words: GNSS/GPS; Positioning; Reference frames; geodesy; precise point positioning; CORS; ITRF

SUMMARY

The International GNSS Service (IGS) is a volunteer organisation of more than 200 individual institutions that maintains a global network of GPS and GLONASS monitoring stations and a long-term tracking data archive as well as products derived from the analysis of these measurements. In 2014 the IGS celebrates 20 years since it was officially established by the International Association of Geodesy. The IGS analyses also make critical contributions to the definition of the International Terrestrial Reference Frame (ITRF), and its products permit users to connect directly to the ITRF. With the advent of modernised GPS signals and the rise of numerous new GNSS such as BeiDou, Galileo, QZSS and IRNSS as well as new augmentation systems, the IGS is committed to evolving to a true multi-GNSS service. To pave the way for a future provision of high-quality data and products for all GNSS constellations, the IGS has initiated the Multi-GNSS Experiment (<http://igs.org/mgex>). MGEX has fostered the build-up of a dedicated global multi-GNSS receiver network, initial satellite orbit and clock estimation, in-depth characterisation of signals and receivers, and development of data formats and protocols. Another IGS initiative that will have an impact on multi-GNSS activities is the launch on 1 April 2013 of the Real-Time Service (RTS) (<http://rts.igs.org>). Currently only GPS satellite and clock information are routinely generated, but a test service for GLONASS products also exists. MGEX will encourage the RTS to ultimately support multi-GNSS Precise Point Positioning as well as play a role in GNSS Monitoring and Assessment. This paper will provide a status on routine IGS operations as well as new initiatives.

Framework for Malaysian 3D SDI in CityGML

Behnam Alizadehashrafi and Siddique Ullah Baig (Malaysia)

Key words: External code lists; CityServer3D; Malaysian 3D SDI; 3D City Model interoperability

SUMMARY

The term Spatial Data Infrastructure is normally used to describe metadata relevant to the collection of technologies, technical methods and processes, policies and institutional arrangements that facilitate the access to 3D spatial data. This paper describes a framework for 3D geospatial data infrastructure based on OGC Standards in Malaysia. The external code lists based on local culture, vegetation and heritage landmarks were proposed and approved for indexing 3D city objects of Malaysia. These code lists can be used between different governmental agencies as a communication tool and utilized for indexing in the 3D spatial database. There are some predefined code lists from other countries such as Germany, which can be utilized for Malaysian context. These code lists can be defined for all the street furniture and façade textures in applications e.g city planning, built environment, disaster management etc. The code lists can also be used for the objects on the façade in different layers such as windows, doors and backgrounds to enhance the usage of 3D SDI for a variety of privileges from end-users to professionals in the near future. The framework for web-based application for connecting to CityServer3D was introduced. CityGML as a standard data model can be utilized for developing Malaysian 3D SDI. In this research different methods were applied for converting 3D models to CityGML format. Implicit geometry representation for visualizing uniform shapes such as coconut or palm trees and other street furniture was addressed.

Semi–Automated Metadata Detection for Assessing the Credibility of Map Mashup

Nurul H Idris, Fathin Nazri (Malaysia), Mike Jackson (United Kingdom), Mohamad Said and Mohamad H I Ishak (Malaysia)

Key words: Geoinformation/GI; Low cost technology; Map Mashup; Web Crawler; Metadata; Credibility; Web GIS

SUMMARY

The current Web 2.0 technologies enable the easy sharing of geospatial data from various sources. Through the free mapping APIs, online maps can be created without the need for high cost software , meaning that a map can be created by both the professional as well as the average web enabled citizen. In a traditional approach, metadata is commonly used to assess the fitness of the data to meet the purpose of usage. In this new mapping landscape, metadata can be used to evaluate the credibility (believability) of information and to generate trust in the sources. However, in this new domain, the embedded metadata is typically informal and unstructured. This paper demonstrates the use of a web crawler to detect metadata criteria. This semi-automated criteria detection is one of the components to support the framework in assessing the credibility of information presented by a neogeography based tool, which is map mashup. This framework could be used to tackle the issue of credibility and trust related to Web 2.0 mapping applications.

Review and Assessment of Current Cadastral Data Models for 3D Cadastral Applications

**Ali Aien, Abbas Rajabifard, Mohsen Kalantari, Ian P. Williamson and Davood Shojaei
(Australia)**

Key words: Cadastre; Land management; 3D cadastre; 3D cadastral data modelling; RRR; Legal Property Object; LADM

SUMMARY

Three-dimensional (3D) cadastres are often described as the 3D digital representation of real property rights, restrictions, and responsibilities (legal objects). They can also contain physical counterparts (physical objects) of legal objects such as buildings and utility networks, on, above or under the surface. Implementation of 3D cadastres requires many elements such as existing 3D property registration laws, appropriate 3D data acquisition methods, 3D spatial database management systems, and functional 3D visualisation platforms. In addition, an appropriate 3D cadastral data model can also play a key role to ensure successful development of the 3D cadastre. Many jurisdictions have defined their own cadastral data models. However, none of them can fully support the requirements of 3D cadastres. This paper aims to explore the theories and concepts of the most common existing cadastral data models and investigate how they manage 3D legal and physical data. The result of this research can be used by cadastral data modellers to improve existing or develop new cadastral data models to support the requirements of 3D cadastres.

Trimble LaserAce 1000 Accuracy Evaluation for Indoor Data Acquisition

Ali Jamali (Malaysia), Francois Anton (Denmark) and Pawel Boguslawski (Malaysia)

Key words: Engineering survey; Laser scanning; Low cost technology; Positioning; Quantity surveying;

SUMMARY

Surveying can be done using several sciences and techniques for outdoor and indoor data acquisition like photogrammetry, land surveying, remote sensing, Global Positioning System (GPS) and laser scanning. Electronic Distance Measurement (EDM) is a reliable and frequently used technique. Laser scanning is costly and time consuming compared to the other mentioned techniques. Currently GPS is one of the most used techniques to measure coordinates, distance and angles between points in outdoor environments, but it has some drawbacks in indoor environment (e.g signal penetration). Currently, for indoor surveying, EDM and Terrestrial Laser Scanner (TLS) are mostly used. In this paper, several techniques for indoor 3D building data acquisition have been investigated. A new technique of indoor building data acquisition is proposed. This technique is efficient and rapid (it requires shorter time as compared to others), however the results show inconsistencies in horizontal angles for short distances below 20 meters in indoor environments. Results were calibrated by a least square adjustment algorithm. Future research attempts to investigate object reconstruction algorithms to optimize measurements.

A Tightly-coupled XML encoder-decoder for 3D Data Transaction: A City Modelling Scenario

Chengxi Bernad Siew and Khairul Hafiz Sharkawi (Malaysia)

Key words: Geoinformation/GI; GSDI; XML;Encoder; Decoder; Data Transaction;

SUMMARY

Gaining interoperability for data transaction in Spatial Data Infrastructure (SDI) leads to increase of data volume has long been discussed in recent years. In order to solve large data volume arises due to XML self-describing capability, which is used in CityGML, a schema-aware encoder (CitySAC) is invented and achieved better compression ratio and require lesser time, compare to the state-of-the-art Lemper-Zipf-Markov (LZMA) algorithm. While geometric and semantic data is equally essential over the web services especially for analysis, the use case of this schema-aware encoder is defined. A decoder is created with proposed query interface, capable to perform direct query onto the compressed document. This paper discusses the schema-aware encoder background of development and the related works; as well as the showcase of tightly-coupled encoder-decoder over web service data transactions in city modeling scenario

The Education for Cadastral Surveying and Young Cadastral Surveyors Network in Japan

Kazuaki Fujii (Japan)

Key words: Education; Professional practice; Young surveyor;

SUMMARY

Young cadastral surveyors in Japan had the 10th anniversary conference in this year. The expansion of YSN have been increasing in a few year and then integrated. In spite of FIG YSN, the quality of networks in any countries keep shining to our future. But improving the education of new surveyors have not built in 60 years after the war. There is no school and learned society for cadastral surveying in Japan. Nevertheless young surveyors need the licenses for surveying and resisting. They have some ways to get these on tests or certifications but they don't get a training in the practice of business. Usually, they only study about geodetic, geology, civil engineering, photographic surveying, and business administration at a survey school by the OLD education system in a year or a few years. We need the improving the education system. One of role which cadastral surveyor have is updating the cadastre. Surveyor who is engage in registing need a license "land and house investigator" without registration officers. The test of cadastral surveyor only include the law for the system of registration. All young surveys should get the knowledge of LAS we need and think about the sustainable development. How to make the next? Young surveyors just do the best we believe. I'm going to show you how to build the YSN in Japan.

Performance of Real-Time Precise Point Positioning Using MADOCA-LEX Augmentation messages

Suelynn Choy, Yong Li, Thomas Grinter (Australia), Yaka Wakabayashi (Japan) and Mohammad Choudhury (Australia)

Key words: GNSS/GPS;

SUMMARY

The Quasi-Zenith Satellite System (QZSS) is a Japanese regional satellite navigation system consisting of several QZSS satellites in highly inclined elliptical orbits that allows it to cover a wide area in East Asia and Oceania. QZSS is a satellite-based augmentation system for the GPS, GLONASS and Galileo constellations, transmitting navigation signals that are compatible and interoperable with these Global Navigation Satellite Systems (GNSS). In addition to the navigation signals, QZSS also transmits the augmentation signals L1-SAIF and L-band Experimental (LEX) Signal. The LEX signal is unique for QZSS in that it is capable of delivering 2kbps (1695bps of effective bit rate) of correction messages compared to the 250bps of legacy Satellite based Augmentation Systems (SBAS) like the MTSAT Satellite-based Augmentation System (MSAS). This enhanced capacity allows augmentation messages aimed at centimeter-level Precise Point Positioning to be broadcasted over the QZSS wide area of coverage. One such message is the Multi-GNSS Advanced Demonstration of Orbit and Clock Analysis (MADOCA) based messages which are currently being broadcasted by the LEX signal. The aim of this research was to evaluate the quality of the corrections include the MADOCA messages and the performance of real-time PPP using these augmentation messages. Centimeter level accuracies were obtained for static PPP after 2 hours of coconvergence and decimeter level accuracies were obtained for kinematic PPP after 1.5 hours of coconvergence. This service is expected to become continuously available for most of East Asia and Oceania region in 2018, when the QZSS constellation gets enhanced to 4 satellites

Assessment of Spatial Urban Dynamics in Enugu City Using GIS and Remote Sensing

Victor Nnam, Ikechukwu Mmaduako, Chukwubueze Onwuzuligbo Chukwubueze, Godwin Nnam and Makuachukwu Eze (Nigeria)

Key words: Geoinformation/GI; Remote sensing; Urban renewal; Urban Dynamics, Urban Development, Population, Enugu.

SUMMARY

In recent times, there is an increase in the rural-urban migration in Nigeria, this is made evident by the population surge in Enugu metropolis; this population growth has increased the rate of physical developments and renewals in the city. Spatial urban dynamics are the processes underpinning changes taking place in the spatial organization of large cities; this phenomenon as effects on the morphology, functional form and character of an urban environment over time. The aim of this research is to assess, model, study and predict the urban dynamics in Enugu metropolis. In this study, the urban dynamics of the case study city was spatially assessed and modeled using GIS and remote sensing techniques, the dynamics were assessed for 1995, 2000, 2005 and 2010 using LandSat Imageries (Enhanced Thematic Mapper plus (ETM+) and Thematic Mapper (TM)) the changes were presented spatially and graphically. A graphical projection was made in order to estimate/predict the extent of the dynamics by the year 2015. Geographic Information System was used to extract developmental spatial regions from the remotely sensed imageries. The results achieved include a spatial model depicting the dynamics in extent and volume within the metropolis for the respective years of study, a graphical illustration of the progression of dynamics and a simple graphical projection/prediction of the dynamics in year 2015. Discussions were made on causes and effects of the dynamics in our cities and how they may be contained and controlled sustainably.

The Effect of Datum Constraints for Terrestrial Laser Scanners Self-Calibration

Mohd Azwan Abbas, Halim Setan, Zulkepli Majid (Malaysia), Albert K. Chong (Australia) and Derek D. Lichti (Canada)

Key words: Engineering survey; Laser scanning; Terrestrial laser scanner; self-calibration; network configuration; datum constraints

SUMMARY

Similar to other optical and electronic instruments, data obtained from terrestrial laser scanners (TLSs) can be impaired by errors coming from different sources. Thus, a calibration routine is crucial for TLSs to ensure the quality of the data. Self-calibration is a common camera calibration procedure used in photogrammetry measurement which has been adapted for TLSs application. According to photogrammetry approach, there are several conditions needed be fulfilled for the calibration process especially about network configurations and datum constraints. However, network configurations applied to TLSs self-calibration are quite different compared to photogrammetry. Regarding the datum constraints, the theory states that the selection of either inner or minimum constraints can cause different effect on parameter correlations. Due to this argument, this study investigates the possible effect of datum constraints selection in TLSs self-calibration. Three comparisons were carried out between results obtained from inner and minimum datum constraints. Applying graphic and statistical approaches, the differences were analysed and the results indicated that both datum constraints could give similar outcomes and parameter correlations.

From Inventory Based Digital Archives to Corporate-Lis in Sri Lanka

Nelson Wijenayake (Sri Lanka)

Key words: Cadastre; "Land Information System", "Admin-LIS", "Corporate-LIS"

SUMMARY

ABSTRACT This article presents the successive approach in establishing of Corporate-LIS in Sri Lanka, which had formerly been conducted as an Inventory based Digital Archives. Being the national organization responsible in Surveying and Mapping for the entire country, Survey Department of Sri Lanka (SDSL) initiated the Land Information System (LIS) in 2007. It has been followed to archive topologically related parcel data in ESRI Arc Coverage format with the MS-Access Database for parcel related Tenement Information. This inventory based digital archiving system was unable to facilitate the LIS concepts in sharing information among the stakeholders. Hence, the system had to be re-engineered in order to sustain the corporate-LIS needs. In the process of joining the digital layers of block based field surveyed data, mismatch of common boundaries were studied with identifying and classification of the erroneous land parcels. Field verification was followed for rectification when necessary. Proceedings adapted in this transition will be briefly discussed in the paper. Creation of seamless set of parcel data, based on country's administrative hierarchy; Divisional Secretary Divisions (DSD) was the greatest achievement for successive LIS, in which all the parcel related information within the same administrative division could be easily mapped for user interaction. Subsequently, in the process of migrating to ESRI-GeoDB, the methodology adapted in LIS improvement will be discussed in the paper. A design or creation will not be a product, until it is published for customer use. Hence, the proceedings need to be attended are numerous for making the LIS to be a product for its customers. The paper will further discuss on the follow up actions for developing the system architecture, middle ware interface, web Application etc. This article may be very useful for those who need to move from Inventory based Digital Archives to a web based Corporate-LIS, a reality.

A Geometric–Topologic Exemplification for 3D Cadastre

Edward Duncan and Bernad Siew (Malaysia)

Key words: Cadastre; Digital cadastre;

SUMMARY

Professional surveyors all over the world are the repository of locational geoinformation data, in the form of either implicit or explicit data formats as defined by the Open Geospatial Consortium (OGC). Two dimensional (2D) cadastre data is not difficult to realise, for 3D data acquisition and modelling, this is a challenge. Different three-dimensional (3D) spatial data models exist for different purposes and applications, therefore, the need to select a single spatial data model for all applications is still difficult to realise. This paper outlines the requirements for a unified spatial data model for 3D cadastre capable of representing volume parcels for man-made objects in a city centre such as a block of flats in a city centre. Microsoft visual C++ 2008 programming language, OpenGL and Qt libraries were used to develop an application for 3D cadastre. The algorithm and modelling techniques are discussed and an implementation for 3D cadastre highlighted. The concepts highlighted are significant for 3D cadastre in an urban environment due to the multiplicity of ownership for the same parcel of land. The 3D Tetrahedralization Model (3DTM) is significant and can be adopted as the geometric representation for 3D cadastre. The model can also be used for facility management and change detection. Further works will research into indoor navigation for 3D cadastre.

The Panoramic VR Integration of Web-based GIS Residential Property Marketing Information System (WGPMIS)

Siti Aekbal Salleh, Eran Sadek Said Md. Sadek and Wan Mohd Naim Wan Mohd (Malaysia)

Key words: Geoinformation/GI; Real estate development; Web GIS; Property GIS; marketing GIS

SUMMARY

The emergence of panoramic virtual reality (VR) as visualization tools and acceptance of GIS technology in real estate business have seen to be a major factor of integrating these technologies to increase the marketing efficiency and information dissemination. This paper presents the integration of panoramic VR and Geo-processing queries of the design and development of the Web-based GIS Residential Property Marketing Information System (WGRPMIS). This system is intended to be integrated with the virtual GIS technology enabling the consumer to virtually explore the potential property upon the multi criteria selection through assisted geo-processing query. The system is built using ArcGIS Desktop 10, ArcGIS Server 10 and ArcGIS Viewer for Flex 3.4. The client-server architecture used for this system is Representational State Transfer (REST) where the client web application is built using Adobe Flex Application Programming Interface (API) through application builder, and customized using Widgets and scripting in Extensible Markup Language (XML). The spatial data features are stored in a Geodatabase and published as Map Service through ArcGIS Server. The base maps are acquired from online web services (Bing, ESRI) and the Animation/Panoramic view of the property is stored in Adobe ShockWave Flash (SWF) file format.

Performance of the Geometric–Historic Method for Estimating Land Subsidence in Urban Areas of Indonesia

Hasanuddin Z. Abidin, Heri Andreas, Irwan Gumilar and Bambang D. Yuwono (Indonesia)

Key words: Deformation measurement; GNSS/GPS; Positioning; Risk management; land subsidence; geometric-historic; Jakarta; Bandung; Semarang

SUMMARY

Several large urban areas in Indonesia, i.e. Jakarta, Bandung and Semarang, have experienced land subsidence for at least more than a decade. Land subsidence in these cities have been estimated using several geodetic methods, such as leveling, GPS survey, InSAR, and/or microgravity. The results obtained from these technique over the period between 1982 and 2011 show that observed subsidence rates in Jakarta are about 1 to 15 cm/year, and can reach up to 20-28 cm/year at certain location and certain period. In Bandung basin, it was found that during the period between 2000 and 2011, several locations have experienced subsidence, with an average rate of about –8 cm/year and can reach up to about –23 cm/year. In Semarang, land subsidence with rates of up to about 19 cm/year were observed during the period of 1999 up to 2011. In this paper, the geometric-historic method for observing and estimating land subsidence is introduced. This method is based on observation of land subsidence impacts in the field. By measuring the vertical displacement caused by land subsidence effect on the impacted object or structure, combined with historical and interview data, then the subsidence rate can be calculated. This method has been implemented to estimate subsidence rates at several locations in Jakarta, Bandung and Semarang, and the obtained rates have been compared with GPS and InSAR derived subsidence rates. The strength and limitation of this geometric-historic method is laso presented and discussed.

WebGIS Role in the Indonesian Presidential Election in 2014

Benni Purwonegoro (Indonesia)

Key words: Geoinformation/GI;

SUMMARY

WebGIS KPU is a system used to support the success of Indonesia's presidential election in 2014. This system helps to monitor the distribution of ballot boxes, ballot papers, stamps, forms and other election materials, ranging from central government (Jakarta) to provinces and districts in Indonesia, to be forwarded to the polling station in the village. With this system it easier for anyone both general users and committee election commission to monitor the distribution and logistics quickly and accurately.

A GIS Based Road Network System of Port Harcourt, Nigeria.

Amina Dienye and Ukeame Ajie (Nigeria)

Key words: e-Governance; Geoinformation/GI; Spatial planning; Road Network; Traffic Congestion; GIS

SUMMARY

A GIS BASED ROAD NETWORK OF PORT HARCOURT, NIGERIA. Mrs Amina. S. Dienye [ANIS][MWIS] (B.Tech (Hons) Land Surveying, (Mphil.) Env. Mgt, Rivers State University of Science & Technology, Port Harcourt) e-mail: aminadienye@gmail.com And Mr. Ajie Ukeame Emmanuel (ANIS) (B. Tech) (Hons) Land Surveying, Rivers State University of Science and Technology, Port Harcourt. e-mail: ukans4u@gmail.com.

ABSTRACT The issue of an improved road network due to the dynamic and massive development of Port Harcourt calls for serious concern and adequate attention. The recent physical developmental projects within the metropolis, for example, the construction of a flyover along Ikwerre road, and the expansion of Ada-George road resulted in the demolition of structures because the government intends to create a conducive and optimized road network system. The aim of this work is to evaluate the problems (traffic jams, small width) in the road network at specific locations and suggest possible solutions. Geographic Information Systems (GIS) operations using Arc GIS 9.3 were performed on the road map digitized with AutoCAD 2007. The handheld Global Positioning System (GPS) in combination with Satellite Imagery from the remote sensing technology was used to acquire data of new roads, for map updating and revision, as well as some major locations experiencing traffic jams and schools. The study signifies the versatility of GIS demonstrated in the buffering, overlay and networking techniques', having been employed successfully in addressing the problems of traffic (road width, lack of alternative routes) identified along some routes such as Harold Wilson Drive and Ada George/Iwofe junctions. The study recommends that; the road network in Borikiri axis of Port Harcourt should be improved by constructing a by-pass to ease the traffic along Harold Wilson road; The width of roads should be increased at T-junctions and cross-junctions rather than reducing as is the case of most of the junction as seen on the field; All public facilities especially those located along major roads should have good parking plots before approval for construction; The government should encourage the use of GIS techniques by training and retraining personnel in their various fields of application regarding road usage; The government should be engaged in projects that would ease traffic flow along the roads; It is also recommended that at proximity of 500km from a developing area, a boulevard should be constructed at the junction linking such area to the center of the town. Example is the Wimpey/Iwofe junction; the government should ensure a proper plan is developed prior to construction of buildings; Provisions for taxi parks should be considered. The road network as predicted in this study is expected to contain

a minimum of 217,360 cars in 2022 for the identified routes excluding larger vehicles like trucks.

Ceaseless Tidal Zoning for Straits of Malacca using Spatial Interpolation

M.D.E.K. Gunathilaka (Sri Lanka) and Mohd Razali Mahmud (Malaysia)

Key words: Hydrography; Tidal Modelling; Ceaseless Tidal Zoning; Spatial Interpolation; Offshore Navigation

SUMMARY

The Straits of Malacca is a tidally complex area with different tidal range patterns and range values, thus making standard co-tidal charts inappropriate for this region. Although tidal zoning can handle such complexities; its create discontinuity between the adjacent zones. Therefore, a different approach is needed to handle tidally complex areas effectively, while providing continuous results. Hence, a new concept 'Ceaseless Tidal Zoning (CTZ)' incorporating tidal zoning and conventional co-tidal charts was developed. In this approach, the tidal amplitude and phase fields are assumed to obey the two-dimensional (2D) Laplace Equation (LE) while the interpolation is computed by numerically solving the LE on a gridded mesh. First, the appropriate boundary condition coefficients were tested and determined by using simulated test basins. In addition, for a realistic scenario, data from ten tidal stations were selected as the known stations and another ten stations were selected as the check stations, in order to cover both sides of the Straits of Malacca. The best solutions were obtained with the boundary condition factor $a = 0.9$ for the coastline and the optimum convergence was achieved with the relaxation coefficient $r = 1.62$. A Matlab based computer application was developed to provide continuous tidal corrections for on-board bathymetric reduction based on the developed CTZ technique. The statistical results showed a 100% correlation with the check stations and also a very good correlation of over 0.8 in offshore areas with the altimetry sea surface heights. Finally, a tidal profile across the Straits of Malacca was obtained with the developed CTZ application and analysed for the discontinuity between the zones. It is shown that this approach has minimized the discontinuity of the tidal values in crossing the zones.

Sustainable Development and Effective Land Management: GDRLC, Turkey

Davut Güney, Abdullah Burak Keser, Nihat Erdogan, İsmail Dursun and Mehmet Fatih Diri (Turkey)

Key words: Cadastre; Land management; Turkey; Property; Land Registry

SUMMARY

Turkey, not only belongs to Asia but also belongs to Europe as spatially sociologically and cultural, is one of the oldest settlement of the World. Through to revolutions in social, politic and economic areas in her 90 years history, today, Turkey has become one of the most important country and by the agency of reforms in last decade, she aims that being a model country in her own zone. In parallel with these several successfully reforms, GDP has gone up 822,8 billion dollars in 2nd quarter of 2013 while it was 304,9 billion dollars in 2003. Innovations which can be seen major industries like tourism, agriculture, transportation etc., has emerged also land management. The General Directorate of Land Registry and Cadastre (GDRLC), the most important land management institution of Turkey, has been carrying out its duty determined by the law in its 22 regional directorates, 91 Cadastre directorates and 957 land registry directorates all around the country. GDRLC, today, is an architect of dynamic chain of service which includes preparing source data for all kinds of planning and organization on the ground and underground, providing spatial dimension data and displaying topographic structure, producing data that can meet the information need required for economy law, statistic, management, planning and various different scientific researches as well as all kinds of contractual transactions related to land registry and register of immovable properties, to follow-up, and control changes on the registers, to ensure the protection of archive records and documents. The property, addition to the economic dimension, is an important aspect of social and moral concept. General Directorate of Land Registry and Cadastre (GDRLC) can be considered the heart of property in Turkey, carried out reforms in last decade has gained more powerful structure, more innovative and more sophisticated. Projects implemented by the institution such as provides significant gains in the country's administrative and sociological perspective, has achieved to a large extent economically. In 2003, the title deed revenue of 252 million dollars, as of the year 2012 came to 2.3 billion dollars, increased by 900%. In order to increase the efficiency and quality of the land registry and cadastre services, with 135 million euro loan from the World Bank-funded and launched in 2008, Land Registry and Cadastre Modernization Project is carried out successfully. Innovative policies following GDRLC, also has a modern and integrated system of land registry and cadastre information. GDRLC as the architect of the Turkey's National Permanent GNSS Network, is the country's most important and most experienced institution in photogrammetry. GDRLC; with its professional teams in land registry and cadastre fields,

166 years experience-based knowledge and solution-oriented management approach; is quite keen on making cooperation with other countries.

Towards Malaysian LADM Country Profile for 2D and 3D Cadastral Registration System

Nur Amalina Zulkifli, Alias Abdul Rahman, Hasan Jamil, Chee Hua Teng (Malaysia) and Peter van Oosterom, TAN Liat Choon, LOOI Kam Seng, CHAN Keat Lim (Netherlands)

Key words: Cadastre; Digital cadastre; e-Governance; Standards; LADM; country profile; 2D and 3D cadastre; registration system

SUMMARY

This paper proposes a comprehensive Land Administration Domain Model (LADM, ISO 2012) country profile for 2D and 3D cadastral registration system in Malaysia. The proposed Malaysian country profile is partly based on the existing spatial (including survey) and administrative registration systems, and partly based on new developments inspired by the LADM standard. Within the country profile it is attempted to cover all Malaysian land administration related information in the model, which are maintained by different originations. The different types of spatial units include customary areas, reserved lands (forest, wildlife), lots (both of private and public land; e.g. roads), buildings and building parts (strata, all in 3D), strata land parcel (with house no more than 4 storeys) and utilities (legal spaces). The lots can have 2D or 3D representations, and include lots for qualified title and temporary occupation licence (TOL), where there is not yet a certified plan available. What makes the development of the Malaysian country profile unique is the support of this very wide range of spatial units. Each of them having different requirements: some need sketches and text descriptions, others need 2D geometry and topology, while yet others need 3D geometry. The county profile includes the content of the various code lists, which are an important aspect of standardization. It is the first time ever that objects related to strata titles are modelled within LADM: building and land parcel (both within a single lot), which can be refined with parcel unit, accessory unit, and (limited) common property unit including support for provisional and multilayer/underground aspects. This is not only important for Malaysia, but also useful for many other countries, that also have the strata title system. Several novel aspects for the Malaysian land administration are introduced, such as: 3D representations (for building units and option for lots), full version management and inclusion of historic information, explicit linking of all land administration information and source documents (titles, certified plans), possibility to group multiple spatial units in one basic administrative unit with same rights attached, and legal spaces around utilities (in 3D). The country profile helps to establish the national SDI enabling meaningful exchange of information between different (type of) organizations in different parts (states) of the country. As LADM is an international standard it will also support international exchange of information, as part of Global SDI (GSDI).

Application of GIS Analyzes with Cloud Computing

Sevket Bediroglu, Volkan Yildirim and Selçuk Erbas (Turkey)

Key words: Geoinformation/GI; Cloud Computing, GIS, Spatial Cloud Computing, Cloud GIS

SUMMARY

Usage of Cloud Computing (CC) has been increasing day by day, due to the advantages at data store, data view and data processes. Common advantages of CC are, working regardless of place and offering economical solutions with the help of “pay as you go” model. Also ability of changing computer forces in a short time makes CC elastic. Although these advantages, CC has some disadvantages and these are about security, privacy and juristically problems. A new technology era occurred when CC and Desktop GIS integrated and this is called Spatial Cloud Computing (SCC). With the help of SCC, users may access their spatial data without any need of stationary operating system or devices. By this way, GIS analyses should be done via tablets, smart phones and other mobile devices on web browsers without requiring program installing. In SCC technology analyze operations are done in central servers and only results are sent to users so analyzes are too fast with the help of central parallel computers. In this work, the first aim is investigation of advantages of CC and SCC technologies. A sample geo database was designed at first step. Spatial data operations and GIS analyses has been done with the SCC technology. The performance compares of these two technology are researched in terms of, temporal compare, economic, time and ease of usage views. Turkey’s situation at this technology is observed, the possible problems may occur in future are defined and solution of them are researched. At the last, a survey work had done to show the spatial data users’ ideas about SCC technology.

Geotechnology as a Means to Promote Economic, Social And Environmental Development: Land Readjustment in Rural Space of the City Joinville /Sc/Brazil.

Mirtz Orige, Carlos Loch and Tadeu Oliveira (Brazil)

Key words: Cadastre; Cartography; Land management; Land readjustment; Photogrammetry; Spatial planning;

SUMMARY

Worldwide, the Land Readjustment is seen as one of the activities of Land Management and is currently an important tool for the promotion of economic, social and environmental development. In Brazil, the Land Readjustment can become an important tool in spatial planning, although not expected the Brazilian urban planning legislation. The various functions of the countryside, with all their potential conflicts, the reallocation of plots becomes an important alternative to sustainable development, although it is a very complex process. However, nowadays with the use of geotechnology supported by geographical information system, remote sensing and aerial photographs were developed tools to model the effects of different rearrangements, their costs, impacts and outcomes. The purpose of this article is to show geotechnologies presented as a means to promote economic, social and environmental development in projects reorganization of the rural space of Joinville / SC/ Brazil and present an alternative of Land Readjustment. The research methods are based on cartographic materials that provided the design and integration of spatial database for geographic information system. From the analysis of cartographic materials were prepared, the identification and characterization of physical-spatial units and subunits Homogeneous Space. From the physical- spatial Could an alternative land readjustment in a Homogeneous Space subunit. The results are presented to characterize the city of Joinville, its history, geography, economic, social and environmental aspects. In physical- spatial catchment area of River Cubatão stood out 3 homogeneous spatial units and 8 subunits with thematic maps. Then there was a larger sample of research using the subunit Pico Road as a model. In this sample it was found that most of the properties have undergone subdivision among heirs, which promoted intense fragmentation of plots causing the current effect of long and narrow ways that hinder economic exploitation. It was also observed that the buffer strip for riparian conservation area, in which properties on the current agrarian structure must meet certain clearances, preventing them even more economically. Finally, we presented an alternative of land readjustment survey sample, which resulted in the rearrangement of the properties in order to optimize the use and occupation of land observing economic, social, and environmental aspects. It was concluded that the use of geotechnology allows the land readjustment in a participatory manner, presenting itself as an efficient tool in the

redevelopment of the rural space, allowing environmental preservation and enhancement of properties economically , socially and environmentally.

Solid Waste Management Using Spatial Analytical Hierarchy Process and GIS: Case Study of Trabzon, Turkey

Volkan YILDIRIM, Tahsin Yomralioglu, Sevket Bediroglu and Osman Demir (Turkey)

Key words: GIM; Spatial planning; solid waste; analytic hierarchy proces; landfill; compost

SUMMARY

Solid waste generated from the industrial organizations and urban areas creates serious environmental problems. The first and most important step in solid waste management is appropriate site selection for landfill, compost plant and incineration plant. The site selection process requires the evaluation and analysis of several criteria. However, the traditional evaluation method is not sufficient for the site selection process. So many environmental, economic and political factors need to be considered in this process. Environmental factors are very important because landfill, compost plant and incineration plant sites may affect the biophysical environment and the ecology of the surrounding area. Economic factors must be considered in the siting of these sites, including the costs associated with the acquisition, development, and operation of the site. Social and political opposition to these siting have been indicated as the greatest obstacle for successfully locating waste disposal facilities. Landfill, compost plant and incineration plant site selection is a type of land use planning that includes many spatial analyses, such as the distance between different land use zones, slope, and proximity to natural hazard thresholds, including landslides in effective solid waste management. In this process, each factor impacting the process of landfill, compost plant and incineration plant site selection corresponds to the spatial dataset. These datasets are produced and stored in different formats by different institutions and particularly in developing countries like such as Turkey. In some cases, datasets are produced using different methods at different scales by different institutions. Such a situation creates significant problems in the organization of spatial data. Furthermore, data collected using different methods are used in solving daily problems of institutions but not plans for the future production of spatial data. In this context, Geographical Information System (GIS) is an important decision support tool capable of operating and analyzing different types of spatial data in the determination of appropriate sites. This article describes raster GIS-based spatial data base and spatial analytic hierarchy process (AHP) integration model for landfill, compost plant and incineration plant site selection method. This method utilizes raster-based spatial database and spatial AHP in which the factors affect the site selection process. The final product in this method is the cost surface map showing pixel-based values of the appropriate area for landfill, compost plant and incineration plant siting in the Trabzon province in Turkey.

Modeling Projections of Potential Sea Level Rise Impacts on Some Caribbean Communities: Is it Worth the Effort?

Michael Sutherland (Canada), Keith Miller, Dexter Davis, Amit Seeram and Demi Singh (Trinidad And Tobago)

Key words: Coastal Zone Management; Hydrography;

SUMMARY

The Caribbean historically experiences a variety of natural disasters including hurricanes, earthquakes and volcanic eruptions, droughts among other things. Climate change is reported to potentially exacerbate many of these extreme events in the region, and add persistent sea level rise as another threat to Caribbean coastal communities. GIS-based sea level rise predictive inundation models have been, and are being, used to assess potential physical and socioeconomic impacts on coastal communities in the Caribbean and other geographic areas. The results of these models are expected to form part of the information base used to develop appropriate adaptation and mitigation strategies. The veracity of the models' results, and the usefulness of the models, are questioned because more often than not the models are constructed with less than ideal data, especially in developing regions such as the Caribbean where there is often a paucity of long term dependable spatial data, including tidal data to determine mean sea level and, as well, coastal deformation data among other things. Within the context of all the foregoing, this paper presents three case studies where GIS-based sea level rise inundation models are produced relevant to selected Caribbean communities. It was found that the models have utility in raising awareness, and support for the development of appropriate adaptation and mitigation strategies.

Engaging the Challenge of Rapid Urbanization and Slum Upgrading and Enhancing the Role of Land Surveyors

Paul van der Molen (Netherlands)

Key words: Affordable housing; Cadastre; Informal settlements; Land readjustment; Low cost technology; Property taxes; Security of tenure; Spatial planning; Urban renewal; Valuation;

SUMMARY

This paper aims at understanding the domain of rapid urbanization and slum upgrading. Therefore it collects facts in order to clarify the status quo. The paper highlights relevant aspects, such as development of new forms of spatial planning, modern slum upgrading methods, provision of security to flexible people-land relationships, linking informality and formality and enhancing land and property tax revenue to facilitate urban services. It appears that for all aspects, a role for the land surveying profession can be formulated. This role requires mastering the newest geospatial and non-spatial technologies, and the capability to design and maintain cost effective land information systems, which can deliver relevant services to urban residents and city managers.

The Requirements of Marine Cadastre in Turkey

Yasar Selcuk Erbas, Recep Nisanci, Ali Erdem Ozcelik and Tahsin Yomralioglu (Turkey)

Key words: Cadastre; Marine cadastre; Marine Area, GIS

SUMMARY

In developing countries, depending on the development of the industry and urbanization rapidly, the use of the marine areas is exposed to commonly use as well as the terrestrial areas. Due to this exposure, it is required that the marine areas are planned as providing the multi-user purposes. So the tenure rights of the marine areas are mapped in three dimensions (3D) and also it is registered. In Turkey the spatial information using the administration and management of the marine areas is inadequate. In this context the marine cadastre provides the marine spatial information system, determination of the tenure rights on the marines and the registration of these rights systematically. On the other hands, the data produced by the institutions of the marine administration and management are not real time and sufficient accuracy. And also since the marine areas are used by many users for different purposes, the institutional conflicts are occurred. Moreover, many maritime application and jurisdictional regulations just consist of attributes data. But the map layers are not produced yet. In this context, the survey will be conducted with experts in order to detect the current situation. The basic aim of this paper is researching and producing basic mapping coverage and spatial database for planning marine areas with support of information technologies, which contributes to cadastral registration for sustainable management of the marine areas. With this aim, a spatial information system which can be used for the management and cadastral registration of marine areas will be established in city-wide using Geographical Information Systems (GIS).

Urban Renewal Activities in Turkey: The Trabzon Experience

Ziya Usta, Ekrem Saralioglu and Ebru Colak (Turkey)

Key words: Land management; Spatial planning; Urban renewal; Irregular Urbanization

SUMMARY

Cities can be deformed due to reasons such as migration, naturel disasters, irregular structuring, industrialization after a period of time and an unhealthy, irregular urban tissue appears. These areas that are not compatible with the whole city, must be revised again and integrated to urban tissue. One of the actions for that purpose is urban renewal practice. In Turkey, urban renewal process increased in importance with the Marmara earthquake that is happen in 1999. Due to about one hundred ten thousand buildings destructed as a result of this earthquake and sixty percent of the buildings in the current cities have destruction risk in an earthquake, the law about transformation of the areas at disaster risk has inured in 2012 and urban renewal activities gained momentum all over the country. Most of the urban renewal practices in the developing countries such as Turkey, physical dimension of the urban renewal is regarded. However, economic and social dimensions of the urban renewal are ignored. In this study, it is aimed that the investigation of "Trabzon Province Zagnos Valley urban renewal practice together with its economic and social dimensions. Zagnos Valley is located in the center of the city. Also this valley is an important air corridor of the city. Especially after 1950, industrialization and urban migration movement has gained momentum in Turkey. As a result of this the development of the city along the coast, caused this area where is close to the coast and in the center of the city filled with the unqualified and low standard of living buildings due to economic reasons with the purpose of settling by the people who live far from the center of the city and the area have been exposed to irregular urbanization. Irregular structuring of the Zagnos Valley eliminated through the urban renewal. Likewise, this urban renewal practice is first urban renewal experience in the city. In this study, owners of the properties who join the urban renewal how affect from this process and how they assessed their revenues that gain from urban renewal will be analyzed. Before and after the urban renewal will be analyzed as compared and new suggestions will be made.

Determining Practically Temporal Coastline Changing in Trabzon

Ekrem Saralioglu and Bayram Uzun (Turkey)

Key words: Coastal Zone Management; Cost management; Remote sensing;

SUMMARY

Coastal areas have been attractive center for people since ancient times. In terms of tourism activities, coasts provide significant contribution to national economy. This contribution is proportional to how well these areas manage. Our country is surrounded by sea on three sides so the concepts of coasts have become more important for our country. For this reason, coast laws are based on old dates. Coasts have been made public domain and have been taken under protection. In order to find coast areas, coastline and coast edge line must be determined. According to the Law no 3621/3830, coastline is defined sea, natural and artificial lake and rivers, except in the case of flood, refers to the line of points touching the water to land. In addition, Coast edge line is defined as natural boundaries of sea, natural and artificial lakes, and rivers. The area between the coastline and coast edge line is called coast. Coastline changes natural ways such as, melting glaciers, tides global warming and meteorological events or artificial factors which made by human such as, improper construction, fill in the sea and sand extraction from the sea. All these factors emerge from with time. Coastline detection and identification of temporal changes in coastal protection and management is important in order to maintain an appropriate manner. In this study, Trabzon province coastline is found as practically with Google Earth satellite image from 2002 to 2012. Coastline is digitizing form different temporal satellite image and changing is investigate with ArcGis software. In addition, photogrammetric and remote sensing methods will be given information about the determining process of coastline so Landsat and Qickbird image are investigated in this project.

The Changing Woman Role of Surveyers in Turkey

Ebru Colak and Tugba Memisoglu (Turkey)

Key words: Education; Professional practice; Young surveyor;

SUMMARY

Positions of women in modern life are directly related to modernization and industrialization development of societies. The role of women in society is shaped by the culture of that society. Even though roles and expectations attributed to women vary according to the socio-economic and cultural structures, generally the position of women follow the men. Getting women's social, political and cultural rights, the process of taking part in the institutional structures started simultaneously modernization efforts in both developed countries and Turkey. Today, the labor force participation rate in half of the population of women is around 30% in Turkey. And also in Turkey, the ratio of men and women with higher education are an equal level with each other and the ratio of women with graduated from higher education are 35%. This is possible to see women employees in Turkey in many business fields. Due to the approaches adopted in the structure of public opinion, occupations are classified according to gender. Especially evaluated in terms of Survey Engineering, despite taking the same theoretical information in training life, women engineers are second plan in contrast to man engineers in the events of the physical endurance such as land requirements and studies, transporting and using technical tools and equipment used for the measurement of land. Although it is created the perception of man's profession, it is possible to work women engineers and technicians in surveying applications. While rate of female students studying survey engineering are approximately between 12%-14.7%, there is an increase in rates in recent years. With developing mapping technology and business areas, there has been a change in the perception of the profession in our country. Along with this change, it is obvious that geomatics engineering profession are chosen by greater number of women. In this study, the role of changing and developing day by day of women engineers will be examined in surveying activities in Turkey. And also it will be focused on provided harmony by the women to technological progress in the profession, problems faced by areas studies and evaluation of the profession through the viewpoint of women.

Tree Species Identification Using High Resolution Remotely–Sensed Data

Zulkiflee Abd Latif and Nur Hidayah Ibrahim (Malaysia)

Key words: Laser scanning; Positioning; Remote sensing; Tree species;high resolution

SUMMARY

Mapping and identification of tree species is a key component in forest conservation and management. The spatial mapping of tree species has becoming more important due to location interest of high market value timber or can be used for medication purposes. Conventional method using surveying techniques was adopted in order to identify the location of different tree species in forests. This technique is rather challenging at inaccessible area, labour intensive and time consuming. Recently, high resolution remote sensing imagery and LiDAR technology provide a very high spatial resolution information of Earth surfaces. This study presents an approach for mapping individual tree species using combination of airborne LiDAR and WorldView-2 imagery. The overall accuracy of tree species classification was 89%. The RMSE for tree location X and Y were 0.4m and 0.2m for tree height. Combination of both WorldView-2 imagery and airborne LiDAR data provides a very promising remote-sensing sources for mapping tree species of the study area.

Topographic Laser Scanning of Landslide Geomorphology System: Some Practical and Critical Issues

Khamarrul Razak (Malaysia)

Key words: Laser scanning; Remote sensing; Natural Disaster, Complex landslides, Laser Scanning-derived products

SUMMARY

Modern surveying technology, notably topographic laser scanning system (TLSS) has been widely used for understanding the geophysical phenomena underlying natural hazards. Advanced and modern TLSS is a promising tool for mapping, monitoring and modeling landslides in the tropics. Understanding this geomorphic processes is an important step forward given the economic losses and fatalities globally. This paper aims at providing better insight into the use of TLSS, captured from airborne- and ground based platform, coupling to advanced point cloud- and image-based processing for a detailed landslide investigation in a mountainous tropical region (Gunung Pass, Perak). This paper deals with some critical issues of laser scanning – from the field to the finish, for collecting landslide topographic data, and outline recommendation mapping practices for a better understanding of geomorphic problem and permutes the operational needs at national, state and local jurisdictions. Notable laser scanning-facilitates products are carefully addressed in the context of tropical landslide geomorphology system. Multi-scale stereoscopic visual analysis of TLSS derived images unveiled much better landslide geomorphology features and activity than that of previously published landslide maps. A series of field investigation explicitly indicated the distinctive morphology, disrupted drainage and vegetation anomalies across the unstable area. We evaluated a series of topographic surveying techniques for explicitly providing spatial pattern of landscape morphology and quantified them in term of time efficiency and its effectiveness. Multisensor laser scanning data enabled identification and classification of complex landslides, but attention is needed to integrate them in a densely forested area. As a conclusion, TLSS can be a very important new data source and mapping tool to characterize landslides even in a complex environment. The increased prevalence of modern TLSS system and advanced point cloud processing has led the ways to improve future landslide maps and subsequently reduce landslide risk. The emergence of TLSS enables the surveyors to more effectively play a vital role in such complex and changing environment.

Modelling Tropical Forest Microclimate with Remotely-Sensed Data

Eran Sadek Said Mohd Sadek and Zulkiflee Latif (Malaysia)

Key words: Laser scanning; Remote sensing; Spatial planning;

SUMMARY

Forest plays an important role in maintaining the environmental quality and the ecological balance of their surrounding areas. Therefore, understanding the effects of tropical rainforest destruction and fragmentation on the microclimate is critically needed. National Park, Pahang is one of the oldest tropical rainforest where the surrounding areas are facing critical threats due to tourism activities and infrastructure development. Solar radiation (I), air temperature (Ta), relative humidity (h), wind speed (v) and rainfall were measured at six different locations under the forest canopy, built-up area, trail, campsite, fragmented forest and village area. All the microclimate variables show significant differences at the measured locations. These results further the understanding of the responses to forest fragmentation in the tropical forests created by human activities, and provide a useful basis for evaluating the implications of forest management practices.

Transition of Property Registration from Paper to 2D to 3D – A Case Study from Bahrain

Ammar Kashram and Neeraj Dixit (Bahrain)

Key words: Land management;

SUMMARY

Property registration repository has significantly been modernized in Kingdom of Bahrain over a period of last 10 years. It transitioned from paper based system to digital environment based on geospatial technology. First digital transition happened in 2005 when all property transactions papers were scanned and digitally archived through Archiving System. Around the same time another system namely, Case File Application System, provided a geospatial platform to capture all transactions marked on paper maps to digital repository. Property transactions on maps were linked to digitally archived documents. From then on, both the systems are so updated that the property registration information is current and available to all authorized users in Survey and Land Registration Bureau or SLRB. Second major transition is happening since 2012. This transition is attributed to the difficulties faced by users in registering Air Parcels. Air Parcels are the ones which are delineated in air in multistory buildings. They are different than the traditional ones which are delineated on ground. SLRB developed an in-house system namely SLRB Bahrain – 3D Property Registration System to meet challenges faced by users and to improve efficiency. Modernization of the property registration repository through transition is governed not only by technological advances but also due to changes in property laws and growing contribution of real estate sector in national economy. This paper covers two geospatial technology based systems, Case File Application System and SLRB Bahrain – 3D Registration System, which are helping in modernizing the property registration repository at SLRB in Bahrain.

Cadastral Survey in the Process of Modernization and Actualization of the Croatian Cadaster System and It`s Adjusting with Land Management Register

Vedran Car, Project Manager, Jelena Car and Dino Dragun (Croatia)

Key words: Cadastre; Digital cadastre; Land management; Photogrammetry; Real estate development; Cadastral survey

SUMMARY

In the last decade countries in transition note increase of the real estate market, a trend which has not bypassed Republic of Croatia. Mentioned trend Croatian cadaster system welcomed with real estate records which in a particular area dates back to the time of the Austro-Hungarian Empire and graphical methods of land surveying. Conditions in most cadastral municipalities has not been updated for more than 150 years and the divergence between cadastral system and land management register became a regular occurrence. For more tha a few cadastral municipality land management register has never been established. All that resulted with the inability for fast implementation of economic projects (e.g. European Union stimulative funds), difficulties in handling real estate transactions, large number of illegal buildings, etc. In order to regulate the situation in the real estate registration and modernization of land administration in Republic of Croatia, State Geodetic Administration in cooperation with the local authorities started with cadastral surveys of cadastral municipalities. Cadastral survey has been proved to be an effective tool in the process of modernization and actualization of the Croatian cadastral system and its adjusting with the land management register. Republic of Croatia plans to continue with renewal and modernization of the Croatian cadastre system with the goal to develop an efficient real estate market. The process of cadastral survey is described in the examples for cadastral municipality Sali and Božava, projects which lasted for a period from 2011. to 2013. and where the last survey was done in the 19th century.

Smart Verification of Geodata, with Open Source Approach

Martin Karlen and Peter Dütschler (Switzerland)

Key words: Cadastre; Digital cadastre; e-Governance; Geoinformation/GI; GIM; Professional practice;

SUMMARY

1. BACKGROUND INFORMATION The verification of the data for the cadastral survey goes through tree levels: On the one hand the verification is made by the employer himself in his surveying-software and on the other hand also by competent departments at cantonal and federal level. For this purpose the competent departments dispose to the employer a free available and automatically Check-Service, which checks the INTERLIS-data on their formal correctness. The competent department of the canton of Berne uses the software BELUTI for verification work. This Software enables the examiner to identify complex and not automatically detectable errors and to judge them. The employer has no access to this application and get known the errors only by the examiners report. In the canton of Solothurn however the verification is differently managed: Producer and Examiner uses the same Software Application for testing the geodata. The competent office has developed the software Application named „VeriSO“ for the verification of the cadastral data. VeriSO has been developed as an Open Source Software and is at the employer’s disposal for independent verification before sending the data to the canton. 2. OBJECTIVE Every year about 40 project on average are verified in the canton of Berne. To ensure a standard verification on a high level, the decision was made to introduce a similar system as in the canton of Solothurn. For an easy, quick and cost-effective endorsement and maintenance of the verification software, they opted for a professional web-based application. 3. REALISATION The free accessible code of the VeriSO got adapted to the canton of Bern and got named VeriSO-BE. The management of this service, which is not done by the canton himself, was delegated to the company ALPGIS AG in Thun. The task then was to arrange the software as a web-service on the server. Every User gets his own workspace where his projects and test results are stored safely. Creating a testbed, up- and download of files is widely automated. With the help of VeriSO-BE as a web-service, important processes can be simplified 4. Outlook The possibility to check data models of cadastral survey by VeriSO-BE was only one first step. Development goes on with data models as utilities and use planning. Also the service get’s developed continuously. In the future no installations of additional programs should be necessary by using VeriSO-BE.

Spatial Data Infrastructure for Sustainable Tea Agricultural Land Management in Turkey

Ali Erdem Ozelik, Recep NISANCI, Tahsin YOMRALIOGLU, Osman DEMIR and Bayram UZUN (Turkey)

Key words: Cadastre; Land management; Spatial planning; Spatial Data Infrastructure; Agricultural Lands

SUMMARY

In addition to determining and registering the rights, restrictions and responsibilities (RRR) on lands in a legal framework, beyond the Cadastre 2014 it is emphasized that the facts effecting the socio-economic balance such as the needs for societies under the urbanization, rural and agricultural development depending on the relationship between land use and communities, poverty, income level, scarcity of land should be considered in land management and land use policies within Cadastre 2034. And so, the spatial data or spatial data management is required as a major tool for both the sustainable land management and spatial data infrastructure as well. Recently the spatial data based systems are most widely used for land use policy mainly rural and agricultural land management around the world. Especially many reforms are implemented on rural and agricultural land use planning within European Union (EU) Common Agricultural Policy (CAP). Today, both national and globally, some agricultural products having major role on rural and agricultural development are classified as special product and made policy for these products. In this context in Turkey tea agriculture and its product have significant effects on socio-economic developments locally, regionally and nationally and so it is generally defined as special. But some deficiencies, mainly the lack of National Tea Farming Spatial Data Infrastructure (NTSDI) for tea agricultural land management are available in Turkey. It prevents the practice of the reforms process and projects on tea agriculture facilities especially within the context of EU Common Agricultural Project (CAP). And also it is called attention to requirement of the Land Administration Model and Spatial Data Infrastructure (SDI) for Tea Agricultural Lands intended to both tea act and institutional policy efficiently. In accordance with these needs, in this paper it is suggested to establishment of the Tea Agriculture Information System (TAIS) to support tea agricultural land administration and sustainable tea farming technically and socially. And also Parcel Identification System (LPIS) for determination of land use rights and spatial data management on tea agricultural lands were established within the SDI. Additionally, to eliminate institutional and legal gaps on tea agricultural production with new standards on tea farmland use and planning, thus the sustainable tea farming policy infrastructure is composed. Furthermore it is emphasized that requirements of the Land Administration Domain Model (LADM) for Tea Agricultural Lands.

Urban Mining – a Geospatial data challenge

Benjamin Schnitzer and Tine Koehler (Germany)

Key words: Digital cadastre; Geoinformation/GI; Land management; Spatial planning; urban mining; resources; SDI; data management; renewable land management; urban facility management; city lifecycle management

SUMMARY

Regarding the worldwide demand on resources like minerals and metal the necessary of improving the mining of secondary raw material becomes clear. One of the biggest warehouses unlocked is the building stock. The approach of recovering resources from the anthropogenic stock is called 'Urban Mining'. Unfortunately, the effective potential is unknown yet, neither in a spatial nor in a temporal comprehension. The availability depends on the type of building and this leads to two main categories which have to be taken into account: On the one hand side space matters, since there is a specific spatial distribution of types of buildings. Concerning the industrial buildings for instance, an urban region with a high density of automotive industry will show a different potential than a rural area with less industry. On the other hand, the remaining life of buildings is based on both the constructional conditions and the specific use. This information could be merged by an urban mining cadaster. Thus, in a research project at Technische Universität Darmstadt a resource cadaster in the metropolitan region Frankfurt/Rhine-Main will be provided, comprising the industrial and trade buildings of the region. Based on single samples of building types, a projection of the spatial distribution as well as the temporal availability for the whole region will be given. This paper shows the methodical approach of gaining a cadaster of secondary resources using private, OpenData, and official geo- and building meta-data as well as modeling the resource inventory. The complex study is initially focused on the city region Darmstadt. Due to the fact different data sources, most of them in a spatial context, geo informatics' approaches can be used to combine and analyze these data. Different spatial data warehouses are providing information about building types in the target area, combined into a centralized data model, analyzed and harmonized to a described comparable value acting as a correlation function and finally will be the basic assembly to perform a resource inventory and statistic based extrapolation to the specific area.

Transparent Land Governance: Temporary Development Zones to meet the Requirements of Urban Expansion

Alexander Kohli (Switzerland)

Key words: Land management; Legislation; Spatial planning; urban Expansion; fast documentation; fit-for-purpose; temporary development zones

SUMMARY

In metropolitan areas the informal urbanization of the outskirts is a classic event. Today it must be accepted that a large number of the regulatory tools available for managing urban development are not necessarily appropriate to be applied as they are in many developing and transitional countries where the rule of law leaves a lot to be desired. In consequence, the large majority of urban authorities often do not engage in realistic preparations for growth. The two known approaches in this field, the set-up of regulatory measures on the one hand and the public initiatives on the other, are commonly accepted but do not necessarily lead to success. Looking at the initiatives approach it becomes clear that the need for a sufficiently consolidated property system to gain long term success is underestimated. A formally correct situation without conflicting property rights and disputed land titles remains a pre-condition not only for enabling land and housing markets but also in view of securing land for public needs, assuring sites and services in the framework of public initiatives (Sustainable Land Management). To create good conditions for improving the property and planning situation, a solid legal base has to be put in place before further land management activities are undertaken. The presented concept, therefore, asks for the initialization of an intermediate legal framework as an initial step to be applied to a special perimeter of action, the so-called 'TEMPORARY DEVELOPMENT ZONES' (TDZ). Dr. Alexander Kohli, Vice-President SWISS LAND MANAGEMENT foundation c/o BSB + Partner, Ingenieure und Planer Leutholdstrasse 4 CH-4562 Biberist SO SWITZERLAND Email: alexander.kohli@bsb-partner.ch Mobile: +41 76 393 0121

Real Estate Evaluation Problems of Turkey

Seda Nur Marabaoglu, Recep Nisanci, Osman Demir, Bayram Uzun and Usta Ziya (Turkey)

Key words: Land management; Land readjustment; Real estate development;

SUMMARY

Real estate values have a significant role in the basis of a sustainable land management system. One of the main goals of land management is to define basic policies related to the determination and use of real estate values. Even though the system on real estate value has been established in many highly developed countries, administrative problems continue in developing countries. Legal regulations on determining real estate values and lack of a standard are the leading problems. In this context, law, regulations and similar legal arrangements should be made primarily. Presenting real estates to the capital market is significant in terms of creating economic sources. On the other hand, real estate value has increasingly become one of the main issues in rural and urban land arrangements, urban renewal and expropriation applications in the recent years. Thus, determining real estate values accurately is essential. Real estate value concerns many different institutions as it at the heart of land applications. Real estate values are obtained through different standards and various methods by these institutions and as a result, some differences emerge among the values. The existence of different values (tax value, trading value, mortgage value, value defined by the court, etc.) belonging to the same real estate cause economic, social, technical and judicial problems. The problems related to the determination of real estate value in Turkey will be revealed in the scope of the study. A new model intended to register and manage these values will be designed and discussed and then some solutions will be presented for developing countries.

Challenges of Land Acquisition the in the Mining Communities of Tarkwa, Ghana

Edward Kwesi, Peter Ekow Baffoe and Kwame Tenadu (Ghana)

Key words: Land management; Land- Acquisition; Land- Ownership; Land-Boundaries; Mining-Activities; Boundary-Markers.

SUMMARY

Abstract One of the major challenges facing land acquisition in most mining communities of Ghana is the absence of clearly demarcated and undisputed land boundaries and ownership. Natural features (trees, hedges, footpaths, ridges, valleys and streams) that were used in the past to mark and describe land boundaries and tracts have become obliterated and obsolete long ago. The locations of some settlements, streams and roads have been changed, ridges have been flattened, valleys filled and even relatively permanent markers like concrete pillars and iron rods have been destroyed. These have contributed to numerous disputes about land boundaries, ownership and compensation payments in the area. This paper presents detail accounts of the land boundary and ownership problems in the mining communities of Tarkwa, Ghana, the sources of the problems, the challenges they pose to land acquisition, and suggests ways to deal with them. The study found mining activities as the major source of the boundary problems, and getting a legal title or recognition to ‘purchased’ land as the main challenge to land acquisition in the area. It is recommended that all stakeholders in land in mining communities should get knowledge of existing boundary and ownership problems and engage the services of professional surveyors to serve as guides in land transactions or undertakings.

Arab Historical Cities: Challenges of Conservation, Management and Developpement –Some Case Studies–.

Rachid Bouzidi (Morocco)

Key words: Cadastre; Cartography; History; Implementation of plans; Land distribution; Land management; Land readjustment; Quantity surveying; Reference frames; Reference systems; Risk management; Spatial planning; Urban renewal; Valuation;

SUMMARY

Arab region cities are in changes in different levels and states according to globalisation, demographic explosion expansion and prssure associated with the development. The challenge of continuity of the past for the futur arises many questions in the Arab world. Historical and traditionnal areas in urban contexts are mainly concerned in order to be survived with conservation of buildings and their sool, managment of urban field, development of the society, shelter conditions, slums, public policies... This paper gives a focuse on some case studies of historical arab cities surviving projects from Morocco and other Arab countries, concepts of conservation, safguarding and restotion, problem of risk and urban management, integration and development necessities.

Assessing the Effectiveness of Temporary Works for Hong Kong Construction

K. H. Chan (Hong Kong SAR, China)

Key words: Professional practice; Risk management; Standards;

SUMMARY

Bamboo Scaffolding (BS) is opined as less safe, highly flexible, more risky, lower cost and less durable; whilst possessing fewer established rules to follow or to be controlled in comparing with Metal Scaffolding (MS), Suspended Working Platform (SWP) and Tower Working Platform (TWP). BS may consist of hidden defects that exist in its traditional design and structural form; while the other systems are contended as more rigid/controllable and thus results with lower accidental rate; which may be more adopted by major stakeholders. The central aim of this research is to study the various Temporary Works commonly adopted for alteration and addition projects in Hong Kong; and details the comparison between BS, MS, SWP and TWP in respect of their design, statutory requirements, capacity, material properties, construction method, cost, safety, durability, effectiveness, and security to the building occupiers. Both qualitative (through structured interviews) and quantitative (be means of questionnaires) approaches will be adopted. Major stakeholders involved are facilities managers, owners, occupiers, contractors, subcontractors, consultants, and relevant professionals. After data collection, these will be analysed and cross examined to justify the effectiveness of these systems in view of the critical factors like design, statutory requirements, capacity, material properties, construction method, cost, safety, and durability. Thus, a more precise picture would be drawn to gauge the appropriateness of using each system considering its uniqueness, application, special feature and value for money.

City Biodiversity index and its linkage to Real estate pricing

Manohar Velpuri and Anusha Pidugu (Singapore)

Key words: Land management; Property taxes; Real estate development; Valuation; city biodiversity index

SUMMARY

In 2002, Conference of the Parties (COP) developed a Strategic Plan to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional, and national level'. Since 1992, ten meetings of the COP to the Convention of Biological Diversity (CBD) have been held. COP-11 provided a unique platform to display, promote, interact, learn and network from each other's experiences and knowledge relating to biodiversity. It has emphasized the importance of Biodiversity indices to quantify the changing biodiversity maps. The drivers of Biodiversity degradation are many-fold. Human activities are the main driver behind the decline in biodiversity and result from a number of different threats. Habitat loss and degradation includes reductions in the quality or quantity of habitat available to species and is considered the single greatest threat to endangered species and overall biodiversity. Biodiversity has globally come under increasing pressure on account of factors such as habitat fragmentation, development imperatives, unsustainable consumption pattern and, more recently, global warming. Biodiversity degradation can cause unstable and lesser resilience to ecosystem providing products and services. This leads to food scarcity, fresh water degradation, and increasing temperature in cities all leading to unhealthy ecosystem. Ecosystem health is one of the direct concerns to real estate businesses because many depend on related services, either directly or indirectly and the degradation of ecosystems can present risks in services like marketing and sales in real estate. Real estate indices are one of the measures to quantify the liquidity and exposure of transaction data during sale of properties. Out of the many factors apart from the demand and supply of the property's the transactional volumes of sales in real estate. influence of the ecosystem health on real estate transaction data depends on several factors. In this paper an effort is made to understand direct impacts of biodiversity degradation on commercial real estate. A quantification method by linking biodiversity indices to real estate market indices is worked to analyze prices in global real estate market

Transparent Cadastral System – in both a Private and Public Task Performance

Juulsager Torben (Denmark) and Ewa Swensson (Sweden)

Key words: Digital cadastre; e-Governance; Land management; Legislation; Professional practice; Transparent Cadastral System performed by public-private partnership contra governmental cadastral organisation

SUMMARY

This paper stress that a good transparent Cadastral System does not depend on whether the actors in the system are private or public. This paper points out other factors of significance. The most important factor is how the cadastral process is carried out by the surveyor. The public must be able to trust on him/her. The surveyor should be well educated, have a high code of ethics and especially a developed knowledge about managing people. He must be sure of the current legal system, listen to the affected parties, advice and explain in an understandable way, find solutions and have decision-making power. The technical systems that support the cadastral procedure should be rapid and cost-effective. Information about the properties must be of good quality and widely available in the community. It should also be possible to have the cadastral process case tried by a court or an authority. In Denmark the process for property formation is performed by private licensed surveyors in a public-private-partnership. In Sweden the property formation is performed by state or local government surveyors. Denmark and Sweden both have transparent Cadastral Systems. Both countries have well educated surveyors; digital cadastral systems including digital cadastral maps. In both countries are good connections between the Property formation organisations and the Cadastral Authorities but in different ways. The paper will describe how two quite similar Cadastral Systems in two neighbouring countries are performed in two different ways – as a public-private-partnership and as a pure public affair. .

A Century of Photogrammetry on Kilimanjaro

Pascal Sirguy and Nicolas J. Cullen (New Zealand)

Key words: Geoinformation/GI; History; Photogrammetry; Remote sensing;

SUMMARY

In 1867, the “German father of photogrammetrie” Albrecht Meydenbauer (1834-1921) met the geographer and explorer Otto Kersten (1839-1900) who, five years earlier, had attempted the first climb of Kibo, the highest of three peaks of Kilimanjaro. Meydenbauer presented to him the technique he designed that allowed measurements to be made from photographs as he foresaw that it could be used as a useful surveying application during expeditions. Fascinated, Kersten proposed to rename the technique Photogrammetry, thus sealing an intimate link between this science and the highest mountain of Africa and tallest freestanding mountain in the world, where a glacier named after Kersten still remains. Forty five years later, in 1912, German explorers Eduard Oehler and glaciologist Fritz Klute returned to Kilimanjaro armed with a photogrammetric camera. This led to a 1:50,000 scale map being produced, the quality of which should be praised given the complexity of the terrain and the technical limitations of the emerging surveying technique at the time. The mapping of Kilimanjaro at a 1:50,000 scale was not repeated for another 50 years when a photogrammetric survey was conducted from aerial images captured in 1962. The rapidly changing topography associated with the glacier retreat and the fact that the slopes of Kibo attract about 40,000 climbers each year justify the need to develop a new topographic survey of this outstanding landmark, designated a UNESCO World Heritage Site in 1987. In this context, the application of the photogrammetric principles to the latest generation of very high resolution spaceborne optical sensors (VHRS) offers new surveying opportunities by enabling the topographic mapping of remote and hardly accessible areas at large scale with unprecedented spatial resolution. Recent hardware and software advances now allow dense point clouds to be generated, thus making the use of VHRS stereo imagery a viable technique to complete a large topographic survey at a small pecuniary and logistical cost. Thus, 100 years after Klute and Oehler completed the first ground based photogrammetric survey of Kibo, and 50 years after the most recent aerial photogrammetric survey, this paper illustrates the potential of a spaceborne photogrammetric survey technique by reporting on the last effort to map the topography of Kibo from GeoEye-1 stereo imagery, which has led to the creation of a new 50cm resolution Digital Elevation Model (DEM), namely KILISoSDEM2012.

Climate Related Sea Level Change – An Inconvenient Fact or an Irritating Fiction?

John Hannah (New Zealand)

Key words: sea-level change; climate change; coastal management

SUMMARY

Climate change has been a focus of scientific study for over 25 years. It has resulted in numerous scientific papers as well as five comprehensive assessment reports published by the Intergovernmental Panel on Climate Change (IPCC). Despite this plethora of data, there remain some, such as Lord Christopher Monckton and Professor Niklas Mörner, prominent sceptics, who maintain that anthropogenic climate change is not happening and that rising sea levels do not constitute the risk claimed by the IPCC. Such sceptics typically see future changes as being small and the product of natural processes that are largely uninfluenced by human activity. This is a crucial issue for a number of FIG member bodies, particularly those associated with small, low-lying islands [sometimes known as Small Island Developing States (SIDS)]. This paper reviews the available science data (at least as it relates to sea levels) and compares it against the claims made by climate change sceptics such as Lord Monckton. Such claims are soundly refuted. The paper concludes by providing balanced guidance on likely sea level change to those who seek to prepare for the future.

Engineering Geodesy – Definition and Core Competencies

Heiner Kuhlmann, Volker Schwieger (Germany), Andreas Wieser (Switzerland) and Wolfgang Niemeier (Germany)

Key words: Engineering survey; engineering geodesy; definition; competencies; self-conception; application areas

SUMMARY

This article summarizes the discussion of the self-conception of engineering geodesy within the respective section of the German Geodetic Commission. It presents engineering geodesy by means of its tasks, methods and characteristics as an application-oriented science whose research questions often arise from observed phenomena or unsolved practical problems. A fundamental characteristic is the professional handling of geometry related problems taking into account the economic principle and realizing end-to-end quality assessment from the planning stage and the measurements to data processing and interpretation. The current methodical developments are primarily characterised by the increasing integration of measurement and analysis into challenging construction, production and monitoring processes as well as by the transition to spatially continuous methods. We conclude this paper with a new definition of the discipline.

The Post–2015 Development Agenda: 10 Questions for Land Informatics

Rohan Bennett (Netherlands)

Key words: Cadastre; Capacity building; Digital cadastre; GIM; Informal settlements; Land management; Low cost technology; Security of tenure; Young surveyor; Post-2015

SUMMARY

At least six (6) of the twelve (12) universal goals, drafted by the UN Secretary General’s High-Level Panel for the Post-2015 Development Agenda, suggest the need for improved land governance, land rights recognition, and land information management. The domain of land informatics – the science and technology dealing with the creation, maintenance, and dissemination of land information – provides seeds for the desired improvement. The science uses the existing structures of geoinformatics to address the information problems associated with land administration systems. Developments in land informatics occur on two fronts. From the domain of geoinformatics a new wave of technology options have arrived: UAS, crowdsourcing (via GNSS), wireless sensor networks (WSNs), Web 3.0, and so on. These options await application in the domain of land administration. Meanwhile, land administration systems themselves are asked to better inform responses to new challenges including land grabbing, food insecurity, and climate change. The opportunity exists to improve alignment between these emerging demands of land administration and the emerging technologies of geoinformatics. Global technology providers are already responding: new providers emerge (e.g. Thomson-Reuters) and existing players intensify their focus and restructure product offerings (e.g. Trimble). International organizations and networks (e.g. UN-Habitat, FAO, and GLTN) add to the mix. They focus on disseminating alternative low-cost toolsets. Determining how fit-for-purpose these new solutions are requires independent evaluation and design work. Synthesizing these developments, this paper uncovers ten (10) pressing questions for the domain of land informatics. Specific country cases taken from Sub Saharan Africa and South East Asia demonstrate the pressing need for answers. Each of the questions is relevant to the achievement of the Post-2015 development agenda. Each presents opportunities to existing and new players in the land sector. Taken together, the questions set the scene for the next phase land informatics research.

Improving Land Governance in the Senegal Valley : Context, Issues and Challenges

Claire Galpin (France)

Key words: Land management; Land governance

SUMMARY

After presenting economic social and demographic situation in Senegal, rural land governance inventory will be done to present and understand land and governance issues and furthermore challenges for future. Based on the case of the Program of support of Communautés rurales (Rural Communities) which is closed since December 2013, the actual land management, land governance et Domain National Law will be analysed. We will conclude on land reform which is expected for many years by civil society and people in Senegal.

Largest Scan Project Ever Collected: Versailles Case Study

Sebastien Varea (France)

Key words: Laser scanning;

SUMMARY

This abstract discusses when history and new technology meet up with a Google partnership. In order to open “La Galerie de l’histoire du Chateau de Versailles”, AFT was in charge of acquiring virtual data needed to create Versailles in 3D. No less than 6 months and 100,000 scans stations were necessary to successfully create a digital copy of the biggest castle in Europe. Not only was the inner castle digitized, but all of the exterior fountains in the garden, the statues, the facades and the roof. The result: It is now possible to take a virtual tour of Versailles or back in time and discover the castle at the age of “Le Roi Soleil!”

Incorporating Remote Sensing as a Tool to Assist Rehabilitation Monitoring in a Dolomite Mining Operation in South Australia

Naveen Kariyawasam, Simitkumar Raval and Ali Shamsoddini (Australia)

Key words: Land management; Mine surveying; Remote sensing; Mine rehabilitation, Spectral derivatives

SUMMARY

Monitoring for rehabilitation success in the mining industry has grown in use and relevance in recent years. Remotely sensed data are considered as a reliable alternative for the field-based monitoring methods which are usually expensive and time-consuming. This study conducted at the Ardrossan Dolomite Operation (ADM) in South Australia, utilises freely available Landsat Thematic Mapper (TM) and Enhanced Thematic Mapper (ETM+) satellite images of last 13 years to monitor and assess the status of permanent re-vegetation using different spectral derivatives including vegetation indices, reflectance and reflectance transformation. Four vegetation indices namely - the Simple Ratio (SR), Tasseled Cap Greenness/Brightness (TC G/B), Normalized Difference Vegetation Index (NDVI) and Inverse Band 3 (B3I) were evaluated through Landsat images, and then compared against high-resolution contemporary Google Earth™ imagery as well as ground based observations to evaluate the utility of each spectral derivative for this task. The NDVI was found more robust among the four spectral derivatives and was consequently used to analyse the time series (2000-2012) of the imagery to monitor the relative health of the re-vegetation at the ADM. Satellite image driven results were further compared with ground-based photographs, historical rainfall records and the conventional monitoring data of the mine site. The results indicated that the use of remotely sensed data can be useful for monitoring the health of re-vegetated areas where the vegetation dominates the ground area of the pixel, e.g. NDVI more than 0.2. However, for the areas where the vegetation cover decreases, e.g. NDVI lower than 0.2, the remotely sensed data failed to map the ground conditions. It seems this issue originated from the coarser spatial resolution (30m) of the Landsat data, which contaminates the spectra of vegetation with the presence of soil. Furthermore, NDVI showed a strong correlation with historical rainfall records and clearly quantified the severity of the 2006 drought on the rehabilitated areas.

Infrastructural Improvement in Basic Schools for a Sustainable Formal Education. The Way Forward in GIS Environment.

Joseph Owusu, Jeremiah Kwasi Owusu and Yaw Poku Gyamfi (Ghana)

Key words: Cadastre; Capacity building; Land management;

SUMMARY

Educational facilities nationwide, are provided by the public, private (individual and religious bodies) sectors. The private sector provides the bulk of these institutions at the pre-school, first and second cycle levels, whereas the public sector is the leader at teacher training colleges and tertiary levels. A major setback to infrastructural development in the Education sector over the years has been the non-availability of lands. The Government of Ghana (GoG) through the Ministry of Education (MoE) acting through the Funds and Procurement Management Unit (FPMU) has received a Grant from the United States Agency for International Development (USAID) towards the cost of providing some amount of infrastructures to improve education delivery in 34 deprived districts in ten (10) regions of the country. Due to the difficulty in land acquisition in the various districts, the opinion leaders and stakeholders from the selected community were consulted in order to make available any vacant land suitable for the project. This was carried by an advance team dedicated for that purpose. This was followed by a reconnaissance survey on all the selected sites by the surveying team. A Cadastral Survey for the entire proposed sites was carried out. All the existing structures like buildings, roads, electricity poles, utilities etc were detailed. Contour maps were generated for the designing and construction of the proposed structures. A Topographical survey plans indicating major landed features has been produced and handed to the client. Plan or maps showing existing buildings and proposed developments were also produced. A database in GIS environment has been created to archive the field data and copies of the site plans that were produced. Keywords: Structures, Global Positioning System (GPS), Education, Demarcation, Survey.

The Use of Different Data Sets in 3-D Modelling

Ahmed Hamruni (Libya)

Key words: Photogrammetry;

SUMMARY

The use of different data sets in 3-D modelling Ahmed M. Hamruni – Almergib University/ Libya elhamrouni@hotmail.com The needs for photo-realistic, modelling of the complete details, and geometrically accurate 3-D models are growing rapidly in several fields, especially in engineering and cultural heritage documentation. Photorealism and better details can be achieved through using terrestrial imagery but it is a very time-consuming process particularly in large modelling projects. It is possible to improve efficiency by image capture from a moving ground based vehicle but this requires an extra process in the work flow if the initial modelling has been undertaken by aerial photogrammetric processes. Pictometry imagery has been used for visual inspection especially in life-saving situations due to the fact that the Pictometry aerial imagery contains oblique (angled) images which provide better view and greater detail. The more conventional method of collecting aerial images with for example the UltraCamD, can also provide excellent views of roof tops and some of the building facades when located away from the nadir on the images. This paper explored the geometry of the Pictometry images (vertical and oblique) and the possibility of using this imagery in 3-D modelling to produce photo-realistic and accurate models. In addition, merging terrestrial imagery with Pictometry imagery to get more ground level details has been investigated in this research. All work has been carried out using the available software packages at the Institute of Engineering Surveying and Space Geodesy (IESSG) and using data provided by Blom Aerofilms Ltd. The results of the aerial triangulation of different Pictometry blocks showed that high quality image measurements have been achieved for all the image blocks. Extraction of 3D geometry for all buildings in the study area has been performed using both vertical Pictometry imagery and UltraCamD imagery. The successful combining of vertical and oblique Pictometry images provided an excellent opportunity to produce an efficient method of high quality urban model texturing. The integration of terrestrial images of building facades (whose texture needs enhancement) with the combined aerial imagery block has been successfully and automatically performed.

Towards sustainable land administration systems: Designing for long-term value creation

Michel Magis and Jaap Zevenbergen (Netherlands)

Key words: Cadastre; Cost management; Security of tenure;

SUMMARY

Many developing and transition countries have adjudicated or redesigned land registration and cadastral systems over the past two decades. The (re)establishment of the systems and the massive collection of information in the field is done in the form of projects, often (financially) supported by donors. However, to have a lasting effect on tenure security and especially on facilitating a land and credit market, the systems need to keep running after the donor has left. The end-users or clients of the land systems are to a large extent the citizens, at least those who have or are acquiring a registered right in land, and the professionals in the real estate market, like banks, realtors and insurance companies. Making their engagement with the land registration and cadastral system effective and efficient has to be a key design requirement when the system is being completed. Specific services, both institutionally and in form of ICT functionality, are needed for this. Receiving an extract to proof ones rights, registering a sales transaction, notifying the new right holders (heirs) after the death of the original right holder, mortgaging the property, are some of the key services for the citizens. Local and national government agencies often also need overviews, esp. to prepare land policies and implement land management decisions. These services, which have to be offered at a cost (in money and time) should take into account the clients' financial situation and other costs borne by the client (related to accessibility, ease of use, etc). These costs next to the perceived benefits are key success factors for the use of the land administration from a client perspective. Enough income is however also needed to sustain the local offices, and thus an active enough market has to exist in the area that the local office serves. Based on existing documentation, business experience and recent project experience, we analyze how the above can be taken care of. We look at the extent to which this has been taken into account in several projects, and what choices have been made in that regard. We also pose the question whether project for land registration and cadastre can come too early. Most likely this will vary between certain types of areas, also within a country.

Innovative Geospatial Solutions towards a Sustainable Maritime Trade

Roux Celine (Australia)

Key words: Cartography; GNSS/GPS; Hydrography; Positioning; Risk management; Standards; environment protection; eNavigation; cooperation;

SUMMARY

The maritime traffic volume has increased substantially in the last years and the growth rate is expected to ascend even further in the years to come. The amount of gas emissions from the global maritime trade and the ship accidents risk is intensifying proportionally. These two elements have a significant global impact on the marine environment and the climate change. We will explain how innovative geospatial solutions, such as vessel and voyage planning or the eNavigation International Maritime Organisation concept can help reduce the maritime trade environmental footprint as long as a good cooperation is maintained between the private and public sectors. Vessel and voyage planning solutions integrate several geospatial data types to provide the navigator with an optimised ship route. When planning the voyage, parameters like the vessel's structure, the weather prediction and of course the hydrography and cartography, are taken into account automatically by the optimisation algorithm. It is then possible to ensure an efficient and safe voyage, while minimising the gas emission of a ship. Such an analysis can be made before the voyage using predicted parameters and the available nautical charts database, or also real time at sea with updated information received directly on board. The eNavigation concept also works towards enhancing safety of navigation and environmental protection globally. We will briefly present the eNavigation framework, together with existing intelligent geo-information integrated systems capable of providing critical navigational and operational information to the mariner. This information needs to be delivered in a timely manner by combining real-time geospatial data streams with marine vector cartography. Automatic routing, weather limitation zones definition and checks for high risk features at sea, are just a few of the geospatial solutions now made available to the ship's captain. Adequate display of such information on the bridge of a vessel brings improved situational awareness to the navigator, and the risk of accidents at sea, like grounding or collision, can therefore be significantly diminished. We will finally underline the importance of private-public cooperation in furthering the sustainability and safety of the maritime trade. Public bodies produce reliable geospatial information which is a necessary data inputs for the above mentioned innovative maritime solutions. Private and public sector need to cooperate even more closely to provide the mariner with the best of both worlds – reliable quality hydrographic data combined with innovative efficient geospatial solutions – thus minimising the environmental impact of the growing maritime trade.

A Proposed Framework for Achieving High Level Automation in Cadastral Processing

Kean Huat Soon (Singapore)

Key words: Cadastre; Digital cadastre; Geoinformation/GI; Land management; Standards; LandXML; Semantics; OWL; Ontology; High Level Automation

SUMMARY

The Land Survey Division of Singapore Land Authority (SLA) has recently embarked on LandXML to replace the existing in-house cadastral submission formats for supporting 3D Cadastres and automation in cadastral processing. LandXML enables the storing of land surveying data, such as traverses, surveyor details, parcels and geometries. LandXML also allows machines to parse information from it and therefore it has been used as national standard under the ePlan Initiative in Australia and New Zealand where registered surveyors are required to submit their cadastral plans in LandXML for automated cadastral processing. In order to achieve a higher level of automation, the paper proposes that LandXML should be supported with formal semantics. Formal semantics allows computer systems to reason about the information and subsequently make inference automatically. Formal semantics can serve as computational knowledge and rules to automatically check for the integrity and consistency of data in LandXML. Unfortunately, representing formal semantics is not part of LandXML. To support formal semantics for LandXML, ontology represented in Web Ontology Language (OWL) is used. Ontology is not novel in the geospatial domain, it has been proven useful in many geospatial applications. Ontology is used to explicitly describe semantics by using formal language OWL. Different from LandXML, OWL is enriched with axioms for semantic definitions to build ontology. The OWL ontology in the paper is created from the formalization of ISO 19152 Land Administration Domain Model (LADM), which defines terminology for land administration. The paper will introduce a conceptual framework on how LandXML is supported with OWL. Each concept in OWL is referred with a unique IRI (Internationalized Resource Identifier). To support LandXML with OWL, the DocFileRef element in LandXML is linked with the corresponding IRI in OWL. When a LandXML is processed, the respective data can be reasoned with respect to the associated OWL ontology. This eventually forms a two-tier framework, which consists of the Data Tier and the Knowledge Tier. The Data Tier stores the surveying data, while the Knowledge Tier captures the ontological knowledge and rules.

LBS–Mobile – A New Way of Handling Data

Martina Stocker and Peter Duetschler (Switzerland)

Key words: Geoinformation/GI; GNSS/GPS; Location-Based Services; Mapping; Mobile Devices; Data Management

SUMMARY

1 Introduction Location-based services (LBS) can be defined as services that integrate a mobile device's location or position with other information so as to provide added value to a user. [1] It is the combination of the three basic components Internet, GIS and mobile devices while also integrating the user's position into the application. Object data (points, lines, polygons) with attributes which is stored in a database and visualized on a web map, can be accessed through the internet anytime. This concept meets the increasing demand of more flexible and real-time data availability. 2 LBS-Mobile Many location-based services only serve as an information provider. LBS-Mobile is a newly developed application which also allows object data to be registered, edited and managed. It is suited for a wide range of applications with geospatial data and runs on all commercial mobile devices. The GPS functionality of smartphones and tablets leads the user to the nearest object or point of interest (POI). Through the user interface objects can be checked, directly edited and maintained. New objects can be registered based on the user's current location. 3 Fields of application and workflow LBS-Mobile is a highly flexible tool. It can be used for field controls of existing data, updates of current statuses, general data management, obtaining new data or serve as a base for decision-making. Because the application is a web-solution all data is always accessible to all users in real-time. Not only from mobile devices but also from desktop PCs in the office. LBS-Mobile is independent of proprietary formats and ensures smooth data exchange to and from a wide range of sources and other programs. 4 Centimeter-level precision In order to increase the accuracy of the built-in GPS-receiver in smartphones and tablets, a method has been developed to connect a high-end survey GPS-receiver to the mobile device. Instead of using the internal position the external one is considered which can be measured with an accuracy of less than 5 cm. This results in a significant increase of the data quality. 5 Future prospects The current development of cheaper and lighter GPS-receivers (such as Piksi [2]) will result in a more wide-spread availability of precise positioning and enhance the quality location-based services. The targeted improvement in indoor-positioning will equally contribute to a significant growth of application possibilities for location-based services. References [1] Schiller J., Voisard A., Location-Based Services, 2004, Elsevier Inc. [2] swift-nav.com/piksi.html

Dynamic Deformation Monitoring Based on Wireless Sensor Networks

Yaming Xu, Jianguo Zhou and Peng Zhang (China, PR)

Key words: Deformation measurement; Engineering survey; deformation monitoring; wireless sensor networks; data acquisition; data processing

SUMMARY

As one of the most important technologies in the 21st century, the emergence of wireless sensor networks (WSN) has brought both opportunities and challenges for the development of deformation monitoring. Compared with traditional deformation monitoring techniques, deformation monitoring systems using a large number of low-cost sensor nodes, can get rid of cable shackles and achieve wireless, multi-hop and long-distance transmission of monitoring data, thus having advantages in automatic, continuous and real-time deformation monitoring. However, there still exist limitations of sensor nodes in computing power, storage capacity and bandwidth. The present article reviews data acquisition and data processing techniques in deformation monitoring based on wireless sensor network. In terms of data acquisition, the paper focuses on the following issues: how to choose nodes, sensors, and software systems to meet the needs of monitoring tasks; the influence of time jitters within and between nodes in data sampling and methods for time synchronization; the issue of data compression because of the large amount of data caused by high-frequency sampling; and the ways to deal with problems of data loss in the wireless transmission process due to environmental interference and other factors. For data processing, firstly the required data pre-processing techniques for acceleration monitoring data, such as static and dynamic tests, temperature calibration, and data de-noising are discussed. Then acceleration monitoring data analysis methods in time domain, frequency domain and modal domain are summarized. In time domain numerical integration is used to transfer acceleration to displacement. Power spectrum density function is calculated based on Fourier transform in frequency domain. As for modal domain, structural dynamics are utilized to identify the structure modal parameters such as natural frequencies, damping ratios and modal shapes.

Design of Real Estate Valuation Information System and Implementation: An Example of Yenişehir, Mersin, Turkey

Mehmet Alkan and Ferihan Ozfidan (Turkey)

Key words: Land management; Valuation; GIS

SUMMARY

It is essential to value real-estates which play a very important role in the economical and social life of man. Land valuation which has gained great importance in our country in recent years has not yet been studied scientifically. Because of this finding different values for a real estate leads to some economical and social problems in property tax, nationalization, purchase and sale and banking. So valuing should be objective, correct and accredited considering the facts of quality, environment and usage conditions. As a result, an information system should be developed that can help a valuation expert to obtain social, legal and technical data on a real estate, reach its location easily and analyze certain information. It is possible to use Geographical Information Systems (GIS) that gather all data according to certain standards analyze them and present them effectively to the user. In this study, a design of system which is likely to help real estate valuation firms and valuation experts in the sector of valuing real estates works efficiently, fast and fruitfully is aimed. Thus, the data which experts need, processing steps in the period of developing the system and software are presented. Then, the data based on appraising is carried out at a region of the Municipality of Yenişehir, Mersin. In the last stage, the data is stored; the inquiry is done on the data which is stored in the system. In this study, with designing system, obtaining the present data is become easier, comparing and checking appraising processes have been provided to valuation experts. In addition, job efficiency and improvement of success are presented to firms and valuation experts.

Life–Cycle Maintenance Cost Implications of Heritage Properties: Valuation Challenges and Opportunities for Further Research

Simon Forbes, Tim Goodhead and Cletus Moobela (United Kingdom)

Key words: Land management; Professional practice; Valuation;

SUMMARY

The valuation of land and buildings or real estate has come a long way in terms of advancements in the development of valuation techniques. The roadmap to the existing practices and techniques in the profession has however been hampered by a multiplicity of challenges. For example, the lack of transaction information which characterises real estate markets makes value estimation all the more critical. These challenges are perhaps more pronounced in the valuation of heritage properties than in other real estate assets. The valuation of heritage properties requires careful consideration of a multiplicity of factors that can take into account the importance of these properties, such as long term maintenance needs and the various restrictions on alterations. The costs of restoration and maintenance are not only long-term in nature, but can also be astronomical and these costs will obviously affect the value of the properties. Moreover, it is quite common for heritage real estate to be used commercially, thereby raising the need for a cash flow based type of value assessment over and above the intrinsic ‘heritage value’. In view of these complexities, this paper focuses on the valuation of heritage properties, with particular reference to their long-term life-cycle maintenance costs and their implications for the valuation of these properties. This is achieved by scanning through the existing techniques in the valuation of heritage properties so as to highlight their shortcomings and suggest areas for improvement. In addition to the review of the literature, the authors also sought to validate the findings by conducting a qualitative survey of a selection of valuation professionals who had previously had an opportunity of valuing heritage properties.

Speckle Modeling and Turbo Filtering of PolSAR Images

Souhila Boutarfa, Lynda Bouchemakh and Youcef Smara (Algeria)

Key words: Geoinformation/GI; Remote sensing; POLSAR images; speckle modeling; speckle filtering; Turbo filter; refined Lee filter; wavelet filtering; SWT.

SUMMARY

SAR polarimetric radar images are affected by a granular noise called speckle, which degrades the quality of these images and makes it difficult to interpret. That is why a polarimetric filtering is essential. The diagonal terms of the covariance matrix C represent the intensity of the linear polarization and can be characterized by a multiplicative noise. The off-diagonal terms contain a noise that cannot be characterized by a multiplicative or additive model. In this paper, we are interested in modeling the speckle in the off-diagonal terms of the covariance matrix C and filter these terms with adjusting the filtering method already developed for the diagonal terms. Therefore, our objective is to adapt the filtering method called Turbo to filter PolSAR images containing noise that is not multiplicative or additive. The principle of Turbo filter is that it combines two complementary filters: the refined Lee filtering based on the estimation of the minimum mean square error MMSE and the wavelet filtering by using the stationary wavelet transform SWT. One filter can boost up the results of the other. We propose to optimize this method by adding a parameter in the calculation of the threshold in the wavelet filtering using multi-scale edge detection and the technique for improving the wavelet coefficients called SSC (sum of squared coefficients), this parameter will control the filtering effect and get a good compromise between smoothing homogeneous areas and preserving linear structures. The advantage of this algorithm is to use the advantages of both filters and to obtain images with well reduced speckle and filter all the elements of the covariance matrix, taking into account the noise type of each component. Visual and statistical evaluation and a comparative study are performed to validate the obtained results according to the following criteria: best filtering in terms of smoothing homogeneous areas, preserving edges and conservation of the polarimetric information

Full Automatically Generated True Orthophotos and Sensational Dense Matching Techniques in Cadastral Applications: Innovative Improvements of Surveying

Martijn Rijdsdijk (Netherlands)

Key words: Cadastre; Cost management; Engineering survey; Geoinformation/GI; Land management; Laser scanning; Low cost technology; Photogrammetry; Spatial planning;

SUMMARY

In the verification of cadastral and topographical borders, it's not always easy for surveyors to do their measurements. Sometimes it's difficult or impossible to enter these locations because of obstacles, safety reasons next to railways or bad entries like waterways. To improve the efficiency and effectiveness of the surveying process in the Netherlands an experiment was set up by the dutch Land Registration and Mapping Agency to use photogrammetry techniques which refrains from conventional terrestrial methods. In a novel approach the verification process relies on recent and accurate aerial photographs of the topographic situation of the parcel(s) involved, which show sufficient details and have a measurement precision of 3 centimeters or less, which is in fact really sensational. In these aerial photographs Kadaster verifies borders by software full automatically. Next to reaching agreements between owners, these pictures can subsequently be used to measure the cadastral borders with high accuracy. Subsequently, a commercial service provider for unmanned aerial photography based services was hired to generate a set of aerial images along the new railway between the cities Kampen and Zwolle, which resulted in automatically generated True Orthophotos. During this experiment Kadaster has build lots of experiences with Dense Matching Techniques, cameras used, the photo collection plan, the usage of ground control markers and the calibration of the camera's. Furthermore experiences of the different used SFM software packages (Visual SFM/Bundler, PhotoScan, PhotoModeler and the Orbit software) is improved. The current conclusion of the still on-going experiments with the data, it has proven to be possible to produce automatically True Orthophotos with a geometric accuracy of 3cm, which is very promising for cadastral usage, making Digital Terrainmodels. Additionally, borders that are indicated on high resolution pictures can be indicated with at least the geo referential precision that is provided by conventional terrestrial surveying methods. However, further research is going on, on numerous areas. Results in tests with change detection methods in 3D pointclouds will be expected in December, costs of the new approach in comparison with conventional terrestrial process has to be determined , procedures for operational application of the methodology have to be established, just to name a few.

The Geodetic Infrastructure Management via Web–Based Mapping Technology in Morocco

Moha El-Ayachi, Khalid El Hajari, Said Alaoui and Omar Jellabi (Morocco)

Key words: Geoinformation/GI; Professional practice; Spatial planning; infrastructure; web mapping; spatial data

SUMMARY

The geodetic infrastructure is a backbone of spatial data related to various projects such as cartography, cadastre, territorial management, navigation, and urbanism. For many surveyors, the traditional ways of managing the geodetic infrastructure is time and cost consuming. The value of the web mapping technology is to illustrate for the professionals and customer the effective way on the quick dissemination and sharing of collected data. This paper has the goal to establish an analysis of the value of the web-based mapping technology in the improvement of the geodetic infrastructure for professionals in Morocco. A study of the current circumstances has been carried out to be aware of the real shortcoming that causes delays in many development projects. An online user friendly platform has been designed and developed to meet the new requirements in terms of spatial data integration, information sharing and dissemination, and metadata generating. The new solution will be discussed to assess the benefit of such product in the enhancement of the geodetic infrastructure management.

Developing Conflict Resolution in Highway and Railway projects in Finland – Perspective of Real Property Owner

Seija Kotilainen (Finland)

Key words: Land management; Land readjustment; conflict resolution, highway, railway, land management, real property owner

SUMMARY

The paper gives answers to the question, which are the objects of development in the land management activities of highway and railway projects in route projects, when we look these projects from the viewpoint of real property owners. It presents main conclusions from my doctoral thesis, which I did in Finnish. Results of the study show that objects of development are associated with participation possibilities, also prevention and resolution of conflicts. In different functions during adjustment phase, like with need analysis and with adjustments of private roads and parcels, a real property owner should have possibilities of participation. Notice methods of preliminary and final engineering plans should be unified, so that all real property owners are ensured possibilities to participation. Real property owner should also have right to participate in negotiations, by which is formulated the method to compensations – either a settlement or a decision of an authority. Right compensations are not enough. Conflicts could be prevented by actions which support confidentiality and possibilities to negotiations and to discussions. With taking possession phases of highway and railway projects, a real property owner himself or herself should present the property expropriated. Legislation should be amended, so that a decision of an authority posted to a real property owner should be enough in those cases, when it is question fo giving an expropriation decision and a notice. Real property owners think that the route project is an entirety. Therefore, conflict resolution should base on holistic approach. If there are no possibilities to resolve conflict in one function, the body that is responsible for this function should be obligated to change hands with other arena, for instance with meditation. This means there should be no more conflicts in wrong places, which should not have an arena of management. In the future, the use of different and new methods of conflict resolution should be promoted. The perspective of the study is new, not been studied in Finland. Research methods consisted of social sciences, which is quite unique in the field of land management researches.

The New Face of the Informal Land Tenure Management in Morocco

Lahcen Bouramdane, Moha El-ayachi, Mohammed Oubaha and Younes Boulaghrad (Morocco)

Key words: Land management; Legislation; informal;land tenure;demarcation

SUMMARY

In Morocco, the informal land tenure was subjected to the Islamic law and local customs and rules until the endorsement of the new law on May 2012. The new law aims the enhancing land governance by supporting greater fairness, participation, efficiency and accountability in decision making over land access, use and dispute resolution. The new law stipulates that any owner may induce his neighbors to demarcate the boundaries of their contiguous properties. The demarcating expenses are shared between the parties. Since the law has been enacted, its implementation was delayed for various reasons and challenges. This study has the aim to develop a new scheme for setting up an implementing approach of applying the new law. A comparative study of the two land demarcation systems is presented. Two scenarios have been discussed and consist of creating a new public institution or empowering the national council of licensed surveyors to manage the informal land tenure. A sequence of achievement mechanisms has been illustrated to enable decision makers to carry out the new enacted law disposals.

Disaster Risk Maps for Gender Empowerment in Disaster Management

Lalitya Narieswari, Sri Lestari Munajati and Mone Iye C Marschiavelli (Indonesia)

Key words: Risk management; Spatial planning;

SUMMARY

In Indonesia, the involvement of gender issue and women empowerment in disaster management is almost never been considered and, moreover, spatially assessed and visualized. This study aims to present two influencing factors of disaster management from gender-related point of view. They are gender-related vulnerability and gender-related risk. Bantul Regency in Yogyakarta Special Province, an area which is very vulnerable of natural hazard such as earthquake, tsunami, and volcanic eruption, was chosen as the study area. The study produced questionnaires, weighting and scoring methods to determine gender vulnerability. The results then further processed with gender capacity and natural hazards to generate thematic maps: gender vulnerability map, gender capacity map and gender disaster risk maps (of earthquakes, tsunamis, droughts and floods). By visualizing spatial information, such maps are expected to be a guideline when the government needs to strengthen and involve gender in disaster management in disaster high-risk areas.

Improvement of Effectiveness – Present Developments in Hungarian Land Administration

Gyula Iván and András Oskó (Hungary)

Key words: Cadastre; Digital cadastre; e-Governance; Geoinformation/GI; Land management; Professional practice;

SUMMARY

New Act on Surveying and Mapping Activities in Hungary (adopted by the Hungarian Parliament on 7th May 2012, came into force on 1st January 2013) has generated a lot of tasks and opportunities in the development of Hungarian Land Administration. Maintenance, development and operation of Land Administration databases and IT systems became the responsibility of Institute of Geodesy Cartography and Remote Sensing (FOMI), independently from their physical place. FOMI became the National Archive of Land Administration and Geoinformation Data. New Act introduced 3D Cadastre, which is one of the greatest challenge in the future. In accordance with the new legal framework several projects have been established related to the changes. The paper deals with these new projects, developments, solutions, which drives to a better performance and effectiveness of Hungarian Land Administration.

Registration and Time Updating of Objects in Public Registers and Impacts of These Operations on Spatial Data Integration for the Needs of Creation of the Spatial Information Infrastructure and the Multi-Dimensional Real Estate Cadastre.

Ludmiła Pietrzak and Andrzej Hopfer (Poland)

Key words: Cadastre; Digital cadastre; e-Governance; Spatial Information Infrastructure, cadastre model, multipurpose cadastre, multi-dimensional real estate cadastre

SUMMARY

Nowadays, in the era of computerisation of various public, and not only public resources, databases of spatial objects have been created for many years, together with assigned attributes. The importance of assigning meaningful and sufficient attributes was not always assumed. It turned out after many years of creation and maintenance of parallel spatial registers, that the majority of them became the public registers and their parallel existence in space, one beside another, must have coincided in one place and must have been integrated. Many countries in the world are at the stage of integration of such public registers; other countries have not considered these issues yet, but they are planning to solve this problems in the future, creating such registers every day. It turns out after deep and wide analyses of created public registers, that it is not possible to integrate them without deep manual interventions, concerning particular objects in these registers. The authors of the paper perform the analysis, which attributes should be assigned to spatial objects at the stage of their generation, in order to allow for their integration, without the necessity of the deep manual intervention, what would also allow for creation a reliable spatial information infrastructure and the multipurpose cadastre, while minimizing financial inputs.

Mind the Gap! Possible Pitfalls of the Social Tenure Domain Model Based on Experience from the Innovative Tools to Secure Land Rights in Ghana Project

Eric Yeboah and Mark Kakraba-Ampeh (Ghana)

Key words: Land management; Security of tenure; Social Tenure Domain Model; Innovative Tools Project; Land Tenure Security; Ghana

SUMMARY

The Social Tenure Domain Model (STDM) represents a significant breakthrough in the search for a pro-poor and flexible approach to secure land rights and improve land administration. Conventional approaches for securing land rights such as land titling have often failed to accommodate the multiplicity of rights and interest which often run currently over a given piece of land. On the other hand, customary institutions and tenure practices which govern land in Sub-Saharan Africa and elsewhere continue to buckle under the pressures of land commoditization, urbanization, rapid population growth and continuous integration of the customary and informal sector into the global economy. There is therefore a disconnection between the formal and customary/informal ends of the continuum which the STDM seeks to bridge. The STDM is not a finished product yet. Therefore, Christian Lemmen was right when he suggested to the pessimists ‘not to start saying why the STDM implementation is impossible because of existing legislation or because of existing institutional settings’ (Lemmen. 2010, p. 14). Rather, all stakeholders have been challenged ‘to start thinking how STDM could be implemented to represent all ‘people – land’ relationships, which can be observed in a community’ (Lemmen. 2010, p. 14). This paper attempts to respond to the latter call by sharing experience from the ongoing Innovative Tools to Secure Land Right in West Africa Project. The objective of the Innovative Tools Project is to build on existing customary institutions and structures to improve tenure security for all with special attention for those whose land rights are often vulnerable such as women. The Project is being implemented in Ghana and Mali with the International Institute for Environment and Development as the Coordinator. Through continuous engagement and consultations with stakeholders, the Project has developed models and templates to facilitate spatial documentation of customary land rights as well as customary/informal land transactions to enhance tenure security and improve land administration. The Project thus shares striking semblance with the STDM both in design and aspirations. The objective of the paper is to share insights from this Project in order to prompt stakeholders of some of the likely practical challenges which may arise during the implementation of the STDM. Strategies to address the identified pitfalls have accordingly been offered. Reference Lemmen, C. (2010) The Social Tenure Domain Model, a pro-poor land tool. Copenhagen: FIG Publication 52

The Requirements Framework for Location of Urban Regeneration Areas: Case Study of Trabzon Industrial District in Turkey

Ridvan Ertugrul Yildirim, Ali Erdem Ozcelik, Ebru Colak and Recep Nisanci (Turkey)

Key words: Land management; Spatial planning; Urban renewal; Urban Development; urbanization.

SUMMARY

Today, because of the population growth, the tendency on cities and urbanization increase gradually. Depend on these tendencies, the requirements of planning and location of the settlements and facilities areas on cities are came up with the migration from rural areas to urban areas. In this process, in addition to physical and environmental factors especially the socio-economic factors should be regarded as main component of sustainable urbanization. And also sustainable policies for urban development created by local governances have an effective role. Furthermore, determination of the urban development areas through the cities, land use and land cover structures are required as well. However, both the industrial areas, seaports, airports and the settlements, facilities areas are located in core of the cities even if without sub-scale urban land use planning. So these areas have to be re-allocated with urban regeneration projects to support for better urbanization. Based on the evaluations mentioned above, this paper outlines the requirements and criteria for location of urban regeneration areas. And also it is comprised to some approaches for integrated urban regeneration projects for provide the sustainability. For this purpose, the light industrial district of Trabzon city is determined as study area. Firstly the current location of this area is evaluated. And following, the physical and socio-economic structure of this area is investigated according to city development. As a result, it is underlined the regeneration of this industrial areas as a priority with respect to other urban facility areas in Trabzon.

Development Of Multi–Purpose Cadastre in Sabah

Safar Untong (Malaysia)

Key words: Cadastre; Digital cadastre;

SUMMARY

The integration of the Land Title Information System, the Digital Cadastral Data Base, the Valuation and Land Acquisition Data base and the Digital Sabah System in the Department of Lands and Surveys is the main framework for development of a Multipurpose Cadastre Model for Sabah. The legal, cultural and the physical information of any land parcel could be easily available on a single common platform. The Integration of these accurate up-to-date text, vector and raster data sets over 3D Digital Terrain Model (DTM) has provide an effective tool for the Sabah Lands and Surveys Department towards a more efficient administration and management of land in Sabah.

Preliminary Study of Modeling the Precipitable Water Vapor Based on Radiosonde Data

Ilke Deniz and Cetin Mekik (Turkey)

Key words: GNSS/GPS; precipitable water vapor; radiosonde

SUMMARY

GNSS meteorology is the determination of the water vapor content of the troposphere from Global Navigation Satellite System (GNSS) data. Moreover, the water vapor content is estimated from the techniques such as water vapor gradiometers, solar spectrometers, radiosondes, and lidars. Unlike GNSS, these techniques are expensive and their spatial and temporal solutions are weak. In addition, they cannot work in all weather conditions and have limited range of global coverage. Thus, GNSS has become an indispensable tool for providing the water vapor content in climate and meteorological studies. One of the applications of GNSS is the estimation of the tropospheric zenith delay derived from ground-based GNSS data. The estimated tropospheric zenith delay is then used for the determination of the water vapour. For this reason, Askne and Nodius (1987) have developed the equation of the index of refraction. Water vapor is estimated from the wet part of the tropospheric zenith delay. There are two models to map the wet tropospheric zenith delay onto the precipitable water vapour: Tm model and conversion factor Q. In this study, another regional Tm model is developed using a radiosonde analysis algorithm which can determine the transformation parameters between the wet tropospheric zenith delay and the precipitable water vapour. The outcomes of the algorithm are the weighted mean temperature, the wet tropospheric zenith delay, and the precipitable water vapour. The wet tropospheric zenith delay and the precipitable water vapour acquired from the algorithm is compared with the wet tropospheric zenith delay and the precipitable water vapour derived from the data of continuous GNSS stations to check accuracy and reliability of these parameters and the algorithm.

Analyses of the Results of Land Consolidation Studies by GIS

Fatih Iscan (Turkey)

Key words: Land consolidation; GIS; landholding; planning; spatial analyse

SUMMARY

Rural development generally refers to the process of improving the quality of life and economic well-being of people living in relatively isolated and sparsely populated areas. Rural planning is the type of planning which solves physical, economic and social problems in rural areas. The first goal of the rural planning is economic development which will be revealed to the enhancement of agricultural production. Land consolidation is one of the most important steps in finding solutions to the problems of rural development. Land consolidation studies are being carried out in most country of the world for increase productivity and provide sustainable production. Putting into practice of land consolidation projects as soon as possible is depend on the collecting and processing the data required for planning stage in a short time and properly. In addition, evaluation of the results of land consolidation projects is very important. There is a great necessity to have numerical and alphanumerical information and to have accelerated working without error in order to carry out land consolidation works. Therefore, a Geographic Information System for land consolidation studies should be established such complicated framework. So that, all information can be accessed readily, related to each other analysed efficiently. In this study, it is tried to find out whether it is possible the analyses of land consolidation results and planning studies, which is one of most important phase of land consolidation studies using Geographic Information System techniques. Study was carried out in Gumusgun village of Isparta-Gönen district. Land consolidation data which are graphical and non-graphical were transferred to the ArcGIS software. Spatial analyses and queries on land consolidation were carried out using geographical information system. Spatial analyses and queries were chosen as follows: The number of parcels and shares, areas of parcels, parcels owned landholdings, landholdings maps, the number of parcels in the agricultural block, areas of agricultural blocks, the creation of thematic maps,..etc. According to the results, the use of geographical information system for Land Consolidation has led to convenience and speed in these studies. Also, the geographic information system is very helpful in making decisions on planning practitioners.

The Influence of Single Criteria Based Valuation to the Land Evaluation in Land Consolidation Projects

Fatih Iscan and Tayfun Cay (Turkey)

Key words: Valuation; land consolidation; land evaluation; land index

SUMMARY

Land consolidation is a procedure of new arrangement of agricultural parcels or their parts in a selected area. Land consolidation is used for specific purposes according to different conditions in the agricultural, economic, environment and economic sphere in each country. The land consolidation applications were begun in 1961 in Turkey. It is applied by General Directorate of Land Reform based on No: 3083 law in land reform area. In the others areas it is applied by Special Provincial Administration based on 2009 land Consolidation Regulation. There is no specific Consolidation Law in Turkey. The applications are made according to the Land Reform Laws and establishment laws, related rules and regulations of some related institutions. In Land Consolidation Projects, land evaluation is one of the most important phase. The aim of evaluation is to obtain the land values according to the certain criteria's. In Turkey, the land evaluations of land consolidation applications are made according to Land Consolidation Regulations in Special Provincial Administration and Land Consolidation Technical Rules in General Directorate of Land Reform. It causes important differences in these institutions. According to General Directorate of Land Reform, all parcels in project areas are marked related to market value indexes and soil indexes. According to Special Provincial Administration, Parcels which are located in consolidation areas are ranked for computed transformation values. Land index is obtained from soil index, productivity of the soil and location index. Each of these criteria increases duration and cost of the project. In addition, the confidence of farmers in land evaluation should be increased. In this study, market value index, soil index, productivity of the soil and location index, which affect land evaluation in land consolidation projects, were examined in Kizik village of Karaman Province in Turkey. Additionally, the effects of each index to the land consolidation projects have been investigated in the way of cost, duration and reliability.

Monitoring of Local Deformations in North Borneo

Mohamad Asrul Mustafar, Wim J. F. Simons (Netherlands), Kamaludin Mohd Omar (Malaysia) and Boudewijn A. C. Ambrosius (Netherlands)

Key words: Deformation measurement; GNSS/GPS;

SUMMARY

Large parts of SE Asia are located on the Sundaland block, a tectonic entity that appears to move independently from the Eurasian Plate. The island of Borneo is also considered to be part of the Sundaland block along its eastern margin. In North Borneo, the highest mountain in South-East Asia is situated: Mount Kinabalu with a height of ~4100 meters. As a result of past tectonic activity the mountain is considered to be still rising with a long term rate of about 0.5 mm/yr. However North Borneo also does seem to be still deforming in a different way. The North Borneo region appears to be actively deforming and might actually be separating from the rigid part of the Sundaland block. Deformation of western parts of North Borneo appears to be driven by gravity gliding due to frontal fold-and-thrust belts. However, north-west of North Borneo is exhibiting different deformation patterns and the driving forces behind it are still part of an already long-lived scientific debate. Global Navigation Satellite Systems (GNSS) are a great tool to study crustal motion and deformations in detail. Since 2007, the Department of Surveying and Mapping Malaysia (DSMM) have established additional continuous GNSS stations along the coastal area of North Borneo. The primary limits in previous researches were due to the lack of sufficient CGNSS station coverage in the area. Also in order to study the present (relatively small) deformation patterns, a sufficiently long time data span is needed. Therefore this region provides a great opportunity for an enhanced study of local deformation as already a three-year time span of GNSS data has now become available. Absolute and relative baseline positioning was used to analyze deformation in horizontal and vertical components. Our first strain rate analysis provides significant results in horizontal deformation. Surprisingly, analysis of the vertical GNSS displacements also appears to show some unexpected results.

Evaluating Geospatial Aspects of the Three–Stage Approach in International Maritime Boundary Delimitation: A Case Study of Indonesia–Malaysia Maritime Boundary in the Malacca Strait

I Made Andi Arsana (Indonesia)

Key words: Hydrography; Marine cadastre; maritime boundary delimitation; law of the sea; three-stage approach

SUMMARY

Pursuant to the United Nations Conventions on the Law of the Sea (Law of the Sea Convention, LOSC), a coastal State is entitled to maritime zones of jurisdictions measured from its baselines. Due to geographical configuration of the world, a coastal State needs to share maritime areas with its neighbours through maritime boundary delimitation. Recent developments in international maritime boundary delimitation introduce a new approach called the three-stage approach. This new approach consists of three steps which are constructing provisional line, adjusting such provisional line by considering relevant circumstances, and conducting disproportionality test to ensure that the result does not cause unnecessary inequality. Legally, the three-stage approach has been widely accepted and implemented in several maritime boundary delimitation cases decided by the International Court of Justice (ICJ) and International Tribunal for the Law of the Sea (ITLOS). The approach has been generally viewed as bringing higher level of certainty in maritime boundary delimitation process compared to the previous ones, such as the two-stage approach. This paper is aimed at evaluating geospatial aspects of the three-stage approach to investigate how the approach can be implemented to facilitate maritime boundary delimitation in different cases. For a case study, maritime boundary delimitation in the Malacca Strait between Indonesia and Malaysia was analysed. It was found that with the three-stage approach, there is now a clear guideline for States and the Court to follow in maritime delimitation in the future. However, in following the three steps there are sources of uncertainty such as the use of types of baselines in constructing a provisional line, the role of coast length ratio in adjusting such provisional line and the absence of specific procedure in the disproportionality test. These findings can serve as a significant contribution to improve the approach for maritime boundary delimitation process that is easier to follow with more objective procedure to duplicate in different cases in the future.

3D Laser Scanning to Detect Property Encroachment

Victor H. S. Khoo, Eric Low and Zhen Hao Ng (Singapore)

Key words: Cadastre; Laser scanning;

SUMMARY

3D laser scanning technique employs the LiDAR (Light Detection and Ranging) scanner to capture millions of data points of a real-world environment in 3 dimension (3D), allowing users to view that environment virtually. The data points are known as point clouds which can be used to produce accurate and realistic 3D maps/models for use in a variety of applications including surveying, mapping, engineering, monitoring and investigations of crime/accident scenes etc. The major advantage of this surveying technique is that it facilitates high accuracy, high resolution, complete and detailed 3D data acquisition of objects and environment rapidly. Property encroachment is the situation which occurs when a structure is built in whole or in part on a neighbour's property. It may be the result of incorrect surveys, or mistakes or miscalculations by builders or owners when erecting a structure. Traditionally, the survey work processes to detect encroachment is tedious and the plan created is not easy to visualise. This paper describes the usage of 3D laser scanner to capture accurate 3D point clouds data and to detect encroachment. Point clouds data collected will be overlaid with existing cadastre boundary GIS data for better understanding of the encroachment and better decision making.

On the Transition to the New Swedish Height System RH 2000

Christina Kempe, Linda Alm, Fredrik Dahlström, Lars E. Engberg and Jakob Jansson
(Sweden)

Key words: Reference frames; levelling network; reference frame implementation

SUMMARY

Sweden consists of some 300 municipalities, all of them more or less having used their own unique height system. A new national height system, RH 2000, was implemented in 2005 by Lantmäteriet, the Swedish mapping, cadastral and land registry authority. Most of the municipalities are now changing to use the national height system also locally, to make more efficient use of GNSS in their own organisation and to harmonise their data with the existing regional and national data. In this process, Lantmäteriet provides re-adjustment of the old local levelling networks in the new national RH 2000 frame, possibly with some supplementary measurements accomplished by the municipality. The presentation will describe this transition process, seen in the light of the municipalities being self-governing to a large extent and Lantmäteriet, the national geodesy authority, only having an advisory role.

Current Developments in the HCU Mobile Mapping Systems and Its Use in Research and Teaching

Friedrich Keller, Sören Leitz, Steffen Kagerah, Gordeon Thie and Harald Sternberg (Germany)

Key words: Education; Laser scanning; Photogrammetry; Positioning; Young surveyor; Mobile-Mapping

SUMMARY

At the HafenCity University a mobile mapping system has been developed in recent years. Consisting of an inertial measurement unit (type: IMAR RQH-1003), a GNSS receiver (Novatel OEMV-2), an odometer and a terrestrial laser scanner (Z + F IMAGER 5010), it is used in various fields. From the very beginning the installation of the system on different types of vehicles was in the foreground. So it can be mounted inside the building on a trolley or outside on various motor vehicles or ships. This versatility is made possible by a modular construction of the instruments. The central module here is the IMU, which is fixedly connected to the module carrier. It forms the center of the measuring system, both topologically and geometrically. This year, the measurement system has been extended by two digital cameras (Point Grey Flea3) and two profile scanner (Sick LMS 151). Due to the easy expandability and versatility of the system, a variety of current research issues around MMS can be edited. Exactly these questions reflect the trend towards the kinematic and thus faster surveying. The system is actively used in research-based learning so that students and young researchers are able to participate on this trend. The results of several theses are presented here in summary: The basis for the following thesis has been given in the master's thesis "Evaluation and calibration of a mobile mapping system". The calibration method developed in this study was taken up and examined in detail in the bachelor's thesis "Review and further development of the calibration of a mobile mapping system". For the extension of the system with two cameras, a master's thesis "Investigations of trajectories with the stereo camera system" has been developed which deals with the topic of automatic registration of image data. Furthermore the bachelor's thesis "Generation of 3D point clouds from image data of a mobile mapping system" serves to automatically generate point clouds from the acquired image data using the 'structure from motion' principle. Based on this work, the use of modern measuring method and system in research-based learning is shown as an example.

Post–Conflict Land Administration as Facilitator of the Post–Conflict State Building; Case Cambodia

Dimo Todorovski and Paul van der Molen (Netherlands)

Key words: Cadastre; Land management; Security of tenure; conflict, post-conflict, land administration, state building, Cambodia

SUMMARY

Challenges that land administration faced during the conflict and in the post-conflict period deserve deeper exploration, specifically the role that land administration had in the overall process of post-conflict state building in the case of Cambodia. Cambodian history witnesses many conflicts in the past, the Khmer Rouge regime (1975-1979) is considered to be the one of the most homicidal and authoritarian regimes in the present history. There are estimations that two million people died in horrifying circumstances and destruction of all existing state infrastructure and state archives occurred in this period. During the Khmer Rouge era, money and salaries have been abolished, schools and factories were closed, monasteries and churches forbidden. Citizens of Phnom Penh were deported in the rural areas but also residents from other cities and rural population were systematically dislocated from their properties. These events had big effect on the Land Administration in the country. All land-related documents, including the land register, maps and geodetic networks were systematically destroyed as well as most of professionals and educated people eliminated during the tragic 1975-79 period. During the Khmer Rouge regime the private ownership was abolished and remained unrecognized also during the following 10 yearlong Vietnamese government. After the Vietnamese occupation ended the private land ownership was re-introduced. Unfortunately there were technical, financial, organisational and legal constrains to implement the old fashion and paper based land registration. This resulted with only 10 % of registered privately-possessed parcels in the period until 1998. In mid and late 90's the Kingdom of Cambodia identified land sector as very weak point of its performance. At that time and until nowadays Cambodia is considered as agricultural country where land plays one of the mayor roles for everyday life of 80% of its population. Since then a lot of efforts capacities and resources are dedicated on development of this fundamental state function. Development of land and land related issues like land policy, land administration and management etc. were and still are supported by development partners, the Governments of Germany and Finland. Characteristics of war-torn societies are: weak institutions, economic and social problems and low security. These characteristics were also present in post-conflict Cambodia. Developments that were evident in the land sector helped tackling at least two of these characteristics; they contributed towards strengthening the institutions and to the economic and social development. All this suggests that land administration could be seen as a facilitator of the overall process of post-conflict state-building.

Securing Land Rights for Broadband – Land Acquisition for Utilities in Sweden

Marija Juric and Kristin Land (Sweden)

Key words: Cadastre; Land management; Security of tenure; broadband; land acquisition; utilities; cadastral procedure; Sweden

SUMMARY

The European Commission's Digital Agenda presents a strategy and goals for the growth of the European Union by the year 2020 in order to better exploit the potential of information and communication technologies (ICT). One of the goals is fast Internet access for all, and the Commission intends to use common funds to finance this investment. Although broadband access is generally good in Sweden, there are still thousands of households and businesses lacking access to such facilities. As a sparsely populated and outstretched country, Sweden requires a certain customer base for profitability regarding broadband. Nevertheless, the demand is as high in rural areas as in other parts of the country, and both Government and private actors make costly investments in ICT infrastructure. The Swedish broadband strategy states that, in the year 2020, 90% of all households and businesses shall have access to broadband with a transfer rate of at least 100 megabits/second. In most cases, it is about rolling out fibre optics based broadband throughout the countryside. In this respect, it is important to discuss how land issues can be resolved at an early stage of the development. Since many property owners will be affected, land acquisition processes may take substantial amounts of time, and it will also be costly to establish the utilities needed especially in remote areas. Hence, such rights to land need to be secured for a long time and in a sustainable way for the future. In Sweden, there are different ways to acquire land for broadband purposes. It can be achieved through an agreement between the parties involved, or through an official right (utility easement) created by a cadastral authority. The latter way implies that Lantmäteriet (the Swedish mapping, cadastral and land registration authority), or a municipal cadastral authority, secures necessary access to land and decides about economic compensation. Being a formal cadastral procedure, the result is registered in, and thereby made official to the public through, the Real Property Register including the Cadastral Index Map. This paper presents the different ways of land acquisition for broadband in Sweden, and discusses the pros and cons of those methods. Focus is on the cadastral procedure for creating utility easements, as that method is getting increasingly popular.

New Technologies for Cadastral Systems

Brent Jones (USA)

Key words: Cadastre; Cartography; Digital cadastre; Implementation of plans; Informal settlements; Land distribution; Land management; Land readjustment; Low cost technology; Property taxes; Security of tenure; Spatial planning; Valuation;

SUMMARY

New Spatial Technologies for Cadastral Systems New spatial technologies are available for cadastral systems. In the past, complex, custom developed software systems were the norm. Now there are dramatic advances that enable new ways to think about developing sustainable cadastral systems. These new capabilities fit for formal systems and also for documenting customary rights and uses. Although it may be counter intuitive to think of using cloud-based systems, these systems are leveraging low-cost devices in challenging environments. Mobile devices have lowered the barrier of entry in both cost and capacity and created new opportunities with data collection and crowd sourcing data. Many of these technologies may appear on the surface as unrealistic in many parts of the world because of poor connectivity, remote locations and high cost. But with new geographic information system (GIS) technology and working with lightweight, inexpensive tools such as android phones and in the cloud in a disconnected environment, it becomes a reliable, scalable mapping/cadastre platform to support a wide range of activities along the continuum of rights. This presentation will detail the new spatial technologies available and easy-to-use, cost-effective and scalable deployment schemes.

Harnessing Crowdsourced Data Through Spatial Data Infrastructure for Disaster Management

Arie Yulfa (Indonesia)

Key words: Geoinformation/GI; GSDI; crowdsourcing; spatial data infrastructure; disaster management.

SUMMARY

Indonesia is the prone country against natural disaster and non-natural disaster. Since the last ten years, there are several disaster events in Indonesia for example Aceh earthquake and tsunami, Padang earthquake, Mentawai tsunami, avian flu, Yogyakarta earthquake, Merapi-Yogyakarta volcano and Jakarta flood. In national regulation number 24 issued in 2007, it mentions seven types of natural disasters which are in the form of earthquakes, tsunamis, volcanoes, floods, droughts, hurricanes, and landslides. For non-natural disaster, it groups in to four categories which include the technology failed, failed modernization, epidemics, and outbreaks of disease. After the disaster, the main issues that emerge are providing and sharing data for disaster management. What data are needed? Who will provide it? How to share the data? These questions are hardly to answer for developing country like Indonesia. This paper is aimed at finding possibilities to solve those questions by utilizing spatial data infrastructure and crowdsourcing concepts. These methodologies are proven to solve those questions in which the abilities of spatial data infrastructure can manage data sharing and the crowdsourcing can harness data from people.

Aboriginal Corporations as a Response to Poverty and Land Claim Settlements

Richard Grover (United Kingdom)

Key words: Land management; restitution; indigenous people's land rights

SUMMARY

One of the principal causes of poverty amongst indigenous peoples is being deprived of their traditional land, thereby compromising their livelihoods. This has come about by various means, including one-sided treaties, expropriation, and corruption. Typically indigenous peoples have customary or unregistered rights rather than statutory and registered ones. Their livelihoods are at risk from the developments such as plantations, sovereign wealth funds' investment in agricultural land, mineral exploitation, hydroelectricity projects, and tourism. At the heart of the problem is the unwillingness of governments to recognise these communities' land rights and to respect their human rights. In some countries loss of land has led to land right claims, which have been settled through the restitution of land previously taken or equivalent compensation in kind paid. The paper uses case studies from Alaska, Canada and New Zealand. Its main focus is not on the process by which land rights have been recovered, though the paper does discuss these, but how the indigenous peoples have responded to the recovery of their land. The governments in each case have wanted to negotiate with groups rather than with individuals. A consequence has been the transfer of land and property rights into the hands of corporate bodies under the control of tribes. This can be surface rights but also mineral rights or fishing rights. Compensation has also taken the form of surplus government property, often in city centres. An important response of the aboriginal groups has been to create corporations belonging collectively to the community to exploit these property resources, to undertake investment on behalf of the community, and to generate employment. These are often major property companies with investments in offices, shopping malls and housing developments. They have often diversified from being employment generating to selling technical expertise. They can also include equity investments in hydro-electricity generation and oil pipelines across their ancestral lands. In this way, the communities have been able to share in the on-going growth from development and not merely be compensated for loss of land use rights. The paper contrasts their sophistication and commercial acumen with the limited compensation other communities have secured elsewhere in the world for giving up communal assets, but also draws attention to some of the problems which have arisen, such as issues of governance and conflicts of objectives.

Surveying and Geoinformatics Training in Nigeria:Issues and Challenges

Anthony Ilufoye Awoniyi (Nigeria)

Key words: Education; Surveying and Geoinformatics;Training;Challenges;Issues

SUMMARY

ABSTRACT As a result of the revolution in Information Technology (IT), the traditional methods and techniques of carrying out surveying had been greatly revolutionalized to the extent that traditional skill in surveying can no longer meet the challenges of the new world order. Therefore, surveying training in Nigeria has metamorphosed from land surveying into surveying and geoinfortmatics technological training in other to enable Surveyors be digital compliant, fit into the IT revolution and fill the gap created by the revolution. It was found out that prospects of Surveying and Geoinformatics training are numerous, but challenges in Surveying and Geoinformatics profession and education in Nigeria are enormous and need be addressed to enable Nigerian Surveyors harness full prospects in Surveying and Geoinformatics profession in the country. Adequate and effective geoinformation policy for the country will likely provide solutions to the challenges facing the surveying and geoinformatics training in the country.

Determining the Spatio–Temporal Distribution of 20th Century Antarctic Peninsula Glacier Mass Change

Jon Mills, Adrian Fox, Pauline Miller, Lucy Clarke (United Kingdom) and Matt King (Australia)

Key words: Photogrammetry; Remote sensing;

SUMMARY

Mountain glaciers are a major source of 20th Century and current sea-level rise. The Antarctic Peninsula (AP) is best considered a mountain glacier system separate to the continental West Antarctica Ice Sheet and East Antarctica Ice Sheet that has experienced summer warming and an increase in Positive Degree Days over the last half-century. Changes to glacier fronts and ice shelves, as well as glacier acceleration, are well documented but there is almost no data on mass changes for the more than 400 AP glaciers. A current crude estimate is that the AP is contributing to sea-level change at a similar rate to that of other fast-changing near-polar or large mountain-glacier environments such as Alaska. Forecasting the future impacts of the AP ice sheet on sea level will require a much improved understanding of 20th Century and contemporary glacier mass changes. The only current way to quantify these past changes in glacier mass, and hence contribution to sea-level change through loss of grounded ice, is by detailed photogrammetric measurements from historic aerial photography. This ongoing project is therefore using novel photogrammetric techniques to collate accurate measurements of surface elevation change for 50+ glaciers on the AP over a 50 year-time span. The project uses almost entirely unexploited source images with the aim of transforming the AP from being almost unmeasured to one of the best determined large mountain or near-polar glacier systems, and will establish a suite of benchmark glaciers for monitoring future changes. Results to date have used surface elevations from USGS and BAS airborne (1948-2005) and ASTER space-borne (2001-2010) stereo imagery, combined by a rigorous semi-automated least-squares surface matching approach, to determine multi-decadal glacier surface elevation changes in the western AP for a dozen glaciers. All observed glaciers show near-frontal surface lowering and an annual mean lowering rate of 0.3 m/yr during the four decades following the mid-1960s, with higher rates for the glaciers in the north-west parts of the Antarctic Peninsula. Increased lowering of up to 0.6 m/yr can be observed since the 1990s, in close correspondence to increased atmospheric positive degree days. In all cases, surface lowering reduces to zero within 5 km of the glacier front. Higher altitude elevation increases suggest that much of this lowering may have been compensated by increased accumulation and further experimentation is assessing this hypothesis. The project will provide direct inputs into integrated global assessment of current sources of sea-level rise. Moreover, new insights into the climate controls on the AP system and the sensitivities of sub-polar marine and tidewater glacier systems to climate change will be gained. Results will also feed into ongoing modelling activities that are developing projections based on significant assumptions about

recent mass balance in the AP ice sheet, allowing these to be tested, and thereby providing a significant improvement in understanding of uncertainty.

Accuracy of 3D Building Models Created Using Terrestrial and Airborne Laser Scanning Data

Andrzej Borkowski (Poland), Grzegorz Jozkow (USA), Marcin Ziaja and Kazimierz Becek (Poland)

Key words: Laser scanning; Photogrammetry; 3D modelling,; accuracy

SUMMARY

There is a growing interest in building modelling, especially from laser scanning data; 3D models are used in many professional applications, such as urban planning, spatial analysis, inventories of historical and cultural heritage, promotion of tourist places, and Building Information Modelling (BIM). This work presents the accuracy assessment of 3D building models created from combined airborne and terrestrial laser scanning data. The investigation was performed on both heritage and residential building models created from LiDAR point clouds acquired using terrestrial Leica ScanStation 2 and airborne Riegl LMS-Q680i scanners. Terrestrial Laser Scanning (TLS) data obtained with average point spacing of about two centimetres was the primary data used in modelling. For the modelling of building elements that were invisible from ground stations, e.g. roofs, airborne Laser Scanning (ALS) data was used; it was collected with a density of about 12 pts./m². Stitching of TLS and ALS was simplified by transforming both into the same coordinate system. Finally, textures mapping was applied, whereby textures were created from digital images taken with a camera Canon 40D. Modelling was performed semi-automatically using both the commercial software Leica Cyclone, as well as the author's software. While the accuracy of models is affected by many factors, such as scanning data accuracy, TLS and ALS data integration errors, model generalization or textures errors, it is challenging to discover the impact of all these parameters separately. The authors decided to assess the accuracy of 3D models considering the influence of all these factors simultaneously. The accuracy of models was assessed by comparing the coordinates of characteristic points of the models and the corresponding coordinates of these points measured on the real buildings, obtained by using total station Leica TCR407Power. The field-measured points were treated as error-free reference points. In addition to determining the cumulative accuracy of the model estimated in the range between 10 to 14 centimetres depending on the model, the authors attempted to investigate the single impact of several factors such as quality of point cloud registration, matching of TLS and ALS data, intrinsic laser data properties. Some of these factors reveal the features of systematic errors, thus their influence on the accuracy of final 3D models can be removed. In particular, improvement of the model's quality was gained applying the Iterative Closest Point (ICP) algorithm, resulting in better point clouds registration between TLS and ALS data. In this case, a reduction of modelling errors up to a few centimetres was observed.

The Relevance of Cadastre Working Tools and its Engagement for Land Administration Challenges in Delta State of Nigeria.

Thomas Dabiri (Nigeria)

Key words: Cadastre; Cadastre Working Tools; Engagement; Challenges

SUMMARY

The relevance of cadastre working tools in a developing economy is immeasurable. Land Administration has many challenges; cadastre working tools application is to harness the spatial data for land administration and good governance. Automation and integration of the tools with holistic approach in Land Administration is the pathway to positive achievements and enhancements. The Objective of this paper is to identify the Cadastre Working Tools readily available and applicable to our challenges; to highlight their relevance; to state the challenges facing our land administration; to relate all these parameters to the inadequacy facing us and to showcase the need for paradigm shift from absolute dependency on government budgeting and viable possibilities of Public, Private, Partnership (PPP). The Results as expected shall be showcased on a proposal for a project at hand which is a discourse of the need to use readily available tools with less dependency on government. The conclusions of this work as a tool on its own is to serve as a paradigm shift. As of now; the major challenge is funding and high cost usually presented to government by the professionals is a major problem militating against good land administration in our state. The lack of will to break from bureaucracy and tendency of high cost of land administration using old and outdated tools are all challenges. The significance of this work is to set up a holistic approach that will be a working tool using Public, Private, Partnership at little or no cost to government particularly for an economy where cost of governance is prohibitively high to the detriment of other basic infrastructural needs of the populace.

Comparative Analysis of Short, Medium and Long Baseline Processing in the Precision of GNSS Positioning

Chika Okorochoa and Oluropo Olajugba (Nigeria)

Key words: Positioning; Baseline; Processing; GNSS; CORS

SUMMARY

The science of positioning has revolutionized with the advent of high precision instruments targeted to improving the achievable accuracy in positioning. GPS has presently evolved into GNSS, with the GNSS receivers having the capability of tracking different satellite constellations. Active CORS have emerged replacing the former passive stations. These innovations in the science of satellite positioning however, have not undermined the importance of baseline processing in satellite based positioning system. This paper thus, presents a comparative analysis and the significance of short, medium and long baseline processing in the precision of GNSS positioning. Satellite observations were acquired on 12 control points using both the passive and active (CORS) station principles in Post Processing GNSS positioning data at differential mode. The short baselines have maximum length not exceeding 1.5km from the control points to a base station, the medium baselines have range not exceeding 12km from the control points to a CORS while the long baselines have range not exceeding 107km from the control points to another CORS. The results obtained from the baselines processing were statistically analysed using ANOVA One Way at 0.05 significant level i.e. 95% confidence interval and subsequently Scheffe test. The statistical results shows no significant difference between the level of precision obtained by the baseline processing involving the CORS at 12km and the Base receivers at 1.5km but there exist a significant difference between the 107km CORS baseline processing and the 12km as well as the 1.5km baselines. The short baselines were found to have the highest achievable processing precision while the long baselines have the least. The study shows that the longer the baselines the lower the processing precision even with CORS. This however, does not negate the reliability of the long baseline result but defines the level of precision and accuracy achievable when compared with other baseline length.

Nzis – the Professional Body for a Bigger Future

Jeff Needham (New Zealand)

Key words: Capacity building; CPD; Education; Professional practice; Governance

SUMMARY

The New Zealand Institute of Surveyors has over the past 3 years undertaken a highly proactive organisational refresh with the objectives of becoming more relevant and beneficial to members and society. This change process has included the first re-write of the constitution in over 10 years and as a consequence seen some significant shifts in the what membership means and how the organisation becomes relevant to a broader community of practitioners working across the wider spatial spectrum. These changes have challenged our conventional thinking and forced us to reassess what the benefits of voluntary membership of a professional body are and how a professional body can make a difference in modern society. A key aspect of the changes include establishment of communities of interest called Professional Streams. These communities are represented formally in the new governance structures and are charged with defining what services and benefits members want from the organisation relevant to segment they represent. New concepts relating to accreditation of members to quality standards established by the NZIS and how these apply to a broader practitioner base are now being developed. These NZIS certification levels are seen by both practitioners and employers as a key benefit component of professional body membership. This paper briefly outlines the new NZIS structure and as a consequence how the Professional Streams and Professional Body Certifications have relevance to the future of NZIS.

Implementing ‘Greenwaste’ Management in a Sustainable City of Lagos, Nigeria

Bernard, Orji Ekpete (Nigeria) and Macbeda, Uche Michael-Agwuoke (New Zealand)

Key words: Spatial planning; Classical waste management; environmental degradation; Lagos mega city; knowledge based ‘greenwaste’ management; sustainable city; integrated waste management.

SUMMARY

Management of municipal solid waste (MSW) is one thing that is common in every city government, though service levels, environmental impacts and costs may vary depending on the level of funding, waste stream composition, waste management methodology and the habits of the people. Globally, the biggest waste management problem is the contribution of greenhouse gases to the environment. But classical waste management processes causes other problems like underground water contaminations, inefficient resource utilization, ozone depletion and toxic emissions into the environment, leading to environmental degradation and negative health implications. But the implementing of new technologies and habit change in waste handling and management can help in reducing or eliminating these problems. The paper attempts a synthesis of waste management strategies for solving the prolonged waste management problems of the Lagos mega city. Using a city-specific approach, it assesses typical success and failure factors. With a standing population of over 21 million people, generating over 10, 000 tonnes of waste daily, the application of knowledge based ‘greenwaste’ management approach in a strategic planning scenario are crucial in the face of the plan for the city to emerge as a sustainable city. Considering the waste stream composition, the variation in the settlement pattern of Lagos and the habit of the residents, the paper discusses the steps to be adopted to follow the impact factors and succeed in the execution of the ‘greenwaste’ management. The ‘greenwaste’ management supported by strategic planning, integrated with spatial analysis will eliminate all the negative effects of classical waste management, leading to integrated waste management hence a sustainable city. This is termed 'greenwaste' management in this paper

Initiatives for Restoring Original Boundaries in Mountains and Forests by Using Past Aerial Photos

Tsutomu Imase (Japan)

Key words: Cadastre; Cartography; e-Governance; GNSS/GPS; History; Land management; Low cost technology; Photogrammetry; Positioning; Urban renewal;

SUMMARY

Introduction Japanese cadaster is based on basic spatial units of land parcel (lots) segmented by lot boundaries. At present, however, there still remain land parcel (lots) whose positional information is unconfirmed. Especially in mountains and forests, it is increasingly difficult to confirm the land boundaries due to the advancing ages of land owners. In the real property registration system of Japan, a lot boundary that identifies a land parcel (lot) is defined as “two or more points and line(s) that connects such points that are recognized as constituting a boundary of a land lot at the time of its registration.” (Article 123 (i) of Real Property Registration Act) In other words, a land lot cannot be established anew, but it needs to be found by surveying and searching the originally registered land parcel. For this reason, the past information of the area including its land parcel is extremely important, but such information is unorganized, scattered and unclear in many cases. Having said the above, this study takes into consideration the past information sources for those unconfirmed land parcel for the purpose of studying possible methods of restoring the original land boundaries in mountains and forests through use of such spatial information as maps provided at the registry offices, topographical maps, and aerial photos with the earth’s gravity center as the datum point. By so doing, we also aim at clarifying issues that involve the spatial information in the cadastral system of Japan.

Content A 3-D model was prepared by GNSS survey (FKP method) of past aerial photos and structures on site that have been in existence from long ago, and then a 3-D diorama and ortho-image thereof were prepared. Next through the combination of stereoscopy of the stereo image and 3-D CAD (Civil 3-d), the 3-D boundary lines were overlaid with the 3-D topographic model and thus estimated original boundary lines of the land were restored on a large scale map in reference to the maps provided at the registry office.

Conclusion The method discussed in this study may be useful for surveying the boundaries of a land parcel (lot) in mountains and forests in our depopulating, aging society. The issue regarding the spatial information in the Japanese cadastral system is that each piece of the spatial data we used in this study was kept at a different location from other pieces, and most of them are paper-based. Moreover, such data were not prepared on a unified coordinate system. In a near future in Japan, “mottainai (wasted) or buried cadastral information” is going to be restructured and archived as spatial information data to be publicized while being linked to the registry information. If such an initiative for utilizing the citizens’ knowledge can contribute to the improvement and rationalization of urban planning and public services, it will also enable us to effectively counteract the aging population with

declining birthrate and to build a community resistant to natural disasters. Japan Federation of Land and House Investigators' Associations Researcher Tsutomu Imase 3206-4 Mino City, Gifu-Pref. Japan 501-3701 Phone: +81 575 33 2558 Fax: +81 575 33 2558 E-mail: tomtom@proof.ocn.ne.jp

Land Administration as a Pillar in e-Government for Public Service in Thailand

Chinnapan Makpiboon and Malin Pholbud (Thailand)

Key words: e-Governance; Land management;

SUMMARY

Thailand has developed a national IT infrastructure that serves the government and the private sector since the late 1980s. In February 1996, the Thai government approved the first National Information Technology Policy called IT2000, a short-term policy for 1997-2001, which was initiated and developed by National Information Technology Committee (NITC). Then NITC launched the second phase called IT2010, aiming to enhance the economy and quality of life of the Thai people and lead Thailand towards a knowledge-based economy and society. Then, to ensuring continuity at the policy level, ICT2020 (2011-2020) has been developed and introduce the vision of “Smart Thailand 2020” by using the key concept of sustainable development with a balanced development in three dimensions: social, economic and environmental dimension. This vision introduces Information and Communication Technology as a key driving force in leading the Thai people towards knowledge and wisdom and leading the society towards equality and a sustainable economy. The geographic information infrastructure of Thailand is relevant in relation to government service innovation and good governance. Under Thai law, the Department of Lands (DOL) is the competent authority to deal with land by issuing documents and delivering the service of registering and transferring private rights over land. DOL issues certificate for private land in four types of document: Title Deed, Certificate of Utilization, Pre-emptive Certificate and Claim Certificate. DOL provides its services from more than 800 land offices (provincial land offices/branch/sub-branch and district land offices). The paper introduces e-government for public service on cadastral map and land parcel information inquiry. Citizens (clients of DOL) can find their plot through map-based interface and can also check its valuation. The paper further highlights how GIS technology is used to manage public land allocation for eradication of poverty, reduction of dispute related to right in land and land boundary, and distinguish between state land and public land. Then the Thailand Land Information System Project and the National Land Information and Mapping Center Project are discussed. The purpose of these projects is to integrate Land Information from various agencies related to state land and private land. There are 13 layers as the Fundamental Geographic Data Set (FGDS); Orthophoto, Satellite Image, GPS Network, Digital Elevation Model, Dominance Boundary, Transportation, Waterway, Urban Area, Land Use, Forest, Topography, Hydrographic, and Land Parcels. These projects also contribute to the increasing in local revenue collection and support the operation of agencies to achieve their mission through the use of data. At present, DOL collects revenues from transactions in the form of transferring fee, stamp duty, income tax, and specific business tax at the average of 50,000-70,000 million

baht (1,700 – 2,500 USD) per year with 5 - 7 million transactions. The paper discusses experiences and lessons learnt.

Evaluation of Indonesian Land Base Map for Cadastral Application

Faus Tinus Handi Feryandi, Wahyu Sari Sabekti, Budi Jaya Silalahi and Asmadi Adnan
(Indonesia)

Key words: Cadastre; Capacity building; Professional practice; statistical evaluation

SUMMARY

Land Base Map (LBM) is fundamental as a spatial basis for parcel-based cadastral application such as land registration, land use management, and land valuation. In Indonesia, LBM is produced and maintained by National Land Agency Republic of Indonesia (BPNRI) via Directorate of Base Mapping. The institution produces the maps in certain scales, ranging from semi detail 10K to very detail 1K map. In order to make the production more precise, i.e., can fulfill the need and effectively support what actually needed by BPNRI's local offices (Kantah) and regional offices (Kanwil BPN) in their public service as cadastral mapping, parcel boundary reconstruction, and land valuation, the directorate conducted an evaluation on its products. It aimed to understand 1) how effective the usage of land base map, 2) among the scales, which more effective, 3) what are the deficiencies of the maps, and 4) what are the obstacles when use the maps. Using purposive sampling approach, the evaluation was chosen to be located in 13 Kanwil BPN and 26 Kantah as sample areas. Then, by analyzing the distributed questionnaires, some statistical analysis was conducted by deploying descriptive statistical analysis, categorization, difference test Kruskal Wallis, importance-performance matrix, and cluster analysis. As results, there was a SWOT analysis of the produced land base maps. This research ended with final conclusion that 1) the larger scale of the maps the more effective they will be used for parcel-based cadastral application, 2) there were classic problems of human resources and capacity building (lack of employees, wrong men in wrong places, lack of professional education and training) that caused inappropriate understanding of how to use the maps effectively according to scale and its operability. Finally, the study provides recommendation containing suggestions how to tackle these problems systematically in order to make BPNRI's public service more effective.

Analysis and Determination of LAT for LPI and LLN Maps Chart Datum Based on Tidal Observation Periods

Fajar Triady Mugiarto and Eka Djunarsjah (Indonesia)

Key words: Hydrography;

SUMMARY

Analysis and Determination of LAT for LPI and LLN Maps Chart Datum Based on Tidal Observation Periods Fajar Triady Mugiarto, ST, MT 1) Dr. Eka Djunarsjah 2) 1) National Geospatial Agency 2) Geodesi and Geomatika, ITB Abstract LPI and LLN maps are a marine base map that has been mandated by Act No. 4 of 2011 on Geospatial Information. According to this Act, the chart datum for depth must be refers to the condition of the lowest tide. During this time, chart datum used (LLW) Lowest Low Water is calculated based on tidal observations data from 1 to 3 months period. By IHO, Chart Datum should be refer to LAT (Lowest Astronomical Tide), which is calculated from the data over the 18.6-year tidal observations or at least calculated from tidal predictions based on minimum of 1 year observational data. To refer LAT, based on at least 1 year data observation, is quite difficult, because the tidal observation data during hydrographic surveys for LPI dan LLN mapping usually only around 1-3 months, unless there is a tidal observations permanent station in surrounding area and continuous observe tidal data. Plan ahead, all LPI and LLN maps will refer to the LAT, in order to meet the standards and can be used by all users. In this paper, the calculation will be performed to determine LAT predictions of tidal data are 1 month, 3 months, 6 months, and compared with data 1 years prediction. Then be analyzed the difference LAT value and whether it is still within the limits of tolerance in hydrographic surveys, especially LPI and LLN maps. Tidal data used are taken from the 2 areas that have small and large tidal range, ie. Kolinlamil, Jakarta and Sekupang, Batam. The method used for the calculation and prediction of tidal component is the Least Square Adjustment, using T - Tide software in MatLab version 2007b. Based on calculation LLW than 1 year of data, observational data obtained for 1 month have the difference between 8.5 to 16.8 cm , for 3 months between 5.6 to 9.1 cm and for 6 months with a difference of 1.0 to 1.8 cm . Key word: LAT, LLW, Least Square Adjustment, Chart Datum

Use of GIS and BIM in the Development of Public Housing Estates in Hong Kong

Winnie Shiu (Hong Kong SAR, China)

Key words: Geoinformation/GI; BIM

SUMMARY

The Hong Kong Housing Authority is a statutory body established under the Housing Ordinance in April 1973. The primary goal of the Authority is to help low-income families with housing need gain access to affordable housing. At present about 30% of the Hong Kong population is now living in public rental housing units, and yet the supply cannot meet the demand for public housing from the general public.. In order to cope with the need for developing more public housing estates, there is the need to speed up the various stages of work throughout the project life cycle starting from feasibility study of potential sites, preliminary design of housing site, detail design, tendering, construction, completion and facilities management. Therefore, various types of advanced technologies, including the use of Geographic Information System and Building Information Modelling, were introduced to enhance the development, construction and maintenance of public housing estates. This paper will introduce the development of GIS from 2D to 3D and BIM in the Housing Authority. How we made use of these two platforms for speeding up the entire process; how we integrate the two types of datasets including spatial and attributes data and merge them with other types of 3D Spatial Data collected by laser scanning and unmanned aerial system etc. I will also conclude the paper highlighting the benefits of using GIS and BIM in the development of public housing.

Harnessing the Use of Information & Communication Technologies (ICT) in Surveying and Geo-Informatics Education in Tertiary Institutions in the South Eastern States of Nigeria

Njike Chigbu, Daniel Chukwuemeka Onukaogu and Michael Apeh (Nigeria)

Key words: Capacity building; Education; Spatial planning; ICT, Surveying & Geo-informatics, Spatial Intelligence, Globalization.

SUMMARY

Information and communications technology (ICT) has become an indispensable tool in the field of Surveying and Geo-informatics. Surveying and Geo-informatics have encountered a gigantic leap especially since the emergence of ICT technologies around the world. This field of study has benefited so much from the steady advancement in computer, Satellite, Digital technologies and Geospatial Science. ICT has helped not only in teaching and knowledge dissemination but also in the aspect of data collection, database management and as well as in the overall end user specifications such as the delivery of high quality map products. The advancement in ICT technology has made the training of both Surveying and Geo-informatics a lot different from what it used to be in the last decades. The adoption of the latest Information and Communication Technologies (ICTS) in education must be embraced by all governments and stakeholders in education to speed up awareness on climate change and other contemporary global issues that are of spatial significance. Thus information and communication technology tools should be properly harnessed in Geomatics training in order to develop the needed capacity to face the daunting developmental challenges in this Nigerian Sub-region. This paper is a review of the role and impact of ICT in the field of Surveying and Geo-Informatics training in South Eastern Nigeria and the inherent benefits

Spatial Information Technology–“a Virile Tool and Fit–For–Purpose in Good Governance Campaign in the Sub–Saharan Africa–A Focus on Nigeria”.

Daniel Chukwuemeka Onukaogu and Njike Chigbu (Nigeria)

Key words: Geoinformation/GI; Spatial planning; Best practices, Sub-Saharan Africa, good Governance.

SUMMARY

The society in which we live has a significant influence on the type of information that we require to address particular socio-economic, development or environmental issues. Spatial information model can be developed in deciding on what information is required for the development of the information system to address a particular problem in the society. This information is needed to address development issues as well as encourage investment by the private sector. Information on the natural resources endowments of sub-Saharan Africa is very necessary in order to attract huge foreign investments to this region of Africa. people’s perceptions, risks of investment (e.g. wars, crime, political instability) and general knowledge of the environment through spatial intelligence are important factors to consider in harnessing the benefits that will be derived from the investments in this sub-region. Necessary policies acceptable platforms and protocols need to be put in place by the sub-regional governments in line with global best practices to ensure that the correct information is collected and that the whole process remains sustainable. This paper is aimed at putting to the fore, the inevitability of harnessing spatial information as a tool in good governance and effective service delivery in the Sub-Saharan Africa and more so , Nigeria.

Flood Risk and Property Values

Sebastian Kropp (Germany)

Key words: Valuation; residential property

SUMMARY

The issue of climate change and its consequences is all over the media and has moved up the political agenda. Since the 1980's the number of extreme weather events has tripled worldwide. For example for Germany statistical predictions say that flood events that have occurred on average every 50 years in the past will take place every 25 years in the future. Flood damages on real estate can multiply and economical losses should not be underrated. The paper is based on a comprehensive survey of about 500 certificated property and valuation experts throughout Germany. The main objective of the survey was to examine whether and to what extent residential property values can be influenced by flood risk. The experts were asked to evaluate two different situations. First was the general location of a residential property in a formally designated flooding area and second the influence of a concrete flooding event. Results of the survey indicate the relevance of the topic. 65 percent of the questioned experts claim to consider flood risk within the valuation process. Flood risk in combination with a concrete flooding event is even considered through a high majority of 93 percent. A consideration within the valuation process primarily takes place through a discount on the unaffected property value. For the location in a designated flooding area a discount between 6 to 10 percent and for a flooding event more than 15 percent seem to be appropriate according to the survey results. In addition a higher property yield can reflect the flood risk compared to unaffected real estate. The experts were also asked if higher insurance premiums might affect property values. With 57 percent the majority disagrees with this statement. In contrast respondents see an extension in selling time up to 6 months. Under certain circumstances this might result in higher vacancy rates. The paper also looks into the real estate valuation process and provides advices for property and valuation experts to deal with flood risk in their daily work.

The Meaning of Student Knowledge. The Case of the International Master Program in Land Management, KTH, Sweden.

Liza (E.M.C.) Groenendijk (Netherlands)

Key words: Cadastre; Capacity building; Curricula; Education; Land management; Real estate development; land administration; land management; academic education; student knowledge; teacher learning; organizational learning

SUMMARY

Higher education institutions are confronted with major challenges such as those resulting from globalization and internationalization. They further have to respond to increasing expectations by students and employers that graduates will be equipped for rapidly changing and globalizing workplaces (Altbach et al, 2009, Fry et al, 2009, Marginson & Van der Wende, 2007). The work of academic teachers is therefore becoming more complicated and demanding. Next to teaching, academic staff is involved in scientific research. The slogan 'publish or perish' illustrates the importance of research and scientific publications in academic practice. Academic staff has to cope with increasing and competing demands from both teaching and research. Against this background the University of Twente, The Netherlands, has formulated a research project that explores if and how teaching processes, in particular student – teacher interaction, can be more beneficial to other academic processes in order to cope with the increasing demands placed on the academic profession. The research takes an organizational learning perspective and aims to explore how the expert knowledge of students can contribute to curriculum development and disciplinary knowledge development in an academic discipline. The relatively young academic discipline Land Administration has been selected as the discipline under study. Three international land administration postgraduate programs have been chosen as case studies. In May 2013 a first series of in-depth interviews have been conducted with academic teachers that have been involved in the International Land Management Program at the Royal Institute of Technology (KTH), in Stockholm, Sweden. This paper will describe the research project and present the procedure and outcome of this first case study research. The results will be analysed and discussed in order to answer the question: what does student knowledge mean for academic teachers and more in particular for their subject knowledge in the domain of land administration? Conclusions will be drawn that feed the next step of the research.

Investigating the Role of Multi–National Corporations in Sustainable Environmental Management in Niger– Delta Region of Nigeria– an Overview

Jennifer Eziaku Chigbu, Pamela Ibukunle, Chigbu Njike and Susan,C. Nmeregini (Nigeria)

Key words: Geoinformation/GI; Land management; Risk management; Multi-National Corporations; Niger-Delta Region; Environmental degradation; sustainability

SUMMARY

The 2002 world summit on sustainable development sharpened global awareness of the role of governance in reversing environmental degradation. Given that governance and institutions such as international agencies (especially rich multi-national corporations in Nigeria) also play a critical role in reducing disaster risk and environmental vulnerabilities, it becomes expedient to harness the role of these organizations in the overall control and management of environmental problems in Africa especially oil rich Niger Delta region of Nigeria. The millennium declaration recognizes the risk to development stemming from disasters and selective negligence and calls on the global community (including international agencies and corporations) to intensify their collective efforts to reduce the number and magnitude of induced natural hazards and anthropogenic (man-made) disasters. This paper is aimed at critically evaluating the role of International agencies and corporations in combating environmental degradations in Nigeria oil rich region.

The Use of GNSS in Sweden and the National CORS Network SWEPOS

Mikael Lilje, Peter Wiklund and Gunnar Hedling (Sweden)

Key words: Deformation measurement; Engineering survey; GNSS/GPS; Positioning; Reference frames; Reference systems; CORS

SUMMARY

Sweden was very early in introducing GPS as an effective tool for navigation, surveying and mapping. Lant-mäteriet, the Swedish mapping, cadastral and land registry authority was one of the first countries in the world to have a national CORS as well as a nationwide network-RTK. The CORS network SWEPOS celebrated 20 years during 2013 and the national RTK service celebrates 10 years in 2014. Today we have almost 3000 users of network-RTK in Sweden. The main users can be found at surveying companies and local authorities and the some of the fastest growing sectors of users are agriculture and machine guidance. This presentation will describe the development of SWEPOS and how GPS, today GNSS, has become such an important tool for us.

A New Approach: Participatory Land Consolidation

Marije Louwsma, Marco van Beek and Bert Hoeve (Netherlands)

Key words: Digital cadastre; e-Governance; Geoinformation/GI; Land management; Land readjustment; Professional practice; Spatial planning; land consolidation

SUMMARY

Introduction Fragmentation of agricultural land continues with the ongoing enlargement of farms. Land consolidation aims at an improved allocation of land that is better adapted to its agricultural use. Therewith it strengthens the agriculture sector and consequently aids food security. In addition, land consolidation may contribute to better water management, environmental management or the realisation of new nature conservation areas. Land consolidation thus contributes to a sustainable rural development. A new approach In the Netherlands a new approach towards land consolidation has been introduced. It allows farmers and other stakeholders to actively participate in land consolidation projects, especially with regard to the re-allotment plan. Public participation may take place in various ways, depending on the local context and followed procedure. The new methodology matches with a recent trend in the Netherlands of politicians invoking citizens to take responsibility for their own environment and neighbourhood instead of expecting the government to take care. This coincides with the trend of a diminishing welfare state due to severe budget cuts. Voluntary re-allotment Land consolidation is to a large extent based on data about land administration as the ownership of land is exchanged. Participation takes place by different means. In a voluntary re-allotment farmers and other land owners are invited to discuss the new allocation together. Since it is on a voluntary basis not all land owners are involved, which sometimes limited the possibilities to exchange land. Nevertheless, the first results have shown that the improvement on allocation of land is equal or better than expected based on average results in previous re-allotment projects using the regular method. Rural land consolidation In a formal land consolidation project participation is among others supported with an e-government service to exchange geo-information. All landowners in this type of project are involved as it has a mandatory character. Public participation is therewith more formalised. The developed e-government service is tailored to public participation within this framework, allowing title holders to register land lease contracts, wishes regarding the new allotment, view the re-allotment plan, and at last submit an objection. People are satisfied with the possibility for e-participation and it also enhances an efficient process. Urban land consolidation Traditionally, land consolidation in the Netherlands only takes place in rural areas. However, the negative effects of the worldwide crises are visible in urban development. The government is currently investigating the possibilities of urban land consolidation as an instrument to mitigate these negative effects, drawing on the experience in the application of land consolidation in rural areas.

Tailings Dam Deformation Monitoring (Case Study: Shamva Mine, Zimbabwe)

Thandinkosi Gracious Dewah (Zimbabwe)

Key words: Mine surveying; Young surveyor;

SUMMARY

Tailings dams frequently represent the most significant environmental liability associated with mining projects, both during the operational and decommissioning phases of a project. A spate of recent and well-publicized tailings dam failure incidents has placed the mining industry in general and those responsible for tailings dam design and safety in particular, under intense scrutiny. Some of these failures are caused by the engineering (or lack of it) that goes into the design of these tailings dams. Owners, designers and operators of tailings dams should aim to have a zero level of failure, whether physical or environmental. Tailings dam failure can be a very devastating event to the environment and for any mining company. It is therefore important to ensure that suitable steps are taken to monitor the deformation of a tailings dam and prevent failure. At the time this research was undertaken, Shamva Mine (Zimbabwe) had no method of monitoring the stability of its tailings dam. If the dam was to become unstable and consequently collapse, it would not have been possible for the mine staff to know beforehand and take steps to prevent this from happening. The monitoring of this tailings dam would become even more critical during the rainy season and once the dam has reached its life span. The main purpose of this study therefore was to develop a method for monitoring the stability of the Shamva Mine Tailings Dam. A traverse survey was undertaken to establish control points around the Shamva Mine tailings dam and then using this control, slope pegs to be used for monitoring were installed on the tailings dam. During the research period, the monitoring exercise was performed thrice and the results obtained indicated that the tailings dam is still stable. The scope of this study is limited to monitoring the deformation of tailings dam slopes to prevent environmental harm. However contamination of nearby or surrounding fresh water sources by seepage from the tailings dams can also pose harm to the environment. For further study therefore, the researcher recommends that relevant methods be designed and implemented to ensure that seepage from tailings dams pose no harm to the environment.

Nordic Session – Introduction

Henning Elmstroem (Denmark) and Lars Jansson (Sweden)

Key words: Land management; Legislation;

SUMMARY

The purpose is to demonstrate the Nordic cadastral and land management systems. In all Nordic countries there is a high level of trust and transparency regarding the property systems and the citizens has access to almost all data involved by use of the Internet. The Nordic Countries consider the property and cadastral system vital for the development and compare it other infrastructural element in society. Grown from a common historical background the systems has never the less differences due to the fact that the Surveyors involved is civil servants in some countries and chartered and licensed Surveyors in the others. This provides an excellent opportunity to demonstrate best practice for both public and private systems.

Civic Engagement – a New Self–Understanding of Villages?

Alexandra Weitkamp and Pia Steffenhagen (Germany)

Key words: Land management; Spatial planning; Civic Engagement, Village Development, Conversion of Vacant Buildings, Demographic Change

SUMMARY

In Germany and also in other European countries, many rural regions are increasingly characterized by the agro-structural and demographic change. Beneath, public authorities are affected in their development by their financial constraints. But these regions should not be generally associated with structural weakness or disadvantages. However, many of them are seriously disadvantaged in terms of economic strength, infrastructure or general common prosperity. Many villages are facing various problems, e.g. high building vacancy rates and decay, reduced attractiveness of the village and landscape, job and population declines and other infrastructure losses. The aim of the "equivalent living conditions" cannot be longer guaranteed. Here, a new interpretation is required: structural changes recommend a greater "self-responsibility" of the affected rural regions. The classic state-guaranteed obtaining and expansion of (material) infrastructure is no longer financially viable. More flexible infrastructures, more organized by private sector or civil society, are needed. However, a lively civil society is essential in villages. In recent years, the strengthening of civil society and a changed understanding of the state influence the concepts of civic, social or voluntary activities. The activities are based on the increasing willingness to voluntary, gratuitous engagement of the society. In particular, the rural population has a high sense of responsibility and the willingness for commitment. As part of a research project these aspects were explored and the potential of activation was determined. The motivations of engaged people are characterized by different perspectives. A behavior analysis was the starting point of the study. Engagement, its circumstances and the associated potentials were studied in a survey and a case study investigation. The analysis allows the conclusion that villagers are potentially willing to engage in projects for common re-use of buildings. But they have to deal with high risks of conversion, financing the projects, formalities and a sustainable maintenance of the project after conversion. Also many currently non-volunteers can imagine to help, but a lack of time is referred as an obstacle. Concluding, village development will be more successful, if a long-term engagement is supported by short time engaged people (maybe only one time). Overall, rural regions are maybe characterized by abandoned buildings, but they have a lot of potential. The villagers are often willing to engage and to work with the community for a better future. These people are strong in cohesion and cause a positive change or maybe only prevent a further decline of their village.

Assessment of the Ionospheric Scintillation in the PPP Results: a Case Study in Brazil

Joao Monico, Bruno Vanni, Haroldo Marques and Herida Reis (Brazil)

Key words: GNSS/GPS;

SUMMARY

Ionospheric Scintillation is (IS) a very problematic effect for high accuracy position in Brazil, like RTK (Real Time Kinematic) and PPP (Precise Point Positioning), when 24 hours service is required. A monitoring network of IS was set up in Brazil based on CIGALA and CALIBRA projects (<http://is-cigala-calibra.fct.unesp.br>). Positioning based on RTK and PPP were carried out for a very important period, in which occurrence of IS was registered. Therefore, one can correlate the error in position and IS in order to see the real effect on such methods of positioning. In this contribution such results will be presented together with a strategy developed at UNESP PP in order to try to partially mitigate the IS problem.

Combined Geodetic and Fibre Optic Deformation Monitoring of a Reinforced Earth Structure

Werner Lienhart, Florian Moser, Helmut Woschitz and Hartmut Schuller (Austria)

Key words: Deformation measurement; Engineering survey; Risk management; Tunnel surveying; Fibre optic; Reinforced earth structures, Geogrid

SUMMARY

The Semmering Base Tunnel with a length of 27.3 km is a core project in the improvement of Austria's southern railway line and as a part of the Baltic-Adriatic railway corridor of European wide importance. The disposal site for 4.25 mio m³ of tunnel excavation material is located in Longsgraben valley and had to be ready before tunnel excavation will start in January 2014. Preparation works for this disposal site included the relocation of the Longsbach stream into a new river bed. The new river bed is located 50 m above the current valley floor, which corresponds to the height of the valley after the tunnel completion. For this purpose, a reinforced earth structure with a length of approximately 1.0 km was constructed within steep mountain terrain. In addition, access ramps with heights of up to 25 m were required. These ramps were also constructed as reinforced earth bodies. Bi-directional geogrids were used due to the complex geometry of the structures embedded into the mountainous topography. In this paper we present the design and implementation of a deformation monitoring system for the reinforced earth structure. The developed structural health monitoring system (SHM) is based on external geodetic measurements and internal fibre optic measurements. Absolute movements of targets mounted on the surface of the structure were monitored regularly using total stations. Additionally, a fibre optic measurement system was installed to measure the current operating grade of the geogrids within the earth structure. The monitoring system was specifically developed for the Semmering project and uses distributed fibre optic sensing based on Brillouin scattering. About 2 km of sensing cables were installed in the project area. Unique anchors were designed to reliably transfer deformations of the geogrids to the sensing cables. The internal and external deformation measurements were analysed in an integrated way and compared to predicted deformations from a finite element analysis. We demonstrate that the developed monitoring system is well suited for assessing the current state of health of reinforced earth structures due to the high measurement resolution of better than 1/100 mm. Furthermore, we show that the measurement results can be used to reliably calibrate numerical models.

A Cost–Benefit Analysis for the Application of a Multi–Sensor Approach to Near Shore Hydrography

Andrew Waddington (United Kingdom)

Key words: Capacity building; Coastal Zone Management; Geoinformation/GI; Hydrography; Laser scanning; Remote sensing; Risk management; Spatial planning; Bathymetric, LiDAR, Satellite, Multibeam, Cost-benefit, Blue Economy, Coastal, Environment, Maritime, Charting

SUMMARY

Hydrography is about more than nautical charts. Increasingly an awareness of the full impact of developments, both manmade and natural, is vital to good decision making and the best decision making is in turn dependant on the best information. We have realised the importance and the potential of the Blue Economy and its vital part in our global economic system but are only slowly becoming aware that the critical component is the land/sea interface between the activities that take place in the Blue Economy and the land based market which it serves. Our awareness of the maritime element of global trade is still largely superficial. According to the IHO Hydrography is the branch of applied sciences which deals with the measurement and description of the physical features of oceans, seas, coastal areas, lakes and rivers, as well as with the prediction of their change over time, for the primary purpose of safety of navigation and in support of all other marine activities, including economic development, security and defence, scientific research, and environmental protection. Hydrography is the science of information about the sea and the waterways connected with it and it is the geospatial element included in hydrography that provides the common thread across these activities. This paper will examine the role of hydrography in the arenas of environmental management, civil engineering, economic and social development as well as nautical charting role with an emphasis on the shallow water coastal environment that characterises the critical interface between activities at sea and on land. It will present a cost-benefit analysis using a case study in the south west Pacific which will cover social, economic and environmental considerations with a view to providing a mechanism for assessing and presenting the value of near shore hydrography so that it may be considered alongside other capital projects and investment priorities. The role of multiple technologies in developing a layered approach to hydrographic data gathering will be presented and will include Satellite Derived Bathymetry, Bathymetric LiDAR and shipborne acoustic systems showing how these technologies can be considered complimentary and provide a value for money solution to data gathering in the near shore environment based on an assessment of the requirement for accuracy and the acceptance of risk. The conclusion will offer an approach to hydrography that places a value beyond the requirements of nautical charting and into the wider socioeconomic impact of a more complete understanding of the near shore environment.

Structural Monitoring of an Ancient Masonry Tunnel Using Laser Scanning Techniques; the Noise Filtering Problem.

Michail Elaiopoulos, Donatella Dominici, Vincenzo Massimi, Maria Alicandro and Elisa Rosciano (Italy)

Key words: Deformation measurement; Engineering survey; Laser scanning; Tunnel surveying; Noise reduction, meshing

SUMMARY

This paper presents a structural monitoring experimented on an ancient masonry tunnel situated under the city of L'Aquila, in the central Italy. In particular, after analyzing about 2000 point clouds (carried out by the laboratory of geomatics during the last years) the noise distribution with respect to the various types of structures, atmospheric conditions, geometric characteristics of the survey and sensor settings has been detected and studied. The collected data helped on defining analytic functions used to implement an algorithm for the noise reduction of the point cloud raw-data. Thus, all point clouds have been filtered adequately creating more accurate meshes needed to experiment their monitoring possibilities. This methodology has been applied for the accurate modeling of an ancient masonry underground tunnel of the XII century, discovered some years ago and only partially explored. The same methodology is being generalized for the structural monitoring of tubular structures such as road and rail tunnels.

The Importance of Hydrographic Surveying in the Development of a Water/Lake Transportation System in Ghana

Isaac Larbie (Ghana)

Key words: Coastal Zone Management; Hydrography; Land management; Water/Lake Transportation

SUMMARY

Background: Transportation in Ghana over the decades has dominantly depended on land by the road and slightly rail systems which has caused a lot of pressure on our road/rail facilities leading to early damages. In the case where access exists, due to the bad nature of the roads, vehicles are either unable to get to the production sites and vice versa. Ghana is fortunate to have a major water body along the southern boundary of the country, i.e. the Gulf of Guinea and a major river body, the Volta Lake linking the southern section to the northern section which when used judiciously can improve upon the transportation system in Ghana by reducing the pressure on the road networks. Along this lake and the coast are towns, communities, villages that depend on the use of these water bodies for their livelihood and business activities. Moving from one settlement to the other either along the water body or across has always been a huge problem. The use of fishing canoes has been the available mechanism for transporting people and goods which has endangered lives over the past periods due to unavailability of safety measures. Safety in the use of our water bodies depends greatly on the nature of the water bodies, their depths and what is below the surface of the water. Under this condition, the application of hydrographic surveying will provide solutions to determine safety in the use of the water body for transportation. Objective: To apply hydrographic surveying on our water bodies to determine the level of safety in the use of our water bodies for the development of a Water Transportation System. Results: Creation of awareness to the fact that transportation means in Ghana can be improved by the use of water bodies within the country and seek for investors to develop the Water Transportation System. Conclusion: Hydrographic surveying is necessary to develop the Water Transportation System that can be one of the cost effective and safest modes of transportation in Ghana. It can improve upon the transportation system in Ghana by reducing the pressure on the use of the road networks. Significant of Work: This work is of high significant to National Development of a country in the area of transportation. This will reduce the over dependence of road transportation by creating another alternative thereby creating jobs for the people.

Land Value Modeling and Evaluation in the Greater of Jakarta Area

Bambang Edhi Leksono, Yuliana Susilowati, Sudarman Sudarman and Andrayani Andrayani
(Indonesia)

Key words: Property taxes; Valuation; Land Valuation, Multiple Regression, Jabodetabek, Greater Jakarta

SUMMARY

The Greater of Jakarta is the urban agglomeration surrounding of the Jakarta as a capital city, in Indonesia. The area comprises the DKI Jakarta and parts of West Java and Banten provinces, specifically the three Regencies of those provinces which surround Jakarta - Bekasi and Bogor in West Java, and Tangerang in Banten. Also included were the Kota (formerly Kotamadya) independent municipalities of Bogor, Depok, Bekasi, Tangerang and South Tangerang. The name of the region is taken from the first two (or three) letters of each city's name: Jabo(de)tabek from Jakarta, Bogor, (Depok), Tangerang and Bekasi. The Valuation of land in this area is an attempt to realize equity in the tax system and the legal aspect of land tenure, as well as the stream direction of optimum land use (highest and best use). Land value data transaction reports from some official land agencies such as PPAT in Indonesia have also proven to be inaccurate in its valuation's manner . Some research of Wibowo, et al (2009) indicated a link between population density per unit area of the village, the population density per built up area of the village, the percentage of built up area every village, and distance of villages to the CBD (Central Business District) of DKI Jakarta to land values within the greater Jakarta. This research aims to produce land value model and the evaluation of land value based on the characteristics of these four variables. The analytical method used in this study is multiple regression analysis with dependent variable $Y = \text{Value of Land}$, as well as the independent variable $X1 = \text{population density per unit area of the village Jabodetabek}$, $X2 = \text{density of population per built up area the village}$, $X3 = \text{percentage of the built up area each village}$, and $X4 = \text{distance of the village to the CBD (Central Business District) of DKI Jakarta}$. Conclusion of this research is the $X1$ (population density per unit area of the village) is proportional to the value of land in Bodetabek, but inversely proportional to the value of land in the area of DKI Jakarta, $X2$ (density of population per built up area of the village) did not affect value of land in the Jabodetabek area, $X3$ (percentage built up area each village) is directly proportional to land value only in areas Bodetabek, and $X4$ (distance of each villages to the CBD DKI Jakarta) is inversely proportional to the value of land in the Jabodetabek.

Can the OpenCadastrMap Initiative be a Game Changer?

Robin McLaren (United Kingdom)

Key words: Cadastre; Informal settlements; Security of tenure; Crowdsourcing; Pro Poor; Fit For Purpose

SUMMARY

The current solutions to delivering land administration services have very limited global outreach; 75% of the world's population do not have access to formal systems to register and safeguard their land rights. The majority of these are the poor and the most vulnerable in society and without any level of security of tenure they constantly live in threat of eviction. For example, foreign investors through large scale land acquisitions have attained 32.8 million hectares of land in largely poor and middle-income countries since 2000; many indigenous people have lost rights to their land. This creates significant instabilities in society and severely limits their ability to participate in economic development. The pressure to change and provide more appropriate and efficient land administration services and strengthen security of tenure is growing within global political circles. Land was prominent on the agenda for the G8 and G20 meetings in 2013 and global land indicators are planned within the replacement of the Millennium Development Goals. The ability of the current land administration paradigm to quickly scale up to engage the excluded 75% of the world's population is impossible; there are simply insufficient land professions. It is time to radically rethink how we record and manage land rights. The OpenCadastrMap (OCM) initiative is reacting to these challenges by proposing a radical new approach by providing a free to use, transparent, global platform where citizens can record evidence of their land rights. The proposed solution is based on global cloud based platforms, ISO land information standards, mobile technology and participatory / crowdsourcing techniques to capturing and maintaining land rights. This paper will describe the objectives of OCM, identify the interventions required to achieve the goals, detail the governance arrangements to stimulate the evolution of an OCM ecosystem and highlight scenarios of its potential impact across the land sector as a game changer.

Geocentraleapps – an Integration Platform for a Spatially Enabled Society

Juerg H. Luethy (Switzerland)

Key words: Digital cadastre; Geoinformation/GI; GSDI; Cadastre 2014; Spatially Enabled Society; distributed data; ontology

SUMMARY

The utilisation of spatial data outside the professional world has for long been difficult, since most citizens face difficulties searching, querying or using a specialised system. When somewhat complex data is published even modern Web-based tools lack of attention. We see two main drawbacks of present SDI's in Switzerland. Firstly, federal structures in Switzerland with – sometimes – different political entities responsible for the same topic make it very difficult for citizens to find the right information without appropriate prior knowledge. Secondly, relevant information is not only captured as spatial but also as "textual" data. The need for more encompassing data provision has been recognised in the preparatory work for the implementation of Cadastre 2014 in Switzerland where an integrated view of spatial data and legal text is required. Instead of following the traditional approach for the combination of legal information with spatial data by defining exchange models, pre-processing and copying data, we decided to pursue an approach in line with the concept of Spatially Enabled Society (FIG Report). Recognising the strength of specialised information systems and established processes for data maintenance the architecture should be a minimal complement of existing information system. This integration platform GeocentraleApps has two main components: middleware (server-side) and client. The datasets remain in their original environment thus achieving a clearly defined responsibility for each data object. Objects are accessed through web services so most current information is always used. The core element of GeocentraleApps is the integration engine in which arbitrary datasets are linked based on facts (common keys) or spatial and non-spatial ontologies using GDAL/OGR. In the OpenLayers-based client the integrated view are rendered as maps, dashboards, simple textual data or as combination of them. Because all presentations use the same data source interactions between the view ports allow for instance that the selection of a feature in one of the view is highlighted in all others too. The first implementation using GeocentraleApps is the realisation of Cadastre 2014 for two Cantons in Switzerland. In the trial period the validity of the concept and the effective operation of the implementation have been proved. The main advantages are the simplicity of data organisation (distributed systems), minimised processing needs, bi-directional querying capabilities (spatial – legal - spatial) and simple operation. Upcoming development will focus on data integration using directories, standardised rule sets (like GeoSPARQL) and component based view configuration.

A new Geodetic Strategic Direction for New Zealand

Graeme Blick and Matt Amos (New Zealand)

Key words: GNSS/GPS; Positioning; Reference systems;

SUMMARY

Land Information New Zealand is responsible for the provision of the geodetic system in New Zealand. At its simplest, positioning data tells us the precise location of points above, on or within the Earth. We provide an accurate geodetic system that enables geospatial datasets to be accurately integrated with each other. Historically there has been a strong focus on the provision of physical geodetic marks and data in support of the cadastral system in New Zealand. However with the increasing use of location based information and GNSS positioning systems by a wider range of users, we are changing our focus from the provision of vast networks of control points to the active maintenance of the models that define our datums. This will enable the development of new services that meet the positioning needs of users who do not want to just use coordinates. We are also placing a greater emphasis on supporting and maintaining global and regional reference frames which we in turn rely on to ensure accuracy of our geodetic system. This paper will describe the changing focus of the geodetic system in New Zealand and the new geodetic strategic direction.

Establishing the National Remote Sensing Centre in Serbia

Dragutin Protic and Vladimir Milenkovic (Serbia)

Key words: Capacity building; Cartography; Remote sensing;

SUMMARY

The IGIS project implemented by Serbian Republic Geodetic Authority (RGA) and French consortium composed of IGN France International and EADS Astrium aimed at building capacity of the leading national survey and cartographic institution in the field of remote sensing technology applications. Remote Sensing Workshop was established as the precursor of the future remote sensing centre that should address the growing needs of national institutions for spatial information from satellite sensors. Methodologies were defined for six standard products, namely: land cover map, agro-environmental map, natural habitat map, landscape fragmentation map, habitat change map and risk map. All models are based on maps of biophysical parameters (Leaf Area Index, Canopy Shadow Factor, Green Cover Fraction, Brown Cover Fraction, Soil Cover Fraction, Water Cover Fraction, etc.) that are automatically generated from Earth observation data. Extensive and systematic field works were organized to calibrate the models and for quality control of the final products.

New Zealand's National CORS Network

Paula Gentle (New Zealand)

Key words: GNSS/GPS; Positioning;

SUMMARY

The PositionNZ active control network was commissioned in 2002 to monitor the impact of tectonic deformation on New Zealand's Geodetic Datum (NZGD2000). Over the last 10 years the network has been developed to support more than just this primary purpose. Land Information New Zealand (LINZ) makes the data freely available, including its real time streams. This approach supports research and aids the development of the CORS commercial sector. This paper will discuss the PositionNZ network and its products and services, including an online GNSS processing service for New Zealand and steps LINZ is taking towards becoming an analysis centre for the Asian Pacific Reference Frame (APREF).

Utilising the Virtual World for Urban Planning and Development

David Jonas (Australia)

Key words: Cost management; e-Governance; Geoinformation/GI; GSDI; Implementation of plans; Land management; Laser scanning; Photogrammetry; Remote sensing; Spatial planning; Urban renewal;

SUMMARY

The twenty-first Century has seen the Asia Pacific region undergo rapid growth in its urban environments, and this shows no signs of slowing. Cities in the region are developing with whole district renewal, mega structures, mass transport corridors and significant population increases ... often with only rudimentary spatial data upon which to manage the development. This dearth of traditional spatial data has opened the way for utilisation of the Virtual World to plan, visualise, analyse and better manage the planned developments. The Virtual World involves a realistic 3D GIS, which supports master planning scenarios with ePlanning workflows and storytelling. The objective of this paper is to describe how virtual urban city models are assisting those in the planning process to better understand the development and then communicate outcomes to the various stakeholders. This paper will discuss the complete process from user needs assessment, data acquisition, planning input, visualisation, required infrastructure, data quality, development analysis, proposal dissemination and stakeholder input. The pros and cons of the various options at each of these steps will be analysed. Case studies will demonstrate how the Virtual World can assist in many of the specific topics of FIG's Spatial Information Management and Spatial Planning and Development Commissions, including Urban and Landuse Planning, Managing Urbanisation, Spatial Data Infrastructure, 3D/4D Models and Web and Mobile GIS. Recent Case Studies will show how the Virtual World can effectively bring government and society together, by spatially enabling the planning and approval process. Processes for managing such spatial data will be described, with regards to available infrastructure and utilisation of existing datasets and data formats. Whilst gaining a foothold in Europe, the Virtual World has largely only existed externally in the Asia Pacific Region. This paper will extend that environment to include indoor applications through the emerging utilisation of Building Information Modelling and Management (BIMs). With increasing pressures on space in Asian cities, authorities are forever searching out alternatives, so the paper will also present case studies and tools for including underground spaces in the planner's virtual World. The paper concludes with a critical review of the components available to construct a Virtual World to best meet Spatial Planning and Development needs within the Asia Pacific region.

Developing a 3D Digital Cadastral System for New Zealand

Trent Gulliver and Anselm Haanen (New Zealand)

Key words: Cadastre; Digital cadastre; Land management; Security of tenure;

SUMMARY

Land Information New Zealand (LINZ) is the government department responsible for land titles, geodetic and cadastral systems, topographical information, hydrographic information, managing Crown property and a variety of other functions. In the early 2000s LINZ introduced an integrated automated survey and title system, known as Landonline, which enabled the electronic capture, lodgement, recording, and supply of cadastral survey data. A highlight of Landonline's success is that advancements in technology and changing expectations of society were embraced whilst ensuring that New Zealand's accurate, authoritative and assured land-based property system was preserved. Despite these achievements, it is apparent that the current cadastral system will not be optimal for the next ten to twenty years. This observation is recognised in a strategy for developing the cadastral system published in 2014. A significant component of the strategy is to make provision for 3D cadastral capabilities. The present system caters for the third dimension through 2D plan and elevation graphics supported by textual descriptions. This portrayal is becoming out of sync with current expectations of government, land professionals and the public and is inhibiting the efficient collection and presentation of 3D cadastral data offered by modern technologies. Despite having a relatively low population, New Zealand is experiencing the same increases in multi-level multi-occupancy developments as other countries. Local authorities are a particular driver as they encourage cities to grow in and up rather than sprawl outward further impacting already congested infrastructures such as roading. These changes to the way in which people live have provided a catalyst for a substantial body of international discussion and research on 3D cadastres. The objective of the work being undertaken by LINZ is to progress from research to actual development and implementation of a fully automated 3D cadastral system. This system will allow the capture, submission, validation, visualisation and recording of rights, restrictions and responsibilities in 3D. The government has recently given approval for LINZ to develop a business case to advance New Zealand's cadastral system to the next level, including developing these 3D capabilities.

The Place of Surveying: What is our Position?

Coutts Brian J (New Zealand)

Key words: Education; Professional practice;

SUMMARY

Land surveyors have long considered their occupation a profession. They have enjoyed rank and status since at least as early as Egyptian and Roman societies. The boundaries between professions, and their related academic disciplines, become blurred as knowledge of the world increases exponentially in depth and breadth. Professional practice consequently requires an ever greater specialisation. Professionally many aspects of land surveying are closely associated with engineering. Academically land surveying is closely associated with geography. The field of geographical information systems is creating tensions in some countries as it looks to establish itself as a vocation, a discipline and as a profession in its own right. As the profession of land surveying undergoes technological revolution, particularly with respect to the digital environment and the acquisition and management of data, it is an appropriate time to re-examine professional and academic relationships and definitions that determine the connections between these related endeavours.

An Innovative 3D Interactive Platform Sourcing Geographic Information Combining Operating Photogrammetry Airborne LiDAR and Mobile Measurement System

Sin Da Tsai, Edward H. Wang (Chinese Taipei) and Hin Yew Kong (Malaysia)

Key words: Engineering survey; Land management; Laser scanning; Photogrammetry; Remote sensing; Spatial planning; Airborne LiDAR, Mobile LiDAR, Mobile Measurement System, 3D GIS

SUMMARY

Abstract As the climate change due to global warming keeps threatening human habitat through increasing intensity and frequencies of natural disasters, an instantaneous 3D geographic information system is highly desirable for governments and societies on disaster prevention, evacuation, rescue, post-disaster restoration, and mitigation. This paper introduces Skyline Global, a 3D interactive GIS containing large volume of spatial information collaboratively collected from operating photogrammetry, airborne LiDAR and Mobile Measurement System (MMS). Developed by Strong JP International Co., the Skyline Global implements the state-of-the-art, non-contact, laser scanning technology based mobile measurement to precisely and efficiently streamline massive geographic map information in an interactive manner. End users may select target positions, turn around, zoom in, and take measurement at their fingertips. The data acquisition integrating airborne camera UltraCam XP and airborne LiDAR Riegl Q680i operating simultaneously. The system features final precise ground elevation profile combining high resolution photogrammetry images at the scale of 10 cm Ground Sample Distance (GSD) and high density point cloud. The full wave form technology enables engineers to acquire high precise ground and vegetation elevation both in mountain and dense forest terrains to generate Digital Elevation Model (DEM) of 1 m raster, and the precision level reaches up to 10 cm in horizontal and vertical directions. The data stored in the Skyline Global is also supplemented by Riegl 250 mobile LiDAR Mobile Measurement System (MMS) at targeted point of interest. This paper summarizes working procedures, lessons learned and knowledge gained through numerous real cases. The case studied proves that the Skyline Global is an advanced technology combining laser scanning technology demonstrated on a 3D working environment not only increases efficiency superseding conventional engineering survey methods but also enhances the level of precision facilitating communication between end users and stakeholders on large volume of spatial information applicable to land management and spatial planning.

China's Macro-Scale LUCC Monitor System Construction and Application

You Shucheng, Liu Shunxi, He Yuhua and Ji Zhongkui (China, PR)

Key words: Land management; Remote sensing; land use, remote sensing, macro-scale monitor system

SUMMARY

The scarcity of arable land and rapid urbanization are China's basic conditions. To make good use of every inch of arable land resources and promote healthy urbanization are great challenges for Chinese government in a long term. At present, China is carrying out LUCC monitor project every year to protect arable land. Low resolution, multi-spectral and wide coverage satellite data make it possible to quickly grasp the general trend of land use change and timely diagnosis land-use management issues. This paper make a full summary of macro-scale LUCC monitoring system construction and application in China based on low resolution satellite remote sensing data, including satellite data acquisition plan of whole country in a very short period, national-scale land uses classification system, large regional image maps generation technology, land uses/cover information automatically extraction technology, parallel bulk and collaborative job system platform development and national-province two-tiers monitor system construction experience. Finally, typical application cases are introduced, such as China's major cities and urban agglomerations expanding monitor. This paper can be a good reference for quickly urbanizing area to carry out macro-scale LUCC monitor project.

Refferal of Regional Spatial Plans (RTRW) by Analytical Hierarchy Process (AHP) Method (Case study: East kalimantan Province Area)

Didik Wihardi, Yuliana Susilowati and Deviantari Udiana Wahyu (Indonesia)

Key words: Cadastre;

SUMMARY

Refferal of Regional Spatial Plans (RTRW) by Analytical Hierarchy Process (AHP) Method (Case study: East kalimantan Province Area) Udiana Wahyu Deviantari¹, Didik Wihardi², Yuliana Susilowati³ ¹ Geomatics Program, Institut Teknologi Sepuluh Nopember ²Masters Program in Land Administration, Geodesy and Geomatics Engineering Program ³Center for Geotechnology LIPI Abstract Province of East Kalimantan is the center of the activities of many parties, ranging from industrial sector, agriculture, forestry, mining, and also the center of economic activities of society. Spatial planning activities should be based on a land allotment notice constraints. In the spatial planning process required a study related to the ability / general land suitability and land suitability studies for a variety of special designation The regional Spatial Plans (RTRW) which is not in accordance with the suitability of land, will result in damage to the land. A direction for land use spatial planning using qualitative and quantitative methods for help existing problems. For data analysis using 2 methods, the first to determine the availability using Geographic Information System (GIS) and to determine the needs of land using AHP method (Analytical Hierarchi Proccess) . The method of AHP are designed with 4 kinds of alternative: Alternative 1, the priority order of mining, Agriculture, Plantation, Forestry ; Alternative 2, the priority order of Agriculture, Plantation, Forestry, Mining; Alternative 3, the priority order of Plantation, Forestry, Mining, Agriculture; Alternative 4, the priority order of Forestry, Mining, Agriculture, Plantation. Alternative analysis involment of stakeholder preference of society, goverments and investors. The criteria used include the social, economic, and environmental aspects. Expected results of this study are as follows optimization of land use in the province of East Kalimantan by existing land suitability and analysis of regional spatial plans (RTRW) with AHP method. Keywords: Regional Spatial Plans, Alternative, AHP

The Internet of Things: Are We at the Fringes of a Paradigm Shift in Geomatics?

Kazimierz Becek (Poland)

Key words: Geoinformation/GI; GIM; GSDI; The Internet of Things

SUMMARY

The Internet of Things (IoT, proposed pronunciation *iota*) is an emerging technology which was introduced as a complimentary solution to the Internet some 15 years ago. The difference between the Internet and IoT lies in the sources of data on which the networks rely. While the Internet is predominantly fed by data provided by humans, the data sources for IoT are signals from sensors attached to things or objects around us. Nowadays, the number and types of objects being equipped with sensors is growing rapidly. Modern cars, mobile phones, and many other instruments or objects are have sensors that produce a steady flow of data on the objects' internal status. Such add-ons to modern objects are very useful for both manufacturers and users of objects. The former use the data to develop better products, while the latter use the data for optimal management of their fleet of assets. Location is one of the most fundamental attributes of any object. Therefore, it is obvious that sensors must also be georeferenced. This georeferencing should also be applied to moving objects, meaning that that sensor needs to generate location data. In this presentation, we explore possible options to include the Internet of Things as a strategy/technology for geosciences of the future, that is, to build models of reality in real time. The demand for real-time maps (RTMs) is growing in many fields of human activity. Prominent areas in which RTMs are extremely useful are emergency response, disaster mitigation, and monitoring and assessment of rapidly developing events, both natural and anthropogenic. However, more "static" objects such as land parcels, transportation routes, buildings, and topographic features can also be represented with help of RTM. It is not difficult to imagine many economic and other types of benefits that the RTM representation of the real world could bring. Presently, real-time mapping already exists, at least in a relatively narrow sense and one that is far distant from the IoT strategy. For example, real-time logistic management requires maps showing the updated positions of assets for effective management. Still, the idea of IoT offers much more than that, because it would also allow for sensors to communicate independently from a central command post, as is the case with the current solution of logistic management. The Internet of Things has already been the subject of two European studies, specifically the IoT–Architecture (IoT-A) and IoT–Initiative (IoT-I) projects, as well as the Cluster of European Research projects on IoT (IERC). As far as the authors are aware, however, no geomaticians are participating in these projects. In our view such participation is desirable, and we suggest that interested colleagues would consider joining research efforts within these programs. This would bring to the field of Geomatics a fresh wave of new thinking about our discipline. We also propose that a working group under the Commission 3 of FIG will be formed which would study possible applications of IoT for the spatial data and information management.

Markov–CA Model Using Analytical Hierarchy Process and Multi Regression Technique

Najat Omar, Mohd Sanusi Ahamad, Wan Muhd Aminuddin Wan Hussin, Narimah Samat and Khaild Sabbar Mohammed (Malaysia)

Key words: Spatial planning; Land-use changes, Markov-CA, Suitability map, Multi-regression, Analytical Hierarchical Process, Kirkuk city.

SUMMARY

The unprecedented increase in population and rapid rate of urbanisation lead to extensive land use changes. Cellular automata (CA) are increasingly used to simulate a variety of urban dynamics. This paper introduces a new CA based on an integration model built-in multi regression and multi-criteria evaluation to improve the representation of CA transition rules. This multi-criteria evaluation is implemented by utilising data relating to the environmental and socioeconomic factors in the study area in order to produce suitability maps (SMs) using an analytical hierarchical process, which is a well-known method. Before being integrated to generate suitability maps for periods 1984-2010 based on the different decision makings, which have become conditioned for the next step of CA generation. The suitability maps are compared in order to find the best maps based on the values of the root equation (R2). This comparison can help the stakeholders make better decisions. Thus, the resultant suitability map derives a predefined transition rule for the last step for CA model. The approach used in this study highlights a mechanism for monitoring and evaluating land-use and land-cover changes in Kirkuk owing to changes in the structures of governments, wars, and economic blockade over the past decades. The present study asserts the high applicability and flexibility of Markov-CA model. The results have shown that the model and its interrelated concepts are performing rather well.

Deformation Modelling to support the Papua New Guinea Geodetic Datum 1994 (PNG94)

Richard Stanaway (Australia)

Key words: Reference frames; ITRF; National Reference Frames; Geodynamics; Deformation Modelling

SUMMARY

The Papua New Guinea Geodetic Datum 1994 (PNG94) is the current datum used in PNG. PNG94 (as with GDA94 in Australia) is a realisation of ITRF92 at epoch 1994.0. Unlike Australia, however, PNG has a very complex tectonic setting comprising of several rapidly moving microplates and deforming zones between the Australian and Pacific Plates. This paper describes how this rapid and complex deformation is modelled in the context of PNG94, considering that more than 20 years have elapsed since the realisation of the datum. Impacts of this deformation on different user groups are discussed with a view to a future update of the datum in the future.

The Application of GIS 3D Modeling and Analysis Technology in Real Estate Mass Appraisal

Hui Zhang, Yan Li, Biao Liu and Chao Liu (China, PR)

Key words: Geoinformation/GI; Valuation; 3D GIS; Mass Appraisal; CityEngine; 3D Modeling; Visibility Analysis

SUMMARY

ABSTRACT : Based on procedural modeling approach and residential property 2D GIS data of Shenzhen, 3D external models of buildings are generated by CityEngine in a quick and batch mode. And 3D internal model is generated by vectorization processing of rooms distribution within the target building. Then, the landscape analysis and the sunlight analysis that based on GIS visibility analysis method are applied on 3D model of the target building to get the concrete quantization indexes such as landscape visual range and sunshine duration. Those indexes could significantly influence real estate value. Finally, the drawing with 3D visualization effect for landscape information and sunshine information is produced. The results showed that: Compared with traditional manual modeling method, the rule-based 3D modeling method in CityEngine platform could take full advantage of existing GIS data. It could improve the efficiency of 3D modeling by rapidly and automatically generate refined building 3D model in batch mode. Meanwhile, compared with man-made subjective judgment, the building landscape and sunlight analysis model built by visibility analysis could quantify landscape and sunshine indexes more accurately. Furthermore, the application in real estate mass appraisal model for calculation and analysis will reduce the index errors brought by man-made subjective judgment. In addition, precise 3D visualization effect can provide appraisers with more intuitive and efficient view for real estate expression. It greatly improve the efficiency and accuracy in real estate appraisal.

The Cadastral Template 2.0, From Design to Implementation

Abbas Rajabifard (Australia), Daniel Steudler (Switzerland), Mohsen Kalantari and Ali Aien (Australia)

Key words: Cadastre; land administration, cadastral template

SUMMARY

Cadastrals are regarded as the foundation for sustainable social, economic and environmental development of societies. In 2003, under the auspices of the UN-sponsored PCGIAP Working Group 3 on Cadastre, a generic cadastral template was developed to establish a standard form, which allowed cadastral organisations to present and describe national cadastral systems in a standardised format. Such standardisation was important for enabling the identification of similarities and differences in matters such as land policy, laws and regulations, land tenure issues, institutional arrangements, spatial data infrastructures, technology, human resources and efforts to support capacity building. The Cadastral Template Project (www.cadastraltemplate.org) commenced and endeavoured to gather data on four key issues: • the magnitude of the basic tasks in the cadastral system; • the magnitude and problems involved in the informal occupation of land; • the role of the cadastre in SDI, and to get an appreciation of the completeness, comprehensiveness, use and usefulness of spatial cadastral data; and • to get an understanding of the capacity building activities in place or which needed to be established to support the system. A decade on, the Cadastral Template Project has collected data on 47 different national cadastral systems with updated reports being provided regularly by countries, demonstrating the continued merit of the exercise. However, in line with new technologies, the evolving conceptualisation of the role of the cadastre and an increasing focus on spatially enabled societies, an evolution of the project is now in the pipeline. This paper presents a new platform for the template, Cadastral Template 2.0. It will be a web-based resource that will gather and authenticate information through an enabling platform that is equipped with new functionalities and flexible design for updating and populating information about cadastrals. Cadastral Template 2.0 will also be designed to reflect the increasing acknowledgement of the relationship between cadastrals and the concept of spatially enabled societies. In addition to continuing to collect cadastral-related data, Cadastral Template 2.0 will also seek to gather data on the key elements that have been identified for a spatially enabled society, as outlined in FIG Publication No. 58, “Spatially Enabled Society”: • legal framework; • common data integration concept; • positioning infrastructure; • spatial data infrastructure; • land ownership information; and • data and information. It is envisioned that this new platform of data will provide a fundamental resource to assist countries in assessing and benchmarking their own national systems. This ultimately will facilitate decision making process in land administration systems and bring efficiency to their processes.

Developing Sustainable Procurement Framework for Malaysia Public Construction Procurement

Siti Nurhuda Binti Abd Wahid, Saiful Azri Bin Abu Hasan Sazalli and Zubaidah Binti Ramli
(Malaysia)

Key words: Professional practice; Quantity surveying; public procurement; sustainability practices; procurement framework; construction industry

SUMMARY

The need to address sustainability in construction through procurement strategies is being actively discussed in developed countries as well as in developing countries. Government is often the single biggest client within a country, and governments can potentially use this purchasing power to deliver government objectives, including sustainability practices in construction. World Summit on Sustainable Development in 2002 has called for governments to 'promote public procurement policies that encourage development and diffusion of environmentally sound goods and services'. Developed countries such as United Kingdom, Australia and Japan have taken the lead in promoting sustainability practices in public procurement. The UK for example, has adopted a Sustainable Procurement Plan and set its goal 'to be recognised as amongst the leaders in sustainable procurement across EU member states'. A study was conducted to identify key elements and measures to formulate sustainable procurement framework for Malaysia. The formulation of this framework begins with critical review of public procurement policies of countries namely UK, Australia and Japan. Input from the review is used to develop a conceptual framework of sustainable public procurement for Malaysia which then tested via questionnaire-guided survey among Malaysia industry players. This paper discusses the findings from the survey in pursuit of identifying key elements of sustainable public procurement for Malaysia.

Let's Talk About land and property information in 3D: What Should The Future Look Like?

Abbas Rajabifard, Mohsen Kalantari, Brian Marwick, Serene Ho and Ian Williamson
(Australia)

Key words: Cadastre; BIM, CityGML, InfraGML, IndoorGML, land administration, 3D, property, land development

SUMMARY

These days, there is much talk about 3D: 3D cadastres, Building Information Models (BIM), 3D GIS, 3D visualisation platforms... technical initiatives that are driven largely by a recognition of the physical complexity of our built urban environment, the growing use of high-rise as the functional residential model in urban settings, the increasing number of stakeholders involved and the corresponding streams of information outputs – all of which demand better tools to facilitate analysis, understanding and ongoing management of the built urban environment. The surveying profession's position within the built environment industry is often understated; yet surveyors play a pivotal role in the development process having the (increasingly) challenging role of crafting the relevant individual and communal rights, restrictions and responsibilities associated with complex high-rise structures. An ongoing research project titled 'Land and Property Management in 3D' at the Centre for SDIs and Land Administration at the University of Melbourne is currently investigating the use of 3D technologies for land administration purposes, with a key aim of modelling legal and administrative cadastral information for complex multi-storey buildings in an urban context and linking this with a building's physical information. The project adopts four key themes of inquiry to support a move to 3D: institutional challenges, data sourcing, data modelling and data visualisation. The paper seeks to provide an overview of the project as well as key findings to date in terms of articulating the opportunities and challenges inherent in the uptake of 3D initiatives relative to the vision of what the future of the surveying profession should look like, potential areas of change, potential barriers to change and suggestions for a way forward. Ultimately, this paper seeks to use these findings as a platform for engaging the wider surveying community. How should the profession interface with these 3D initiatives? What are the cultural, technical and systemic issues that the profession needs to be thinking about? These issues require consideration and input from a cross-section of the profession if we are to craft a legitimate and appropriate response.

Strategic Network Level Mapping of Underground Assets using Ground Penetrating Radar

Mark Bell (Australia)

Key words: Engineering survey; GNSS/GPS; Implementation of plans; Laser scanning; Positioning; Risk management; Standards; GPR, ground penetrating radar, utilities, mapping, laser scanning

SUMMARY

The commercial, safety and community benefits for using Ground Penetrating Radar (GPR) in the detection of underground assets, in particular utilities, is well proven. Currently most GPR surveys are typically carried out by hand pushed units using either single or dual frequency systems to confirm and/or locate underground assets. Once located, asset locations are marked using spray paint, the GPR images are saved for reporting and sometimes locations are mapped using GPS or other means for further use in CAD or GIS. These surveys are typically independently commissioned to contractors by utilities organisations with information rarely shared between organisations after survey completion. Advanced development of GPR systems now allows for rapid full 3D capture of underground assets using arrays of multi-frequency, multi-polarized antenna GPR towed by vehicles. This rapid capture capability is bringing to the table a case for a more coordinated capture of underground asset location across utility organisations for centralised and coordinated management and improvement of the efficiency of construction activities. The vehicle based GPR underground asset capture capability is towable and compliments the push for above ground asset capture using mobile 3D laser scanning technologies.

Ground Surface Deformation of L'Aquila Earthquake Revealed by InSAR Time Series

Sanming Luo, Wanju Bo, Shuang Zhu and Liming Fu (China, PR)

Key words: InSAR time series;L'Aquila earthquake;three dimension unwrapping;deformation field;evolution processes

SUMMARY

We measured deformation field and its evolution processes of the Mw 6.3 L'Aquila earthquake occurred on 6 April 2009, using time series of ASAR ascending track images acquired from October 2008 to September 2009. We processed the time series using the Stanford method for persistent scatterers. On epicenter the significant deformations was observed: (1) Envisat ASAR satellite detected clearly the process of the displacement field change of the earthquake and the different deformation characteristics associated with focal rupture in different period, which included pro-earthquake creep displacement, obvious accelerating deformation, rapid rupture during the quake, and continuously and significantly decreased deformation in magnitude after the quake. (2) There existed a significant accumulation of regional stress and strain the period of the seismogenic zone become destabilizing before the seismogenic fault ruptured and dislocated. (3) The region of the strongest deformation and ground rupture located at a low depression area tending towards southeast. The cracking propagated with an orientation of 135° , along the NW striking and SW dipping Paganica-S. Demetrio normal fault. (4) The rupture was mainly formed at the epoch of earthquake and thereafter with a maximum subsidence of 210 mm in the line-of-sight, concentrating on a zone of 22 km x14 km, and a large subsidence bowl was formed.

Investigation of the Optimal Resolution for Landslide Monitoring Using Terrestrial Laser Scanner

Chong Luh Lau, HALIM Setan, Zulkepli Majid (Malaysia), Albert Chong (Australia) and Mimi Diana Ghazali (Malaysia)

Key words: Deformation measurement; Engineering survey; Laser scanning; Terrestrial laser scanner; Resolution; Landslide; Deformation

SUMMARY

Landslide is one of the crucial natural disasters for countries throughout the world which leads to life threatening, properties and infrastructure damages. Hence, an effective technique is needed to reduce the impact caused by this type of disaster. There are two approaches available for landslide deformation monitoring and they are point-based technique and area-based technique. Nowadays, TLS technology is gaining popular in monitoring and predicting the movement of the landslide body due to the capability of high speed data capturing without needing direct contact with the monitored surface. Therefore, it is a suitable option for monitoring unstable land slopes. It is undeniable that, proper project planning is needed before carrying out any data collection for landslide monitoring. One of the aspects that need to be studied is the optimum resolution of survey. This scan resolution mainly depends on the distance between the scanner and slope surface: cm to mm resolution. Besides that, the type of resolution also depends on the minimum feature size that needs to be collected. Most of the researchers are using high resolution in this kind of application. The resolution of the digital terrain model (DTM) that can be generated for deformation analysis and easiness for data handling are directly influenced by the point cloud density set. Therefore, the objective of this study is to determine optimal level of resolution for landslide deformation monitoring purpose. In this research, the data acquisition was conducted at a cutting slope in Universiti Teknologi Malaysia (UTM), Skudai by using Leica ScanStation C10. Five control points were well distributed and established around the interest area for point clouds registration purpose. Two scan stations were used to cover the entire land slope surface. Three types of resolution were utilized at each scan station and they are low, medium, and high. The difference between generated DTMs for each resolution was compared with one another through model deviation analyse. At the same time, some artificial targets were placed on the land slope surface in order to evaluate the displacement measured from TLS with the value obtained from reflectorless total station. This study shows that the scanning resolution affects the generated DTM especially the low resolution sample. Hence, it can be concluded that the scanning resolution must be set carefully according to the accuracy required. In conclusion, this study demonstrates that TLS can be used to analyze the condition of the entire slope surface.

Collaborative Positioning – Concepts and Approaches for more Robust Positioning

Allison Kealy (Australia), Guenther Retscher (Austria), Charles Toth and Dorota Brzezinska (USA)

Key words: GNSS/GPS; Positioning;

SUMMARY

Collaborative or cooperative positioning techniques (CP) have been adopted from the field of wireless sensor networks as an approach to improving the navigation and positioning performance for a range of human and land vehicle navigation applications. This is particularly relevant for those applications operating in GNSS challenged environments where requirements for positioning availability cannot be met and/or which are safety critical, requiring higher levels of reliability and integrity. CP techniques typically leverage an available communications infrastructure to share information between users operating within a defined neighbourhood or so-called ad hoc network. This shared information can be integrated to deliver more robust positioning performance. Under certain conditions, the communications infrastructure itself can be used as a measurement source for positioning. For example, Dedicated Short Range Communications (DSRC) infrastructure which is being deployed in many countries to facilitate a range of Intelligent Transportation systems (ITS), has the potential to provide a ranging measurement between vehicles in a vehicular ad hoc network (VANET). What is emerging as a significant consideration for CP are the benefits for positioning in terms of availability, integrity, reliability and accuracy versus cost in terms of infrastructure, computational overheads and the overall quantity and quality of information that needs to be shared to meet the positioning requirements of a specific application. In this paper, the broad applicability of CP algorithms and techniques for land mobile applications is discussed. A range of qualitative and quantitative measurement information that can support CP is presented such as low cost MEMS based inertial sensors, map matching and DSRC. An initial cost benefit assessment of these 'measurements' is undertaken, in addition to considerations for determining the point of diminishing marginal utility for positioning i.e. at what point does the integration of additional information provide a negligible return to the positioning performance. This is an important step forward in redefining the concept of ubiquitous positioning from the traditional idea of integrating all available signals of opportunity, towards identifying the optimal set of measurements for the requirements of the application i.e. fitness for use. In this paper measurements collected during field experiments conducted under a joint FIG working group (5.5) and IAG sub commission (4.2.1) entitled Ubiquitous Positioning are analysed and evaluated in the context of CP. Full details of the experiments, practical results and future directions are presented.

Land Management Issue Related to Recovery From east Japan Great Earthquake

Masaru Kaidzu (Japan)

Key words: Cadastre; Land management;

SUMMARY

To promote quick recovery from damage by East Japan Great Earthquake, Japanese government continuously invest budget and implement necessary measures. East Japan is an area where cadastral survey has been intensively conducted compared to other area. Land administration related effort and role of Cadastral record in recovery in the area will be shown.

Urban Land Grabbing and its Implications to Urban Development

Komu Felician (Tanzania)

Key words: Implementation of plans; Land management; Security of tenure; Spatial planning;

SUMMARY

Land grabbing is a term that most investors find distasteful while to the general public it could be an eye opener to the future of the land that they might be occupying. To the urban planner, it may connote inefficiency and lamed administrative machinery that has permitted greed over land. Whatever land grabbing submits itself to be, its main concern is built on the premise of holding land for the future which may be translated to speculating on land either for economic or social-status gain. Land grabbing in urban areas may be explained from the observed multitude of undeveloped land parcels in urban Tanzania amidst a cry for shortage of land for development. This paradoxical urban reality has been considered differently by scholars, those advocating horizontal expansion of cities tolerate it and subscribe to more urbanization of the peri-urban areas; while there are those that consider viable urban expansion as that which takes cognizance of intensification of all available lands before venturing out to the periphery. Urban Tanzania is fast growing and in some cities at an alarming rate of over 3.5% per annum. This has bred land pressure for housing development on one hand, but on the other provided opportunities for large scale investments in form of schools, hospitals, retail properties and hospitality industries. With escalating land prices in urban areas, individuals are taking up lands in the peri-urban areas and in some instances from land occupiers with little exposure on the latent value that sits in the land to be sold to the land seekers. With use of five carefully selected cases, this study illustrates how urban land grabbing has given cause to land conflicts thereby impairing smooth urban development. The paper demonstrates how rigid form of land registration has bred loop holes in land use planning and tenure almost crippling and ridiculing the land administration system and made the work of professional town planners less significant to the public.

Private–Private Cooperation in Urban Regeneration Projects

Erwin Van der Krabben (Netherlands)

Key words: Land management; Land readjustment; Real estate development; Urban renewal;

SUMMARY

Traditionally urban regeneration in the Netherlands has been based on either ‘public-led’ development projects, with the municipality in a leading role in the development, or public-private partnerships, with the municipality and one or more private developers closely working together in the development project. Usually, municipalities had (and still have) a very substantial role in these projects, not only in the planning process, but also in financial terms. For various reasons, the effectiveness of these development models is now being questioned. Many projects have come to a standstill. The on-going financial and economic crisis can partially be hold responsible for this, but shortcomings of the development models have been suggested as a cause of the problems as well (Buitelaar, 2011; Janssen-Jansen et al., 2012; Van der Krabben & Jacobs, 2013). Moreover, apart from the possible shortcomings, municipalities have now become very reluctant to take a role as investor to the extent they were used to. As an alternative development model private sector-led and private-private partnerships have been put forward (Heurkens, 2012). In the context of this paper, we define private-private partnerships as the collaboration of two or more private developers in an urban regeneration project, both in organisational and financial terms. Recently, the ministries responsible for planning in the Netherlands, in cooperation with several Dutch universities, have launched a national pilot program to experiment with innovative private-private partnership in urban regeneration. Ten pilot projects have been selected as part of this program. In this paper we address the question to what extent private-private partnerships for urban regeneration can be effective, in the context of the present Dutch planning system. Regarding this effectiveness we analyse two different aspects: (1) how effective are private-private partnerships in the process of purchasing the necessary land and properties in the redevelopment area, and (2) to what extent can the public interest be protected properly and, related to this, can cost recovery of public works take place? To answer these questions we will, first, study the international literature on private-led urban regeneration projects. Second, we will analyse to what extent Dutch planning law ‘supports’ such a private-private partnership. And third, we will discuss the results of the pilot projects. We conclude that planning law, in its present form, lacks the right instruments to deal properly with private-private partnerships in urban regeneration. References: Buitelaar, E. (2010) Cracks in the Myth: Challenges to Land Policy in the Netherlands. *TESG* 101 (3), 349-356. Heurkens, E.W.T.M. (2012) Private sector-led urban development projects: management, partnerships and effects in the Netherlands and the UK. *Architecture + Built Environment*, Vol. 4. Delft: Delft University of Technology. Janssen-Jansen, L., Lloyd, M.G., Peel, D. & Van der Krabben, E. (2012) Planning in an environment without growth. Invited essay for Raad voor

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Using 3D Geographic Information System to Improve Sales Comparison Approach for Real Estate Valuation

Haicong Yu and Ying Liu (China, PR)

Key words: Geoinformation/GI; Real estate development; Valuation; 3D GIS; sales comparison approach; real estate valuation; spatial analysis;

SUMMARY

Geographic Information System (GIS) technology provides valuers with analysis tools to enhanced real estate valuation. The objective of this paper is to illustrate how GIS with three-dimensional visualization can improve traditional real estate valuation approaches. First of all, an integrated database for real estate valuation was built with real estate database, spatial database and valuation thematic database. The integrated database provides professional data support for valuation. Secondly, virtual reality technology combined with digital elevation model was used to construct a three-dimensional visualization environment. Three-dimensional building models can be added for working area reappearance. Through GIS tools, it benefits the understanding of working environment before field work. Importantly, an improved 3D GIS sales comparison approach was proposed as the demonstration of the combination of valuation methods and GIS. In this approach, a flowchart was first introduced, which enhanced the determination method of selecting and querying of comparable cases. Specifically, a 3D GIS valuation model was proposed. In the first place, feature analysis was executed to determine the impact factors of the value of properties, and then quantitative analysis was used to form a quantitative table for further analysis. Next, by utilizing spatial analysis, the feature factors can be accurately measured. In this model, spatial analysis, including spatial query, buffering, network, visibility, and surface analysis, was conducted for factor evaluation such as regional planning, regional prosperity, transportation convenience, landscape, environmental condition, fundamental infrastructure and public facilities conditions. According to the analysis results and quantitative table, each impact factor can be calculated, and represented as matrix. Then, through dimensionless treatment, detailed comparison approach among comparable cases in each factor can be executed, as well as the similarity analysis between the estimated object and comparable cases. Eventually, the most relevant comparable cases can be determined and the accurate adjustment can also be calculated for estimated object valuation. To illustrate the above approach, a prototype system was implemented. Actual data of Shenzhen have been used. The practice shows that more relevant data can be well collected and managed, which further promotes the data usage and data sharing. Second, it highly improves the working efficiency and the valuation accuracy, which further enhances the credibility of real estate valuation work. To sum up, the combination of 3D GIS with real estate valuation shows great benefits to promote valuation approaches, and eventually, it will promote the informatization of the entire property valuation industry.

Land Information System for Land Administration and Management in Bangladesh.

Haragobinda Baidya (Bangladesh)

Key words: Education; e-Governance; Engineering survey; Land distribution; Land management; : survey, population, land-man ratio, development, retrieval, interventions.

SUMMARY

Minority Self Empowerment Foundation (MSEF) NGO which is working with the land reforms and land survey in Bangladesh from many years. We are engaged with the land survey for the community based poor and remote village's mass stakeholder's people in our domestic country Bangladesh. This is ultimate helpful projects to develop the rural groups those who are living in Bangladesh. Bangladesh has a very high population density. Scarce land and the rapid increase of population of the country are creating high pressure over land-man ratio. Land ownership record system is insufficient and incomplete in Bangladesh. As a result, it spills out jumbled and spontaneous land development throughout the country, especially in the major cities. In this situation, it is important to establish a compatible land administration and management system for establishing a systematic approach for planned land development. Land Information System (LIS) is the most accountable and feasible systematic approach for developing an up-to-date land administration and management. LIS is related to various quantitative and qualitative aspects of land resource. Holding different cartographic information, LIS facilitates capturing, retrieval, and querying of information and provides tools to perform different analyses. Based on the secondary information by literature review, this paper is aimed at studying the existing land administration system, and recommending feasible interventions and strategy of LIS for creating an efficient land administration and management policy for Bangladesh. This paper also focuses on the challenges of LIS that are needed to be resolved for framing the existing land administration and management policy for planned and controlled growth of Bangladesh.

Improvement of Real Estate Appraisal Sales Comparison Approach Based on Cluster Analysis and Hierarchical Analysis

Jie Sun and Haicong Yu (China, PR)

Key words: Quantity surveying; Real estate development; Valuation; sales comparison approach; fuzzy clustering analysis; hierarchical analysis;

SUMMARY

Sales comparison approach is one of the most commonly used valuation approaches in real estate appraisal. In practice, however, the accuracy of estimated value has been definitely influenced due to the subjective and arbitrary determination on both quantification of real estate value influence factors and selection of comparison cases. To overcome above disadvantage, this paper proposed an improved approach by applying statistical analysis such as clustering and hierarchical analysis into the market comparison method, and then further present real estate appraisal model. To begin with, according to the dates of Shenzhen real estate sales price and real estate property need prepared. Then fuzzy clustering analysis was introduced to calculate the fuzzy membership degree and sensibility of regional factors and individual factors of all real estate. Both the final regional factors set and individual factors set can be determined according to the calculation results. Then, the most influenced feature factors was selected and quantified by utilizing Delphi survey method and hierarchal analysis. By doing so, the weights of each feature factor and the quantification rules can be determined. Last, on the basis of the above process, fuzzy clustering analysis was used to analysis the relevant building data to get the optimal clustering. In the optimal clustering set, the most similarity cases with estimated object were finally selected. This paper avoids the arbitrary selection of comparison cases and the subjective feature factors adjustment by transform qualitative analysis to quantitative analysis. The improved sales comparison approach shows more accuracy and more reasonable results in real estate appraisal.

Political and Ethical Responsibilities for Guaranteeing Privacy of Individual LBS Users

Franz Obex (Austria)

Key words: Positioning; LBS, people tracking, privacy protection, ethical issues

SUMMARY

The use of Location-based Services (LBS) is growing continuously and their acceptance for navigation has increased due to their benefits. Thus, people have started to trust navigation instructions on mobile devices more and more. The community of geodesist is working hard (also sometimes in cooperation with other disciplines) on technical developments for location technologies which can be applied in combined indoor and outdoor environments. In the case of localization of smartphones and other mobile devices, current development directions focus on the use of all available in-built sensors in these devices, such as GNSS, MEMS-based accelerometers, digital compasses and gyros, barometric pressure sensors, temperature sensor, etc. Using these sensors the trajectory of the moving user can be determined continuously using dead reckoning (DR). Further new development directions include the so-called collaborative or cooperative positioning technique (CP). In this case, a group of mobile users is located together by sharing their absolute and relative locations via their sensor measurements. Additionally measurements between all users are performed, such as range measurements between them. This approach strengthens the navigation solution of all users significantly. When it comes to the point that individual users have to provide and share their sensor measurements to other users it is usually not considered that a loss in privacy can occur. The available positioning technologies allow that is to say that, for instance, movement patterns of LBS users such as shoppers in malls can be recorded. Then in the best case, only their consumer behaviour is investigated. But the location capability could also lead to the point that people are continuously tracked. One might argue that the CP concepts may only be employed to locate and guide first responders, emergency crews, team of robots or swarm of Unmanned Aerial Vehicles (UAV's) or even soldiers in military application there is still the risk that it will be employed for tracking and observing people in other LBS applications. By the knowledge of the author so far the researchers are not considering privacy issues in relation to positioning systems in LBS. It seems that such a culture under geodesists has not been established yet. Hence, in this paper the question is raised why only in social science disciplines such privacy and ethical issues in relation to people tracking are evinced and discussed. The author believes that it is now of highest priority to establish ethical commissions at technical research institutes or that at least collaborations with social scientists are sought-after. Examples described in the paper demonstrate that the issue of protection of privacy of individual users is very important in LBS. Scenarios of people tracking and their consequences in combined indoor and outdoor environments are discussed and investigated. Study areas include large indoor complexes such as airports or shopping

malls. The examples demonstrate that the CP location technologies must be carefully handled and applied so that a navigation solution is obtained that benefits the individual user while keeping his privacy.

Real Estate Valuation Based on 3D GIS for Compulsory Purchase and Compensation

Ying Liu and Jie Sun (China, PR)

Key words: Geoinformation/GI; Real estate development; Urban renewal; Valuation; real estate valuation; 3D GIS; spatial analysis; Compulsory purchase and compensation

SUMMARY

Accompany with the development of urbanization, land and housing compulsory purchase is becoming a hot topic in China. In this process, land and housing valuation play an important role for compensation. Due to the innovative experience driven approach of valuation activity, and the fact that subjective factors may infect the valuation results, thus, it is necessary to enhance the scientific aspect of real estate valuation. This paper discussed applicable approaches supported by 3D GIS for optimizing the compulsory purchase working area, improving the valuation approach and providing a public platform for equal communication. Researches in real estate valuation and 3D GIS technology were first discussed, as well as the contribution and deficiency of current valuation theory in compulsory purchasing. Then, the difficulties in the current valuation practice were analyzed. Secondly, positive results had shown after analyzed the possibility of using 3D GIS to improve the accuracy of real estate valuation model. Then, this paper discussed how to use 3D GIS to assist real estate valuation. The integration and implementation methods of combining 3D GIS with professional valuation model were proposed. A real estate valuation model with 3D GIS technology was established through technical support such as spatial analysis, spatial measurement and spatial statistics and so on. It realized the quantification analysis and visualization of real estate valuation. Finally, this paper developed a 3D GIS valuation system for compulsory purchase and compensation (3DGISVCPC). Through the practical applications of using this technology in real estate valuation, it shows some advantages of the proposed approaches. Firstly, the compulsory purchasing working area is optimized through many efficient tools to reduce the unnecessary working cost. Secondly, the valuation standard and compensation standard are unified. In the meanwhile, the valuation accuracy is enhanced and working efficiency is also promoted. Last, the communication platform is built through 3DGISVCPC, any disagreement of neither the valuation results nor the compensation value can be easily reviewed.

Urban Renewal – a Case Study in Hong Kong

Edward S. H. Au (Hong Kong SAR, China)

Key words: Land distribution; Land management; Real estate development; Urban renewal; Valuation; Urban Renewal Acquisition and Resumption Reshape Redevelopment

SUMMARY

The Kwun Tong Town Centre project in Hong Kong is one of the biggest urban renewal and redevelopment projects ever since. Occupying a site area of 570,000 square feet, this multi-billion-dollar project will be the largest single project undertaken by the Urban Renewal Authority (URA) affecting about 1,653 property interests and about 5,000 people. Most of the existing buildings in the area were built in the 1960s, although 24 buildings are well over 40 years old and quite dilapidated. Back-lane hawker stalls and temporary structures pose serious hygiene and safety problems, with the poor sanitary conditions contributing to a hazardous living environment. The project plans include residential and commercial developments, leisure and recreational amenities, various community facilities, a public transport interchange, Government offices, and medical clinic. A landmark building will be erected in Kwun Tong once the redevelopment project is completed. The implementation of the project faces lots of challenges: The project involves more than 1,600 property interests and around 5,000 residents, and over 500 shops and licensed hawkers are affected. Taking proper care of all these stakeholders, and handling their re-housing arrangements, is a substantial and difficult task. Because of the unprecedented scale of the project, the very large number of property interests involved and the need to ensure that the offers made closely reflect market prices, 11 independent surveyors have been appointed to work out offer prices for these properties. They are required to take into account both current market conditions and the URA's established compensation policies. Urban Renewal – A case study in Hong Kong As the project covers a large area, the URA needs to consider factors such as the appropriate density of development, the height of the buildings, and the transport facilities required, while still preserving important original local features. A further goal is to meet the needs of the 'grass-roots' local population by retaining some low-cost residential flats and shops in the town centre. With a total development cost of over \$30 billion, this large-scale project is the most challenging development ever undertaken by the URA. Despite the high financial stakes involved, the URA's primary aim is to take care of the needs of the community and local residents. However, the large investment in the area should also bring with it a host of economic benefits. This paper aims to give an overall view of this mega urban renewal project highlighting the issues as abovementioned.

Development of a Prototype for the Assessment of the Malaysian LADM Country Profile

Nur Amalina Zulkifli, Alias Abdul Rahman, Hasan Jamil, Chee Hua Teng (Malaysia) and Peter van Oosterom (Netherlands)

Key words: Cadastre; Digital cadastre; e-Governance; Geoinformation/GI; Land management; Standards; database; technical model; LADM; country profile; 3D cadastre

SUMMARY

During the last couple of years, the potential of 3D and Land Administration Domain Model (LADM, ISO 2012) based cadastral registration in Malaysia has been investigated as described in several papers, and presented at various (FIG) meetings. Based on these preparations, a two day meeting between R&D staff from JUPEM and UTM has resulted in a proposal for a comprehensive LADM country profile supporting 2D and 3D cadastral registration in Malaysia. This conceptual model contains several novel aspects for the Malaysia: 3D representations (incl. legal spaces around utilities), full version management, linking of database information and source documents, and basic property units (grouping of spatial units in one basic administrative unit with same rights attached). In order to assess the new conceptual model, before taking further implementation decisions, a prototype system was developed. The purpose is to discover potential weak aspects of the conceptual model, and use experience from the prototype development to further improve the conceptual model, before actual implementation. The steps in developing this prototype include: 1. derive technical model (Oracle spatial) from conceptual model, 2. convert some sample JUPEM/land office data into model, and 3. develop prototype (based on MicroStation) to view and edit. Many decisions have to be taken to develop the database schema (technical model): which exact data types (with special attention for 2D and 3D spatial data types), how to implement topology, which references to store explicitly (and which to derive), how to physically organize the data in the various tables (clustering), on which (spatial and non-spatial) attributes should indices be created, how to implement various constraints (e.g. sum of shares must be equal to 1), etc. Modelling tools, such as Enterprise Architect, offer automated conversions from the conceptual model (UML class diagram) to the technical model, which will be explored. However, some manual fine-tuning of technical model is expected. Having the technical model, then existing (and if needed additionally created) sample data from JUPEM (spatial) and Land Office (legal, administrative) are converted into this structure and loaded in the database. Finally, the data from the Oracle database can be accessed by using Bentley MicroStation software for 2D and 3D visualisation and editing. The Structured Query Language (SQL) will be used to query and extract the data from the database. Based on the assessment, further steps could include (before actual implementation): • develop regulations/formats for digital certified plans with 3D objects, • redesign XML exchange

formats for LADM based Malaysian data, and • also create prototype of web-interface for integrated access JUPEM/land office data.

Combining Gns Measurement Technologies with Terrestrial to Improve Slope Stability Monitoring Accuracies.

Neil Ashcroft (Singapore) and Syamsul Bahri (Indonesia)

Key words: Mine surveying; GNSS; TPS; Monitoring; Slope Stability

SUMMARY

Slope stability monitoring activity and slope movement analysis in an open pit mine are important in evaluating the operational areas with high degree of failure possibility. Mining deformations such as geological conditions, hydrology, geomechanics conditions and geometry of the slope and the knowledge of the kinematic analyses are crucial in managing and reducing these possible risks. PT. Adaro mining concession lies in Warukin formation with coal deposits punctuated by mudstone and sandstone. Central Tutupan pit is located at the nose folds with the rock layers which undergo significant changes in the bedding dip of 65 ° at the low wall and 20 ° - 30 ° at the high wall. The low wall also contains layer of bedding shear form carbonaceous mudstone contained in the low wall and high wall. Green sandstone at low wall has a power lower than the sandstone. Drastic decrease of green sandstone with strength comparable to uncemented sand if exposed to air force. Since 2004 PT Adaro Indonesia has been developing an advanced slope monitoring system to monitor slope stability of its open pit mines. As one of the world's largest, with a mining area of nearly 45,000 hectares, PT Adaro's single open-pit mine boasts of 13 Robotic Total Stations (RTS) supported by 800 active monitoring prisms scattered throughout the mine area. From the results of the automatic slope monitoring system performed by RTS and GNSS, the information is taken as the value of the movement that occurs in each respective area or disposal. If the movement of a slope exceeds a predetermined trigger level, then it can be taken in the form of changes in mine design controlling evacuation or any type of work (including the mining activity) done in the affected area to avoid the risk of equipment damage caused by a catastrophe, such as landslide. For long-term purposes, data from the RTS and GNSS can be used as supporting data for further Geotechnical analysis to get an overview of the characteristics of a slope in a particular area. Geodetic monitoring, through the RTS system, measures 3D positions at specific instances in time and compares them with previous positions to derive changed in deformation over time. These positions are derived from what is an assumed to be FIXED and STABLE reference position, which is not always so, specifically in the world of open pit mining. GNSS equipment can position 3D coordinates over longer distances, where a FIXED and STABLE reference position is better controlled. This paper cites an example in Indonesia where 16 Robotic Total Stations are combined with 8 GNSS devices to provide better overall absolute accuracies.

Analuis of Earthquakes Patterns in Iran Based on the Defelection of Vertical Components of the Egm2008 Global Geoid Model

Ramin Kiamehr (Iran)

Key words: Deformation measurement;

SUMMARY

Only with satellites it is possible to cover the entire Earth densely with gravity field related measurements of uniform quality within a short period of time. A new Earth Gravitational Model (EGM2008) to degree 2160 has been developed incorporates improved 5 5 minute gravity anomalies and has benefited from the latest GRACE based satellite solutions. Due to the high altitude of the satellite, the effects of the topography and the internal masses of the Earth are strongly damped. However, the deflection of vertical components, are the second order spatial derivatives of the gravity potential, efficiently counteract signal attenuation at the low and medium frequencies. In this article we review the procedure for estimating the deflection of vertical components based on the spherical harmonic coefficients of the EGM2008 global combined geoid model. Then we apply this method as a case study for the interpretation of possible earthquakes patterns in Iran. We found strong correlations between the components of the deflection of vertical, and earthquakes patterns in Iran. It can be used for detecting of possible hidden faults in the study areas for establishment of the deformation monitoring networks based on the GPS.

A Review on Legal Traceability of Global Positioning System (GPS) Measurements in the Malaysian Cadastral Practice

Kamaludin Omar, Azhari Mohamed and Jespal Gill (Malaysia)

Key words: Cadastre; GNSS/GPS; Professional practice; Standards; Legal Traceability

SUMMARY

As the dependency on Global Positioning System (GPS) surveying has been growing over the years, the need for legal traceability of GPS measurements has become a significant matter. In Malaysia, with the advent of the Malaysian Real Time Kinematic Network (MyRTKnet), GPS surveying has revolutionised land survey and mapping. Correspondingly, the Department of Survey and Mapping Malaysia (DSMM) amended and published standard regulations and guidelines concerning cadastral survey, i.e. Cadastral Survey Regulations 2009, to include GPS measurements. However, these regulations and guidelines do not provide a comprehensive form of legal traceability of GPS measurements; which is a requisite for cadastral surveys as it requires conclusive and legitimate evidence for issues such as boundary disputes. The aim of this paper is to review the current practice of GPS in cadastral survey, and to outline the issues and importance of legal traceability of GPS measurements in cadastral survey. The current practice will be reviewed in terms of calibration procedures, measurement techniques, and observation results (i.e. accuracy and repeatability) to provide a so-called best practice guideline. The outline on legal traceability of GPS measurements will encompass issues related to the aspects of the previous review, as well as further aspects such as reference datum, and methods to implement legal traceability of GPS measurements. It is expected that this paper will contribute to the understanding and implementation of best practice and legal traceability of GPS measurements in cadastral survey.

Cooperation Between Taxpayers and Municipalities for Valuation Purposes

Ruud Kathmann and Marco Kuijper (Netherlands)

Key words: e-Governance; Geoinformation/GI; Property taxes; Valuation; mass appraisal

SUMMARY

In The Netherlands all real estate is assessed annually for levying taxes and other government purposes. Real estate owners annually receive an official notification of the assessed value of all their real estate properties. The 408 municipalities in the Netherlands are responsible for these assessments and therefore also for the quality of the data used for the appraisals. The appraisals are performed by (tax) divisions of the municipalities, by partnerships of municipalities or are outsourced to mass appraisal companies. The Netherlands Council for Real Estate Assessment (in Dutch: Waarderingskamer) supervises the appraisal process and stimulates the cooperation between government and taxpayers. An convincing assessment of real estate is only possible when accurate, reliable, updated and accepted data is used. The system of base registers in the Netherlands helps, but for the assessments more data is needed and a higher level of reliability, topicality and acceptance is necessary. A growing number of municipalities systematically updates and verifies data by consulting the taxpayers by internet. Three important reasons for this approach are: 1. the current conditions of the real estate market, whereby maintenance conditions and a dated nature of the property have great influence on market value of houses; 2. a changing relationship between the government and inhabitants, whereby inhabitants prefer to be in the lead and distrust government information and; 3. the necessity for municipalities to work more efficiently and reduce their costs. The taxpayers in these municipalities have been given the opportunity to monitor the appraisal data by internet and to declare whether the data is (still) correct or to suggest alterations or improvements of the data. This proves to be an efficient method since owners can give the most accurate information on the maintenance condition or the technical state of the building. People turn out to be willing to check and improve the data, because they are curious to see the new appraisal of their property and want to influence this appraisal. Of course, municipalities check the data provided by the taxpayers and stay responsible for the correctness of the appraisal. The involvement of citizens in the appraisal process has already two important positive effects: 1. it improves the taxpayer's trust in the correctness of the valuation and this reduces the number of appeals against the assessed values; 2. it has a positive effect on the quality of the data for the appraisal, but also a positive effect on the quality of the data within the Dutch system of base registers. These effects have been reached without an increase of total costs. We hope that in future it will even contribute to a further decrease of costs. In this article we will describe different cases where the input of taxpayers play an important role in the appraisal process. This article will also describe the conditions provided by the Netherlands Council for Real Estate Assessment to stimulate this role for taxpayers to improve government data.

Preparing Kadaster for the Future and Contribute to Sustainable Economic Development

C. J. (Kees) de Zeeuw and F. L. V. P. L. (Frank) Tierolff (Netherlands)

Key words: Cadastre; Data collection, Information services, Cadastre, Land registry, Sustainable economic development, Future

SUMMARY

Intelligent and effective land administration systems are a solid condition for a sustainable and healthy economy. If such a system does not exist in a country, development chances are far from optimal. For instance, regarding legal security (a basic requirement for investors), access to credit (mortgage), spatial planning (in support of economic and environmental development) and effective and efficient land taxation. As a result, there may be many disputes, frustrating efficient land use. Therefore, protection of ownership through property registers is an important condition for sustainable economic development. The national and international context in which this must be done is dynamic, and asks for permanent adjustment and improvement of products, services and business models. This also counts for land administration and cadastre in the Netherlands. As a result the products, services, the area of application and business models of Dutch Kadaster change, whether we like it or not. There is a clear movement in the requirements of our users, from data deliverance activities towards (integrated) information and knowledge supply. To meet up to this requirements and to be prepared for our future role, Kadaster restructured it's organisation from a registration and a mapping division, to two new divisions: Data collection and Information services. This paper gives examples of the concrete recent activities at Kadaster, that contribute to these developments. With respect to data collection the use of unmanned aerial vehicles (UAV) and a web based customer application for the identification of preliminary borders (SPLITS) are good examples. Groundbreaking is the new approach for automatic generalisation of (topographic) maps. But also giving room to small innovations by employees, is part of the used approach. In the domain of information services our contributions to a national system of key registers is important, as new services like public web map services (PDOK), in which many national organisations work together. The provision of information to excavators on cables and pipelines (KLIC) has become a success, and land consolidation processes in the Netherlands are supported with new information products, such as 'the agricultural report'. New business models like governmental open data policy influences our way of work and the area of application changes both in theme and in geography. In Europe, cross border developments become more important. Also the role of the user is changing (both professionals and the general public), resulting in self service and crowd sourcing initiatives. Meanwhile, the collaboration between governmental organisations, universities, NGO's and private companies is becoming more and more a prerequisite for keeping pace with developments and user demands. Finally, being part of an international context is considered

very important to achieve all these objectives. Developments within Kadaster can no longer be seen without the context of international developments.

Improve the Accuracy of SPP and Reduce the Cost When Using Global Navigation Satellite System

Fawzi Zarzoura (Egypt) and Baris Mazurov (Russia)

Key words: Cost management; GNSS/GPS; Positioning; SPP; DGPS; IGS and GDOP.

SUMMARY

The standard scenarios for GPS surveying can be performed by either of two ways: single point positioning SPP, or differential positioning DGPS. SPP employs one GPS receiver, while DGPS employs two (or more) GPS receivers. The disadvantages of DGPS are: dependency on the measurements or corrections from a reference receiver, the accuracy degradation when the rover receiver is being far from the reference receiver, the cost of two GPS receivers and associated software. On the other hand, SPP mode has become an attractive alternative to the differential GPS mode of positioning. Until now, the instantaneous accuracy of the GPS single point positioning was limited by many errors. This paper tries to improve the accuracy of SPP by selection the best error models in Mecca observations. Precise ephemeris from (IGS), Klobucher ionosphere model, and Hopfield or saastimoinen troposphere model with cut off angle 220 and $GDOP \geq 6$ would give an appreciable improvement for SPP. One way of reducing the cost of GPS surveys is to propose that the reference station receiver be operated as a service by some government agency or private industry organization. In this way the surveyor need only purchase a single GPS receiver. This paper also concluded that multi-references solution with code solution improves the accuracy of single references solution but using of single references with phase-code solution gives nearly the multi-references solution in Mecca , Egypt and Kuwait networks

Building Moral Foundation for Ethical Professionalpractice:the Nigerian Surveyors Experience.

Chima Ogba (Nigeria)

Key words: Legislation; Professional practice; Standards; MORAL,ETHICAL AND PROFESSIONAL PRACTICE

SUMMARY

BUILDING MORAL FOUNDATIONS FOR ETHICAL PROFESSIONAL PRACTICE: THE NIGERIAN SURVEYORS' EXPERIENCE ABSTRACT To influence the society they serve positively, Surveyors need to earn and maintain public trust by not only exhibiting high technical capability, but also high moral standards and integrity. This paper therefore deals with issues of professionalism, morality and ethics, and how professional associations ensure public trust by having code of ethics, which governs their activities. Studies show that adherence to professional ethics is a function of three factors – the personal ethics of the professional, the influence of the professional's role models and the Laws and Regulation of the professional body/regulating authority. The paper sets out to determine the extent each of these factors has contributed in ensuring ethical professional practice in the country. Surveyors in Nigeria have code of ethics given by the professional association, called Nigerian Institution of Surveyors (NIS), and a statutory regulating body, the Surveyors Council of Nigeria (SURCON). The codes of ethics from these two institutions regulate professional practice in the country. The paper analyses the activities of these two institutions over the years in checkmating unethical practices and found the Institutional laws and regulations inadequate in addressing the problems. Our findings show that using Laws and regulations to maintain ethical practice is always limited in their effect, and relatively weak. The paper believes that integrity and ethics must be built from within, reserving the use of law and regulations as last choices only. Based on this fact, this paper focuses attention on what happens in the inside of the professional, the moral make-up that shapes all other professional action. The paper proposes a new professional ethics based on two ethical principles- the Golden Rule and Hippocratic Oath. We saw the universality of these two principles and its applicability in the Nigerian context. Based on these two principles, a more pragmatic, positive ethical behaviour was proposed where the professional sees himself highly obligated to his society, employers and funders, his profession and professional colleagues. In dealing with each of these, he makes sure that he is fair to all concerned, by not knowingly do harm unto any, and by acting in a way that he will want them to deal with him. This is the whole gamut of moral foundation being canvassed in this paper. The paper advocates a revision of the existing code of ethics based on the proposed moral foundation.

HMK – Swedish Handbook in Surveying and Mapping

Anders Alfredsson, Johan Sunna and Clas-Goran Persson (Sweden)

Key words: GNSS/GPS; Photogrammetry; Reference frames; Reference systems; Standards; Guidelines; Handbook; Surveying; Mapping

SUMMARY

The aim of the Swedish handbook in surveying and mapping is to contribute to an efficient and standardized handling of survey and mapping issues in Sweden. The objective is to provide guidelines and to support different user groups in the field of surveying and other types of geodata capture. Lantmateriet, the Swedish mapping, cadastral and land registration authority, has a long tradition of supporting the Swedish surveying and mapping community. The same type of guidelines was written about 20 years ago and is widely spread within Sweden. New techniques and new working methods have increased the demands for an updated handbook. A common situation today is that a geodata capture project is ordered by procurement and then performed by some surveying company. The new working methods need a new structure of the supporting handbook, it needs to support both the procurement process and the actual geodata capture procedure. The handbook covers most of the field of surveying and mapping and is now divided into two main parts, geodesy and geodata capture. The part of geodata capture includes several different sections, aerial photography, photogrammetric surveying, laser scanning, orthophoto and digital elevation models. This presentation will however focus on the geodetic part. This part is divided into three sections. The first section is a knowledge base with information about the geodetic infrastructure in Sweden - such as reference systems and frames, map projections and geodetic surveying in general. The second section contains practical guidelines for different surveying techniques, such as GNSS and terrestrial techniques. For example, the GNSS section includes RTK, network RTK and static GNSS surveying. While the last section contain tables to help the reader to choose a suitable surveying method from the ones described in the second section. The main idea is that the geodetic part of the handbook would be possible to read both as an educational book, from top to bottom, and as support in procurement, from bottom and up. The handbook is written mainly by Lantmateriet in collaboration with the stakeholders and will be published in digital form continuously as the different parts are completed. The first completed documents were published in 2013 and the following documents will be published during 2014-2015. The handbook will in the future be updated with new versions to keep up with new demands.

Propagating the Uncertainty of the Market Value by the Use of a Bayesian Regression Approach

Sebastian Zaddach and Hamza Alkhatib (Germany)

Key words: Valuation; market value; uncertainty; sales comparison approach; Bayesian regression analysis

SUMMARY

The real estate and finance crisis has shown the importance of real estate valuation: The market value has to satisfy high objective requirements. Besides, the German jurisdiction demands a maximum dispersion of $\pm 20\%$ of the market value. The sales comparison approach as one of the valuation methods is from a mathematical-statistical point of view based on a multiple linear regression analysis. Since decades it has been considered as a standard procedure for analysing the real estate market and to determine the current market value. Nevertheless, the method has not been enhanced significantly since its introduction. The estimated comparative value is in particular depending on the number and the type of value influencing characteristics which are considered within the regression model. The aim of this research is to enhance the use of regression analysis in real estate valuation by the use of a Bayesian regression approach, which is able to consider the uncertainty of the value affecting characteristics as a prior information and thus to quantify the impact to the market value. For this purpose, the prior information of the data has to be derived empirically from the data itself using empirical Bayes method. The resulting density function after applying the Bayes theorem, the posterior density, has to be estimated by means of Monte Carlo techniques. After initialization, the estimates and their uncertainty are used as a prior information for following analysis. Thus, the uncertainty of single analysis can be propagated at any subsequent data set. The methodology is tested on a real data set. The establishment of the advanced mathematical approach should allow predicting any real estate values for objects within the selected spatial and objective submarket. It can be supposed, that this approach should provide more precise and appropriate uncertainty of predicted values and the use of information that are not yet included in the regression analysis.

Introducing a New Class of Survey–Grade Laser Scanning with Unmanned Aerial Systems (UAS)

Philipp Amon, Peter Rieger, Ursula Riegl and Martin Pfennigbauer (Austria)

Key words: Bridge surveying; Deformation measurement; Engineering survey; Laser scanning; Mine surveying; UAS, Unmanned Aerial System, UAV, surveying, laser scanner, forestry, corridor mapping, pipe line monitoring, echo digitization

SUMMARY

Unmanned Aerial Systems (UAS) – until some years ago most restricted to the use for military applications - are about to capture the commercial and civil market. Advanced systems providing first-class technique for this new dynamic topic are becoming available now. To meet the requirements of LiDAR instruments used with UAS applications, RIEGL comes up with a new class of survey-grade laser scanner. We provide insights on the employed technologies as well as on integration and operation of the instrument. The results of first field test are analyzed with respect to measurement precision, resolution, and other application-related aspects like provided point attributes, thus opening up new possibilities of using laser scanners with UAS in commercial and civil surveying and monitoring applications. The new RIEGL VU-XX is a very lightweight and compact laser scanner, meeting the challenges of emerging survey solutions by UAS and ultra-light aircraft, both in measurement performance and in system integration. With regard to the specific restrictions and flight characteristics of UAS, the scanner is designed to be mounted in any orientation. It is tailored for platforms with limited weight, space, and supply power for payloads. The entire data set of an acquisition campaign is stored onto an internal 360 GByte SSD and/or provided as real-time line scan data via the integrated LAN-TCP/IP interface for post-processing. The VU-XX offers high-accuracy laser ranging based on RIEGL's unique echo digitization and online waveform processing, which enables achieving superior measurement results even under adverse atmospheric conditions, and the evaluation of multiple target echoes. The scanning mechanism is based on an extremely fast rotating mirror, which provides fully linear, unidirectional and parallel scan lines, resulting in excellent regular point pattern distribution. Employing such cutting edge LiDAR technology enables operation at up to 500 kHz measurement rate, with a maximum scan speed of 200 scans/sec, and at an operational flight altitude of 350 m. With its high-resolution multi target capability the instrument is excellently suited for agricultural and forestry applications, power line, railway track or pipeline inspection, as well as surveying of urban environments, surveying and monitoring in open-pit mining, or terrain and canyon mapping, to name just a few possible applications.

Efficient Land Registration in Jamaica

Munsung Koh (Republic of Korea)

Key words: Cadastre; Land management; jamaica; land registration; title registration system

SUMMARY

Jamaica is a lower-middle income country with almost half its population residing in rural areas and dependant on the land. Less than 40 percent of the rural areas in Jamaica are registered that it leads difficulties in utilizing land, proving ownership and even taxation. The high costs and long processing time incurred by the Title Registration System in Jamaica had been recognized as the main hindrance of the low land registration. To facilitate the process, the Government of Jamaica in 2000 had established Land Administration and Management Programme (LAMP), which aimed to assist land holders without titles to obtain land title, and installed 13 continuously operating reference stations (CORS) in a national scale, which aimed to assist better land surveying services by Network-RTK activation. However, such endeavors could not effectively assist land holders to obtain land title even though the titling environment had been improved. Korea Cadastral Survey Corporation (KCSC) had realized more improvement is feasible in Jamaica that the participation in LAMP project was initiated in 2010 in St. Elizabeth, the parish showing the lowest land registration rate as 33 percent. KCSC primarily focused on cadastre innovation by computerization and technology transfer. The cadastral surveying has been undertaken by Network-RTK method in a systematic way, and an alternate land registration method has been adopted to reduce the high costs and long processing time. As a result, the costs and time were reduced approximately by two thirds, achieving public attention. This paper introduces the land registration in Jamaica, and the endeavors and outcomes had driven by KCSC are presented.

Territorial/Spatial Planning in Albania

Pal Nikolli, Bilal Draci (Albania) and Bashkim Idrizi (Macedonia, FYROM)

Key words: Spatial planning; "GIS", "spatial data"

SUMMARY

Territorial/spatial planning in Albania Pal Nikolli, Bilal Draçi, Bashkim Idrizi Albania has a complex history of spatial planning that dates from the last century (1950 year) and has experienced a dramatic transformation due to changing political and economic regime in 1990. The first attempts to create a new system of territorial planning in Albania began in 2006 with the preparation of a policy document for planning. The process for preparation of the law on territorial planning began after the adoption of the policy document in 2007. On April 23, 2009, was passed by the Parliament, the Law no. 10119, "On Territorial Planning". This law has been amended six times since it was approved. Territorial planning authority in Albania resides at the national and local level. The national territorial planning authority resides in the central government, which (under the current legislation) is with the Territorial Planning Council of the Republic of Albania that adopts and approves or rejects different urban and spatial planning studies. The relevant ministry handling territory planning activities through the Territory Planning Directorate co-ordinates work among Territorial Planning Council, state bodies and local government bodies in the field of spatial planning. This presentation addresses these problems: - Territory Plan overview - Territorial planning in Albania - National authorities of territorial planning - Coordination of territorial planning documents - GIS Technique for Territorial Analysis - Data for Spatial Planning in Albania - Current problems related to spatial planning in Albania

Urban Renewal Site Selection Using Gis in Karatay Region, Konya/Turkey

Beytullah Yalcin, Mevlut Uyan and I.Kursat Gocergi (Turkey)

Key words: Urban renewal;

SUMMARY

Urban renewal is a program of land redevelopment in areas with various applications in accordance with the principles of modern urban planning and planning fundamentals after unplanned urbanization and its caused problems are examined social, economic and spatial aspects. Implementation of urban renewal efforts is an important issue in the developed cities. Because, many criteria such as social structure, ground conditions, infrastructure and transport availability, land prices, request of landowners must be taken into consideration for urban renewal site selection. This paper is focused on the combining Geographic Information System (GIS) technology and spatial analysis techniques for the most appropriate urban renewal site selection in the Karatay District of Konya Province, Turkey. Determined areas were compared with the existing renewal areas.

Using of Laser Scanning Technique to Culture Heritage: the Sample of Kizkalesi

Murat Yakar and Ali Ulvi (Turkey)

Key words: Laser scanning; kızkalesi

SUMMARY

The aim of this study is to show that cultural heritage, relievos and silhouette projects Located in study area can be produced by 3D terrestrial laser scanners. In addition, used a large number of information in different ares based on these datas. In this study, the dimensional model of Kızkalesi has been done by using topographic laser scanning techniques. Check points were measured with Total Station, to prepare Relievo Project and to create 3 dimensional point datas. Laser scanning operation was done with the device Trimble GX3D and point cloud. CASE STUDY This work forms 2 phases that they are the works of terrain and bureau. Our terrain working was formed with preparation before work, coordinatement of check points with total station and attachment them, and field scanning with laser scanning tool. Field work is five days and Office work is twenty five days. RESULTS OF SCANNING Laser scanning was done with Trimble GX 3D laser scanning from 25 different station and with 1,5 cm space. Every scanning was done at least 4 linkups in mutual areas. Coordinates of points (30.374.829 adet) obtained from scanning, were transformed general coordination system. Considering coordinate differences and their standard deviations, t-test was applied to coordinate differences obtained from manual method if it is meaningful or not. Calculated test sizes were given in Graph 7. These values were compared with limit value in t-chart and with degree of freedom ($f=n-1$) and $\alpha=0.05$ mistake possibility, t-test limit value is 2.05. (for $f=30-1=29$ degree of freedom and $\alpha=0,05$ mistaking possibility) When the graph 7 is analyzed, it is seen that all test values are seen under limit value. $T_x=V_i/S_{x_i}$ $T_y=V_i/S_{y_i}$ $T_z=V_i/S_{z_i}$ 200 1.273 -0.883 -0.68737 201 1.206 -1.232 0.737557 204 -0.853 0.755148 -0.58019 205 0.756 -0.35695 -0.38567 207 -0.987 0.211787 1.372945 215 -0.474 -0.39978 0.967545 210 -0.743 -0.36542 -0.50537 227 -0.355 -1.25638 -1.01357 231 -1.150 1.233465 -1.386 233 1.500 0.491458 -1.01951 244 -0.794 0.416431 -0.44993 246 -0.463 -0.45519 1.337721 251 -0.801 -1.57506 0.816851 254 -0.868 1.1093 -1.1801 256 1.607 -1.26374 -1.09232 316 1.259 -1.18808 0.770196 320 -1.333 1.178954 -0.90581 322 0.818 -0.53643 -0.2782 325 -0.990 0.233546 1.514005 330 -0.541 -0.45603 1.024853 343 -0.793 -0.38999 -0.67419 350 -0.729 -1.84215 -1.06152 357 -0.896 1.174873 -1.11706 360 1.476 0.483524 -1.00305 363 -0.745 0.549051 -0.47458 367 -0.590 -0.57995 1.503853 377 1.054 -2.21045 1.074722 383 -1.001 1.503139 -1.48486 387 1.178 0.365624 0.758472 394 -0.691 0.453036 -0.31327

CONCLUSIONS Today, it is important to have visual information and a three-dimensional model which is fast and complete at minimum cost. Therefore, we need to collect lots of data quickly, in order to use of three-dimensional information for various purposes. Especially, usage of this method, which begins to have an important place at the engineering field,

become widespread gradually, and provides good advantages in terms of time, cost and labour for users. As a result of this study, we concluded that laser scanning measurements have sufficient sensitivity for the protection of world cultural heritage assets and the information obtained from such measures can be used in interdisciplinary studies.

GIS Based Carbon Dioxide Concentration Research in ITU Campus, Istanbul –Turkey

Hayri Hakan Denli, Dursun Zafer Seker and Sinasi Kaya (Turkey)

Key words: Geoinformation/GI; Risk management;

SUMMARY

Clean air and clean water is a basic requirement of life. Opposite to water, getting fresh air in the developed areas is not possible especially in the megacities like Istanbul. The quality of air inside buildings where people spend a large part of their life is an essential component for health and well-being. Hazardous substances emitted from buildings and vehicles like Carbon monoxide and Carbon dioxide may lead to a broad range of health problems. Thus, measuring and mapping of these parameters are extremely important to get precautions to increase their life quality. In this study, Istanbul Technical University campus was selected as the study area. It is located near by the heart of the commercial area with more than 25K people including students and personal. At the 80's, the neighborhood of the campus was totally covered with the forestry areas and small buildings which are turned to skyscraper later on. The area now is housing many national and international companies in these huge skyscrapers at the northern part adjacent with a road of high traffic intensity. The other parts of the campus are either surrounded by squatter's house or high level traffic roads. As the indoor air quality is directly dependent to outdoor gas component, the study's aim has been focused to find out the distribution of Carbon monoxide and Carbon dioxide levels in and around the campus. GIS based distribution maps were realized using daily measured parameters in and around the campus on the approximately 20 stations. GIS supported spatial analyses have been carried out to display the level of the parameters which are over the acceptable level for the human health. In the study also comparisons with other parts of Istanbul have been presented.

Documentation of Remote Archaeological Sites – a Comparison Between Long Range Laser Scanning and Uav–Based Photogrammetry

Ephraim Friedli and Pascal Theiler (Switzerland)

Key words: Engineering survey; Laser scanning; Photogrammetry;

SUMMARY

In this paper we focus on two geodetic methods for documenting remote archaeological sites. We evaluate and compare the two methods – terrestrial long-range laser scanning and aerial photogrammetry based on unmanned aerial vehicles (UAV) – with respect to the demands of archaeological surveys. The investigation is based on two archaeological sites in the Peruvian Andes. Santa Maria, the smaller site, spanning about 0.16 square kilometres, is located in a high mountain valley and is covered with vegetation, i.e. grass and bushes. The larger site, Cutamalla, spanning 0.35 square kilometres, is located at the crest of a mountain at an altitude of 3300 metre and thereby represents one of the highest areas in this region. The data sets were acquired during a field campaign in collaboration with the German Archaeological Institute (DAI) within the “Verbundprojekt Anden-Transekt” in 2011. The principal goal was to generate high resolution digital terrain models (DTM) as well as orthophotos. The resulting terrain models with resolutions of 10 centimetres prove that both methods can be used to derive DTM’s that fulfil the archaeological requirements, i.e. objects of interest such as terrace structures or brick walls are clearly visible. A comparison of the models shows, that the planar congruency is within some centimetres, whereas the height differences are up to some decimetres. Reasons for the larger height discrepancies are the different effects of vegetation and man-made structures on the terrestrial and on the airborne measurements as well as inaccuracies arising during the post-processing (i.e. registration, filtering or matching). We also compared the methods regarding economic and practical aspects. UAV-based photogrammetry enables one to capture a complete scene with high and approximately constant resolution over the entire area. However, to keep the acquisition and processing time (i.e. ground control point distribution, amount of images) feasible, the observed area should not exceed a few hectares. Furthermore, the application of a UAV is limited by wind, precipitation and potentially legal restrictions. Terrestrial long-range laser scanning is more robust with respect to meteorological conditions, does not necessarily require ground control points in the observed site and can acquire data over large areas. The main drawbacks of laser scanning are the required line-of-sight between the instrument and the features to be scanned, and that the spatial resolution decreases linearly with distance and thus varies within a single scan, which influences the effective resolution of the final DTM. Consequently, the acquisition from multiple stations becomes necessary which increases the effort for fieldwork and post-processing. Finally, due to the different viewing angles and sensing principles, TLS is less accurate for horizontal structures whereas UAV-based photogrammetry is less accurate

for vertical ones. Within the above project, long-range laser scanning proved to be more efficient for the Santa Maria site due to larger height differences and the visibility of the valley's counter slope. The rather flat area of Cutamalla was better suited for UAV-based photogrammetry than for TLS. Current investigations exploit the advantages of combining both methods.

Modelling of Road Traffic Noise

Bulent Bostanci and Abdurrahman Geymen (Turkey)

Key words: Geoinformation/GI; Spatial planning; Highway Traffic Noise Map; Regression Analysis; Interpolation

SUMMARY

In a daily routine of city life, noise is one of the most influential factors on human health. Noise, which may be denoted as undesired sound may also lead to physiological and psychological diseases. Particularly, metropolitan cities are the sources of relatively several noises such as transportation, industry and human voices. Developments of the cities in the world have accelerated after the World War II. Parallel to the developing cities, numbers of motor vehicles have increased significantly and relevant traffic issues have arisen due to inadequate road network. It is understood that the vehicle traffic has increased 10 folds between the periods of 1980 and 2012, in Turkey according to the statistical data. One of the most important issues in the developed and developing countries is the traffic noise due to the increasing number of the vehicles. Road traffic noise sourced by the vehicles present variety according to the density of the traffic, kind of vehicles, braking status, road surface and the air stream created by the vehicle. In order to determine and assess the road traffic noise sourced by the traffic density, it has been planned to measure the noise on the main street in front of the Erciyes University, Kayseri within 5 minutes intervals in the morning, evening and at night. Noise values have been measured within a period for 3 three weeks of time under the similar air conditions along the route approx. for 1 km and in cross section for 100 m by using Delta Ohm Type 1 noise measuring equipment. Location of the each point measured on the land has been transferred to the satellite map by determining using the Global Positioning System (GPS). It has also been recorded the vehicle numbers and types passed during the measurement duration for 5 minutes. Noise values of the day, evening and night noise levels measured on the same point have been translated into a single value that reflects the daily average noise. In this study, the relationship among the noise values obtained, road traffic density and the distance to the road have been studied by using the regression analysis. Besides this, noise values obtained as the result of the studies have been assessed by using interpolation methods and a Geographic Information System aided highway traffic noise model have been created.

Surveying & Technology in a Changing Environment: Relevant Surveyor in the New Challenges

Abiodun Awofeko (Nigeria)

Key words: Education;

SUMMARY

Abstracts By definition of a surveyor – He/she is an expert in measuring and locating of space on the surface of the earth, often used that information in establishing land maps and boundaries for ownership or governmental purpose. Looking at the theme of FIG 2014 – "Engaging the Challenges, Enhancing the Relevance". We can see how surveying is being revolutionized in new innovation in technology development which altered the ability to - Capture Data, Manage data, Model data, Representing/Reconstruct Survey data. In this presentation we can see how Surveyors can operate under different prospective as to become a relevant factors in changing world in term of instrumentation/software, adapting to new ventures across disciplines and successfully engaged in multi- disciplinary capabilities and solving Environmental issues.

The Impact of Buildings and Apartments Registration in Economic Development of Kosovo

Murat Meha (Kosovo), Joep Crompvoets (Belgium) and Muzafer Çaka (Kosovo)

Key words: Cadastre; Digital cadastre; Land management; Apartment, Building Cadastre, Cadastre, KCLIS

SUMMARY

SUMMARY The registration of buildings and apartments as a highest priority task of Kosovo Cadastral Agency (KCA), is contributing to the improvement of the real property systems in Kosovo and, therefore to the operation of the real property markets. The main outcome is that the number of users is being increased actually using their property as collateral, especially for securing mortgages, transactions and land market. Therefore a well-functioning Cadastre for registration of buildings and apartments in Kosovo is considered as a base for investments, mortgages, and for spatial planning. After data collection in the field, buildings and apartments are registered into the Kosovo Cadastre Land Information System (KCLIS), which has been conceived of as an integrated multi-purpose system and is as a base system for NSDI in Kosovo. This article is about the impact from registration of buildings, apartments and business premises in Kosovo. The concept behind and the approach for implementing building cadastre are presented including analysis from achieved results. After analysis of the current registration status, some key conclusions regarding the impact of registration of buildings and apartments in Kosovo are made. PËRMBLEDHJE Regjistrimi i ndërtesave dhe banesave si një detyrë me prioritet të lartë për Agjencinë Kadastrale të Kosovës (AKK), është duke kontribuar në përmirësimin e sistemit të pronës së paluajtshme në Kosovë, si dhe në operimin e tregut të pronës së paluajtshme. Rezultati kryesor që është duke u arritur është rritja e numrit të përdoruesve që janë duke e përdorur pronën si garanci, veçanërisht për të siguruar hipotekat, transaksionet dhe tregun e tokës. Prandaj një kadastrë i cili funksionon mirë sa i përket regjistrimit të ndërtesave dhe banesave në Kosovë, konsiderohet si bazë për investime, hipoteka, dhe për planifikim hapësinor. Pas mbledhjes së të dhënave në terren, ndërtesat dhe banesat regjistrohen në Sistemin e Informacioneve Kadastrale të Tokës në Kosovë (SIKTK), i cili cilësohet si një sistem i integruar shumë qëllimor, dhe është sistem bazë për NSDI në Kosovë. Ky artikull ka të bëjë me ndikimin që ka regjistrimi i ndërtesave, banesave dhe lokaleve afariste në Kosovë. Koncepti prapa kësaj dhe çasja për implementimin e kadastrit të ndërtesave janë prezantuar duke i përfshirë analizat nga rezultatet e arritura. Pas analizimit të statusit aktual të regjistrimeve, janë nxjerr disa konkluzione lidhur me ndikimin e regjistrimit të ndërtesave dhe banesave në Kosovë.

Germany on the Way to 3D-Cadastr

Ulrich Gruber, Jens Riecken and Markus Seifert (Germany)

Key words: Cadastre; Digital cadastre; Geoinformation/GI; Land management; Standards; 3D-cadastre, solar and noise cadastre, CityGML, vertical data integration

SUMMARY

Nowadays economy, science and administration have an increasing demand for official three-dimensional spatial information (3D-geodata) as a base for multiple applications. The surveying and mapping administration in Germany has accepted this demand as a challenge to develop and realise sustainable conceptions for 3D-geodata, focussing on quick and economic solutions. In this context, national and international standards, infrastructures and activities had to be considered. The German AAA® cadastre standard takes into account the international standardisation of ISO and OGC to include 3D-geodata. In Germany the taxation issue was the reason for the establishment of the cadastre in the beginning of the 19th century. One hundred years later (1900) the property cadastre was established. In the last decades the cadastre was increasingly used for other necessary mapping and planning issues - it became a so called multi-purpose cadastre as a geo-basis LIS and nowadays as a part of the NSDI. The cadastre in Germany is a parcel-based system, i.e. information is geographically referenced to unique, well-defined units of land. These units are defined by formal boundaries marking the extent of land. Each parcel is given a unique parcel-number. In addition the buildings are collected and updated. Buildings are proved geometrically (2D) and semantically. They are an important component of the cadastre and basis for tasks of the administration, economy and science. Because of the federalism in Germany, the states and local authorities are responsible for the cadastre. For that reason the Working Committee of the Surveying Authorities of the States of the Federal Republic of Germany (AdV) gives recommendations for nationwide cadastral standardization. The AAA® - data model which ensures the interoperability cadastral and surveying and mapping data is the result of this standardization process. During the last years the information systems of surveying and mapping and cadastre were focusing demands for three-dimensional applications, e.g. environment protection, planning, energy supply and disaster management. The basic request of coverage and actuality was formulated for the third dimension. In 2009, the AdV came up with the following decision: "The collection, data modelling and quality management of buildings for the geo-topographical surveying and for the cadastre are main tasks of the official German cadastre. This also includes the third dimension". This paper will focus on this process and will show benefits and applications.

The Importance of Cadastral Organisations for Cadastral Development

Tommy Osterberg (Sweden)

Key words: Cadastre; Capacity building; Land management; Professional practice;

SUMMARY

The importance of cadastral organisations for cadastral development This paper will discuss the importance of organisational development for cadastral and land registration systems to support economic and social development. The paper will start from a review of the development of systems and organisations in different parts of the world, Europe, Africa, Asia and America over time. The situation will be analysed and achievements and shortcomings will be illustrated with examples from various countries in South-East and Central Asia, Balkan, and Southern and Eastern Africa. Based on the basic principles developed by international organisations as the Voluntarily Guidelines on the Responsible Governance of Tenure (FAO), the Land Policy Initiative in Africa, the Global Land Tool Network (Un-Habitat), the paper will analyse the importance of the organisations responsible for different aspects of land management, land registration and cadastral development for delivering appropriate services to all people, including the fast growing urban population, for securing land rights in rural areas and minority people's rights, for investments in economic development in rural and urban areas and for improving women's access to land. The need for capacity building in order to meet the expectations of the international society will be analysed. The paper will conclude that among others, land administration organisations need to improve their institutional capacity including more efficient delivery of appropriate services in order to meet the fast growing demands from the users of land administration. The paper will illustrate possibilities for improving the service delivery through improved management, organisational reforms, new ways for financing of the services and also development of legislation and technology. Capacity building and change management are some central elements in this development.

An Introduction to ‘The Guide to the Expression of Uncertainty in Measurement’

David Martin (France)

Key words: Standards;

SUMMARY

Organisations are created to fulfil some need. They succeed when they satisfy the requirements and expectations of their stakeholders. Stakeholders are the people or organisations that can give or take something from an enterprise. They include government, suppliers, society, employees, and most particularly customers. The customer is a special stakeholder. The customer is the person, or organisation that receives a product or service. The customer is the one who pays. And only the customer can decide if products or services are satisfactory. Customers require quality products and services delivered on time and at a price that reflects value for money. What are characteristics of quality? Quality products are reliable, functional, durable, secure, available, and traceable - among many other things. Quality services reflect competence, responsiveness, integrity, reliability, and credibility. Quality is the degree to which a product or service fulfils a set of requirements: a requirement being a need or expectation. Surveyors must provide legally accurate and precise information to their customers. Typically they will strive to do this in an optimal cost effective way and with the most appropriate instrumentation. Naturally this requires a good understanding and assurance in the instruments that are used. All instruments are subject to measurement error or uncertainty. Measurement uncertainty can be an essential element in the professional decision making process. Additionally, as tolerances become more demanding, the role of measurement uncertainty is becoming more important in determining conformity. Measurement uncertainty almost always plays a central role in quality assessment and quality standards. The Guide to the Uncertainty in Measurement - colloquially referred to as the GUM - is an internationally recognised standard that addresses uncertainty in measurement. Because Surveyors are so consummately involved in measurement, an understanding of the role of uncertainty is essential. This paper aims to provide an introductory discussion of the GUM in the context of the surveying profession.

Integration of MODIS Satellite Image into Snowmelt Runoff Model to Estimate Daily Runoff

Mohamadsadegh Sadeghian and Kambiz Borna (Iran)

Key words: Remote sensing; Snowmelt Runoff Model (SRM); digital elevation model (DEM); Spatio-temporal data; MODIS images; Mountainous catchment.

SUMMARY

The output of a modeling method, such as a rainfall-runoff models on a Mountainous catchment, could be reliable if it is formulated based on the effective variations, like snow-covered, and the different aspects of a modeled phenomenon, for instance time. The main purpose of this paper is to present the capabilities of an integrated application of remote sensing data and Snowmelt Runoff Model (SRM) to forecasting scheme of stream flow in a snow-dominated catchment, located in the North-East region of Iran. For this purpose, firstly, a digital elevation model (DEM) is provided based on the elevation points extracted of a map with the scale 1:5000. After that, the boundaries of the desired catchment along with its hypsometric curves are drawn in terms of the extracted DEM by the Automated Geospatial Watershed Assessment (AGWA) tool in ArcGIS. The changes of snow-cover, as a spatio-temporal data, which is one of the effective variables of the SRM, is obtained from 500 m resolution of MODIS images for the period of the winter of 2010–2011, in the next stage. Then, input parameters to the model including runoff coefficient, degree-days factor, temperature laps rate, critical temperature, recession coefficient and lag time; are measured and calculated for the above mentioned period. So, when a desired domain of data is provided, the run-off of the catchment is calculated by SRM and then compared with the observed daily stream flow recorded in the catchment's outlet. The detailed results, like 78% coefficient of determination R^2 , illustrate that the proposed method has the potential to estimate run-off, accurately.

Towards a Distortion Free National Spatial Data Infrastructure in Switzerland: Approach, Developed Tools and Internet Services for the Change of the Reference Frame

Matthias Kistler, Marti Urs and Jérôme Ray (Switzerland)

Key words: Geoinformation/GI; GSDI; Reference frames; Reference systems; Internet Transformation Services

SUMMARY

In the nineties, the national mapping agency of Switzerland, swisstopo, established a new, distortion free reference frame LV95 in Switzerland related to the European one ETRF93. Following this task, different transformation methods, e.g. FINELTRA (affine transformation by finite elements), have been developed in collaboration with the Swiss Federal Institute of Technology to be able to transform the data of the National Spatial Data Infrastructure SDI from the historical reference frame LV03 to the new one in high accuracy. The federal law for geo-information stipulates now that all the reference datasets have to be transformed until 2016 the latest and for the other base data sets until 2020. So swisstopo was requested to develop different software tools, libraries and services for the reference frame change to support the different stakeholders best possible. In a first step, the client solution GeoSuite with the modules REFRAME and TRANSINT have been developed. This software is not only able to transform or inter-polate geo data sets in different formats, it also provides direct access to all data sets in the SDI of Switzerland over an integrated application programming interface API as well as to any Web Map Services WMS available. With this visualization module, the results of a transformation or interpolation can be easily analysed or documented. Furthermore, all the transformation and interpolation algorithms are available as dynamic link library DLL for the integration in third part products, e.g. in GIS extensions for cadastral works, or for the development of Plugin's, e.g. realized for FME by swisstopo itself. In a second step, a set of Internet services have been developed: 1. Transformation services as Machine2Human M2H service for all the usual geo formats and as Machine 2Machine M2M service for real-time transformation in the federal geoportal map.geo.admin.ch or for the Swiss positioning service swipos. swipos can offer so GNSS corrections for the two reference frames 2. Interpolation services for the conversion of geodata sets on the very local level with big distortions based on deformation grids 3. Visualisation services for desktop and mobile devices, e.g. all the survey mark protocols with old and new coordinates and different metadata are available or a map with the expected transformation accuracy for all Switzerland 4. Download services for DLL's and transformation data sets With these different tools, the georeferencing of the SDI of Switzerland can be easily converted to the new reference frame LV95 in the next couple of years. Some cantons (state level) have already transformed their SDI's successfully.

Study on the Quality of the GNSS Measurements in Static Mode If Applying Certain Values of the Parameters, Following the Current Regulatory Requirements

Gintcho Kostov (Bulgaria)

Key words: GNSS/GPS; Positioning; Professional practice; Geodesy, GNSS, measurements, quality assessment

SUMMARY

The continuous GNSS modernization leads to improvement of the results from the measurements. From technical point of view this necessitates an update of the requirements for conducting of GNSS measurements. This paper studies the overall quality of the results from the geodetic measurements, conducted and processed with certain, but various values of the cut-off angle and length of the session. Several spatial chords with different lengths were measured and the results were analysed, using own geodetic software. The experiment is one continuation of a previous study of the author, now done in the light of current requirements for the GNSS measurements and technical possibilities. Based on the derived results, conclusions are done. Recommendations and proposals are also given.

Highly Detailed 3D Modelling of Mayan Cultural Heritage Using an UAV

Cornelis Stal, Britt Lonneville, Timothy Nuttens, Philippe De Maeyer and Alain De Wulf
(Belgium)

Key words: Cartography; Photogrammetry; UAV; cultural heritage; 3D modelling; GIS

SUMMARY

Highly detailed and highly accurate 3D models are indispensable tools for the management of cultural heritage, as well as for archaeological and anthropological research. These digital 3D models should be combined with high resolution texture maps to facilitate the understanding of the heritage sites or parts of the heritage. The construction of these models requires the deliberate selection of a data acquisition platform and spatial measurement instruments. Different considerations on these issues are discussed in this paper, based on a case study at the site of Edzná, Mexico. This project focuses on the virtual 3D reconstruction of the different structures and artefacts on the site. The project is a collaboration between Ghent University (Belgium), INAH Mexico and UNESCO. On Mayan sites, Unmanned Aerial Vehicles (UAV) are exceptionally useful tools for data gathering. These devices allow image acquisition with high resolution and various incidence angles. Moreover, the platform is compact and light weight, so it allows a flexible deployment. In this sense, flexibility means both the ability to make the platform easily transportable, and the possibility to manoeuvre in both high elevations and narrow spaces. High elevations are required to position the modelled structure in a wider spatial context. The ability to manoeuvre in narrow spaces is needed to operate in forested areas and to avoid self-occlusion in the model. Images taken with the UAV are combined with terrestrial images of the site, resulting in a full coverage with significant overlaps between consecutive images. The entire data set is processed in an image based virtual reconstruction process, resulting in digital elevation models, orthophotos, textured 3D models and other derivatives. Absolute referencing is performed based on a series of GNSS measurements, densified with total station measurements. The data is processed with various levels of details (LoD). Working with different LoDs allows the smooth implementation of the models in a 3D geographic information system (GIS). Semantic data can be assigned to different geometric features within the project. The models can be used for online consultation and visualisation systems.

Feasibility Study of the Use of Bathymetric Surface Modelling Techniques for Intertidal Zones of Beaches

Alain De Wulf, Philippe De Maeyer, Annelies Incoul, Timothy Nuttens and Cornelis Stal
(Belgium)

Key words: Hydrography; Laser scanning; Positioning;

SUMMARY

This paper elaborates on the use of different 3D data acquisition techniques for the construction of Digital Surface Models (DSMs) of intertidal zones of beaches to detect archaeological relicts. DSMs are an indispensable tool for the development and sustainable management of cultural heritage and archaeological relicts and in many applications, these models are used for the analysis of existing archaeological features or the detection of new features. This is also the case in the presented project on archaeological research in the Belgian North Sea. Obtaining a sufficient resolution and accuracy for these models is a challenging task, especially for intertidal zones of beaches. Specific difficulties in these transitional areas require a thorough study of available spatial data acquisition techniques, focussing on the various system properties and measurement methods. In general, bathymetric techniques make use of different approaches compared with topographic techniques, like the use of acoustic versus electromagnetic signals for distance measurements. The limited draft of intertidal zones, as well as the turbidity and tempestuous weather conditions are additional limiting factors for the Belgian North Sea coast. Different data acquisition techniques are discussed in this contribution: Airborne Laser Scanning (ALS) from a flying platform, Airborne Laser Bathymetry (ALB) as a combination of ALS with a water penetrating electromagnetic signal, Static Terrestrial Laser Scanning (STLS) (scanning from a fixed position on the ground), Mobile Terrestrial Laser Scanning (MTLS) (terrestrial laser scanner mounted on a driving platform). Moreover, image based reconstruction techniques and conventional topographic techniques, like a total station and Global Navigation Satellite System (GNSS), are discussed. These techniques are selected based on a required ground resolution of at least one metre and an vertical accuracy of at least twenty-five centimetre. A field campaign was organized at the intertidal zone of the beach of Raversijde (Belgium) in the early summer of 2013. Various techniques were deployed during this campaign in order to define the advantages and disadvantages for archaeological research. Based on this study, the use of MTLS appears to be very useful for the construction of the required DSMs. An ARGO, which is an amphibious vehicle, was used in combination with a series of positioning and orientation sensors (GNSS, INS,...). Using this system, the requirements concerning the resolution and accuracy were respected. Besides, the ARGO enables a fast and flexible usability, which is important for the varying weather conditions and tide. As a result, further development of het ARGO based acquisition platform is planned and additional campaigns

for a more extensive systematic surface modelling of the intertidal zones of the Belgian North Sea coast will be organised.

Research of the Horizontal Crustal Motions, Based on Gps Data for the Territory of Bulgaria and the Balkans

Mila Atanasova-Zlatareva (Bulgaria)

Key words: GNSS/GPS; Positioning; Reference systems; velocity; Euler pole; earth crust movement; GNSS

SUMMARY

Since the launching, geodetic techniques for monitoring crustal motion, advanced satellite techniques and systems, including GPS, significantly simplified the procedure for determining the parameters of crustal motions since it allowed during a short period of time to receive precise of data that helped to determine with greater accuracy the parameters of crustal movement for definite time. The present study is focused on the used GPS data from free available GNSS stations on the territory of the Balkans. The ETRF horizontal velocity vectors are representative for the local station. They are obtained by using ETRF components of the Eurasia plate rotation pole to the obtained solution ITRF velocity vectors. Applying velocities v_x , v_y and v_z and respective coordinates of the stations estimated from GPS data processing, it is possible to estimate the rotation Euler vector (Ω_X , Ω_Y and Ω_Z) by Least Squares Method. For determination of Euler parameters the author accepts a set of GPS stations as stable. Several different rotation poles have been estimated in order to test the proposed kinematics model for Balkans. The analysis of the velocity field for the whole studied area leads to the hypothesis of continuous deformation to the detriment of local deformation at the borders of stable blocks. The presented velocity gradient clearly indicates the increase of the motion from north to south. A map representing the relative velocities changes on the territory of Bulgaria and the Balkans have been created. The investigation in the present publication is focused on the South Balkan extensional region using Global Positioning System (GPS) technique. The GPS derived velocity field from GPS stations covering the territory of Bulgaria has been analysed and discussed in the context of tectonic block models. The results show southward displacements between 2-10 mm/yr. This study presents the contemporary tectonics in the south Balkans region. The horizontal velocities in North Bulgaria, north of the Balkans Mountain, confirm the suggestion that North Bulgarian territory is part of the Eurasian plate. Our results show that the Southern Balkans do not belong to the Eurasian plate and seem to be dragged toward the south with the velocities relative to Eurasia gradually increase in N-S direction from 1-1.5 mm/yr in western Bulgaria to 10mm/yr in the Greece, leading to N-S directed extension along this area. The estimations agree very well with results from other investigations of this region.

HydrOs – An Integrated Hydrographic Positioning System for Surveying Vessels

Annette Scheider, Harry Wirth, Marc Breitenfeld and Volker Schwieger (Germany)

Key words: Hydrography; Positioning; Multi-sensor System; Extended Kalman Filter; Squat Determination

SUMMARY

Generally, multibeam echo sounders are used for the acquisition of geospatial data such as shape and depth of inland waterways. For safety and ease of navigation these data need to be georeferenced and plotted in accurate and reliable sea charts and maps. Therefore, the positioning of the echo sounder and of the surveying vessel respectively is essential. Currently, positions of surveying vessels on German federal waterways are determined with GNSS (Global Navigation Satellite Systems) receivers or GNSS-INS (Inertial Navigation System) coupled systems. Reliability, availability and accuracy of GNSS positions are influenced by shadowing, refraction and multipath effects. Gaps mainly occur in regions with riparian vegetation, in narrow valleys with steep slopes and during crossing of bridges. The project HydrOs (Integrated Hydrographic Positioning System) focuses on the optimal estimation of three-dimensional coordinates of a reference point and the spatial orientation of the vessel. Even if GNSS signals are completely lost for one minute, the height shall be known with an accuracy of one decimeter (95% level of confidence). Therefore, a multi-sensor system is developed combining the measurements of multiple GNSS receivers, Inertial Measurement Unit (IMU), Doppler Velocity Log (DVL) as well as propulsion information. The measurements of each connected sensor are recorded and processed in an Extended Kalman Filter (EKF). For this purpose the motion of the vessel is predicted by a motion model which includes twelve state variables: turning rates, velocities, orientation angles and coordinates of the reference point. In contrast to other prediction models for vessel motion, a three dimensional prediction is realized. It is particularly important to check, if a valid and reliable GNSS solution is available for each single GNSS receiver just before shadowing events occur. Currently used integrity parameters do not meet the requirements concerning reliability. Therefore, new algorithms are developed and are used to detect outliers in the GNSS observations. In progress of the project, other absolute positioning sensors and hydrodynamic numerical models will be added to further stabilize the accuracy and integrity of the positioning. Height of water level and current stemming from hydrodynamic numerical models can only be used, if the ship squat is precisely known. In the project a new method to estimate the squat effect was developed. The basic principle is to measure the height of a reference point on the vessel in comparison to the undisturbed height of water level while the vessel crosses the water with varying speed. Additionally, the ship's trim, the velocity through water and the under keel clearance are considered. Hence, a vessel-specific 3D characteristic model for the squat depending on the mentioned influences can be estimated. The final

HydrOs system will be able to provide a highly reliable and accurate position of surveying vessels in real-time and in post-processing mode. Furthermore, quantities like water level and current velocity can be derived.

“Decades of Struggle for Space”: About the Legitimacy of Informal Settlements in Urban Areas

Arbind Tuladhar, Jaap Zevenbergen (Netherlands) and Mahesh Banskota (Nepal)

Key words: Informal settlements; Action Space; Urban Space; Urban Land Governance; Legitimacy

SUMMARY

There are two prominent factors (i.e. push and pull factors) causing rural/urban migration resulting in the emergence of informal settlements in urban areas. The push factors are directly related to livelihood problem and food security due to the subdivision of inheritance properties, the internally displacement due to the conflicts and the natural disasters due to the climate changes. Similarly, the pull factors are those related to economic opportunities, better education and better health facilities in the urban areas. In Nepal, the informal settlements without formally recognized land tenure in urban areas have always been the critical issue, and the failure to recognize legitimacy on these settlements always resulted many hurdles and/or continuous struggles between the governments (central and local) and the informal settlers. Although the informal settlements are not within the existing legal framework, currently there exist a lot of pressure from various stakeholders to legitimize these settlements on allocating urban land. Since the urban land allocation is multifaceted with many issues including the housing rights and land rights, this paper analyzes the problems on legitimizing urban land for the urban informal squatters using the concept of “action space” in which the state, market force and civil society groups play the major roles for provision of the urban space. This paper then explores how the “action space” is used within the informal settlements to deliver urban space. Land governance aspects within the “action space” are also explored using the case study approach. Lastly this paper identifies the major factors that bring pressures on the legitimacy of informal sectors.

Automating Data Accuracy from Multiple Collects

David Janssen (Australia) and David Collison (Canada)

Key words: Engineering survey; GNSS/GPS; Laser scanning; Positioning; Remote sensing; Spatial planning;

SUMMARY

When surveyors perform a 3D survey over multiple days, minor changes in GPS conditions can misalign the data between the collects. Realigning the data usually requires hours of labor from an experienced post-processor, often using multiple software programs. Although surveyors prefer to avoid these misalignments by performing all collections in a single day, weather, breakdowns and large survey areas often make this impractical. Now new data processing techniques and workflows are available to simplify and automate the alignment of overlapping datasets. These techniques exploit planar features and their unique spatial relationships to each other. By extracting the common planar features found within multiple datasets, they can be matched with a high degree of confidence. To take advantage of these techniques, the processor must identify the existing spatial relationship between the planes to maximize the number of common areas available for use, and automatically extract those meeting the requirements of the process. The algorithms automatically determine the optimal boresight and calibration values, using common features identified in the data. Identified features are converted to shape files to allow the software to produce a robust, repeatable, and calculated output, while improving the expediency of the process over traditional lidar processing techniques. As a case study, this presentation describes a mobile lidar survey performed around Kelowna and Vernon, Canada in May 2013 for the British Columbia Ministry of Transportation, where bad weather had forced the operator to spread the survey over three days. Varying GPS conditions over these 48 hours misaligned the datasets, but the processor aligned them quickly and automatically by identifying several shared planar features in the overlapping areas.

The Contemporary Role of Geospatial Information Technologies in Sustainable Territorial Management

Alexander Karpik (Russia)

Key words: geospatial information technologies, sustainable territorial management, geo-information space, GI, interdisciplinary links

SUMMARY

Geodesy in wide sense has to be considered as integrated system of interconnected and accuracy-consistent technologies used for solution of particular tasks. Thereby the principles for building such system should provide its sustainability while updating geospatial techniques and tools. The creation of geospatial information system for sustainable territorial management requires detailed studies of subsystems for geospatial data acquisition, processing, representation, and usage.

Urban Land Readjustment as a Strategic Tool for Urban Redevelopment: Experimenting Negotiations Between Landowners

Datuk Ary Samsura and Erwin Van der Krabben (Netherlands)

Key words: Land readjustment; Real estate development; Spatial planning; Urban renewal;

SUMMARY

The Dutch national government has recently launched a national pilot program to test the effectiveness of urban land readjustment as a strategic tool for urban redevelopment projects. Urban land readjustment has been defined as the consolidation of adjoining plots 'by a government agency for their unified planning, servicing and subdivision with the sale of some of the new plots for cost recovery and the redistribution of other plots to the landowners' (Archer, 1989: 307; cited in Adams & Tiesdell, 2013: 274). Urban land readjustment – similar to the more common agricultural land readjustment, but now applied in an urban context - has been widely adopted both in European countries (but not in the Netherlands) and in Asian countries (Hong & Needham, 2007). In Van der Krabben & Needham (2008) we have argued the theoretical case for applying urban land readjustment in the Netherlands and elsewhere. Adams et al. (2001) have also proposed urban land readjustment for the UK, termed an 'urban partnership zone'. Urban land readjustment can be considered as a type of self governance, based on close cooperation between land and property owners in a certain area. In this paper we present the results of a simulation game regarding the negotiations that will take place between the land and property owners to decide for urban land readjustment. In our game experiment, we have tested the effect of law enforcement and availability of information to the prospect of land and property owners to cooperate in an urban land readjustment project.

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Tax Increment Financing as a tool for Public Infrastructure Development: A Game Negotiation Experiment

Sander Lenferink, Datuk Ary Samsura and Erwin Van der Krabben (Netherlands)

Key words: Property taxes; Real estate development; Spatial planning; Urban renewal;

SUMMARY

The development of public infrastructure has been proven to be costly and complex because it often involves large-scale investments and management of conflicting interests of different parties from both the public and private domain. However, it also has been long recognised that public infrastructure can play a crucial role in economies because of its ability to produce positive effects to the society. Traditionally, public authorities or governments are responsible for public infrastructure provision and financing. With this perspective, the problems and difficulties in public infrastructure financing arise mainly because of the limitations on public revenue, expenditure, and borrowing as well as the increase of development and construction costs. This situation has increased the need to finance the public infrastructure development by involving the contribution from private sectors. One of the most promising financing mechanism is Tax Increment Financing (TIF). In short, with TIF, future tax income as a result of public investments are used to pre-finance these investments. As such, the instrument relies on projected rises in property values caused by public investments. The instrument has been applied, with varying success, in the US and Canada since the second half of the 20th century. Currently the instrument is also considered in other countries, including the Netherlands. However, such application requires (1) adapting the preconditions to the specific national context and (2) involves a structural reconsideration of the roles of public and private actors. In this study, we have conducted an experiment to simulate the essential negotiations between local governments and private developers that are embedded in the local application of TIF. The negotiation is about the contributions of the municipality and the private developer to the financing of public infrastructure and also the content of related development project by considering TIF as well as the profitability of the project to both players. In addition, we projected the application in a case study. These abstract and practical simulations provided the basis for a discussion of essential preconditions for TIF especially in the Netherlands context.

TopologicalErrorsFromCADtoGIS

Esin Bitik, Dursun Zafer Seker and Hakan Denli (Turkey)

Key words: CAD;Topological;GIS

SUMMARY

CAD software is used to create precise drawing and technical drawing. Two-dimensional 2-D CAD software or three-dimensional (3-D) model can be used to create drawings. For CAD spatial database model and layer information in the form of graphics, this acts as the electronic drawing board. CAD is powerful graphic software in which the important thing is lines and the drawing is itself attribute. GIS is a database software. A line means in GIS is representation of data from database. Geodatabase provide the user of the analysis, reporting and queries is experienced due to the convert to GIS format. Data conversion from CAD to GIS data is s increasing with each passing day in Turkey. During the conversion process each user encounter with many different errors and these errors are trying to solve with their own methods. Main scope of this research is to analyze the topographical errors for all data types during transformation CAD data's to Geodatabase format in Turkey. Gathered errors under a title and developed solutions and this study is intended to be a guide for users who encounter problems.

Social Network Analysis and Data Mining of Land Tenure Information in the Talking Titler System

Kwame Asiedu and Michael Barry (Canada)

Key words: Cadastre; Informal settlements; Land management; Security of tenure; social network analysis, land administration, land information system, talking titler model

SUMMARY

Networks of social relationships are a fundamental attribute of land tenure systems. In changing situations, individuals and groups may belong to complex, multi-layered, changing and perhaps conflicting social networks at any particular time. Standard land administration models serve as blueprints for developing land tenure information systems (LTIS), but many of them are derived from western administration systems and fail to accommodate some of the complex realities of many customary systems and unstable, changing states of affairs such as post conflict situations or the major changes that occurred in post-apartheid South Africa. The paper describes exploratory data mining and social network analysis (SNA) techniques of simulated social data stored in an ubiquitous (web and mobile) Land Information System (LIS) based on the Talking Titler Model (TTM). The Talking Titler Model is a flexible land administration model suited for securing tenure in complex and uncertain situations. The design philosophy for local level land tenure information system development is that the design should be grounded in the data, and evolves according to what local circumstances dictate. All preconceived notions about data classes, such as person, land objects and reference instrument (e.g. title deed), and the relationships between them should be subject to rigorous, continual, critical examination to handle social change and improve the suitability of the original design model to local circumstances. Social network analysis may facilitate visualizing complex relationships between objects (people to people, people to land, and people to particular data types or items). Social network analysis and data mining may reveal relationships that were not identified in the initial model or uncover relationships that emerge as social change takes shape. It may also identify errors and inconsistencies in a land records system.

The Effect of the Land Consolidation on Urban Development

Gaye Onursal Denli and Hayri Hakan Denli (Turkey)

Key words: Land readjustment; Urban renewal;

SUMMARY

Land Consolidation is a necessity for rural areas and is regarded as a useful instrument for improving farmer's incomes and life standards. Land consolidation can be described as to unite and reregister the lands which were fragmented because of inheritance, roads, sales or irrigation/drainage canals. Farm structure and the infrastructure are also affected by fragmentation. In Turkey, farmers have generally a large family. After the death of the householder, inheritance leads to the further fragmentation of agriculture lands. After a long fragmentation period, each family has approximately five, six or more different types of land parcels located in different areas. The rural people are aware of the problem but are hopeless and helpless to change this situation. Actually Turkey has rich natural resources. The great diversity of landscapes and climate, as well as the fertile soils has always allowed a huge variety of agriculture products. Because of small and untidy parcels, farmers cannot take productive harvest. Finally they have to emigrate to big cities to earn money. Until now, emigration caused to irregular construction in the cities. But Turkey is an earthquake region and irregular construction cannot be accepted for public health. For this reason the "Ministry of Environment and Urban Planning" of Turkish Government decided to start an Urban Development and Transformation Project. But the application of this huge project is very difficult because of the population density. If the problem of rural areas/farmers could be solved and life standards upgraded, migration can be prevented. Moreover, an opposite migration could be probably realized. In this paper, the importance of Land Consolidation and Urban Development will be emphasized and interaction between them will be displayed by using the data from Turkey.

The Systematic Land Verification (SiLVer) Protocol

Louie Balicanta and Rosalia Balicanta (Philippines)

Key words: Cadastre; Digital cadastre; Geoinformation/GI; Land management;

SUMMARY

Currently in the Philippines, cadastral database is on a transition from paper-based to computer-based. Encoding and plotting were done using the original cadastral lots. However, cadastral data are regularly updated because of various processes and events. Monitoring and updating are done by two land agencies, the Department of Environment and Natural Resources-Land Management Sector (DENR-LMS) and the Land Registration Authority (LRA). These updates affect the spatial and attribute characteristics of the cadastral parcels. The most common events and processes that affect the change in spatial characteristics include a parcel's subdivision or splitting, consolidation or merging, consolidation-subdivision and boundary adjustment. Ideally, the topological relationship and integrity of the affected cadastral parcels must be maintained as the changes happen. The objectives of the research are to determine and evaluate the factors affecting changes in the cadastral database, provide a protocol that updates the main cadastral database and place the previous and historical data to a history layer and maintain the topology between the cadastral parcels and between the history and current layer. These will greatly help the key land agencies once the computerized cadastral database has been completed. To test the protocol a portion of a cadastral database was obtained from DENR-LMS and implemented using third party GIS software.

Surveying with Uav Infrared Sensors for the Urban and Eco–Sustainable Requalification of Old Cities.

Donatella Dominici, Maria Alicandro, Vincenzo Massimi and Michail Elaiopoulos (Italy)

Key words: Digital cadastre; Engineering survey; Photogrammetry; Real estate development; UAV, Infrared, Sustainability, Laser scanner, smart city

SUMMARY

The paper regards the evolution of the experiments on surveying with UAV, integrated with infrared data for the energy requalification of existing buildings under the conception of creating eco-sustainable smart cities. In this concept, an old district situated in the region of Abruzzi (central Italy) has been surveyed using both optical and infrared cameras mounted on an UAV. The data elaboration focused on creating detailed and accurate 3D models exploiting the infrared data in order to create considerations connected with thermal dispersion between edifices and the environment. The obtained results permitted considerations and a documentation of the quality of the old masonry Italian buildings mainly observed from an energetic point of view. Thus, the presented methodology is proposed as a valid instrument needed to provide both privates and public bodies with all the essential information for a correct and eco-sustainable urban requalification of old cities both after a calamity and in order to improve their overall energy efficiency.

Estimation of Wetland in Indonesia with multitemporal satellite imagery Extraction Model–based Neural Network (NN), Genetic Algorithm (GA) and Fuzzy Logic

Lilik Budi Prasetyo, Agung Budi Harto, Deni Suwardhi, Soni Darmawan and Chairuddin (Indonesia)

Key words: Remote sensing; remote sensing, estimation, extraction, Artificial Intelligence

SUMMARY

Advantages of remote sensing technology in making estimates through the object image data with satellite vehicle into an alternative decision makers in order to support and obtain information as well as the best solution in determining the steps to be taken to determine a reliable decision. This study aims to estimate and predict wetland to determine yields in Indonesia with multitemporal satellite images. Estimation, prediction and image extraction process are done by using a model of Artificial Intelligence (AI), namely Artificial Neural Networks, Genetic Algorithm and Fuzzy Logic, and maximum likelihood. The comparison show that the algorithm model using Artificial Intelligence approach is more accurate than the statistical method. This is indicated by the results of the classification accuracy with the field of Artificial Intelligence methods is higher than statistically method (maximum likelihood). The result is expected to be a benchmark solution for the further research in determining the method or model which used in image processing of AI-based classification model is needed to accelerate the process of identification of rice fields in Indonesia. Finally with better accuracy of rice field, government will be able to take a decision or policy related to food, where it is most closely related to national food security.

Integration of Existing 3D City Models and Laser Scanning Data for Positioning in Urban Environments

Craig Hancock and Khalil Al-Manasir (China, PR)

Key words: Engineering survey; GNSS/GPS; Laser scanning;

SUMMARY

In the UK there are some 4 million kilometres of buried pipes and cables. There has been very little coordination between utility companies to map their assets. This all leads to a situation whereby digging for a buried utility can be quite literally hit or miss. When mapping utilities, GNSS is often the preferred method of positioning, due to its relative ease of use and its ability to acquire absolute positions. The accuracy that is required for this type of application is of the order of decimetres. Using GNSS for this purpose and at this accuracy is difficult in urban environments due to non-line of sight to the satellites and multipath errors. This paper will investigate using a multi GNSS receiver, capable of receiving signals from GPS, GLONASS and QZSS combined with laser scanners and 3D city models to compute the position of utility detection equipment in an urban environment. The 3D city model has been created from a laser scanning survey of the campus of the University of Nottingham, Ningbo, China. The laser scanner will provide profile lines that can be matched to the 3D city model enabling the calculation of the position of the vehicle during GNSS outages.

Proposing A New Paradigm of Sustainable Development in Indonesia Through Indonesian Land Strategic Programs

Budi Jaya Silalahi, Faus Tinus Handi Feryandi, Memby Untung Pratama, Purnomo Hadi and Gunawan (Indonesia)

Key words: Cadastre; Land management; Spatial planning; Urban renewal; sustainable development

SUMMARY

The new paradigms of Sustainable Development are Equity of Growth and Development, Interdependency of Socio Cultural, Socio Economic and Politics, Horizontal and Vertical, Equity of National Land Administration Services (NLAS), Citizen Participation in Development Planning and Borderless Socio Economic Development. The objective of this paper tries to explain one of these paradigms that influence the sustainable development in Indonesia, especially in national land administration services. The main issue of equity NLAS is how to build of public trust, improvement of land services and land registration, improvement of people's rights on land, development of a national land management information system and land document security system, development of large scale land mapping and a land ownership database and development of land laws and policies. Those issues are related in supporting sustainable development in Indonesia. Sustainable Development has a meaning that each case development should lead to progress, expressed primarily by welfare improvements in the communities involved and that it will occur through specific changes (Stimson, R.J, Stough, R.R, Roberts, B.H, 2006). The other opinion of sustainable development is a concept for combining environment, economy and society in order to develop the area of nations. According to GSA Office of Government area Policy (2000), sustainable development means integrating the decision-making process across your organization, so that every decision is made with an eye to the greatest long-term benefits. The effort to build a truly sustainable way of life require the integration of action in three key areas, namely: economic growth and equity, conserving natural resources and the environment and social development (Memby, 2009). Some people also believe that the concept of sustainable development should include preserving the environment for other species as well as for people. The conclusion of this paper is proposing a new paradigm of sustainable development by using NLAS approach. The National Land Agency, as the government institution which has authority in land policy, can apply to sustainable development comprise with the ecological (environment), the land used regulations, the economic, and the socio cultural aspects.

Investigating the Conformity of the Zimbabwe Land Administration System to the Land Administration Domain Model Standard (iso 19152)

Charles Paradzayi, Robert Mapamula and Tinashe Mtariswa (Zimbabwe)

Key words: Land management;

SUMMARY

Zimbabwe is emerging from both a political and economic slumber and authorities have since realised the role Information Communication Technologies (ICT) can play in resuscitating the economy. The government recently introduced the e governance initiative which aims to provide citizens timely and accurate information. As a result there is renewed interest, within various government institutions in the existing or previously abandoned information management systems. In Zimbabwe, land administration functions are distributed amongst various government and private sector organisations. The Department Surveyor General (DSG) is responsible for supervising the survey and charting of land for purposes of registration in the Deeds registry. The Deeds registries office is responsible for the registration of all transactions affecting land while land use control is the responsibility of Planning Authorities. Land value information is captured through registration processes when land is transferred from one party to another. The Ministry of Lands and Rural Resettlement (MLRR) is responsible for the managing and administering all state land under the resettlement schemes. Over the years, different departments have developed separate electronic systems for storing and managing land information falling under their respective jurisdictions. In 1997, the Department of the Surveyor General in conjunction with the Swedish government developed the Land Transaction system (LTS) which contained details of all properties surveyed including permits, approval dates, scanned diagrams, working plans and map compilations. The Deeds Registry made efforts to digitise all land registration documents. The Ministry of Lands and Rural Resettlement is in the process of developing a Land Information Management System (LIMS), designed to maintain a national register of all state land that falls under its jurisdiction. The DSG is attempting to resuscitate the Land Transaction System that crashed in 2002 forcing the DSG to revert back to a manual system. However, data exchange between different organisations is mainly based on manual transfer of files. Linking up of the different systems poses big challenges due to the isolated conceptualisation, different operating systems and application softwares. This challenge has effectively limited the benefits that ICT can bring to the overall land administration system. A common data model should provide a holistic solution by harmonising different datasets and functionalities of the different players. The LADM provides such a reference model for the development of efficient land administration systems. The introduction of the LADM standard has coincided with the movement for an integrated and more efficient land administration system in Zimbabwe. This paper analyses the current land administration

system in Zimbabwe by identifying institutions involved in land administration, respective information management systems and related land administration workflows. Conformity of the current land administration system in Zimbabwe to the LADM standard (ISO 19152) is investigated. Similarities and differences are identified and used to develop a LADM country profile for Zimbabwe. This country profile should form the basis for the adoption and implementation of an ISO 19152 based land administration system in Zimbabwe.

An Interrogation of the Meaning and Policy Implications of ‘Customary’ Land Tenure from the Sub–Saharan African Perspective

Eric Yeboah (Ghana)

Key words: Land management; Security of tenure; 'Customary Land Tenure'; 'Land Policy'; 'Sub-Saharan Africa'

SUMMARY

In dominantly agrarian societies where agriculture is the main source of livelihood, landlessness could be the greatest form of poverty. It is therefore appropriate that policies and other interventions to ensure optimal land use continue to be part of the various efforts being put in place to reduce poverty in Sub-Saharan Africa (SSA) and elsewhere. Land in Africa has been described variously by various commentators with ‘customary’ being perhaps the most popular adjective. But what is ‘customary’? This question has not attracted adequate attention in the development discourse. This is despite the fact that one’s conception of what is ‘customary’ land tenure influences his or her diagnosis and subsequent prescription of policy interventions. For example the hegemonic view land rights in SSA lack the needed security of tenure is partly rooted in how ‘customary’ land tenure is conceptualized. Also claims that land tenure systems in the region do not support efficient land markets and individual property rights are rooted in one’s understands of the meaning and dynamics of the prevailing land tenure. It is now a popular knowledge that the various western- led interventions in the land sector across SSA have failed to achieve their stated objective thereby prompting the need for a shift in policy direction. Such a shift should however be preceded by critically interrogation of some of the fundamental underpinnings of the design and implementation of the early interventions in order not to repeat past errors. Flowing from this logic, this paper examines the actual meaning of customary land tenure systems and their implication of for land policy. The paper argues that description and evaluation of ‘customary’ land tenure based on western and neoliberal parameters must be avoided as a result of the significant contextual gaps. It further posits that supporting the prevailing local land holding arrangements to evolve can strengthen existing tenures to cope efficiently with contemporary pressures exerted on indigenous lands. Accordingly, the paper provides fresh insights to buttress the emerging paradigm that land policies in SSA should be driven by local narratives rather than uncritical adoption of western ideals.

Development of Mechanical Accessory for Quality Control in Industrial Topographic Survey

Carlos Aurélio Nadal, Pedro Luis Faggion and Leonardo Ribas Précoma (Brazil)

Key words: Deformation measurement;

SUMMARY

A new accessory is being developed at the Federal University of Paraná in order to provide quality control for industrial topographical precision surveying whose main objective is to verify Metrologically small displacements and rotations of controlled mechanical instruments computationally industrial platforms. We tested a system composed of a total station Leica TC2003, and an accessory which consists a supports which two or more glass microprisms, spaced by approximately 20cm. The accessory was calibrated with the help of Laser Interferometer that provided the spatial distance between centers of glass microprisms. With this system it is possible to determine the inclination of the bar and their displacements (spatial rotations and translations). Initially were simulated and tested in the laboratory to determine the pitch of bar and compared with the results Talyvel level. Other actual tests were performed in a mill in the court of Mechanical Engineering UFPR laboratories. The results obtained showed the potential of the system for use in calibration and certification of mechanical instruments similar to those tested.

Factors and Spatial Pattern Analysis of Land Price

Catur Kuat Purnomo, Wahyu Sari Sabekti and Dian Permana Sari (Indonesia)

Key words: Land distribution; Land management; Valuation; land price, spatial pattern, spatial dependence

SUMMARY

Based on Presidential Decree Number 63 Year 2013 about National Land Agency Article 25 point d about the implementation of land acquisition for development activities in the public interest needs the fast, reliable, fair and independent land valuation, which the results of the assessment for the land causes a lot of conflict of interest and horizontal conflict due to the aggrieved stakeholders. To get the fast, reliable, fair and independent assessment result, factor analysis and the spatial pattern of land prices are required, spatial regression method can be used to showing land price factors spatially, to identify spatial pattern of land price, to identify imaginary land values zones and also to find out the effect of spatial dependence on nearest neighbors. The results are expected to reduce appraiser subjectivity in assessing land prices. This study uses Global Moran's I index, regression maximum likelihood spatial lag and spatial error and Moran's scatterplot to identify factors and spatial pattern that influence land prices in accordance with land market price and land tax value (NJOP). There are five variables used: the distance to the city center, the distance to the nearest university, the distance to the nearest station, the average house size, and the number of buildings. The results show that the significant spatial factors affecting land prices are the distance to city center (51.28%), the distance to the nearest university (18.21%), the distance to the nearest station (24.29%) and the number of buildings factor (24.83%). The average house size factor has no significant effect on land prices according to the market. Meanwhile, the significant factor which influence land tax value are the distance to the city center (24.98%), the distance to the nearest university (17.20%), the distance to the nearest station (21.52%) and the number of buildings (27.37%), while the average house size factor has no significant effect on land tax value (NJOP). The spatial pattern of land price in the market is identified having systematic pattern or clustered. Spatial lag models can explain the variation of land market price according to the value of $\rho(\text{rho})$ 19.62% and variation land tax value with value $\rho(\text{rho})$ 20.31%. The spatial error models can explain the variation of land market price with $\lambda(\text{lambda})$ 24.96% and the land tax value of $\lambda(\text{lambda})$ 25.51%. However, as conclusion, all results are not strong enough to show the effect of spatial dependence on nearest neighbors.

The Analysis of GPS Signal Short-term Loss Influence on the Accuracy of Mobile Laser Scanning Data

Maxim Altyntsev and Roman Popov (Russia)

Key words: mobile laser scanning; accuracy estimation; GPS signal loss

SUMMARY

The Analysis of GPS Signal Short-term Loss Influence on the Accuracy of Mobile Laser Scanning Data Maxim A. ALTYNTSEV, Roman A. POPOV Russian Federation Key words: mobile laser scanning, accuracy estimation, GPS signal loss SUMMARY The results of mobile laser scanning data accuracy obtained for the same area under various conditions are presented. For the purposes of investigations there was chosen in Novosibirsk Region a nonlinear road with a length of 1 km. Gage marks were painted by white color on both sides of asphalt pavement every 50 meters. Paint marking coordinates were measured by a total station. When the marks painted, scanning was done three times by the LYNX Mobile Mapper M1 system. The mobile scanning system was calibrated in advance. The first scanning was carried out in a forward direction, the second in a backward direction. Then the GPS antenna installed on the mobile laser scanning system was switched-off and the test road section was scanned for the third time. The GPS antenna's switching off was done in order to simulate a GPS signal loss which appears during moving through various tunnels. The main goal of analysis was to determine the GPS signal loss influences on the quality of obtained data. In case of GPS signal losses coordinates of a scanning system's motion trajectory are determined only by means of the inertial navigation system. The more GPS signal loss duration, the lower accuracy of obtained data. Furthermore, the final accuracy significantly depends on how such trajectory will be adjusted by POSPac MMS software. The adjustment method of mobile laser scanning data obtained by LYNX Mobile Mapper M1 and using POSPac MMS, DASHMap and TerraSolid software is described. The results of relative and absolute accuracy estimation of mobile laser scanning data adjustment are given.

ISNSW Cadastral Workshops: 2006 to 2014 and Beyond

John Minehan (Australia)

Key words: Cadastre; Education; Professional practice; cadastral;workshops;graduates;registered surveyors;ISNSW.

SUMMARY

ISNSW Cadastral Workshops: 2006 to 2014 and Beyond John MINEHAN, Australia Key words: Cadastral, workshops, graduates, registered surveyors, ISNSW. SUMMARY Currently there is a shortage of Registered Surveyors in New South Wales (NSW), Australia. A recent report by BIS Shrapnel entitled “Determining the Future Demand, Supply and Skills Gap for Surveying and Geospatial Professionals” predicts that there will be an acute shortage of surveyors in NSW and Australia by 2019. The problem is twofold: the number of undergraduates in surveying is low and there are insufficient graduates continuing on to registration. The New South Wales Board of Surveying and Spatial Information (BOSSI) has encouraged the Institution of Surveyors NSW (ISNSW) to offer programs and initiatives to assist graduate surveyors to become registered. ISNSW offers Instructional and Assessment Cadastral Workshops to financially enrolled BOSSI candidates undertaking registration. The Victorian and Queensland surveyor’s boards, in conjunction with professional surveying associations in each of those States, are developing their own cadastral workshop models. The genesis of what they are developing is based on the ISNSW cadastral workshops. This paper presents a history of the development of the ISNSW workshops that started with a letter of request in 2006 from the then NSW Surveyor General Warwick Watkins. The development and improvement of the workshops to the present is outlined along with a summary of the content of the Queensland and Victorian models. The paper concludes with an evaluation of the worth of these workshops

Engaging the Challenge of Climate Change, Enhancing the Role of Land Surveyors in Land Use Change and Carbon Credit Markets.

Paul van der Molen (Netherlands) and David Mitchell (Australia)

Key words: Geoinformation/GI; Land management; Security of tenure; Spatial planning; Climate Change

SUMMARY

Land use, land use change and forestry are major contributors to greenhouse gas emissions. Urban areas are the main centres of consumption and greenhouse gas emissions. While in general emissions have grown with 70% between 1970 and 2004, buildings emissions have grown with 75% including electricity related emissions, transport even with 120%. However, urban areas also offer good chances to play an important role in climate change mitigation and adaptation, creating long term sustainability and social development. Rural areas make up a quarter of the Earth's surface and their soil and plants hold three times as much carbon as the atmosphere. More than 30% of all greenhouse gas emissions arise from the land use sector. Livestock-related emissions of carbon and methane now account for 14.5% of total greenhouse gas emissions, more than the transport sector. What is special about the rural areas: while climate change measures in other sectors aim at achieving a lower level of greenhouse gas emission, the land use sector is the only one that is able to also remove greenhouse gases from the atmosphere through sequestration and storage. In general, the largest source of carbon emissions has been from fossil fuels, followed by land use change stemming predominantly from the conversion of forests to agriculture. Deforestation or the conversion of forests to agricultural land, accounts for the loss of 13 million hectares each year. Articles 3.3 and 3.4 of the Kyoto Protocol provide for the use of greenhouse sinks (carbon sequestration and storage in soils and vegetation) to be used by countries to fulfill their obligation to reduce greenhouse gases. Articles 6, 12 and 17 establish a market for trading of 'assigned emission units' (AAU's). So land use, land use change and forestry should be managed well with respect to climate change aspects. Climate change reinforces the urgency of scaling up the delivery of secure land tenure over land and natural resources using low cost decentralized systems of documentation and building where possible on functional informal systems. Regarding mitigation measures related to land and housing, suggestions are increased production and use of biofuels, reduction of transport needs by means of climate-proof land-use planning, energy-efficient houses and commercial buildings by the establishment of energy labeling and building codes, land management to increase soil carbon storage, restoration of degraded lands, application of cultivation methods that improve carbon sequestration (such as more rice cultivation, livestock and manure management), better forest management and better land-use management. In the case of 'unbundled' property rights, with the separation of carbon credit titles, these land administration systems should be able to register such rights (registration) and to attach appropriate geometric attributes and to make those titles accessible for trade in the carbon credit market. The land profession can enhance its relevance through adaptive land administration and land management.

Evaluation of Recent Global Geopotential Models for Geomatics Applications in the North of Libya

Jamal Gledan and Akram Algnin (Libya)

Key words: Geoid; GPS; Global Geopotential Models (GGM); Ellipsoidal heights; Arithmetic heights; Libya

SUMMARY

Recently, the Global Positioning System (GPS) satellite-based technology has been used extensively in the north of Libya for a wide range of Geomatics applications. However full utilizing of this technology is not achieved for example converting the GPS heights, ‘ellipsoidal heights’, to mean sea level ‘arithmetic heights’ that normally used in surveying and mapping through a geoid model. Currently, there is no local geoid model covers this region and all arithmetic heights can be obtained using ordinary differential leveling. Global Geopotential Models (GGM) provide appropriate cost-effective transformation alternatives. This paper presents an over view evaluation results for GGM using GPS and leveled arithmetic heights in the area of the north of Libya. A number of the most-recent GGM have been obtained and used for representing the Earth's gravity field and converting GPS heights into MSL heights in northern region of Libya . First-order and second- order control points for many Libyan projects have been used to evaluate the quality of GGM's results aiming to know which one suits better for geomatics application within the study area The comparison between local data and the results of global models is shown with the residual statistic. The obtained results showed that the EGM2008 model is the most precise GGM within this region , with an overall accuracy level about ± 0.24 meter. In addition , a new modified geoid model was developed for the northern region of Libya , that is based on integrating the original EGM2008 with precise local GPS and leveled arithmetic heights. In accordance with that, it is recommended to apply the modified version of EGM2008 geoid model in surveying and mapping projects in this area until a Libyan local geoid model is developed. Finally utilizing the modified version of EGM2008 geoid model compared with traditional method for obtaining arithmetic height that is now used by the surveyors is less time consuming and more cost-effective.

‘Cadastre 2014’: a Beacon in Turbulent Times.

Paul van der Molen (Netherlands)

Key words: Cadastre; ‘Cadastre 2014’

SUMMARY

In the almost 16 years of its existence, the readers of ‘Cadastre 2014’ might have observed that the quest for efficient and effective cadastres reached manifest high levels. Although the word ‘cadastre’ became a bit maligned, because ‘cadastres’ were too much associated with western type full fledged state guaranteed property titles, still many people were convinced that ‘something’ was needed that could safeguard land tenure security for the unrecorded owners or users of land. When we realize that the word ‘cadastre’ just means ‘list’, that ‘something’ could be indicated as a ‘cadastre’ in its original sense. This paper places ‘Cadastre 2014’ in a broader context of rapid urbanization, food security, climate change and informal economies. These items are issues which are high on the global political agenda: that is to say within the overall goal of poverty eradication. Time and again one of the solutions is found in the provision of security of land tenure for the poor, whether slum dwellers (urbanization), farmers (food security), land users and foresters (climate change) and businesses (informal economies). But from project evaluations it became clear that full fledged property titles are not considered to be appropriate to achieve that goal. The demand for recognition of a variety of human-land relationships has meanwhile been adopted by the UN and the urge for low cost information systems that allow fast and cheap recording of those rights has become pervasive last decade. ‘Cadastre 2014’ has been a beacon in this turbulent world, providing the general principles for thinking about cadastres, guiding governmental and non-governmental organizations to getting their things right.

SDI, Key Registers and Changing Role of NMCA's

Aart Jan Klijnjan and Rik Ebbeling (Netherlands)

Key words: Digital cadastre; e-Governance; Geoinformation/GI; GSDI; Legislation; Reference systems; key registers; SDI; good governance; spatially enabled society;

SUMMARY

For the purpose of good governance and corporate social responsibility, citizens, governments and companies need to have access to information through state of the art tools, products and services. In modern systems, geospatial information plays a key role, provided through Spatial Data Infrastructures (SDI). Good governance, the development of e-government services and a spatially enabled society are basic elements in the national strategy of the government of The Netherlands, asking for a good functioning SDI. Dutch Kadaster contributes to the SDI of the Netherlands. E-government in The Netherlands is based upon a National System of Key Registers. This system of key registers concerns a set of interrelated datasets on persons, companies, addresses, parcels, rights, buildings and topography with a legal and institutional fundament and centralised services. The integrated system of key registers aims at improving services for citizens and businesses, increasing government efficiency and effectiveness and decreasing administrative burden and fraud. Cadastre, the Land Registration and Topographical maps are established key registers. The role of Dutch Kadaster has shifted, with new responsibilities in maintaining links between the Land Registration and other registers and new tasks in maintaining national central registrations for buildings, addresses, valuation and pipelines. Kadaster Netherlands has obtained a central role in data dissemination from these registers. The data is widely used, i.e. for economic and legal security (property, mortgages), taxation, disaster management, policy preparation, resource management, ecology. It is a challenge to meet up with the fast and continuously changing demands in society. Our services become more and more location based and business processes of Kadaster and its customers are further automated constantly. The SDI in the Netherlands has been implemented within the international context (e.g. INSPIRE in Europe). The SDI has already been implemented for a substantial part and is still under development for some components. Dutch Kadaster is looking for international collaboration and opportunities to share its knowledge and experience world wide.

Improved Oil Slick Identification Using CMOD5 Model for Wind Speed Evaluation on SAR Images

Horyia Khenouchi and youcef Smara (Algeria)

Key words: Coastal Zone Management; Remote sensing; Risk management; SAR images, oil spill, lookalikes, wind, CMOD4 and CMOD5 models

SUMMARY

The capacity of synthetic aperture radar to observe the sea surface and its potentiality for evaluating the wind vector and for the interpretation of atmospheric and oceanic phenomena make the radar SAR a useful tool in the control and surveillance of oil spill pollution on sea surfaces. The wind is the most important phenomena which affect the appearance of the sea surface on the radar images. It can cause or modify several atmospheric and oceanic phenomena. In particular, the wind can change the shape of oil slicks, or causes lookalikes. The visibility of oil spills and their identification from radar images are particularly dependent on wind speed. For this reason, we've included the wind speed in our identification methodology in order to improve the identification of oil slicks process. Wind speed is calculated using the CMOD4 model. This is a model for evaluation of wind vector, initially developed for radar scatterometers, it gives the backscattering coefficient according to wind speed, wind direction and the angle of incidence. The inversion of the CMOD4 model allows the calculation of wind speed from a SAR image but with an interactive pre-estimate on the image by the operator. This interactive inspection is based mainly on the interpretation of atmospheric phenomena. In this paper we describe the performance of CMOD5 model. CMOD5 was derived to correct for some deficiencies of the currently widely used C-band GMF called CMOD4 with approximation of coefficients. We have used CMOD5 for calculation wind speed and compared it with wind speed calculated from CMOD4 using SAR images which include oil spills and look alikes of the algerian coasts. Validation of our tests shows that CMOD5 is able to largely remove known wind biases in CMOD4. These improvements aid the general usefulness of retrieved SAR images for climate and weather applications, and CMOD5 has now replaced CMOD4 in the operational applications

Aeronautical Data Quality – A New Challenge for Surveyors

Ralf Schroth (Germany)

Key words: Cartography; Geoinformation/GI; Standards; surveying, work flow, aeronautical data quality, International Civil Aviation Organisation (ICAO), Eurocontrol

SUMMARY

The International Civil Aviation Organisation (ICAO) introduced some years ago their standards and recommended practices which related also to digital terrain and obstacle data. To achieve compliance to these standards the states had to introduce new work flows for the data capturing and the storage of these data. Eurocontrol which represents the Member States of the European Organisation for the Safety of Air Navigation took over the responsibility to introduce these standards and implement them for the European airspace. These standards covering an enormous range of stakeholders from those who plan a project to those who are responsible for the data capturing, i.e. from the planer to the surveyors and the data base. The data related to these standards will have in the future the same importance for the air traffic as car navigation systems for the roads but with much higher safety requirements. The legal frame is given in the European Regulation 73/2010 where the Aeronautical Data Quality (ADQ) is defined, also the special data format AIXM (Aeronautical Information Exchange Model) which will guarantee a loss free transformation of all spatial and non-spatial data including the meta information. The aeronautical data chain contents the integrated aeronautical data package (NOTAM), digital obstacle data, digital terrain data and airport terrain data. In all data the surveyor is involved and has to deliver the information compliant to the standards. The paper will describe the challenges for different data capturing methods to achieve the compliance with the ADQ standards and data formats. Till now no surveying work flow for geographical data capturing is fulfilling it. It will influence the suppliers of surveying systems, the service providers, the GIS applications and the data base structures.

Managing Curriculum Development and Enhancing Quality

Bela Markus (Hungary)

Key words: Capacity building; Curricula; Education; Geoinformation/GI;

SUMMARY

Surveying profession is changed largely in the last decades. As a consequence essential transformation continues to occur in surveying education. Spatial information management became an important element in our education and training programmes. The universities should respond to industry needs, improving the curriculum of their traditional programmes, opening new specializations and ensuring life-long-learning possibilities not only for their graduates, but also adult learners in the related fields of geoinformation technology and science. University education and continuous professional development need innovation in our curricula. The paper is dealing with some of the educational development aspects of new MSc programmes in Geoinformatics. The author aims to introduce some concepts and practical tools, which were usefully applied in the curriculum development influenced by the Bologna process and successfully used in the quality enhancement practice. The first part is dealing with the definition of education/training needs and involvement of stakeholders curriculum planning. One of the most important outcomes from these activities is the definition of skills and competences; and stakeholder management plan. The curriculum is a crucial component of any education/training activities, it is a road map to knowledge, and it builds knowledge topology. The second part is focusing on curriculum and learning material development methods. The competency matrix will be introduced as a tool used to document and compare the required competencies for graduates. It is used in a gap analysis for determining where critical overlaps between courses are or which skills/competencies are not taught deeply enough. The implementation of new curricula often needs capacity building for faculty delivering education or training. Faculty of Geoinformatics at University of West Hungary participated or managed in many relevant international projects. The author will share some good educational practices. Quality is omnipresent, ubiquitous – like the cloud of computers. Understanding and evaluating the quality of education requires a comprehensive picture of the unique and complex characters of the system that produced them. The third part of the paper is dealing briefly with quality enhancement issues.

The Land Valuation Issues In Turkey

Ezgi Candas and Tahsin Yomralioglu (Turkey)

Key words: Land management; Legislation; Valuation;

SUMMARY

To assess the value of a real estate by evaluating several factors related to land, e.g. location, environment, topography, utilisation conditions etc. is called land assessment which is one of the key factors for land management. In Turkey as well as worldwide, real estate valuation is used in quite a few applications, directly or indirectly by private or public sectors. Several problems are faced because an administrative infrastructure for real estate valuation in Turkey has not been established yet. According to the researches, these problems on real estate valuation in Turkey could be listed as follows: i. There is no an efficient legal infrastructure for real estate valuation: Although there are plenty of regulations on land a specific act for “value” as an attribute of real estate does not exist. Also these regulations on real estate and their disorganisation cause legislative complexities and problems in practice. For example, in land consolidation process a value is determined, then another value for land title and different values for tax and mortgage are determined, furthermore a value for expert appraisal can be determined separately too. ii. An administrative structure for real estate valuation have not been established yet: In Turkey real estate valuation is used directly or indirectly by local municipalities and over 20 national governments for various applications. There is a need for an authority, which will organise, specify the rules and supervise the real estate process. iii. Rules and standards on real estate valuation have not been created: Objective criteria on real estate valuation do not exist in Turkey. Only some factors, which have to be considered in real estate valuation, are mentioned in Land Consolidation Act. These are not objective and sufficient. In fact various factors have to be evaluated altogether while valuing a real estate. These factors must be used based on national standards. Likewise these national standards must be suitable with the International Valuation Standards. As well as standards for valuation factors, standards for valuation methods must be established. Especially real estate valuation process must be carried out with geographical information technologies. In this paper the land valuation issues in Turkey will be discussed in the context of information given above. Moreover, land management issues in developing countries similar to Turkey and the suggestions to them will be examined and experiences will be shared.

The Feasibility Study of Automatic Extraction of Cracks in the Roadbed from Mobile Laser Scanning Data

Vladimir Seredovich and Maxim Altyntsev (Russia)

Key words: mobile laser scanning; image decoding; crack identification

SUMMARY

The Feasibility Study of Automatic Extraction of Cracks in the Roadbed from Mobile Laser Scanning Data Vladimir A. SEREDOVICH, Maxim A. ALTYNTSEV, Russian Federation
Keywords: mobile laser scanning, image decoding, crack identification
SUMMARY The investigation results of automatic extracting cracks in the roadbed from mobile laser scanning data are presented. All roadbed defects are visually well-identified using mobile laser scanning data. This is achieved by simultaneous analysis of laser points in display mode by the reflected signal intensity and images taken from digital cameras equipped with the mobile laser scanning system. The cracks of medium and large size are well identified by the intensity of laser points, whereas the smallest ones by images. Therefore, in technique development for automatic crack identification was used the IDIMA software as that of including automatic image decoding algorithms and TerraSolid software used for laser scanning data upload and processing. Automatic image decoding algorithms in IDIMA software are studied for the purpose of crack extraction. To extract certain groups of objects in IDIMA software, it is necessary to create a training sample using area masking. What is concerned crack extraction, all areas not relating to a roadbed should be masked. Otherwise, the result of classification will be unsatisfactory. The estimation of crack extraction accuracy from images taken by the mobile laser scanning system is described. The technique for obtaining identified crack coordinates using IDIMA software in the world coordinate system is outlined. The matter of this technique is that initial images in TerraSolid project work directory are replaced by images with detected cracks, and then laser points are painted according with colors taken from images. The laser points matching by cracks will be painted in given image classified color. Hereafter, laser point coordinates corresponding to cracks can be saved separately. Conclusions on the feasibility development of completely automated technique for crack extraction are given.

The Great Wall of China: The World's Greatest Boundary Monument !

John Brock (Australia)

Key words: History; Great Wall of China; ancient Chinese surveyors; Boundary monuments

SUMMARY

ABSTRACT It is said that the Great Wall of China is the only manmade structure on Earth which is visible from space (not from the Moon?!). The only natural feature similarly identifiable from the outer reaches past our atmospheric zone has been named as Australia's Great Barrier Reef. This natural wonder of the sea is continuous while the Great Wall of China is actually made up of a series of castellated walls mainly erected along ridge lines causing major variations in the levels of its trafficable upper surface. Some of the barriers built are not formed from stone but from rammed earth mounds. The purpose for these walls was primarily to facilitate protection from hostile adjoining tribes and marauding hordes of enemy armies intent on looting and pillaging the coffers of its neighbouring wealthier Chinese Dynasty of the time. As the need for larger numbers of military troops became required to defeat the stronger opponents, which may sometimes have formed alliances, the more astute provincial rulers saw a similar advantage in the unification of the disparate Chinese Provinces particularly during the Ming Dynasty (1368-1644). In fact the earlier sections of the Great Wall(s) were constructed to delineate the territorial areas of separately governed principalities thus representing some of the most ancient continuous boundary monuments of substance still surviving to this day. This paper will investigate which portions of The Great Wall(s) of China were mainly erected as boundary demarcations and the others put up as protection as well as attempting to highlight early techniques and equipment used by the Chinese surveyors of antiquity hopefully supplemented by some translated texts and historic art.

Territorial Monitoring for Nuclear Power Plants Using Geoinformation

Alexander Karpik, Vladimir Seredovich and Alexey Dubrovsky (Russia)

Key words: geoinformation, nuclear power plant, territorial monitoring

SUMMARY

The experience in providing the Crisis Centre at Rosenergoatom Concern OJSC by digital maps covering the nuclear power plant territory and on-line evacuation measures planning flowcharts is described. The examples of how they can be used in territorial monitoring, accident and incident management at the nuclear power plant are given.

Utilization Of PS–InSAR Method Optimizing In Land Subsidence Disaster Mitigation In Bandung City (Indonesia)

Yudo Prasetyo (Indonesia), Joshaphat Tetuko Sri Sumantyo (Japan), Ishak Hanafiah Ismullah, Hasanudin Zainal Abidin and Ketut Wikantika (Indonesia)

Key words: Remote sensing;

SUMMARY

Spatial technology dependency in monitoring and analyzing every natural disaster events in the currently time is very high. Especially in the Indonesia territory, which has a wide variety the characteristics of natural disasters and the scale of the natural disaster area. It is requires a lot of combination of spatial technologies to be able quick assessment of natural disaster impact in disaster mitigation concepts. One of the many terrestrial technologies that are part of the natural disaster mitigation process is the radar technology. The ability of radar technology that can penetrate cloud cover and large area coverage to be one of the advantages of quick assessment process. Application of PS-InSAR technology that has advantages in minimizing the decorrelation effects and get a good accuracy than other radar methods. Make it as research material in this study, especially the analysis of the influence of the data reduction, a combination of data level and the coherence differences apply. In this study, the study area is Bandung city area with a land subsidence as natural disasters research subject. This technique is used to analyze subsidence in Bandung City, West Java-Indonesia by assessing 19 ALOS PALSAR images (Japanese L band spaceborne) during the periods of July 2007-February 2011. After PS-InSAR processing, the land subsidence results will be validate with land subsidence observations using a GPS method. The results of land subsidence velocity in Bandung city have a various value results between $0,6 \pm 0,4$ cm/year and $2,1 \pm 1,2$ cm/year. The result of validation has resulted such as $1,4 \pm 1,4$ cm/year (PS InSAR-DInSAR) and $1,6 \pm 0,7$ cm/year (PS-InSAR-GPS). Analysis of the effect of PS-InSAR processing results of the combined use of data ALOS PALSAR level 1.0 and 1.1 as well as differences in the determination of the value of coherence was also performed. The objective of this research is to get a light processing in PS-InSAR method as part of quick assessment in disaster management concept. Also this research shows a capability of data optimalization in PS-InSAR technique as basic concept of LPS-InSAR processing.

Developments out of "Cadastre 2014" Internationally and in Switzerland in Particular

Daniel Steudler (Switzerland)

Key words: Cadastre; Digital cadastre; e-Governance; Geoinformation/GI;

SUMMARY

With translations into some 25 languages, the «Cadastre 2014» publication of FIG-Commission 7 went far beyond of what was expected in the beginning. This article therefore looks back again at the original statements and what the developments since its publication in 1998 have been. The article is part of the special sessions on "Cadastre 2014 – From Concept to Practice" and will be presented therein.

Renewal of the Cadastral Template with Web 2.0 Technology

Daniel Steudler and Abbas Rajabifard (Australia)

Key words: Cadastre; Digital cadastre; Education; e-Governance;

SUMMARY

The "Cadastral Template" has originally been developed in 2003 with the objective to provide a platform for discovering the basic social, conceptual and institutional context of national cadastral systems and how they relate to building Spatial Data Infrastructures (SDI). The initiative and the website have been well received and used by many countries, government agencies, the wider industry, as well as in the research and education sector. The technology behind the website, however, is outdated and maintenance became too time consuming. Due to the importance of the cadastre as a foundation for the national economy in any given country and also due to facilitate the delivery of tenure security and the availability of advanced technology, the data contained in the cadastral template are very valuable. Therefore a project of renewal is carried out by a project team consisting of Abbas Rajabifard and Daniel Steudler, endorsed by the FIG President's office, and technically supported and hosted by the "Centre for Spatial Data Infrastructure and Land Administration" (CSDILA), the University of Melbourne. This article is illustrating the motivation behind the project, the conceptual design, the outcome, and future direction.

Responding to Climate Change: Carbon Rights and Data Sharing Within Land Administration

Adish Khezri and Arbind Tuladhar (Netherlands)

Key words: Cadastre; Digital cadastre; Geoinformation/GI; GSDI; Climate Change; Carbon Market

SUMMARY

Abstract: The 2007 Intergovernmental Panel on Climate Change (IPCC) Assessment Report states that the warming of the global climate on earth is mainly caused by Greenhouse gases (GHGs) especially carbon dioxide (CO₂), which is absorbed and emitted naturally as part of the carbon cycle, through animal and plant respiration, volcanic eruptions, and ocean-atmosphere exchange. Additionally the mankind activities, such as the burning of fossil fuels and changes in land use, release large amounts of carbon to the atmosphere, causing CO₂ concentrations in the atmosphere to rise. As reported within the REDD+, the carbon rights as a part of other land rights have potentials for creating new markets and funds aimed at reducing carbon emissions or enhanced removals. This requires adequate integrated concept for land administration and timely sharing of relevant data among various institutions and the beneficiaries involved in the market including the vulnerable groups in the society. This paper analyses the integrated concepts and critical issues by reviewing existing literature on climate change, carbon and land use rights, and land administration with spatial dimensions to respond to climate change. Then we present geo-information requirements including sharing model, and finally we discuss the conditions, the roles and responsibilities of both institutions and beneficiaries using land administration in new market aiming at reducing carbon emissions for the positives effects on climate changes.

Selecting Optimal Data–Fitting Model for Surveying and Geodetic Applications

Joseph Odumosu, Funmilola Idowu and Chika Okorochoa (Nigeria)

Key words: Engineering survey;

SUMMARY

SELECTING OPTIMAL DATA-FITTING MODEL FOR SURVEYING AND GEODETIC APPLICATIONS (1)ODUMOSU, JOSEPH O, (2) IDOWU, FUNMILOLA F and (3) OKOROCHA, CHIKA V (1)Department of Surveying and Geoinformatics, Federal University of Technology, Minna. (2)Department of Surveying and Geoinformatics, the Polytechnic, Ibadan. (3)Lord's-Field Limited. ABSTRACT Geoid Computation, Topographic Surveying, GPS signal processing, Modelling of geo-hazards, datum transformation, image registration and all surveying and geodetic tasks require analytical interpolation of mid-point values having obtained certain bounding conditions via field observations especially as coverage area increases. Besides, field data is often accompanied by noise irrespective of the degree of refinement and accuracy involved in the data gathering process. While separation of noise from signal can be achieved via least squares collocation, interpolation of mid-point signal values requires that appropriate analytical interpolation technique is employed. Six interpolation models are herein presented and the optimal for particular surveying application determined based on the derived residuals and predictive error estimates.

Application of Importance Performance Analysis Methode to Improve the Quality of Services in Land Office

Dian Permana Sari, Firman Ariefiansyah Singagerda, Esti Prajoko and Catur Kuat Purnomo (Indonesia)

Key words: Land management; the quality of service; importance performance analysis; land registration; the land national agency; land office

SUMMARY

Application of Importance Performance Analysis Methode to Improve the Quality of Service in Land Office Dian Permana SARI, Firman Ariefiansyah SINGAGERDA, Esti PRAJOKO, Catur Kuat PURNOMO Indonesia Key words: the quality of service, land registration, servqual, importance performance analysis, land registration, the National Land Agency

SUMMARY There's still a lot of public complaints in the provision of services in the land sector. In the Annual Report of the Ombudsman of the Republic of Indonesia (ORI) in 2009, the National Land Agency listed as the fourth worst in public service. In some cases in land sector, public services in Indonesia is not proper because the service was only designed by the provider without considering user requirements from consumers. This conditions often resulting in services which is not meet with the expectations of service users. Therefore we need a tool to analysis user requirements and determine the aspects that should be a priority concern in an effort to improving the quality of service. This study aims to improve the quality of land registration services in South Jakarta Land Office. The quality of service is measured by the SERVQUAL model and used Importance Performance Analysis methods to determine which service indicator needs to be improved . Based on the research results, it can be concluded that the quality of service has not met the expectations of consumers. Therefore need to improve service on some indicators , especially the use of modern equipment systems such as queuing systems, speed of processing time according to the standard procedure , the accuracy of the service opening hours , request a notification when a file has been completed, the existence of customer care, the waiting time to be served. With this research, the Land Office of South Jakarta have an alternative policy to improve the quality of services in the land sector.

Lessons–Learnt from the use of Opensource GIS for Training of Disaster Contingency Planning in Indonesia

Purnama Budi Santosa, Trias Aditya, Heri Sutanta and Dany Puguh Laksono (Indonesia)

Key words: Capacity building; Education; disaster management; opensource GIS

SUMMARY

For the purpose of improving capacity building in disaster preparedness and responses of local agencies and communities in Indonesia, National Agency for Disaster Management (BNPB) and Australia Agency for International Development (AusAID) through the Australian Indonesia Facility for Disaster Reduction (AIFDR) established a project on disaster management. The project includes the developing a tool (named InaSAFE) for enabling hazard specific-impact assessments running on top of Quantum GIS (QGIS) as the underlying software, as well as executing trainings on the use of the developed tool and QGIS for developing disaster scenario plans. In regards with this, this paper presents the lesson-learnt from the capacity development activities side. Prior to executing the training, a series of works have been done. These include (1) preparing and developing Indonesian version of QGIS Training Material for beginner, intermediate and advanced users; (2) preparing and developing InaSAFE training module in both English and Bahasa Indonesia; (3) delivering capacity development program for local agencies, local universities, and relevant NGO members in six targeted provinces on the use of QGIS and InaSAFE; and (4) develop a mechanism for a sustainable support to BPBD in the six targeted provinces. The project activities were grouped into training preparation, training implementation, training monitoring and evaluation, and reporting. Twelve sessions of trainings, which include six session of beginner and six session of intermediate level, were conducted between September 2012 and March 2013 at six provinces namely, Sumatera Barat, Jawa Barat, Jawa Timur, Nusa Tenggara Timur (NTT), Sulawesi Selatan, and Papua Barat. All of these provinces are considered as highly prioritized areas for disaster mitigation and risk reduction programs. During the time period, the training faced a variety of challenges but was successfully implemented. This paper will present and discuss the results of training monitoring and evaluation in detail.

Determining factors in enhancing a shopping arcade's value upon renovation

Chan K (Hong Kong SAR, China)

Key words: Land management; Professional practice; Real estate development; Valuation;

SUMMARY

It is crucial to maximize a shopping arcade's retail and rental value; especially in a prominent Central Business District (CBD). Major alteration, addition and renovation works can help increase the pedestrian flow, attract more consumption by potential customers, and improve user's satisfaction through the upgraded facilities; and thus increase the shopping arcade's image, turnover, as well as yield. In this research, the determining factors of modifying and upgrading a shopping arcade will be explored by means of detailed feasibility study and post occupation analysis; so as to assess the net gain in tangible, non-tangible and financial aspects, with a Hong Kong case study. Questionnaire will be dispatched to the major stakeholders like shop tenants, passer-bys, potential consumers, property management, owners; to solicit their respective views of pre/post upgrading works. These findings will be further analyzed to establish the determining factors in enhancing a shopping arcade's value upon renovation; so as to shade some light for the retail industry of Hong Kong.

3-D Digital Modelling using Multi-Spectral Remote Sensing Imagery: A Study of Million+ City, Faridabad, Sub-Region of Central NCR, Haryana State, India

Madan Mohan (India)

Key words: Geoinformation/GI; Land management; Remote sensing; Spatial planning; Urban Sprawl, Economic Development

SUMMARY

The geospatial remote sensing information have a complex structure involving space, time and presentation. The 3-Dimensional digital modelling involves of spatial and non-spatial information integration for geographic visualisation in context to the real world. In other words, the geospatial information visualisation is also known as geovisualisation. So, the multiple interactively linked view providing different perspectives into the data has become a kind of standard in geovisualisation. Urban sprawl has been quantified by considering the built-up area as the key feature of sprawl, which can be obtained either from physical field survey or through remote sensing satellite imagery. A large number of studies are dealing with quantification of the spatial patterns of urban sprawl with the help of Remote Sensing and GIS. In all these studies, however, concluded with different methodologies in quantifying the urban sprawl. But it is found that there is common approach to consider the behaviour of built-up area and population density over the spatial and temporal changes which has taken place in most of the cases of spatial pattern of urban sprawl. So, the urban sprawl is the process of transformation of rural areas into urban areas due to in-migration, industrial growth and transport network infra-structure development. In the recent past, a lot of attention has been paid to understand and analyse the process of spatial patterns of urban sprawl. It is noteworthy to mention that over the periods, there has been continuous process of urban sprawl in the rural-urban fringe of Faridabad City due to the liberalization of economy, development plans and policies of the State Govt. of Haryana and Central Govt. of India. In view of this, the conventional surveying and mapping techniques are expensive and time consuming for the estimation of urban sprawl. Such information is not easily available for most of the urban centres and cities. So, as a result, increasing research interest is being directed to the mapping and monitoring of urban sprawl using geospatial technologies which is best suited for geovisualisation of multi-spectral imagery for spatio-temporal land development as well as for 3-dimensional modelling of the process of urban sprawl. Hence, the present research would make an attempt to help local, regional and state level land use planners and policy makers to better understand and address the issues attributed to urban sprawl in context to the real world scenario.

Studies of Tectonic Movements in Saudi Arabia Using CORS

Muhamad Al Rajhi, Ali Al Omar, Ramazan Yanar, Fahri Kartal and Kamil Eren (Saudi Arabia)

Key words: Cadastre; Deformation measurement; Engineering survey; GNSS/GPS; Positioning;

SUMMARY

Studies of Tectonic Movements in Saudi Arabia Using CORS Muhamad Al Rajhi and Ali Al Omar, Saudi Arabia Ramazan Yanar, Fahri Kartal and Kamil Eren, Turkey Key words: tectonic movements, deformation, earthquake, CORS, GNSS SUMMARY This paper presents the scientific applications of GNSS in general and CORS in particular. Amongst others, these applications include: monitoring plate tectonics, deformation meteorological studies using CORS data. The paper also discusses case studies of scientific applications such as the results of the velocity of Arabian plate. Earthquakes have been the great natural hazard that threatens the Middle East region socially and economically. Hence, it is crucial to have knowledge on the characteristics and dynamics of the tectonic fault lines to mitigate this hazard. This mission is partly accomplished by the outcomes of the CORS networks by looking at the results of CORS data process obtained from an 8 year measurement period in Saudi Arabia as presented in this paper. The precise positions of 13 x CORS sites in Saudi Arabia at epochs 2004.0 and 2012.7 were compared to determine the tectonic movement of the Arabian Plate. The results show a displacement of about 37.1 cm in NE direction corresponding to a velocity of about 4.3 cm / year in the same direction. The same data was also used to determine internal deformations in the Arabian Plate. In Saudi Arabia, there are already 186 CORS sites. By the end of 2014, the number of CORS sites shall reach about 300. These sites shall affectively serve for geodetic positioning and engineering surveys. They will also serve scientific applications such as tectonic movement of the Arabian Plate, crustal deformation studies and modeling of the atmosphere (troposphere and ionosphere) over Saudi Arabia. However, this network needs to be expanded to cover the Arabian and Eurasian plates so that these networks can greatly contribute to scientific studies related to geohazards and disaster management in the region.

A Model for Sustainable Urban Regeneration in Turkey

Nihat Enver Ulger (Turkey)

Key words: Urban renewal; Urban Regeneration; Development Plans; Dense Urbanization; Turkey

SUMMARY

Due to deficiency of land/terrain politics across the country, existence of dense urbanization against to development plans, absence of comprehension and opinion about real estate valuation in development applications; new legal and technical arrangements and development application tools are required for land settlements in Turkey. The process of urban regeneration comes in agenda because of dense urbanization, problems related with applications of land management, necessity to increase the standards of equipments in densely urbanized zones of cities, regeneration due to reduce the risks of earthquake – a reality of Turkey – and requirement of new constructions in demolished areas. In this paper, authors suggest methods and recommendations concerning law and legitimacy for development plan applications, which will settle this process.

The GPS Data Campaign for the Slip Surface Estimation Ciloto Landslide Zone Case Study, West Java, Indonesia

Vera Sadarviana, Hasanuddin Zainal Abidin, Djoko Santoso, Joenil Kahar and Achmad Ruchlihadiana Tisnasendjaja (Indonesia)

Key words: Deformation measurement; GNSS/GPS; Positioning; landslide, slip surface

SUMMARY

Landslide is a disaster that often occurs in the rainy season in Indonesia. One in Ciloto West Java has hilly terrain, which continues movement of soil. The effort to carry out disaster prevention is finding a stable material layer by means to find the location of the slip surface, where slip surface is delaminates between sliding material and stable slope material. In the limit equilibrium method, the slip surface is used as surface reference for safety factor calculation. The GPS data campaign provides horizontal and vertical soil movement at each monitoring point in landslide zone. First, the landslide area is divided into several sections based on the same direction of horizontal movement monitoring points. The similarity direction of horizontal movement at several monitoring points indicates that the monitoring points located at the same slip surface. Second, the intersection point of velocity movement trend lines from each monitoring points, can provide slip surface location as the estimation result. The vertical movement could give estimation of scarp position also. Locations of scarp in vertical section to ensure compatibility with result of geology research at same study area. Ciloto landslide zone is classified to very slow velocity movement (5×10^{-5} - 5×10^{-7} mm/second). The characteristic of horizontal displacement has diversity directions. Those characteristic gives indications that landslide zone have many slip surfaces. From this research, the landslide type at Ciloto zone has multiple compound (rotational and translational) slip surfaces.

Review and Impact of the Six Statements of ‘Cadastre 2014’

Jürg Kaufmann (Switzerland)

Key words: Cadastre; Digital cadastre; Geoinformation/GI;

SUMMARY

During the XX. FIG Congress 1994 in Melbourne, Australia the FIG Commission 7 mandated a working group with the task to reflect on the developments in the field of modern cadastres and to imagine ‘How the cadastre would look like in 20 years’. Jürg Kaufmann was the chair and with his Secretary, Daniel Steudler, he established a concept of how to tackle the task together with FIG delegates, which numbered about 40 people participating in at least one annual meeting. The issue was discussed at four annual meetings of Commission 7: 1994 in Fredericton, Canada; 1995 in Delft, The Netherlands; 1996 in Budapest, Hungary; and 1997 in Penang, Malaysia. A one-day seminar on ‘Modern Cadastres and Cadastral Innovations’ was organized during the Delft meeting. Already in this seminar the six statements on the future cadastral systems were presented as: (1) Cadastre 2014 will show the complete legal situation of land, including public rights and restrictions! (2) The separation between ‘maps’ and ‘registers’ will be abolished! (3) The Cadastral mapping will be dead! Long live modelling! (4) ‘Paper and pencil - cadastre’ will have gone! (5) Cadastre 2014 will be highly privatized! Public and private sector are working closely together! (6) Cadastre 2014 will be cost recovering! The topic was increasingly refined until the results were published during the XXI. FIG Congress held in Brighton, UK in 1998 in the brochure ‘Cadastre 2014’. After publication the booklet was translated in many languages and began to impact the thinking. Not all of the statements were implemented equally quick or intensely. While some of them became reality due to the general development, others needed more effort because mental or legal changes were to be undergone before the conditions were ready for action. This paper shows how and to which extent the statements impacted the development of cadastral systems.

An Assessment on Applications of Development Plans in Turkey

Nihat Enver Ulger and Tahsin Yomralioglu (Turkey)

Key words: Land readjustment; Development plans; Land Consolidation; Turkey

SUMMARY

In Turkey, lands subject to property are settled with two main perceptions. Rural lands are settled with 'Land Consolidation'; while for urban territories 'Land Readjustment' is essential. Development plans with different content and purposes enable us to make interventions on rural and urban lands. In other words, the technical and legal foundations of these interventions on lands and land management are development plans. Development plans, which are supported by Turkish constitution, civil law and development law, not only determine new land property and its usage; but also delegate central and regional institutions. The problem is related with legitimacy and internalization of beneficiary. This situation brings discussions about the purposes of development plans and the methods in which they will be applied. Therefore, it is very important to prepare plans based on compromised resources. Even though development plans are prepared in detail carefully, they cause loss of time, effort and resource as long as these lands are not applied and not registered officially as new property and its use. Applications of development plans are harder and complicated than preparation.

Underground Utility Detection Survey and Mapping. Land Surveyors Board of Malaysia Certification Course

Siew Siew Weng and Ibrahim Shahabuddin (Malaysia)

Key words: Education; Professional practice; "Underground Utility Detection Survey and Mapping", "Land Surveyors Board of Malaysia", "Association of Authorised Land Surveyors Malaysia", "Competency Certificate"

SUMMARY

Underground Utility Detection Survey and Mapping. Land Surveyors Board of Malaysia Certification Course The subject matter Underground Utility Detection Survey and Mapping (UUDSM) encompasses 3 core disciplines i.e. Electrical and Electricity which focus on signal and operation aspects, Geology and Geophysics on acquisition anomaly aspect and Mapping which provide a complete spatial definition of "what is where". Attempt at knowledge transfer largely depends on the domain of expertise and constraints as well as business focus of organisations, corporations and academic institutions. A review of existing courses offered by these organisations worldwide only serves to prove that these courses fall short of the expected role to be played by land survey professionals. Recognising the need to address the issue, the Land Surveyors Board Malaysia and the Association of Authorised Land Surveyors Malaysia has embarked on a mission to design and offer a professional course in UUDSM to its members at post-graduate level in line with the professional and institutional need of the country. Besides the challenge to unify a multitude of disciplines, the conduct of the course has to cater for the underlying constraints that its potential candidates are professional land surveyors who have their practice to attend to. To date, three batches of a total of 90 Licensed Land Surveyors have successfully completed the said course and have been awarded with Competency Certificates by the Board of Land Surveyors Malaysia. This paper will present the contents, modules and implementation schedule of the course. Participations and the role-played by various experts from institutions of higher learning and organisations are specifically highlighted and duly recognised as having contributed to the successful implementation of the course. The course consists of lectures and practical assignments, which includes reports and documentation of each module/dissertation/project documentation, competency test, skills and an oral interview. A certificate will be awarded to participants who fulfill the accreditation prerequisite. Author: Mr. Siew Weng Siew and Mr. Shahabuddin Ibrahim

Geodetic Monitoring of Arch–Span Bridge Construction in Novosibirsk Using Laser Scanning

Alexander Seredovich and Andrey Ivanov (Russia)

Key words: terrestrial laser scanning, geodetic monitoring, 3D measurements, bridge construction, cable-stayed bridge

SUMMARY

The experience of using terrestrial laser scanning technology for the purposes of geodetic monitoring during arch erecting of cable-stayed bridge under construction through the Ob River in Novosibirsk (Russia) is described. The features of terrestrial scanning equipment used for monitoring and the results obtained were analyzed as well as the actuality of laser scanning technologies for bridge construction was revealed and justified. The space-monitoring procedure of span launching and bridge arch trajectory was developed based on lessons learned.

UAV System With Terrestrial Georeferencing For Small Area Mapping

Hendriatiningsih Sadikin, Asep Yusup Saptari, Rizki Abdul Haris and Andri Hernandi
(Indonesia)

Key words: Engineering survey;

SUMMARY

Unmanned Aerial Vehicle System With Terrestrial Direct Georeferencing is a survey and mapping system combining terrestrial survey method and close range photogrammetry. The UAV system capabilities to fly with or without runway make it as a potential application for small area mapping. So that UAV method become a feasible alternative solution to map some cluster of parcels in rural or village area which has less and difficult transportation facility and as the solution to provide spatial data for land administration purpose. UAV technology characterize with low altitude flight, adaptive with the environment, climate condition problem overcoming like cloud cover whereas always be a major problem in satellite imagery and aerial mapping. With knockdown system, aero plane elements assembled easily in all kind of environment. In spite of several benefits, UAV has a major problem in geometric accuracy. In accord with cadastre map for instance, geometric accuracy highly required and Indonesia National Cadaster Office setting up geometric accuracy of cadaster map with government rule. UAV geometric accuracy degradation caused by several factor likes; Platform flight instability and flying height variation as the influence of the wind resulting various photo scale. Modification of existing method must be carried out to solve these problems. The modification offered in this research is the combination between UAV and terrestrial method to overcome geometric problems. The error effect of platform instability significantly reduced using measured coordinate photo from a reflectorless total station on the ground, these coordinate information applying as the coordinate of photo central. Each photo has a central photo coordinate accurately both horizontal (x,y) and vertical (z) whereas in bundle block process will control error of the photo. Total station stand up on a control point and pick every single photo from high resolution RGB digital pocket camera which is mounted inside the platform. Camera shutter pick time and total station coordinate photo take time synchronization was a major problem in this research, specific arrangement required to relate central photo with coordinate data from total station. Specific UAV design and Find fixing UAV is another challenge for surveyor to get used with moving target measurement.

Integration of Land Information and Standard GIServices in an Interoperable Framework for the City–Planning System in the Context of Housing Problems

Hoda Tahami and Majidreza Farahani (Iran)

Key words: Affordable housing; Geoinformation/GI; Land management; Spatial and semantic interoperability, geoservice

SUMMARY

Urban environment is changing permanently due to the great deal of economic, technological, political and environmental changes. In this situation, land context plays significant role in the cutting-edge of every field and can be evolved from heterogeneous land information system with different functional aspects. In order to design standard city-planning systems, which specially focus on Housing problems the need for a framework, which serves as an integration tool in the data and services context cannot be overlooked. Because of the importance of such a framework not only for governance policy and decision making but also for socio-economic problem solving in a society there is now an increasing interest in the use of possibilities of geospatial information services (GIServices) to solve significant problems and challenges especially in housing domain. Numerous aspects of land information may be related to the housing purposes including a property and ownership information, condition and physical characteristics, financial and tax information, prior land use information, environmental deterioration and concerns which in its turn results in non-interoperability in spatial and semantic themes. This paper applies Land Information System concept as well as GIS capabilities and geo interoperable services to provide an interoperable framework in order to modeling new approaches applied for effective housing problem solving and planning techniques. This framework especially concentrates on resource allocation, economic and environmental management and health issues with regard to integration of different aspects of land concept and its related services. It is to demonstrate how GIServices functionalities in LIS can serve from a mainly GI prospective within the context of current and future housing policy making and troubleshooting its own potential problems.

Coastal Gravity Anomalies from Retracked Geosat/GM : A Case Study in Bali, Indonesia

Dyah Pangastuti and Arisauna Maulidyan Pahlevi (Indonesia)

Key words: Engineering survey; Positioning; Reference systems; Geosat/GM, gravity anomaly, satellite altimetry, waveform retracking

SUMMARY

Coastal Gravity Anomalies from Retracked Geosat/GM : A Case Study in Bali, Indonesia

Dyah Pangastuti (dyah.pangastuti@big.go.id) Arisauna M. Pahlevi

(arisauna.maulidyan@big.go.id) Abstract Geoid is the equipotential surface of the Earth's gravity field which best fits, in a least squares sense, global mean sea level. Geoid

determination need gravity data in land and in the ocean. Gravity data in the ocean can be derived by shipborne gravity, airborne gravity, and satellite altimetry. Airborne gravity data have not measured in Bali, Indonesia. Shipborne gravity has covered some of the ocean of North of Bali. We used altimetry data from Geosat/GM to dense gravity data in the ocean of Bali. Subwaveform threshold is chosen to retrack the data which near of coast. The gravity anomalies in the ocean are derived from sea surface height (SSH) gradient by using Least Square Collocation (LSC). For data validation, we used shipborne gravity and EGM 2008, and we used DTU10 as comparison. Standard deviation of our model-shipborne gravity is smaller than DTU10-shipborne gravity, while standard deviation of DTU10-EGM2008 is smaller than our model-EGM 2008 due to DTU10 is used for EGM 2008 determination.

Based on the validation result, our model is quite good to be used for geoid determination in the ocean of Bali. Indonesian geoid determination is a responsibility of Geospatial Information Agency of Indonesia (BIG) that i have been working in. Indonesia has many island which separates by wide ocean. By its geography, airborne gravity has limitation to cover all of the ocean of Indonesia, therefore, satellite altimetry can be used as solution to derive gravity anomaly in the ocean of Indonesia. Keywords: Geosat/GM, gravity anomaly, satellite altimetry, waveform retracking.

Sovereignty Islands Between Finland and Sweden

Aune Rummukainen (Finland)

Key words: Land management; Legislation;

SUMMARY

In the year 1809 Sweden had to cede Finland's area to Russia. The border of Sweden and Finland was imposed to the rivers at the north. Real estates along these rivers have their grounds both side of these rivers and on the islands too. According to peace terms these real estate owners had to decide during three years on what side of river they are going to live and they had to sell their property from the other side of river. It is noticed in boundary survey that land consolidation is needed primarily and selling by auction secondary. Owners of islands would perpetually have possession to their islands which after land consolidation were still at wrong side of state border. These islands are called sovereignty islands. Finland declared independence in 1917. Finland and Sweden concluded an agreement of these islands in 1986. This agreement preserves the special status of these islands. According to this agreement possession of islands which are situated in Sweden is under Finnish law and possession of islands situated in Finland is under Swedish law. According to peace agreement border was imposed to be at the deep channel of the river. Bottom of the river is mostly sandy and in course of time deep channel is changed. Owing to this boundary survey is needed after every 25 years. Boundary survey is done according to centre line principle at deep channel. Because of boundary survey some islands have moved from country to country and these islands have lost their special status.

Mapping a Tropical Marine Environment using a Vessel-borne Mobile Laser Scanning System: A Pilot Study

Jonathan Li, Haiyan Guan (Canada), Yongtao Yu, Cheng Wang and Fukai Jia (China, PR)

Key words: Coastal Zone Management; Hydrography; Laser scanning; Marine cadastre;

SUMMARY

Researchers from the Centre of Excellence in Remote Sensing and Spatial Informatics at Xiamen University carried out a pilot study to investigate the marine use of a mobile laser scanning (MLS) systems and a terrestrial laser scanner (TLS) to collect high-resolution near-shore infrastructure and coastal topographic data along the Gulangyu Island, in Xiamen, Southeast China in support of Coastal and Marine Spatial Planning. Investigations into use of a RIEGL VMX-450 MLS system and a RIEGL VZ-1000 TLS full-waveform scanner onboard a small vessel were carried out in Xiamen's tropical marine environment in April 2012 and May 2013, respectively. The high speed of data acquisition, the abundance of information (3D coordinates, reflecting characteristics) and the accuracy of the acquired point clouds within the centimetre range offer good requirements for the use of this new technology for many applications at and on the water. The VMX-450 MLS system consists of two RIEGL VQ-450 scanners (with a scanning range up to 800 m) and four digital cameras for acquisition of point clouds and colour images as well as two GNSS antennas and one inertial measurement unit (IMU) for providing accurate timing for synchronization of laser scanning data along with the real-time position and orientation of the vessel. By integrating RIEGL VZ-1000 into the VMX-450, the system is able to produce a more detailed description of vegetated structures with its full-waveform function and long range up to 1400 m. The investigations demonstrated that the software for data acquisition plays a crucial key role for making the integration of a TLS such as VZ-1000 in real-time successfully accomplished. In addition, the pilot study showed that the pure accuracy of the inertial measurement unit significantly affects the accuracy and quality of the kinematic laser scanning data. Finally, the laser scanner RIEGL VZ-1000 used onboard the vessel has a clear advantage due to its technical specifications concerning scanning range, accuracy and resolution, making the use of this TLS scanner very reasonable economically. By system integration and extension of a TLS scanner on board a vessel the range of applications can be increased.

Development of Modern Education in Geoinformatics for Enabling Sustainable Development in Uzbekistan.

Odil Akbarov (Uzbekistan), Bela Markus and Andrea Podor (Hungary)

Key words: Curricula; Education; Geoinformation/GI; GNSS/GPS; Photogrammetry; Reference systems; Remote sensing; Young surveyor;

SUMMARY

This article is intended to give information about a new TEMPUS project that is underway in Uzbekistan. The aim of the project is to ensure that partner universities in Uzbekistan have the capacity to offer a Master programme in Geoinformatics that meet Bologna process, international academic quality standards, job market needs, make GI science attractive for young generation and support Uzbekistan in sustainable development. The project is supported by TEMPUS programme of the EU the aim of which is to strengthen the cooperation between the EU countries and peripheral countries in the field of education. Uzbekistan is a young independent country facing several challenges including environmental pollution, severe drought, inadequate land and water usage etc. Land degradation processes are widespread due to deteriorating irrigation and drainage infrastructure causing water logging and soil salinity. Addressing this requires speeding up environmentally sustainable rural development by supporting: improved land and water use management, and land administration reform; rural infrastructure and services etc. These issues would be manageable more efficiently by the applying GIS technology. In Uzbekistan the curriculum and the educational infrastructure in Geoinformatics are also needed to be modernized therefore it is a key point to enhance academic capacity and supply the partner universities with the necessary equipment. All in all, Uzbekistan needs to be developed regarding Geoinformatics in order to manage properly the challenges. The project propose in its outline an approach for supporting spatial decision making in the different fields where GIS are used and by extension to ensure sustainability in Uzbekistan. The qualified academic who will attend the course will understand the spatial dimension of the different problems, learn how to collect relevant data, how to store, how to analyze it and how to visualize results. The project consortium in total consists of 11 academic and non-academic institutions. The project is coordinated by University of West Hungary and on national level by Tashkent Institute of Irrigation and Melioration. Project partners are Paris-Lodron Universität Salzburg (Salzburg, AT), Royal Institute of Technology (Stockholm, SE), University of Greenwich (London, UK), National University of Uzbekistan (Tashkent, UZ), Karakalpak State University (Nukus, UZ), Tashkent Architecture Building Institute (Tashkent, UZ), and 3 non-academic partners Ministry of Higher and Secondary Specialized Education (Tashkent, UZ), State Unitary Enterprise “Geoinformkadastr” (Tashkent, UZ), National Center of Geodesy and Cartography (Tashkent, UZ).

Automated Extraction of Road Surface Information from Mobile Laser Scanning Point Clouds: State-of-the-Art

Haiyan Guan (Canada), Yongtao Yu (China, PR), Haocheng Zhang (Cayman Islands), Jonathan Li and Cheng Wang (China, PR)

Key words: Engineering survey; Laser scanning; Young surveyor;

SUMMARY

In this paper the main problems and the available solutions are addressed for the automated extraction road information from 3D point clouds acquired by mobile laser scanning (MLS) systems. Mobile mapping using CCD and video cameras has dealt for many years with manual or automated extraction of road geometric information from digital images. Nowadays mobile laser scanning systems are also becoming a standard source for input data in many transformation application areas. However, transportation agencies have neither interests in such 3D point clouds nor know how to convert those huge volume, highly dense, irregularly distributed MLS point data into their CAD-formatted road information. Automated software tools for handling such convention robustly and accurately are therefore urgently required. The development and implementation of an automated road information extraction strategy become very critical to make the MLS technology the most complete, economical, portable, flexible and widely used approach in transportation applications. This paper presents the results for automated extraction of road information (e.g., road surface, centrelines, road markings, payment cracks) from MLS data, considering the different approaches and analyzing all the steps involved.

Development of Indonesian Ecoregion Geodatabase

Akhmad Riqqi and Wahyudi Nugraha (Indonesia)

Key words: Spatial planning; environmental information system

SUMMARY

An ecoregion map has been developed by Indonesian Government to respond the national act for environmental management and protection. The objective of the environmental management and protection is to achieve sustainability by maintaining sustainable environment due to the impact of national development and global climate change. To achieve this goal, the planning of environmental management, protection is established based on ecoregion boundary. This map will be used to inventory about environment status and conditions. This environmental inventory should be conduct by pursue information about natural resources, degradation, and conflict. To collect this information will need a geodatabase that can store and manage the information based on ecoregion boundary. This paper will explain the process of developing ecoregion map and a geodatabase model that can be used to gather data and information for environmental inventory. The ecoregion boundary had been define systematically and considered many aspect including multi-scale, multi-function, substantial and dominantly landscape characteristics. A model geodatabase has been developing to store current information about ecoregion boundary and their characteristics and the future data that will be gather then. This model will be propose as a standard (or an open standard) to store ecoregion data and can be use to develop environmental information system by national government, province, or county.

Hydrographic Education, Training and Professional Development

Mustafa Iptes (Monaco)

Key words: Capacity building; Cartography; Education; Hydrography; Professional development

SUMMARY

Hydrographic education and training is baseline for recruiting new hydrograpers and cartographers and also essential for maintaining the Hydrographic Offices and Services in their constant activities. As a nature of conducting hydrographic surveys and producing standard nautical charts, theoretical hydrographic education and practical training ought to be world standard and include modern technologies. Along with the technological developments in hydrographic and cartographic fields, demands of the Hydrographic Offices and the hydrographic industry have triggered the new curriculum developments in hydrographic education and training. In our era, addition the traditional nautical charting surveys, surveys for Coastal Zone Management and Industrial Offshore Surveys are also inseparable subjects of the modern hydrographic education and training. In this context, hydrographic education should contains difficult scientific components, applied mathematics, physics and information technologies that students can understand the complexity of hydrographic surveying systems and data processing methods. Modern technology can also be used to deliver training in new and innovative ways, such as providing e-learning resources and programmes tailored to individual needs. This distance-learning method can make hydrographic training and education more accessible. On the other hand, IHO Capacity Building training programme should continue for providing developing and small countries with starter assistance in order to meet their hydrographic requirements and obligations. Taking into account the rapid technical changes or developments in the practise of hydrogarhic surveying, nautical charting and data management, Professional Development should be considered to gain new skills and knowledge as part of hydrographers` work. This can be delivered by individual states according to the guidelines and resources provided by the IHO. This might encompass Marine GIS; Nautical Charting or Hydrographic Surveying with recognition of efforts made. This can be woven into career development pathways for IHO Member States` employees. One additional option might be to instigate a “mentoring” programme. Also, Professional Development should be implemented at every level in Hydrographic Offices and hydrographic industry, from surveyor and cartographer to the top level Manager and Directors.

Support the Development of the Housing Market in Poland

Justyna Jasiołek and Krzysztof Jasiołek (Poland)

Key words: Affordable housing; Legislation; Real estate development; real estate housing; government support; flat for young

SUMMARY

Proper management of real estate and managing the resource is currently a significant problem developing and stabilizing market economy in Poland. It is important not only planned way of space (real estate) development, but also the competent management of real property and premises. Much of them can be used to satisfy the basic housing needs of the public. The group, which the most depends on today's "own home" are young, educated and ambitious people. Starting career they also wish to raise a family. The rising cost of living do not go hand in hand with the reward. Becoming these needs the State introduces and implements programs to help get a home loan by growing population group. One of them was already terminated program "family on its own", and currently is being implemented "flat for young". The purpose of these projects is to promote the development of housing, to improve the situation of young people and to contribute to an increase in the number of children in Polish families. The paper presents the detailed goals, objectives, constraints and the effectiveness of the implemented pro-housing projects in Poland.

Hydrography in Africa: Issues, Problems and Prospect

Angela Etuionovbe (Nigeria)

Key words: Hydrography; Implementation of plans; Africa,technology, Potentials, Resources, Benefits

SUMMARY

Most African countries are embedded in water and are blessed with its wonderful gift of nature. Unfortunately African nations had not been able to exploit its hydrographic potentials. This is due essentially to lack of awareness and the dearth of relevant technological know-how with which hydrographic data and its potentials need to be harnessed. Hydrographic data that comes in various forms obviously are harnessed through various processes, in order to finally derive its actual essence and benefits. This in no small way had hampered the actual exploitation and the benefits derivable. African countries without exception and exaggeration constitutes greater majority of the under developed nations of the world today whose per capital income is below the one dollar mark. Hydrography for various reasons would have provided the necessary impetus by which development to some extent would have been achieved if the necessary input has been introduced. African nations and its people with its vast hydrographic potentials had continue to wallow in abject poverty and its people with no means of sustenance save for mere subsistence farming despite the rich hydrographic resources nature had endowed them with. It is my candid view that the exploitation of these vast untapped hydrographic resources all over the place in Africa would have caused great source of employment and much wealth for the nations. Thus this paper which to discuss the challenges faced by the African people in exploiting hydrographic resources, the attendant problems, their loses and how the forgoing could be transformed into economic benefits.

The Application of 3d Network Analyses for Determine the Time Zones of the Evacuation in Multi–Storey Building

Ewa Debinska (Poland)

Key words: 3D network analyses, 3D modelling, safety in public buildings

SUMMARY

Today, we live in a time when we can not imagine the smooth functioning of civilized society without using of multi-storey buildings. In every major city in such buildings are located public institutions such as offices, schools, hospitals, but also dwellings. Safety of people staying in public buildings is a priority for managers of these facilities. One of the main risks that may occur and require the evacuation of the occupants of the building is a fire. In order to secure the building when the people are determined evacuation routes, this task belongs to the engineers and technicians of firefighting. The most important criteria that must be fulfilled for the escape route is the shortest length. The requirements that must be met for the transition evacuation are defined in separate regulations, and on Polish territory is a regulation of the Minister of Infrastructure dated 12 April 2002 on the technical conditions to be met by buildings and their location. Determination of the shortest route is the task of the scope of the canon of GIS analysis, and more specifically of network analysis. Geographical Information Systems offer a wide range of tools for 3D modeling and 3D analysis, and for several years we can also conduct 3D network analysis in buildings. The paper presents the possibilities of using GIS tools to verify fire protection in multi-storey premises. Analysis were carried out on the example of 7 -storey building, in which the Department of Mining Surveying and Environmental Engineering AGH in Krakow is situated. The building was built in the 50s of XX century. In 2011 it underwent a complete renovation. As a result of which it has been changed passageways and thus escape routes. Author using GIS tools has made revision the level of safety and the possibility of evacuation in the state before and after renovation. There were given the steps of preparing the data, as well as set out the requirements and formats in relation to the data that could be used to 3D network analyze. In the paper there were presented the possibilities and limitations of the available GIS tool in the field of 3D network analysis in buildings.

Gender Contributions to Sustainable Development in Nigeria: Enhancing the Gender Relevance by Constructive Engagement and Education.

Jennifer Eziaku Chigbu, Pamela Ibukunle and Njike Chigbu (Nigeria)

Key words: Capacity building; Education; GENDER, ENGAGEMENT, SUSTAINABILITY AND GOOD GOVERNANCE

SUMMARY

While the relevance of gender equality and women's empowerment for sustainable development has long been established in intergovernmental conventions, such as the Rio Declaration on Environment and Development, Agenda 21 and the Beijing Declaration and Platform for Action, it has become increasingly evident that women's contributions to sustainable development are both undervalued and underutilized in the developing countries. Women Participation, decision-making and management roles are critical to sustainable development processes and governance at local, national and international levels, where they can be effective agents of change. Sustainability is all about women. Society flourishes when women's leadership, creativity, and initiative are recognized, embraced, and harnessed. In many countries, women are the champions of green economy, practicing sustainable agriculture, nurturing our natural resources, and promoting renewable energy. In this paper, a critical assessment of the contributions of some of the women in Sub-Saharan African and Nigeria who have blazed the trail in their pursuit for sustainable development and leadership endeavors. This work further advocates a constructive engagement of the Gender and their integration into key critical sectors of the economy and environmental management.

Land Administration Domain Model: Opportunities for Enhancing Systematic Registration in Romania

Ionut Cristian Savoiu and Ciprian Gabriel Savoiu (Romania)

Key words: Cadastre; Land management; Land Administration Domain Model, Non-formal rights, Land Administration System

SUMMARY

This paper purpose is an analysis of the Romanian Land Administration System perseverance to achieve complete registration. Since 1990's the Romanian cadastral system have been the subject of transformation and development. In this particular paper, the authors will concentrate on a recent systematic registration project: Complementing European Support for Agricultural Restructuring (CESAR) funded by World Bank. The development of the Land Administration Domain Model (LADM), approved as an ISO Standard in 2012 that, in principle, facilitate the modelling of informal rights raise the perspectives for the Romanian LAS. In this regard the authors will analyse and develop a LADM model for Romanian LAS. The key idea of the designed LADM is based on the principle "fit for purpose". The analysis of opportunities achievable implementing LADM in Romanian system is based on the research of classification of the LADM RRR classes (Jesper PAASCH 2013), on specialization of the LADM – Modelling of Non-formal RRR (Jesper PAASCH 2013) and the LADM and the continuum of Land Rights (Christian LEMMEN 2013). Furthermore, non-formal rights description used in the Social Tenure Domain Model (STDM) are used as an input for Romanian LADM design. In this paper first the systematic registration is discussed based on CESAR project in Section 2. Then the RRRs in the Romanian system are analyzed in Section 3, with extra attention to non-formal rights. In Section 4 the proposed LADM is briefly described. Legal situation of Romanian system and how LADM can be integrated will be discussed in Section 5. The paper closes with conclusions and recommendations.

Spatial Data Analysis of Solid Waste Management System in Port Harcourt Metropolis After 100 Years of Its Existence

Ukeame Emmanuel Ajie and Amina Dienye (Nigeria)

Key words: Geoinformation/GI; Positioning; Spatial planning; Solid Waste, management, Disposal, collection site, Dumpsite, Haulage

SUMMARY

During the early years of the discovery of Port Harcourt, it was generally addressed as the “Garden city of Nigeria” because of its neatness and the overwhelming presence of vegetation and flowers all over its metropolis. Along history lane, the presence of piles of refuse dotting the entire city brought about its public criticism as “Garbage city of Nigeria”, as indiscriminate dumping of solid waste such as food waste, paper, polythene, textiles, scrap metals, glasses, wood, plastics, etc at street corners, and gutters became very common. These heaps of refuse do not only affect the aesthetical nature of the city, but also block drains, and obstruct free flow of traffic. This study therefore is targeted at using spatial data to examine the nature of solid waste management system in Port Harcourt metropolis after 100 years of its existence. The study involves the collection of primary data from Waste Dumpsites and Collection Points by personal and field observation using Garmin 76 handheld GPS alongside a Digital Camara. These primary data abstracted were analyzed using their photographs and spatial location on the road map of Port Harcourt. The research reveals that; waste collection points are indiscriminately scattered in the study area with only four legally approved dumpsites, located at Oyigbo, Eliozu, Rumuolumeni, and Eleme; only the landscape method of disposal is practiced; method of waste haulage have drastically improved as compactors are now been used against the hitherto ugly open trucks; collection and disposal time have been restricted to 7pm-5am daily to enhance a speedy haulage, as well as protect the aesthetical nature of the city; the government have recently established the Rivers State waste management authority (RIWAMA), etc. Consequently, the study recommends among others that more waste collection carts and containers should be strategically located in the study area; provision of more dumpsites, strategically located within the Igwuruta/Eneka axis, Borokiri, Elelenwo, and Choba/Aluu axes of the city; adopt other methods of waste management, especially those that enhances wealth generation like recycling, mostly referred to as waste to wealth

Tropospheric Modeling in GNSS Observations

Maduabughichi Okezie, Victus Nnamdi Uzodinma and Njike Chigbu (Nigeria)

Key words: Deformation measurement; GNSS/GPS; Reference frames; Reference systems; GNSS OBSERVATIONS, TROPOSPHERIC EFFECTS, MODELING.

SUMMARY

High precision GNSS measurement are required for many scientific applications such as the establishment of geodetic control networks, the monitoring of crustal deformation, strengthening of geodetic networks, as well as vertical control networks, etc. These networks serve to control topographic mapping as well as cadastral, engineering, and other surveys, and the determination of sea level changes. It is of importance to develop the proper strategies and techniques for GNSS observation and data processing to effectively enhance the accuracy of coordinates based on GNSS measurements. Tropospheric effect is one of the GNSS error sources. It can cause significant site displacement during the GNSS observation. Thus to study, the effect of the troposphere on GNSS position determination, dual frequency GNSS observation were done in static mode at three stations (NI02, NI03 and DPR 773) located within University of Nigeria Enugu Campus (UNEC) and processed using four tropospheric models namely Essen & Froome, Saastromoinen, Hope/Field and simplified Hopfield. The data was also processed without any tropospheric model (No Model). The site displacements caused by the tropospheric models were estimated practically by comparing processed GNSS observations with those obtained from Total station observation whose observations are not significantly affected by vertical refraction. This comparison is aimed at identifying the model most suited for GNSS position determination within UNEC. The results obtained showed that the positions given by Saastromoinen model were closest to those given by the TOTAL STATION. We are therefore inclined to recommend this model as the most suitable for processing GNSS observations within UNEC (based on the available results). Further research on this assertion is also advocated.

Planning Laws, Development Controls and Social Exclusion: Lessons for Developing Countries

Rachelle Alterman (Israel)

Key words: Affordable housing; Implementation of plans; Spatial planning; planning laws; land use regulations; exclusionary zoning; illegal development; developing countries

SUMMARY

Implementing or revising planning laws is a booming trend around the globe, especially in developing countries. The tendency in developing countries has been to model planning laws along the lines of those enacted and practiced in advanced-economy countries. Before rushing to emulate the planning laws of advanced economies, however, developing and transition countries should ask some tough questions about the models to be adopted. Perhaps the most important is whether the enactment and implementation of planning laws has enhanced social equity in cities or exacerbated the inequities? When one examines advanced-economy countries, where planning laws and regulatory instruments have been routinely applied and enforced for many decades, the answer to this question is a mixed one. Although the initial rationale for planning regulations is to reduce conflicts among land uses and to distribute land and infrastructure resources equitably, all too often, planning regulations work in the reverse direction: They create physically – and socially - uniform neighborhoods, allocate better sites, infrastructure and public services to the more affluent, and thus exacerbated social disparities. And because regulations often cost money, the increasing number and scope of planning regulations may have prompted higher housing prices. In developing countries, where planning laws are enforced only intermittently, they are vulnerable to greater misuse. In order to preserve the essential underpinnings of planning regulations but minimize their socially unjust effects, developing countries should be critically selective about the planning regulations they wish to adopt, and should lead the way in adopting new cost-accounting criteria. The proposed paper delves into the underlying functions played by planning laws and how cities and countries have operated without them, both in the past and more recently. The paper then presents a brief history of the evolution of planning laws around the globe and a conceptual framework for thinking about the regulatory layers of development controls developed over time. I then review existing research evidence about the relationship between planning regulations and the social composition of cities and neighborhoods, with a special focus on housing prices. The evidence points out the dangers of exclusionary effects of some types of planning regulations. Finally, lessons for developing countries are discussed, with the message: what could be learned from advanced economy countries, and what should indeed be “unlearned”.

Cartographic modeling based on an object-oriented and declarative multi-paradigm

Małgorzata Leszczynska (Poland)

Key words: Cartography; Geoinformation/GI; spatial model, cartographic modeling, intelligent spatial decision support system, artificial Intelligence, digital map

SUMMARY

The literature relating to cartography highlights the longevity of some of the most fundamental problems with modeling selected elements of the natural environment of the Earth and the interpretation of geographic information. Good representation supports the exploration and understanding of the phenomena occurring in the specified area of the real world and provides knowledge about the phenomena studied. New methods for creating maps as models of the world are being continually developed supported by advances in technology. The digital map, among the many forms of specific models, has a special place and has made possible the solution of many previously unsolved problem. A particular challenge is to create a model to represent the social phenomena and their impact on economic development and the environment. The aim of the author's research is, therefore, to develop a method for creating spatial models that allow the representation of complex socio-economic and natural processes. During the implementation, a formulated objective was prepared and tested using the intelligent spatial decision support system to optimize the development of the risk of social marginalization of rural areas. The system allows the storage of the cartographic modeling process without use of algorithms, taking account of both qualitative and quantitative traits. Here, the map is treated not only as a final result, but also as a whole, functioning in the computing environment. In this form the map is both a model of the studied phenomena, as well as research tool that allows testing of hypotheses and predictions. This functionality has been achieved as a result of extending an object-relational data model, which is the basic model of digital mapping data, with the characteristics of deductive reasoning. It also allows for dynamic creation of thematic maps representing an effective tool for the decision-making process, which cannot be structured and thus described in the form of an algorithm. Which makes the modeling of spatial data also effective in terms of representation of social phenomena and their impact on nature and the economy. The challenge in this case was to create a method combining geoinformation technologies with artificial intelligence technology to allow the construction of a powerful spatial data model of semantic expression appropriate to the complexity of the problem being solved. The resulting functionality is achieved through the seamless combination of a relational database, extended with object-oriented features allowing the storage of geometric and topological information, with expert rule-based system. This method made it possible to create an intelligent and dynamic spatial database with model rules compatible with current standards. The extended databases consists of an extensional databases and some intensional databases. The seamless connection ensures

that, during process of manipulating data, the static relational database extended with object-oriented capability, becomes the extensional database which is part of a dynamic extensional structures. The methodology developed to create the spatial data model characterized by semantic expression is important for the further development of digital mapping methods towards enabling the representation of social phenomena and their impact on nature and the economy.

Towards the development of Geospatial Mapping of Financial Institutions in Nigeria: Opportunities and Challenges

Anthony Adeoye (Nigeria)

Key words: e-Governance; GSDI; Spatial planning;

SUMMARY

Today's business environment is very dynamic and undergoes rapid changes as a result of technological innovation, increased awareness and demands from customers. Financial Institutions, especially the banking industry of the 21st century operates in a complex and competitive environment characterized by these changing conditions and highly unpredictable economic climate. One of the yardsticks being added as criteria for rating financial institutions in Nigeria is the inclusion of Geospatial Mapping infrastructure. This is an indication of the importance of Geospatial Mapping for Financial Institutions. The application of Geospatial Mapping concepts, techniques, policies and implementation strategies to banking services has become a subject of fundamental importance and concerns to all banks and indeed a prerequisite for local and global competitiveness. Consequently, the Central Bank of Nigeria (CBN) commenced the deployment of geospatial mapping in July 2013 to identify access points to capture unbanked persons, as part of its measures to make banking accessible to more Nigerians. The purpose of the Geospatial Mapping of Financial Institutions in Nigeria is to support the cashless policy and the Nigeria Financial Inclusion Strategy (NFIS) on data-based evidence to track the progress of the NFIS and bridge the financially excluded adults of 46.3 per cent to 20 per cent by 2020. This new technology is to provide information within a five kilometer radius to identify financial access points such as places, markets, motor parks, POS (point of sale) terminals and postal agencies. Other initiatives of the Geospatial Mapping of Financial Institutions include the development of the Consumer Protection Framework under a newly set up Consumer Protection Department and increase campaign to promote financial literacy. Banks in particular adopt Geospatial Mapping technology to improve the efficiency and effectiveness of services offered to customers, improve business processes, as well as to enhance managerial decision making and workgroup collaborations. This will help strengthen their competitive positions in rapidly changing/emerging economies. The aim of paper is to ascertain the level of use of Geospatial Mapping infrastructure and their impacts on customer service; which invariably will determine the growth of banks, . the Geospatial Mapping as a growth enabler, the extent of deployment by banks and customers' perception of its relevance will be the focus of the paper. Therefore, the paper will describe the objectives, approach adopted towards the development of the Geospatial Mapping and examine in details the results opportunities and challenges being faced. Finally the paper will assess the potential benefits, risks and impact of these changes in Financial Institutions presently and in the near future.

The Dilemma of Restructuring the Land Governance System in Nigeria

Andrus, N. Ukaejiofo and Ijeoma Nnaemeka (Nigeria)

Key words: Digital cadastre; e-Governance; Land management; Land registration; Land Governance

SUMMARY

Land reform is essentially the process of examining land management patterns, introducing regulations and understanding customs relating to land ownership and tenure. Several countries have adopted different approaches including changing the laws, transfer of ownership, redistribution of land holdings and development of clear land policies as a way of reforming land tenure and land administration processes. Several efforts have been made in the past in Nigeria to improve land governance. The current emphasis is to provide title to land holders because less than 3% of the land in Nigeria has been duly titled. Low level of title registration has been a disturbing truism. There are no compelling provisions for title registration in the prevailing National land law. The Land Use Act enacted in 1978 was intended to radically restructure land governance approach. It was arguably revolutionary but 35 years after, Nigeria is still grappling with the reform process. The Federal Government of Nigeria constituted the Presidential Technical Committee on Land Reform to mid-wife fresh reforms in land. The work of the Committee is focused on providing title with greater ease to land holders. It is consequently piloting Systematic Land Titling and Registration (SLTR) in some States as a transparent, participatory and an all-inclusive fast method of issuing titles to land holders. Systematic Land Titling and Registration seeks to check the inherent problems of informal land transfers with poor documentation. It aims at delivering valid legal title to land holders at low costs, standardizing the system of land registration as well as building up a comprehensive database of land holdings. The idea is novel, requiring careful enlightenment to make it clearer for all the stakeholders to understand. Much progress is yet to be made because there are different dimensions of the challenges to its total success. There are institutional and socio-political obstacles whipping up mixed reactions about the intentions of the programme. There also appears to be some conflict between politics and technology. The problems of the poor implementation of the Land Use Act of 1978 appear to have resurfaced in the land reform process under a different garb. This paper highlights the seeming conflict between socio-economic and technological factors in the implementation of SLTR and the steps adopted to address them against poor acceptance. Systematic Land Titling and Registration, though good is yet to be fully understood and embraced by stakeholders. The pilots were successful but comprehensive implementation across the thirty-six States and the Federal Capital Territory, Abuja in Nigeria is yet to be executed.

Shaping the Cadastral Infrastructure for a Digital Future

Craig Sandy (Australia)

Key words: Cadastre; Digital cadastre; GNSS/GPS;

SUMMARY

The cadastral network, represented by the Digital Cadastral Database (DCDB), plays a fundamental role in National Spatial Data Infrastructure (SDI), supporting decision making across all levels of Government. The accuracy and integrity of the DCDB is essential to ensure critical decisions are made based on current and correct land information. With the introduction of electronic Conveyancing and Survey Plan lodgement, land information from a variety of external sources will rapidly populate the SDI with Global Navigation Satellite System (GNSS)-based information. The integration of this highly accurate information will compound the inherent historical inaccuracies within the DCDB, causing considerable impact on service and information delivery. To ensure responsive service delivery in a digital land administration of the future, Cadastral Fabric technology is transitioning the decades-old static DCDB to a dynamic survey title-based Numerical Cadastral Database (NCDB) that accurately models the nation's cadastral network. This paper provides surveyors with a comprehensive overview of how improved rigour and accuracy of the DCDB will provide powerful spatial infrastructure to generate technical and legal certainty for all stakeholders. In this paper a case study from Tasmania, Australia outlines the implementation of a Numerical Cadastral Database Project and discusses the vision, the challenges and the benefits a project of this nature can deliver. Additionally, the lessons that can be derived from this case study can be applied to other similar Cadastres.

Impact of Tree Shade on Rental Value of Residential Property in Maiduguri, North – Eastern, Nigeria.

Oyewole Mustapha Bello and Awoamim Joseph Yacim (Nigeria)

Key words: Valuation; Rental Value, Hedonic Model, Residential Property, Tree Shade

SUMMARY

Residents have preference for areas that are conducive to both their social and economic well being. Tree shade has been found to provide certain benefits that enhance the well being of residents such as shading of privacy, adding aesthetic value to residential property including addition to the rental value of property among other things. This study is set out to find a way of assessing the contribution of tree shade to the enhance value of residential property in Maiduguri metropolis, using the hedonic models (multiple regression techniques). The city was stratified into three (3) namely; traditional area, Government Reservation Area (GRA) and urban periphery. Systematic sampling technique was used in the administration of questionnaires of which the first house was randomly selected and every 25th house was subsequently selected. The household head in each of the selected houses was served with the questionnaire. On the whole, a total of 474 household heads were served with questionnaires out of which 372 were returned. Analysis was however, done for the whole city of Maiduguri. The study found out that tree shade contributes significantly to the value of residential property in Maiduguri at 0.05level of significance. The study recommends the use of a valuation model which will incorporate those structural and environmental attributes which in most cases are explicitly left out when using traditional valuation methodology. Also, there is the need for policy makers in the areas of environmental protection and management to create awareness on the benefits of tree planting in the study area.

Personal Navigation and Indoor Mapping: Performance Characterization of Kinect Sensor-based Trajectory Recovery

Charles Toth, Dorota Brzezinska (USA), Allison Kealy (Australia) and Guenther Retscher (Austria)

Key words: Positioning; indoor mapping,

SUMMARY

The Microsoft Kinect™ sensor has gained popularity in a large number of applications beyond its intended original design of being a 3D human interface device, including indoor mapping and navigation of pushcart and backpack sensor platforms. Indoor mapping and personal navigation systems are generally based on the multisensory integration model, as currently no sensor itself can provide a robust and accurate navigation solution. To assess the error budget as well as to support the design of such systems, the individual sensor error budgets should be known (estimated). In this paper, a performance analysis of the Kinect sensor is provided based on a series of indoor tests, where sufficient control was available; note UWB-based trajectory provided the reference. The main goal of the study is to assess the trajectory reconstruction performance from Kinect imagery only; note that only widely available mainstream computer vision methods are used to process 2D and 3D image sequences. This paper is a continuation of research on investigating the indoor mapping and navigation potential of the Kinect sensor. Earlier efforts were focused on the calibration and performance potential evaluation of the Kinect sensor, including data characterization provided for the imaging sensors of the Kinect, and then initial indoor navigation test results of a personal navigation system using 2D and 3D image-based navigation components were reported. All these investigations have confirmed that 3D range measurements of the Kinect sensor have the potential for indoor navigation and mapping, as the Kinect sensor could provide reliable 3D data up to ten meters. This paper is focused on analyzing the 2D and 3D Kinect image matching performance that is realistically achievable under typical indoor conditions. In other words, no additional sensory data is used to reconstruct the platform trajectory. The scene and trajectory reconstruction based on images (also known as visual odometry) from active sensors is an actively researched area nowadays. The applied error budget analysis in these works can be divided into two main parts: (1) the camera pose error budget analysis, and (2) the error contribution of the scene, the diversity and complexity of the imaged scene. The first part defines the accuracy potential of the reconstructed trajectory. The second part is about the object space dependency that is the error introduced by the scene content in terms of geometry. While it is difficult to encapsulate the impact of the object space in a rigorous sense, tendencies can be identified based on statistical evaluation of data acquired under typical object space scenarios. Test data was acquired by the Kinect sensor mounted on the top of a pedestrian backpack navigation prototype in forward looking orientation with a clear field of view, and a user walked a hallway loop in several patterns. The results were evaluated based on a UWB-based reference solution.

Disaster Mitigation Uncertainty in Nepal

Babu Ram Acharya (Nepal)

Key words: GNSS/GPS; Spatial planning;

SUMMARY

Disaster Mitigation Uncertainty in Nepal Babu Ram Acharya (Mr), M.Sc., FRICS Email: lamachourbabu@yahoo.com Key words: Disasters, Prediction, Preparedness, Mitigation, Rapid Response Disaster Relief Abstract Nepal is one of the most disasters prone countries in the world. The country lies between two active tectonic plates, i.e. Tibetan plate and Indian plate. The country has rugged and fragile geophysical structure, very high angle of slopes, complex geology, variable climatic conditions, active tectonic processes, unplanned settlement, dense population, poor economic conditions and low literacy rate. Furthermore, most part of the country is seismically active, the sizes of the glaciers that are potential to outburst are increasing, and there is high forest fire occurring every year. Due to these various reasons, the country has been suffering from several types of disasters. Past scenario indicates that flood and landslide is the major cause of destruction among others which not only have effects on resources but also in human lives. The problems have yet to be addressed seriously through spatial planning. Little efforts have been seen in disasters management with respect to research, policy, planning, strategic learning, education, preparedness and deployment units. One of the main reasons is lack of knowledge, awareness and advocacy among the people, and secondly lack of the preparedness plan. In addition, Government and the disasters related organizations have only focused towards relief instead prediction and prevention. At least, Government of Nepal has introduced Natural Disaster Relief Act, 1982 for disaster management with the provisions of Central, Regional, District and Local level natural disaster relief committees. Primary disasters data and the use of present day developments of spatial technology (application of GIS/RS) could play an important role to predict or foresee the possible trends of likely disasters and its preparedness. Knowledge based decision support system encapsulated with spatial information (such as topographic, land system, hazard mapping, spatial analysis etc.) would be worth enough for prediction and mitigation of natural disasters. Therefore, there is a need of effective Disaster Management System, incorporated with disaster related geospatial information in the country. The system driven by foreseen necessity and supported by technology could be realistic for Disaster Prevention and Rapid Response Disaster Relief (RRDR). This paper aims to highlight on the present scenario of the disaster management system, analyses the present need and suggests way forward to reduce disaster mitigation uncertainty in Nepal.

Borrower Attributes as Mortgage Default Triggers: Evidence from Nigerian Lending Market

Oyewole Mustapha Bello and Tunbosun Biodun Oyedokun (Nigeria)

Key words: Affordable housing; Borrower, Default, Loan-To-Value, Mortgage, Payment-To-Income, PMI

SUMMARY

The need for proper identification of mortgage default factors has become a major focus of mortgage researches given the debilitating effect of default on mortgage market and real estate finance in particular. The paper therefore analyzes the borrower socio-economic attributes as default triggers in residential mortgages of Primary Mortgage Institutions (PMIs) in Lagos metropolis, Nigeria. Relevant data were collected on profiles of Three hundred and five (305) borrowers randomly drawn from the credit databank of Thirty-six (36) PMIs out of which One hundred and sixty-three (163) were in “default category” while One hundred and forty-two (142) were in the “non-default category”. Using logit model, it was discovered that payment-to-income ratio, type of borrower, sex and educational status are significant mortgage default triggers.

Geospatial Information and Regional Boundary Disputes in Regional Boundary Demarcation in the Regional Autonomy in Indonesia

**Sumaryo Joyosumarto, Subaryono Subaryono, Sobar Sutisna and Djurdjani Wardaya
(Indonesia)**

Key words: Geoinformation/GI; Spatial planning; "boundary demarcation"

SUMMARY

Abstract Boundary demarcation is one of the main activities conducted after the establishment of an autonomous region pursuant to the Law regarding Region Establishment. Regional boundary demarcation activities include the definition of coordinates of regional boundary points that can be conducted through cartometric method or terrestrial surveys. The results of the demarcation activities are presented on a boundary map with list of coordinates of regional boundary points. According to Jones (1945), regional boundary demarcation is part of a boundary making process. In each step of boundary making process, map (geospatial information) is always required as part of the infrastructure. Records show that in relation to demarcation activities in regional autonomy era in Indonesia, there have been a number of regional boundary disputes, where maps can contribute as a source of such disputes. This research analyses the source of dispute by investigating 36 cases between provinces and between kabupten/cities in Indonesia in the regional aoutonomy era. The analysis is based on the circle of conflict theory introduced by Moore (1986). It was found that 28 cases are between kabupatens/cities established during the regional autonomy era and those established before the regional autonomy era. Meanwhile, eight cases occurred between kabupaten/cities established during the regional autonomy era. Prior to the regional autonomy era there was no regional administrative boundary map attached to the Law regarding Regional Establishment, while during the regional autonomy era, maps are generally attached but the maps unsufficiently meet the required cartographic standard. Consequently, such maps can hardly be used as the basis for regional boundary demarcation process. It was found that in 25 cases (70 %), geospatial information is the source of regional boundary conflict in Indonesia during the the regional autonomy era. While in 11 (30 %) other cases, the main source of conflict is the combination of geospatial information and factors of interest and structure. In the latter cases, regional boundary conflicts are triggered by issues regarding geospatial information followed by interest and structural conflict. **Keywords:** geospatial information, demarcation, regional boundary, boundary disputes, regional autonomy era

Impact of the Federal University of Technology, Akure on Residential Property Values in Akure, Nigeria.

Victoria Amietsenwu Bello and Olusola Adebisi (Nigeria)

Key words: Valuation; Residential Property Values; Population; University.

SUMMARY

The presence of a university in a derelict area may initiate the transformation of the entire neighbourhood through the action of development, regenerating houses that may attract students, staff, and those providing support services. The paper therefore posits to examine the impact of the Federal University of Technology Akure on residential property values around the university. Structured questionnaire were administered on tenants of 251 residential houses of which 176 were retrieved for analysis. Also, records of students' population and those living on campus were gotten from the students' affairs division. The data collected were analysed using descriptive statistics and simple regression analysis. The result reveals that greater number of the student population lives off campus and this impacted greatly on rental value of residential properties occupied by them. The study therefore, recommends that government should build more hostels accommodation in the universities and renovate old ones. If this is done many of the student population will be accommodated and this will reduce the pressure of student in the housing market thereby reducing rental value of residential properties.

Unmanned Aerial Vehicle (UAV) for the Outermost Small Island Mapping as an Alternative Method for Collecting Geospatial Data

Niendyawati Supardan and Eko Artanto (Indonesia)

Key words: Remote sensing; UAV; geospatial data; small island

SUMMARY

Indonesia is an archipelagic nation that has many large and small islands that spread from Sabang to Merauke and from Miangas to Rote Island. For the major islands mapping is relative no significant obstacles, however, for small islands mapping especially the outermost islands is not easy, especially regarding the accessibility to the location and other constraints such as cloud cover and so on. However, geospatial data and information of the outermost small islands should continue to be collected and constantly updated. Unmanned aerial vehicle (UAV) is used as an alternative for inventory and updating data, where the collecting data using drones controlled via remote control and computer. The purpose of the use of UAV is in order to get geospatial data of the outermost small islands, in accordance with the desired scale and location. For this paper, we will show Batek Island which is one of the 92 outer islands, which located at Kupang district, East Nusa Tenggara Province as a case study.

The Pattern of Land Value in Bodetabek Area

Andrayani Andrayani, Didik Wihardi and Yuliana Susilowati (Indonesia)

Key words: Land management; Property taxes; Real estate development; Spatial planning; Valuation;

SUMMARY

Case Study : The Pattern of Land Value in Bodetabek Area Author : Andrayani (1), Didi Wihardi (2), Yuliana Susilowati (3), Indonesia The improvement of land value can not be separated from the development progress. Communities tend to cluster in areas that are considered to meet the needs of its survival. One phenomenon that looks real is the area spread around the DKI Jakarta city. Research conducted by the Research Center for Limnology LIPI Bogor (Wibowo et al , 2009) in the region Bodetabek indicate a correlation between the development of built up area to land values. Jakarta is growing into a center of activities make this city as a provider of jobs, but the land for settlement no longer affordable in terms of price for the workers, so that the developing of new settlements in rural areas such as Bekasi, Bogor, and Tangerang. This will certainly have an impact on land values in the Bodetabek area (Bogor, Depok, Tangerang, and Bekasi). This study uses the average of Tax Object Sale Value each village in Bodetabek area as the reference of land value. The pattern of land values in the region can be traced further based on data obtained in this study. This study aims to produce a model of land value based indication of the relationship between population density per unit area of the village in Bodetabek area, density of population per built up area the village, percentage of the built up area each village, distance of the village to the CBD (Central Business District) of DKI Jakarta on land values in Bodetabek area. The analytical method used in this study is multiple regression analysis with dependent variable Y = Land Value, as well as the independent variable $X1$ = population density per unit area of the village Bodetabek, $X2$ = density of population per built up area the village, $X3$ = percentage of the built up area each village, and $X4$ = distance of the village to the CBD (Central Business District) of DKI Jakarta. Conclusion of this research is the $X1$ (population density per unit area of the village) is proportional to the value of land in Bodetabek, $X2$ (density of population per built up area of the village) did not affect value of land in the Bodetabek area, $X3$ (percentage built up area each village) is directly proportional to land value only in areas Bodetabek, and $X4$ (distance of each villages to the CBD DKI Jakarta) is inversely proportional to the value of land in the Bodetabek area. Keywords: Land Value, Multiple Regression, Bodetabek

Development of Structure-based Topology of 3D Spatial Databases for Storing and Querying 3D Cadastre Cases

Wahyu Marta Mutiarasari and Trias Aditya (Indonesia)

Key words: Cadastre; Digital cadastre; topology; database; spatial analyses

SUMMARY

In realizing 3D representation of 3D cadastre objects, the construction of 3D spatial databases requires a special attention. There are two approaches for building 3D database structures to represent 3D spatial objects, namely the geometry and topology-based structure database. The fundamental difference between the two structures is on their storage methods. The storage of spatial data with topology structures does not contain redundant objects. Therefore topological structure offers better data consistency. Meanwhile, geometry-based structure offers practicality in terms of data conversion. In this research, 3D database structure construction was developed using the application that enables topological structures on 3D spatial database with 2.5D approach. The implementation was done using PostgreSQL with PostGIS extension. The resulting data are used to solve 3D Cadastre cases by using spatial analysis tools in Geographic Information Systems (GIS) software. The resulting database was tested using queries that relevant to represent real world's 3D Cadastre cases. The analysis showed that the database with topology-based structure was able to solve some cases of 3D Cadastre that included the neighborhood relationship of the objects.

The Challenge of Enhancing Land Administration Systems to provide Responsible Governance in Trinidad and Tobago

Charisse Griffith-Charles (Trinidad And Tobago)

Key words: Cadastre; Digital cadastre; e-Governance; Land distribution;

SUMMARY

Responsible governance of tenure on land requires a land administration system that is responsive to fundamental global ideas of equitable allocation of land. The Food and Agriculture Organization of the United Nations (FAO) has collated and published in 2012 the guidelines by which states can ascertain whether their land information systems are transparent, simple, and provide for equitable allocation and distribution of land. The Trinidad and Tobago land administration system was evaluated specifically for compliance with the FAO's 'Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security' and the principles of participation; fairness; decency; accountability; transparency; and efficiency. Using indicators to assess the system, it was found that there were areas where interventions are required to improve the ability of the land administration system to adhere to generally held ideals. There were particularly low perceptions of transparency and efficiency. This study is important for the land administration institutions to set targets for improvement of their processes. More importantly, those drafting the land policy would need to address the failings or shortcomings in the system and set targets for reforms of the system so that it supports the achievement of the priority land policy goals. Further work would require benchmarking against other land administration systems to determine whether the Trinidad and Tobago institutional environment is above or below the international average. Whether it is or not, however, there should always be growth and development in a positive direction so that the system continuously advances towards the ideals.

Engaging Commercial RTK Network Services for Precision and Availability _ Experiences from Smartnet Australia

Ryan Keenan and John Da Mina (Australia)

Key words: Cadastre; Capacity building; Digital cadastre; Engineering survey; GNSS/GPS; GSDI; Legislation; Mine surveying; Positioning; Reference systems; Spatial planning;

SUMMARY

The majority of GNSS Network RTK projects have been implemented following the economical justification that an active geodetic network will reduce the costs and challenges of maintaining a traditional (passive) geodetic network, wherein the maintenance of the benchmarks and the control survey were a significant part of the owner's budget. Even so, the ongoing management and maintenance of active geodetic networks can be overwhelming in both time and resources for governmental organisations. This is where experienced private companies can assist, firstly in efficiently handling the commercial delivery and marketing of GNSS services, and secondly providing income streams to the respective network owners enabling them to manage and maintain infrastructure in a more viable manner. SmartNet Aus is a Leica Geosystems and C.R.Kennedy joint initiative to provide GNSS CORS-based services to the Surveying, Construction, Precision Agriculture and GIS markets throughout Australia. Founded in late 2009, SmartNet Aus is now the largest provider of CORS-based services in Australia seamlessly combining CORS from governmental and private organisations. This paper will focus on the practicalities and challenges of running and delivering commercial CORS-based GNSS services rather than the GNSS technology itself. Drawing from our own experiences, three broad topics are discussed; (1) what it takes to keep a service running 24/7 and consistently meeting customer expectations, (2) the issues around building CORS networks based on shared infrastructure and managing coordinates, and (3) the challenges of bringing such services to the market through various business models, sales and support channels.

A Framework of Local Geospatial Data Infrastructure for Sustainable Urban Development

Nabila Ibrahim, Ghazali Desa and Malik Tassaduq Abbas (Malaysia)

Key words: GSDI; Spatial planning; Sustainable Urban Development

SUMMARY

Amongst the issues that concern the urban areas is the increase in population due to mass migration from rural to urban areas. The implication of this phenomenon results in many factors including degradation of environment, pollution, lack of housing, transportation, waste disposal, increased crime rate and poverty. These issues should be addressed in a holistic manner to ensure the cities as engines of economic growth, continue to be sustained and strengthened. Cities should be administered efficiently and effectively in order to create a sustainable and comfortable environment to live, work and play in. At the same time, the uniqueness of a city must be preserved to maintain its unique image and identity. However, sustainable management of cities requires ample information to be made available to decision makers to solve many issues related with sustainable urban development. Many developing nations, particularly those in the Asian region, now have their own successful National Geospatial Data Infrastructure (NGDI). However, these cities currently are not able to cater for the need at the local level. This paper addresses the need to develop a Local Geospatial Data Infrastructure (LGDI) for sustainable urban development. This research will highlight the effective and efficient framework for the development of local infrastructure. This paper presents a framework (a combination of domain based and goal based frameworks) for developing a Local Geospatial Data Infrastructure. The basis of this research is on a case study conducted on a Malaysian city. The main focus of the case study was on measuring and assessing sustainability. Six conceptual frameworks were produced based on 6 key dimensions of sustainability. The developed framework consists of 6 conceptual data models and 6 conceptual data structures. It was concluded that 30 spatial data layers are needed of which 12 data layers are categorized under point shape, 17 data layers are categorized under polygon shape and 1 data layer is under line shape category.

A Guideline for Establishing Digital Cadastral Information of National Land

Jung-young Jung and Hyun-jung Ha (Republic of Korea)

Key words: Cadastre; Digital cadastre; Land management; Spatial planning; National land; Numerical cadastre; Land merger

SUMMARY

Even though, national land is the most important resource of the country, it has been short of managing cadastral records and cadastral research. It makes problem such as land occupation without permission or using ground illegally. Therefore, disagreement between present using condition of land and land category of cadastral record reduces confidence for statistics. The reason is that changing the land category to right thing is not requirement as establishing social overhead capital (SOC), so most of cadastral arrangements are applied not by numerical method but graphical method. The purpose of this study is managing parcels effectively and makes cadastral statistics objective analysis. Because the last goal of The cadastral resurvey is to construct all of the land to register numerical cadastre, this study will be based of the cadastral resurvey. Finally, established digital information can be element to develop spatial data industry even low cost. In this paper, after suggestion for way of arranging cadastral categories and merging to reduce small parcels, establishing the system of researching digital information of national land will be discussed. In the last, when the method is combined with The cadastral resurvey, how to create range of national land zoning and solve the problems of adjacent land parcels as technical method are analyzed.

Managing Inaccurate Historical Survey Records in a Future Accurate Digital World.

Ian Harper (Australia)

Key words: Survey database, cadastral model

SUMMARY

For many years survey plans have provided a level of spatial certainty that underpins confidence in the Torrens Title system in Australia. Retaining the legal and location intent of historical survey plans as we move into the digital world is important to ensure ongoing commercial and social stability. In spatially locating property boundaries the edict of 'monument over measurement' is the foundation of that system but there is a complexity in the hierarchy of field and survey plan evidence when redefining older surveys. The location outcome is an intuitive assessment by an experienced licensed survey practitioner. This process is not easily translated to an automated computational process, particularly with poor quality survey plans that may have large misclosures. Technology now provides the capability to manage all these issues in a digital environment. New survey data and the geometry referenced on the original survey records is used to generate a database geometry model in any reference frame. This process is available at two levels, the original Australian developed GeoCadastral technology which is used at a local level to collect and compute survey data into a wider survey database and the ESRI Parcel Editor which uses the same survey data management engine to manage the survey database within an SDI at regional or state levels. The process facilitates the transition from historical measurement based or coordinate based title systems to the position based measurement and digital title systems of the future. It has considerable rigour to generate high accuracies subject to data quality and redundancies allow the Least Squares Adjustment to automate intuitive aspects of the process. Several States in Australia are implementing the survey database cadastral modelling process by: 1. Manual entry of geometry from historical survey plans (generates highest accuracies and efficiencies but with initial higher costings) or 2. Migration of existing mapping cadastral databases to the survey database (existing accuracy initially retained with less up-front costs but higher ongoing ones) In NSW the intelligent data format has enhanced the implementation of the ePlan process. To register a new title, a LandXML survey plan file is lodged at the titles office portal and immediately undergoes over 40 tests of the plan's jurisdictional information and geometry quality. This is followed by an automated location validation process. This is in line with NSW eGovernment implementation that is now providing efficiencies to their overall Spatial Data Infrastructure (SDI) workflows. In some cases this has resulted in a reduction of the time taken to register a new survey plan from 1-2 months under the existing manual workflows to 3-5 days. Economic benefits then apply to all stakeholders, the state requires less staff resources, receives property based revenue sooner and those looking to create new titles have their development holding costs reduced and their revenue returns are also faster.

This presentation will discuss the benefits of the various methods of the survey database creation and case studies highlighting technical and business outcomes at local and state levels.

Extracting Topographic Information in Tropical Rain Forest Using IfSAR

Suraya Jamaluddin, Abdul Wahid Rasib, Muhammad Zulkarnain Abd Rahman, Wan Hazli Wan Kadir and Abdul Razak Mohd Yusoff (Malaysia)

Key words: Remote sensing; Topographic Information, Tree Height, Tropical Rain Forest, IfSAR

SUMMARY

Recently, low-cost information from Interferometric Synthetic Aperture Radar (IfSAR) is widely used for the purpose of creating topographic information such as landforms map. Theoretically, the synthetic aperture radar (SAR) images with 32-bit floating number are using a different phase of waves so that the deformation of surface (digital elevation) can be generated. However over high density vegetation coverage, this data has limitation to produce a better accuracy of terrain elevation such as in Tropical Rain Forest. Thus, this study is attempted to analyze the topographic information at Pasoh Forest Reserve (PFR) such as contour extraction and tree height from correlation of two IfSAR products namely digital surface model (DSM) and digital terrain model (DTM). Tree height patterns which calculated from isometric allometric equation is also been used to gain the digital elevation accuracy of the study. The 50ha of experimental area in Pasoh Forest Reserve has been divided into 20m x 20m and 5m x 5m in grid in order to extract the Canopy Height Model (CHM) or tree height. In this study, the CHM of SAR images are extracted by DSM and DTM. Analysis by fourteen random point of tree height samples that derived from IfSAR give a good confident accuracy (RMSE = 1.29) regression analysis ($r^2 = 0.7$) compare to biometric height. The outcomes of the study is then can be used in enhancing further analysis in forest ecosystem conservation studies such as extraction of tree biomass from remote sensing satellite data.

Validation of EGM2008–Based Orthometric Heights in a Micro Environment in Nigeria

Victus Uzodinma, Johnson Oguntuase, Raphael Ehigiator, Emmanuel Onah and Chidinma Chike (Nigeria)

Key words: GNSS/GPS; Positioning; EGM2008; Orthometric height; micro environment; spirit levelling

SUMMARY

The Earth Geopotential Model of 2008 (EGM2008) is the latest effort by NIMA (National Imagery and Mapping Agency, USA) at generating an accurate global geoid height model which will facilitate accurate conversion of geocentric ellipsoidal heights to their corresponding orthometric equivalent. This paper evaluates the accuracy of the EGM2008 model in a 23 hectare micro-environment located within the compound of the University of Nigeria, Enugu Campus. The validation was done by comparing EGM2008-based orthometric height differences with height differences determined from spirit levelling. GNSS and spirit levelling measurements were taken on nine validation points. Results obtained indicate an accuracy of $\pm 0.188\text{m}$ (std. dev) for EGM2008 within our study area. Key words: EGM2008, Orthometric heights, micro-environment, GNSS, Spirit-levelling

The Completion of the Cadastre 2014 through a Case Study on the South Korea

Bong-Bae Jang (Republic of Korea)

Key words: Cadastre; Cadastre 2014, Public & Private Cadastral surveying sector

SUMMARY

The cadastre 2014 published 20 years ago is a booklet packed with a vision for a future cadastral system. In the case of South Korea, the predicted statements 1-6 are entirely consistent with current Korea cadastral system. Many cadastral experts say that the cadastre 2014 written for only targeted in Korea. This paper has discussed the statement 2 and 5 because of limit of space. Statement 2: The separation between maps and registers will be abolished. In Korea each of ministries, Ministry of Justice and Ministry of Land, Infrastructure, and Transport, has been administered cadastral and registration information since in the early 1990s. That national information, which are isolated and managed for long periods of time, resulted in many problems such as inconsistent data base, increase in management costs and the inconvenience of the people. In order to solve these shortcomings, in 2013 the Korean government has completed a system which is called real-property overall official books system. The system consolidated 18 official books, managed by two ministries in the four different systems, into one sheet. Although did not achieve the integration between the two ministries have been continued 100 years, the first system in the world can be issued 18 different types of information on a piece of sheet by internet anywhere anytime. Statement 5: Cadastre 2014 will be highly privatized! Public and private sector are working closely together! The Korean cadastral system has a very unique history. The Korean government decided a cadastral agency that the Joseon cadastral association carries out cadastral surveying exclusively targeted all over the country since 1938. However, from 2004 up to now, the Korean government allowed private organization to implement cadastral surveying on the numerical area in this sense, the cadastral surveying market was opened. According to official statistics, from 2005 to 2013, Korea Cadastral Survey Corporation (public sector) carried out \$552,650 U.S. dollar (76%) and the private sector carried out \$97,950 (24%) currently 164 private organizations are working in Korea. One of an unprecedented phenomenon is co-order obtain project from public and private sector. From 2009 to 2013, co-order obtained amount is over \$800,600(11%) and this phenomenon is growing very rapidly. In the near future the cadastral market should be opened 100% in Korea.

The Use of GNSS to Aid the Structural Health Monitoring of the Seven Suspension Bridge's Suspension Cables and Support Towers.

Gethin Wyn Roberts (China, PR), Chris Brown (United Kingdom), Xu Tang (China, PR) and Oluropo Ogundipe (United Kingdom)

Key words: Bridge surveying; Deformation measurement; Engineering survey;

SUMMARY

The Severn motorway Suspension Bridge is a 1,600m long suspension bridge, with a main span length of 988m long, and towers of 136m in height. The bridge spans the River Severn and the River Wye, and took three years to construct. The bridge was opened on the 8 September 1968 by Queen Elizabeth II. The Bridge was granted a Grade I listed status on the 26 November 1999. The bridge is a conventionally designed suspension bridge, where the bridge deck is supported by two main cables slung between two pairs of steel support towers. The cables that support the bridge deck were spun from 29,000km of wire, and each of the two main cables are made up of 8,322 individual 5mm diameter wires. The hanger cables connecting the deck to the suspension cables are not vertical, but are arranged in a zig zag manner. This was a part of the design to help reduce the vibrations of the bridge, as is the use of Stockbridge dampers upon the cables. In 2010, a series of field trials were conducted upon the Severn Bridge, whereby 9 GNSS receivers were placed upon the bridge, and two were placed as reference stations adjacent to the bridge. Of the 9 on the bridge, 4 were located at the tops of the two pairs of towers and the remaining 5 were placed at strategic locations on the bridge's suspension cables. Four on the north side cable, and the 5th on the south side cable. This configuration allows the movements of the North cable to be analysed, at 3 different locations, as well as the differential movement between the two suspension cables. In addition, this configuration allows the movements of the tops of the towers to be compared to the cables, as well as to each other. All in all, allowing the relative movements of the various locations on the bridge to be compared. This is possible in terms of the magnitude of the movements in the 3-Dimensions of the bridge, as well as the frequencies of the movements. Three days of data at 10Hz and 20Hz were gathered at all these locations. During these periods, normal traffic flow was experienced. This paper focusses on the accuracy of the measurement of movements of the towers, and how they correlate to the movements of the suspension cables, as well as the correlation of frequencies of movements experienced at each location.

Geomatic Undergraduate Programme at the Universiti Teknologi Malaysia – Students and Alumni Perspectives

Farah Aishah Alias (Malaysia)

Key words: Curricula; Education; Geoinformation/GI;

SUMMARY

Geomatic education at undergraduate level in Malaysia started many decades ago. The pioneer institution in this land surveying and mapping or geomatic discipline is the Universiti Teknologi Malaysia (UTM), and then followed by other institutions at much later stage. UTM has produced many land surveyors since then and they are being employed in various sectors (both in government and private). This paper discusses some aspects of the UTM geomatic undergraduate academic programme's curriculum and syllabus and highlights some reflections of the programme by several alumni and existing students. This 4-year programme has been benchmarked by several institutions within or beyond Malaysian border. Revising and improving the programme to a much better level of acceptance by various stake holders including the industry are being continuously carried out by the institute. The outcome of the interview, survey and questionnaire on the programme provides vital feedback to the programme owner and thus to the university. Engaging or benchmarking the programme at the international arena is also important and could determine the sustainability of the programme both for local and international students and this aspect will form part of the discussion for an improvement to the programme. The remaining of this paper highlights the acceptance level among the existing students and alumni towards the programme. Outcome based education within the programme is also being evaluated and monitored by the programme owner with the aim to provide the best undergraduate geomatic programme in the country. The feedback from the students as well as from new graduates provides vital input to the success of the programme.

On-Going Need for Local Survey Control Networks?

John Ritchie (New Zealand)

Key words: Cadastre; Positioning; Risk management;

SUMMARY

Survey marks provide a wealth of location based information to a wide range of people in the community. They are used to support the surveying of property boundaries, but are also important to engineering, road building, mapping and resource management projects. The loss of survey marks can significantly degrade the integrity of the legal property boundaries and impact on the costs of development projects that depend on position and height. Land Information New Zealand (LINZ) is the government agency that has the responsibility for managing the New Zealand survey system. The New Zealand cadastral system is reliant on physical reference marks to support and verify property boundaries. These marks are also directly tied into or are also geodetic control points at the local level. Recent deformation e.g., earth quakes, slow slip events in New Zealand have highlighted the value of having local control marks to support cadastral parcel definition and also as a means to monitor the rate, extent and variability of deformation. This presentation will discuss the benefits of protecting and maintaining local survey control.

Image-Based Registration Method for Terrestrial Laser Scanner Data

Khalil Al-Manasir (China, PR)

Key words: Laser scanning; Photogrammetry; 3D point clouds, registration, digital images, 3D similarity transformation

SUMMARY

The registration of point clouds forms the first task associated with building 3D models from laser scanner data in cases where multiple scans are required for complete coverage of the scene or object being recorded. This paper presents an image-based registration method for terrestrial laser scanner (TLS) data in which the transformation parameters of one data set with respect to another are determined via 3D similarity transformation. Digital images of the object are recorded using a calibrated digital camera, rigidly attached to the laser scanner. These images are used to identify, measure and label manually in the imagery from each TLS station feature points which can be served as common points between overlapping TLS data. The spatial position and orientation of the camera within the TLS coordinate system, along with the well known collinearity equation of close range photogrammetry, are then used to automatically find the feature points in the laser scanner point clouds. Finally, the identified feature points in the scan data serve as common or ‘tie’ points for the 3D similarity transformation which registers one point cloud with another overlapping data set. The proposed method provides a simultaneous registration of overlapping TLS point clouds. Test results obtained with the approach are presented to highlight its practicability and accuracy.

Towards 3D As-Built – What Say The Professionals?

Shazmin Aniza Abdul Shukor (Malaysia) and Emma Rushforth (United Kingdom)

Key words: Laser scanning; 3D interior modelling; 3D as-built; BIM

SUMMARY

Building Information Modelling (BIM) is getting more attention from the professionals due to its benefits towards Architectural, Engineering, Construction (AEC) area. Elements in BIM, especially the 3D modelling, plays the important role for such attractions. Although BIM covers the overall process of building construction, the component of 3D modelling in BIM during post construction, which can also be known as 3D as-built, is underutilized due to several issues, specifically for existing buildings. This paper will highlights on the current concerns in generating 3D interior models, which in some applications can be used as the 3D as-built, based on the feedback obtained from related professionals. These concerns were obtained from surveys made towards surveyors, engineers, architects and facility / project managers. The importance of the survey is to highlights on the disadvantages of current methods in producing 3D interior models. Moreover, the results can also reflect the readiness of the related professionals in extending BIM, in particular the 3D modelling, for post construction purposes. All of the respondents have agreed that the existing, traditional laborious method is having disadvantages in visualization, features and standardization, apart from poor accessibility and poor data capture. However, to use laser scanner to generate 3D models is having its own limitations, mainly due to its cost, and other restrictions in software and features. From their opinions, there is a need to develop such required solution to overcome these disadvantages and limitations to ensure that BIM can be expanded to post constructions. In conclusion, 3D as-built can be generated especially for newly constructed buildings that implement BIM at the starting of preconstruction by optimizing the same 3D model used during construction. However, for existing buildings, there are limitations that can put off professionals to extend BIM, especially in generating the 3D as-built. It is important for BIM to be fully utilized and expanded to post construction, especially since BIM in pre and during construction has been fully exploited and matured. Therefore, more researches are needed to overcome these limitations as now is the perfect time to concentrate BIM for post construction.

The Concept of Equitable Compensation in Proceedings Related to the Expropriation of a Property.

Pałubska Joanna (Poland)

Key words: Legislation; Professional practice; Valuation;

SUMMARY

In the wide catalogue of property rights, it is the ownership right which is the most significant one and which is a subject to a special legal protection. All activities, which aim at its revocation or even limitation, constitute the land owners' source of dissatisfaction. The expropriation of a property is possible only in cases where the public-purpose investment are implemented and it constitutes one of the most popular subject concerning real estate, especially that it does not only concern the expropriation of a property but also many other rights connected with a property. The revocation of land rights is only possible when public-purpose investments are implemented and if the equitable compensation is paid to people who have the rights to these lands. However, this proper compensation is not specified by provisions of the law and the way of defining its amount, in most cases, is not sufficient to compensate losses which have been incurred as the result of property's expropriation by property's owners. In this article, the main problems connected with defining compensation in relation to the expropriation of a property are discussed with the special attention paying to these factors which are significant when it comes to a decent indemnity for properties' owners for taking over a property from them however, they are not taken into consideration while defining a compensation. Theoretical considerations are supported by practical examples which illustrate problems with defining the amount of compensation depending on the kind of property expropriation, its purpose, component parts as well as laws related to it. The issue related to property expropriation is also analyzed in terms of solutions which are applied in other countries.

GIS Equipped Geovisualization for Investment in Real Estate:visualising the Reality with the Notion of Economy

Sonali Ghosh and Arunava Dey (India)

Key words: Affordable housing; Cartography; Geoinformation/GI; Real estate development; Valuation; Real Estate;Geo-visualization;webGIS;Routing

SUMMARY

GIS equipped Geovisualization for investment in Real Estate: Visualising the reality with the notion of economy Sonali Ghosh¹ and Arunava Dey² ¹National Atlas & Thematic Mapping Organisation, Kolkata- 700091, India ²Ramtech Software Solution. Noida, UP – 201301, India Email: ¹sonali.natmo@gmail.com ²arunavadey83@gmail.com With its powerful analytical capabilities and potent interactivity, geovisualization coupled with GIS, significantly aids human understanding of the surrounding reality leading to strategically better decision making. The advent of web enabled geospatial solution has popularized GIS as a powerful technical tool which provides solutions for almost every day to day life problems. Like people of all walks of life potential Property Buyers or Investors also come within the realm of Geographic Information System and can get benefited through it. Before an investment, a property investor always like to have some facts and figures regarding the location of site, facilities available and strategic importance to evaluate the economic viability. This paper aims at the development of a web based GIS application that will facilitate a property buyer to identify the best location, considering various influencing factors and their relative weightage. A Proof of Concept has been developed to demonstrate the same using open source tools. It supports highly complex spatial queries powered by the detailed spatial and related non-spatial data. The objective of this paper is to assess the applicability of GIS-based visualization in the real estate sector keeping in mind the scenario of Salt Lake City, Kolkata. This web based application will provide an option to the visitor (who intends to buy a property) to get an overview of the existing real estate scenario and associated socio-economic setup of the area. With the SEARCH option, the user can fix the criteria of his requirement, such as locality, budget etc. This will generate an intermediate result, populated with a number of site locations. The user then can select from a number of pertinent parameters, like nearness to road, railway, urban parks, hospitals, schools and etc. Each of these will be associated with user defined relative importance. In order to reproduce a better picture of the reality, multiple levels of drive time buffers will be generated, using road network data for all the sites. The previous result will then be filtered based on the user input to produce the final result, which will be a colour coded map of choice scores. Choice Score will signify the suitability of a site with respect to the user requirement .A detailed report will be generated in the form of maps and charts, describing the distribution of Points of interests surrounding the filtered sites, from various spatial layers. There will be geo-tagged

photographs, as well for these sites. The GIS equipped Geovisualization enriches the analytical power of the property buyer. It offers a more rational-realistic picture of the situation, so that one can take an economically viable decision. Key-words: Real estate, Geovisualization, webGIS, routing

Land Information System for Revenue Planning, Estimates and Collection

Hardi Fadillah (Malaysia)

Key words: Valuation; Land revenues

SUMMARY

With the emerging trend of State Government implementing good governance and prudent financial and resources management, an enterprise land information system with geospatial capability, is essential and serves as a strategic tool to face the challenge of mobilizing appropriate level of land-related revenues to enable effective service and provision of infrastructure. The land information system in Sarawak, known as LASIS, is an integrated GIS-Database system, has the ability to integrate and analyze a wide variety of information based on their spatial locations and textual attributes like ownership and value. It also supports a full range of the land administration and land management processes covering cadastral mapping, land tenure, land value and land use, providing the framework for all types of spatial data storage, data retrieval, and visualization, analysis, modeling and reporting. This paper illustrates how LASIS can assist the State Government in the revenue planning, estimates and collection. The paper examines the integration of the textual data and geospatial information to provide realistic intelligence on the revenue potential of land. The Department fully leverage on geospatial and database technologies to simulate and estimate the optimum level of land revenues based on the land values and land categories. GIS is deployed, too in the enforcement of the revenue mobilization and collection in order to assist and achieve sound and prudential financial management for the State. The challenges encountered are the land owners avoid the payment of land rent and the failure to contact the defaulters due to non-currency of the ownership records. Departure of the actual land use from the approved usage may result in minor anomalies of the estimated land value. However, such constraints can be rectified by site inspection.

Photogrammetry for Recording, Documentation and Exploration of Cultural Artifacts in Order to Revitalize the Batak Toba Settlement and Craft Centers

Deni Suwardhi, Himasari Hanan, Tika Nurhasanah and Elya Santa Bukit (Indonesia)

Key words: Photogrammetry; Spatial planning;

SUMMARY

The Architecture of Indonesia reflects the diversity of cultural, historical and geographical influences that have shaped Indonesia as a whole. These also provide opportunities for the development of creative industries and tourism, especially for those areas that do not have natural resources wealth as a driver of the regional economy. The existing condition of the traditional settlement needs to be revitalized and enhanced physical attractiveness in order to meet the demands of today's consumer tourism. Unfortunately, there is no accurate and comprehensive documentation of art and cultural products that can be used for revitalization strategy. This paper describes the development of local arts and culture revitalization models with application of photogrammetry method to speed up the process of recording, documentation and exploration of cultural artifacts. Photogrammetry technique is used to recover the geometry and appearance of architectural scenes directly from a sparse set of photographs. Electromagnetic energy which is owned photogrammetry allows the recording of physical buildings from aerial, terrestrial, exterior and interior photographs so that authenticity can be achieved. Furthermore, the authentic data recording allow analysis and evaluation of gap that exists between stakeholders in achieving the target of revitalization, namely community development strategies and programs for creative industries and tourism. Field survey sample is the traditional settlements and craft centers of Batak Toba in Samosir Island. The revitalization of traditional building activities particularly required on the return of the original look and shape decoration that gives the symbolic value of a cultural artifact, which would not have been possible without the valuable "stereo based" technique in photogrammetry. The output of the processing is an accurate 3D wireframe models, surface models, and volume models with realistic texture.

Mitigation of the Impacts of Climate Change – Surveyor’s Role

Francis Tham (Australia)

Key words: Laser scanning;

SUMMARY

MITIGATION OF THE IMPACTS OF CLIMATE CHANGE – SURVEYOR’S ROLE By Francis Tham Dip (Land Surveying) Royal Melbourne Institute of Technology Licensed Surveyor (Victoria) Registered Surveyor (New South Wales) Australia. 1. Introduction Climate Change is real, particularly, in one of the driest continent on earth such as Australia. During the last two decades, we saw a gradual increase in drought conditions resulting in less rainfall and the drying out of vegetation and soils. Although wild fires (bushfires as they are known in Australia) are common features of the Australian landscape, many studies in Australia have provided evidence that climate change has increased the risk of conditions that make bushfires possible. A recent catastrophic event, known as The Black Saturday Bushfires, started on the 7th of February 2009 in Victoria, Australia. A total of 173 people were confirmed to have died as a result of these fires. Surveyors do not seek to guide the political debate on policies of greenhouse gas reduction or the implementation of an Emission Trading Scheme, rather our interest is to see that any impacts resulting from climate change are mitigated and managed. In Australia, the common cause of bushfires is the clashing of overhead conductors in the rural areas during extreme weather conditions of high ambient temperature and gale force strength dry northerly wind. This is where surveyors are called to assist with high tech laser scanning technology to detect dangerous spans of overhead wires that are likely to fail under such conditions. Once identified immediate remedial maintenance can be undertaken to ensure safe statutory clearances between conductors are corrected and maintained. 2. Application of Terrestrial Laser Technology for Bushfire Mitigation and Network Electrical Modelling The clashing of conductors is a major risk factor and one of the causes of bushfire in the rural areas. For the low voltage (LV) conductors, this clashing issue can be mostly addressed by the installation of spreaders at the appropriate intervals; however, it is difficult to do the same for circuit-to-circuit conductors. For safety and reliability of the network, it is critical that these conductors are properly kept apart, particularly under extreme weather conditions. With the best intention of design and construction, power poles, due to the deterioration of their structures and in-situ soil conditions, could lean over, thus increasing the span sags and resulting in clearances being breached. This problem is further exacerbated under extreme weather conditions when there are significant load differences between the upper and lower circuit conductors. 3. Mobile Laser Scanning With significant numbers in pole population, mobile scanning has been proven to be an efficient and effective way to identify non-conforming spans of conductors that breach the required clearance. With twin laser scanners mounted on a vehicle travelling at speed up to 80km/hour, the conductors are scanned and the captured data used for analysis via PLS-CADD, a line design software

commonly used by Electricity Distribution Businesses (EDB). Some EDBs have conducted experiments on the use of airborne LIDAR mounted under aircrafts or helicopters. However, problems were encountered as a result of the direct overhead (non-oblique) scanning and the speed of the aircraft which rendered conductors not “picked up”/defined sufficiently clear enough to be used for analysis. 4. Identification of Non-Conforming Spans Using Software PLS-CADD With the captured data defining conductor catenaries, vegetation density and ground profile, the separations of Ground Clearance, Circuit-to-circuit Clearance, Vegetation Encroachments and even Phase-to-phase Clearance (when the image is clear enough) can be interrogated using PLS-CADD. Non-conforming spans are then identified as illustrated in RED by the following profile drawing. Once identified, the culpable spans can be redesigned using the same digital data to initiate site work to rectify the dangerous situations. A network condition and risk modeling can also be undertaken as the captured data are able to be easily integrated into EDB’s Corporate Asset Management System. 5. FIG Conference Proposed Paper I belong to a unique group of surveyors who is not involved in land developments or major construction projects. I have worked in the electricity industry for over 30 years using surveying knowledge and experience but supplemented by a detailed understanding of electricity transmission and distribution, in particular, structural aspects of the electrical network. This proposed paper will outline recent projects undertaken in developing a terrestrial and later a mobile scanning system linked to a high degree end-to-end automation system (to ensure efficiency) within PLS-CADD to identify these non-conforming spans. Several EDBs have expressed interest in its application in light of a Victorian Bushfire Royal Commission Report and its recommendations.

Property Value Information Systems (PVIS) : A Glocal Perspective

Mohammed Abdur Razzak (Bangladesh)

Key words: Cadastre; Digital cadastre; Education; Geoinformation/GI; Land management; Legislation; Property taxes; Real estate development; Risk management; Security of tenure; Standards; Valuation;

SUMMARY

ABSTRACT This paper discusses the prevailing need for a unified property value information system as an integral part of Registration and Information Systems including GIS, LIS, PSI, right to information, human rights, evidence based transparency, property valuation and information, valuation methods, tools, techniques, regulatory, standardization, strategic and policy options, institutions and organisations, profession and ethics, infrastructure and access, technology and innovation and procedures of all kinds, always what we need is integrated information systems to meet our daily needs in the area of our business. It is not essential to prove further that ‘property equals power’ as the simple prevailing rule of human life which dominates over the centuries among civilisations around the world. Information has vital significance as a tool of rights based empowerment, inclusive justice and good governance, evidence based transparency, workable capacity building, development and services for all and socio-economic progress of individuals , communities and nations. Fast and capable information systems and in-depth knowledge of different national and international working practices lie at the heart of effective property management. The objective of this paper is to achieve a better understanding of the present situation with the information systems of property valuation including land and real estate to facilitate systematic professional services on property value information systems which is an integral part of our political economy. The findings of the research are expected to provide government and local administrators as well as representatives of real estate valuation community. Hundreds of professional assessors and appraisers , engineers, surveyors and accountants, asset and fund managers, property and research professionals try to make strategic and tactical practices to determine portfolio and asset value from acquisition to sale, encompassing all aspects of the property value information systems in the process with a continuously updated vision of all real estate, financial and accounting information regardless of the physical location of the investments for achieving expected goals. Key Words : Property Value Information Systems (PVIS), Registration and Information Systems, Location Profiling, Uniform Property Value Database

Exploring the Possibility of Developing Multipurpose Marine Cadastre in Indonesia

**Andri Hernandi, Rizqi Abdulharis, Sadikin Hendriatiningsih and Asep Yusuf Saptari
(Indonesia)**

Key words: Marine cadastre;

SUMMARY

Marine information is required to support of sustainable development and it should be well managed to support good marine governance. How to get good marine information, a multipurpose marine cadastre could be applied. This paper attempt to examine how to multipurpose marine cadastre may be developed in Indonesia. The need to provide marine cadastre information in a common geographic information system framework would be highlighted. An integrated marine information system can benefit comprehensively as well as a visual approach to data analysis that able to finding the best location for marine resources. And also, multipurpose marine cadastre able to choose quickly see the applicable jurisdictional boundaries, restricted areas, laws, critical habitat locations, and other important features. The resulting of this study elaborates some aspect that possible to developing mutlipurpose marine cadastre in Indonesia.

Closing the Gap and Harnessing Opportunities in Life Long Learning: an Initiative for Curbing the Vulnerable Youth in Nigeria.

Jennifer Eziaku Chigbu (Nigeria)

Key words: Education; Standards; LIFE LONG LEARNING, EDUCATION, SOCIO-ECONOMIC DEVELOPMENT, STRATEGIES

SUMMARY

: Lifelong learning is no longer a luxury but a prerequisite for adaptation to the professional, social, economic and informational demands. Lifelong education has become a priority for education systems globally. Even if the role of basic education and of the formal education remains essential, lifelong learning has developed skills as closer as possible to market and society demands. Education for sustainable development should pay attention to other segments of the population. Farmers, for instance need basic literacy and numeracy to effectively adapt to new agricultural methods, gain entitlement to their land, apply for credit facilities from lending institutions to enhance their living. The strength of the restive and vulnerable youths in oil rich Niger-Delta region and the resurgence of the Boko-Haram sect in the Southern and Northern parts of Nigeria can be harnessed positively for national development through well-developed operational strategies and concrete policy initiatives on lifelong learning. Lifelong initiative should cover educational programs that contribute to adult literacy, basic education for those who have left the formal educational system (like the vulnerable youths), to improve life skills, workplace skills and also will improve the general knowledge of the youth (learner). This paper is an advocacy tool aimed at closing the learning gap and the inevitability of harnessing the gains of lifelong learning as a good and concrete initiative for curbing and stemming the tide of youth restiveness and religious insurgences in Nigeria.

Geographic Information System as a Decision Support System for Tourism Management in a Developing Economy: a Case of Abuja, Nigeria

Kayode Odedare and Adedayo Alagbe (Nigeria)

Key words: Tourist Sites, GIS, Spatial Database

SUMMARY

In Nigeria, Tourism is growing rapidly and it is among the viable revenue earners for the country. Nigeria has a wide range of tourist activities to offer. However, many of these attractions are still largely untapped and even at their raw states; they are still being enjoyed by few outsiders, either very rich visitors in quest of exoticism or adventurous people in search of new challenges and experiences. Worst still, some of the tourist sites are not known and those that are known are not published on the net to make them accessible. This paper discusses how Geographic Information System technology could serve as a decision support tool for tourism management in ABUJA. GIS functionality was used to create digital spatial database for tourist site, hotels, hospital, police station and road network for tourist movement within ABUJA. The research involved the design of spatial database for various entities identified in the study area. Geometric data was acquired from satellite imagery through digitizing and the imagery updated through hand-held GPS receiver while attribute data were acquired through social survey. ARCGIS 10.1 was used for database creation where attribute tables were linked with geometric data. Various spatial operations were performed and these include spatial search and closest facility analysis to efficiently guide tourist movement in ABUJA. The study was concluded by recommending various ways to promptly identify tourism sites, managing tourist movement and solving direction finding problems for tourist.

Different Measurement Methods of Structure Components Deformations

Wojciech Pachelski, Bogdan Kolanowski, Ryszard Soloducha, Krzysztof Baszkiewicz and Dorota Latos (Poland)

Key words: Deformation measurement; Engineering survey;

SUMMARY

The evaluation of deformations like stress, strain, displacement of construction components in real-time could provide essential information on the state of the construction. It's very important to assess correctly the condition of the structure, to identify the most important points of construction and measure them. In order to achieve this goal, it is necessary to choose proper methods of measurements and right instruments. The geodetic techniques of acquiring information about deformations have strongly directed towards the remote methods in recent years. This trend can be observed for example in using the reflectors at the distance measurements, interferometry, scanning or remote sensing methods. Very promising are also approaches employing instruments like: clearance gauge or dial gauge. The deformation evaluation of structures belongs to the type of very sophisticated measurements. They cannot be carried out by geodesists on every day routine. The paper presents different measurement methods of deformations for varied structures ranging from buildings to bridges together with the attempt to determine the most suitable for each of the constructions. The best technique is chosen based on the accuracy requirements, length of the measurement time and the total cost of the survey and data processing. Finally the paper takes into consideration that some of methods needs to be backed up by another independent measurements and proposes the idea of combining techniques to achieve the goal.

The Valuation of Holiday Hotels. A Case Study of Negril, Jamaica

Tina Beale (Jamaica)

Key words: Valuation;

SUMMARY

Introduction Beach erosion is an environmental problem which has resulted in devastating effects to Jamaican settlements within the last 50 years. This issue has manifested as a result of both man-made and natural causes, thus increasing her vulnerability to tropical cyclones and sea level rise. In light of this, the paper discusses/analyzes the valuation approaches used in valuing hotels and presents a more explicit approach for valuing holiday hotels.

Significance Negril, known for its white sand beaches, is Jamaica's third largest resort area. It is protected under the Natural Resources Conservation Act 1991 (NRCA) and has the highest rate of beach erosion in Jamaica. In fact, Environmentalists have predicted that by 2060 Negril will have little or no beaches left. Without beaches, then hotels will have no value and the domino effects will be a reduction in the foreign exchange earned by Jamaica, less employment for Jamaicans, a change in land use for hotel properties and a higher risk profile of legal interests in hotel properties.

Research Questions The research questions used were: 1. What impact does beach erosion have on hotel values? 2. How does man by his ingenuity address this phenomenon 3. How can the market for hotel investment be maintained? 4. How does the operational cost of Hoteliers equate into value?

Results The research revealed the following: 1. Hotels in Negril suffer from a high level of depreciation in the form of beach erosion which is not accounted for in the Profits Method of Valuation. 2. Data implies that Hoteliers pay vast sums of money to dredge seas on an interim basis to replace the sand that has being lost, as a result of beach erosion. 3. The current practices used in valuing hotels, focuses primarily and uses profits earned to determine the value of these properties. The current valuation methodology does not account for the reduced remaining useful of hotels affected by beach erosion.

Conclusion The Profits Method does not adequately account for all factors which affects the value of holiday hotels. A more explicit approach is required which takes into consideration the remaining useful life of the investment and its impact on security of tenure. It is believed that this can be best accomplished by developing a methodology which merges the Discounted Cash Flow Technique with the Mineral Valuation Approach, in order for value to be the outcome of all factors affecting holiday hotels.

A Performance Test of a 3-axis Accelerometer and Modal Analysis

Jin Woo Jung, Dae Joong Moon, Ji Won Jung, Byeung Leul Lee and Seung Jae Lee (Republic of Korea)

Key words: Engineering survey;

SUMMARY

In the paper, MEMS based 3-axis accelerometer and a monitoring program for detecting ambient vibration were developed. And data acquisition device with 24bit ADC (Analog to Digital Converter) was used for the purpose of improving performance of the accelerometer. Accelerometer which was developed in this study and commercial accelerometer were set up in the building so data was analyzed during one week. This data was accumulated at frequency of 100Hz and this paper focused on detecting ambient vibration of the building. And data trend and various statistics of the 3-axis accelerometer were compared. FFT (Fast Fourier Transform) analysis was performed using data from accelerometer and frequency related to mode shape was extracted using a modal analysis program.

Global Professional Regulation and Guidance – a 'good Practice' Example

Murray O'Connor Helen (Ireland)

Key words: Capacity building; CPD; Education; Professional practice; Standards; Regulation
Professional guidance Compliance RICS

SUMMARY

The approach to professional governance globally ranges from local through national to international, and in the degree of formality from legally binding regulation to 'voluntary' cross sectoral professional guidance notes and standards. All require relevancy, currency and adequate resourcing to be effective. Good regulation aims to provide cohesive, meaningful and recognised rules of conduct for practitioners to facilitate the provision of professional services to the citizen and business within an indemnified framework of good practice and compliance. However globalisation in land, property, construction and 'geo-information' industries has created challenges for the 'global professional' - those working within trans-border technical, procedural and legislative frameworks. For many graduates from these disciplines, the recognition and transferability of their skills is potentially a passport into this global job market. As graduates begin to build on formal academic qualifications, the requirement to be aware of and compliant with professional regulatory standards becomes critical. However many assume regulation is solely about ensuring statutory professional compliance. This oversimplifies and underestimates the true breadth of tangible and intangible benefits of regulation. Irrespective of whether it is an early professional or seasoned practitioner, the availability of clear technical guidance documentation, access to good practice case studies, the provision of the necessary tools to continue to learn what is current in their chosen discipline, the mentoring role of professional regulation cannot be ignored. The Royal Institution of Chartered Surveyors (RICS) is well positioned to lead in this regard. An independent global professional body, the RICS is committed to setting and upholding the highest standards of excellence and professional integrity. RICS Regulation acts in the role of regulator to its members worldwide by monitoring and supporting them in the compliance with professional and technical rules, regulations and ethical standards. The Society of Chartered Surveyors Ireland (SCSI) is the RICS representative body in Ireland. This paper details how the SCSI's Geomatics Professional Group has embarked on a programme of work to produce a range of new 'geo' related guidance notes and practice standards, and to revise/adapt relevant RICS guidance. To this end, rather than a mere 'translation' of heretofore (primarily) UK focussed regulatory guidance, the RICS has supported and facilitated in the 'transformation' of practice notes to reflect and 'fit' the Irish profession and market. Guidance notes and standards on Boundary identification and demarcation (a guide to boundary disputes); Map Projection Scale Factor; Scale; Geospatial information and the surveying profession; Grid systems in Ireland; Terms of contract for land surveying; and Virtually real terrestrial laser scanning, have already published as co-branded

SCSI and RICS publications. An overview of the process is given and the significance of the resultant 'geo' guidance to the profession is explored.

Modeling Spatial Changes in Suburban Areas of Istanbul Using Landsat 5 TM Data

Elif Sertel and Dursun Seker (Turkey)

Key words: Remote sensing; spatial changes

SUMMARY

Modeling Spatial Changes in Suburban Areas of Istanbul Using Landsat 5 TM Data Sinasi Kaya, Elif Sertel, Dursun Zafer Şeker ITU, Department of Geomatics, 34469, Maslak-Istanbul, Turkey kayasina@itu.edu.tr, sertele@itu.edu.tr, seker@itu.edu.tr

ABSTRACT

Population of Turkey has been steadily increasing with a yearly average rate of 2.2 %. Urban population in different cities of Turkey is comparatively higher than suburban population like several other countries in the world. While the population in the urbanized areas was %24 in 1945, it increased to %58 in 1985 and reached to % 77 in 2012. According to the statistical studies realized between 1990 and 2010 the population increase was 2.9 % in urban areas whereas -0.75 % in rural areas. These population changes could not be described by only using birth and death rates since there is an important issue of rural exodus to larger metropolitans in Turkey. This migration has been causing abrupt land use/cover changes in the surroundings of metropolitans. It is not easy to solve this rapid urban spatial growth problem because of socio economic reasons. Istanbul, selected as the study area, is the biggest metropolitan city of Turkey covering a total area of ~ 57 500 km² and having a population of about 13.8 million according to the population census of 2012. It is among the most populated metropolitan cities of the world as well. Population of Istanbul was only 4.7 Million in the year of 1980. As a result of the rapid population growth and urbanization, the urbanized area has extremely expanded causing significant changes in land use/cover. City planners and policy maker's have been working on to evolve better strategic plans related to protection environment, infrastructure development and maintenance, and land development. Thus, they need to access to up-to-date base maps and systematic information on the land use patterns, environmental problems and infrastructure facilities. Multi-temporal remotely sensed data has been commonly used to determine land use/cover changes and their impact to environment. In this study, district based suburban land cover changes in Istanbul were determined and analyzed using Landsat 5 TM data obtained in 1987 and 2011. After conducting geometric correction, Landsat 5 TM images were classified into four major classes namely water, vegetation, urban and soil using supervised classification technique. The results of the study pointed out the land cover changes within 24 year period. Beside the highly urbanized areas, especially changes in the suburban areas have led to the establishment of new suburban areas. Impervious areas for each district were analyzed and distributions were calculated using spatial weight rate for Istanbul metropolitan.

Using GIS to map HIV/AIDs Prevalence in Lagos Mainland Local Government, Lagos State, Nigeria

Adedayo Alagbe, Oluwole Adeniran, Ekpo Effiong and Christiana Umunna (Nigeria)

Key words: Spatial Database, Heart to Heart centers, Risk Factors

SUMMARY

In recent years, there has been growing interest among health departments, ministries and parastatals in the use of Geographic Information System in order to strengthen the decision making capacity of public health. The focus of the paper is on the development of GIS application in the mapping of HIV/AID prevalence in Lagos Mainland Local Government Area, Lagos. The study area was divided into wards. The coordinates of the Heart to Heart centers were acquired using Hand held GPS. An existing topographical map of the study area was obtained from Lagos State Ministry for Land and Survey which was updated. Attribute data collection was through verbal interview and document files from the Heart to Heart centers. Spatial database was created by using ArcGIS 9.3. Spatial analyses performed include Clustering Analysis, Spatial search, Buffering and Erase operations. The risk factors that aid the spread of HIV within the wards were identified. The intersection of these factors in an area leads to high HIV prevalence. Understanding the spatial distribution will enhance the efficacy of the prevention efforts of policy makers

Land Administration Systems: Underpinning the Human Rights Perspective

Stig Enemark (Denmark)

Key words: Land administration, Human rights

SUMMARY

Land administration systems are the operational tool for conceptualizing rights, restrictions and responsibilities (RRRs) in land. Each of the RRRs encompasses a human rights dimension that relates to the overall national land policies and should be unfolded as more than just rhetoric. This paper attempts to analyse the aspects of human rights in relation to land administration systems with a special focus on developing countries struggling to build adequate systems for governing the RRRs in land. Human rights are the rights inherent to all human beings without discrimination. The “constitution” of human rights is the Universal Declaration of Human Rights (UN, 1948) stating the universal rights of human beings based on the principle of respect for the individual – rights that can be enjoyed by everyone simple because of being alive. Of special interest in relation to land and property is the right to own things and the right of food and adequate housing for all. More generally, human rights should be seen as an ethical responsibility of government to ensure that people enjoy some basic rights as human beings. This relates to national political arrangements and standards for good governance. Land administration systems are highly instrumental in this regard. It is argued that human rights and land administration are closely linked and that every state needs to ensure that efficient and effective land administration mechanisms are in place to pursue this interaction. Land administration systems should embed a human rights perspective when managing rights, restrictions and responsibilities in land. This, in turn, imposes a huge challenge and also ethical and social responsibility on all land professionals.

Developing Emergency Management System for Fire and Road Accidents (A case study of Abuja Municipal Council Area, Federal Capital Territory, Nigeria)

Ekpo Effiong, Felix Iyiola and Furababonye Wilcox (Nigeria)

Key words: Emergency, GIS, Database

SUMMARY

The value of GIS in emergency management arises directly from the benefits of integrating a technology designed to support spatial decision making into a field with a strong need to address numerous critical spatial decisions. Abuja Municipal Area Council has been well planned but there is need to involve a system whereby people can find the best or alternative road to get to the hospital, ambulance station and fire station in an emergency situation because most of the emergency situations arise in the city due to road and fire accidents. Geospatial data and tools have the potential to help save lives, limit damage, and reduce the costs of dealing with emergencies. For this reason, new applications of GIS in emergency management have flourished in recent years along with an interest in furthering this trend. This paper involved the design of spatial database for various entities identified in the study area. Geometric data was acquired from satellite imagery through digitizing and the imagery updated through hand-held GPS receiver while attribute data was acquired through social survey. ARCGIS 10.1 was used for database creation where attribute tables were linked with geometric data. Various spatial operations were performed and these include Spatial query and Network Analysis (best routes and closest facility) to map accident risk zones required for an emergency responder. ArcGIS 10.1 provides greater support in giving information about the vicinity of an emergency and solving direction finding problems. The study was concluded by recommending various ways to identify prominent and likely accident prone areas for proper monitoring and control by appropriate traffic agencies for coordination of traffic flow on the roads across the town for effective response and solving direction finding problems during an emergency.

Building Fit-for-Purpose Land Administration Systems

Stig Enemark (Denmark), Christiaan Lemmen (Netherlands) and Robin McLaren (United Kingdom)

Key words: Cadastre; Land management; Land administration,

SUMMARY

Arguably sound land governance is the key to achieve sustainable development and to support the global agenda set by adoption of the Millennium Development Goals (MDGs). The operational component of land governance is the country specific land administration systems dealing with the four key functions of land tenure, land value, land, and land development. Land administration systems - whether highly advanced or very basic – require a land parcel framework to operate. Building such a land parcel framework – showing the way land is divided into parcels and plots for specific use and passion - is not primarily about accuracy. It is about adequate identification and representation of the spatial objects and parcels; completeness to cover the total jurisdiction; and credibility in terms of reliable data being trusted by the users. This paper argues that the land parcel framework should be developed using a flexible and fit-for-purpose approach rather than being guided by costly field survey procedures or over-engineered technology solutions. When considering the resources and capacities required to building such land parcel frameworks in developing countries, the western concepts may well be seen as the end target but not as the point of entry. When assessing the technology and investment choices the focus should be on building a fit-for-purpose framework that will meet the needs of society today and that can be incrementally improved over time. The paper addresses some of the key technological, economic, legal, and social issues related to building fit-for purpose land administration systems in support of sustainable and transparent land governance especially in developing countries. Some key principles are presented and the main benefits and constraints are discussed along with the opportunities for land professionals when applying such a fit-for-purpose approach. Finally, the papers emphasises the demand for capacity development measures being recognised up front.

The Climate Change Challenge for Land professionals

Stig Enemark (Denmark)

Key words: Risk management; Climate Change

SUMMARY

“Climate change is the defining challenge of our time”. This statement by UN Secretary General Ban Ki Moon in 2009 is still valid. The challenges of food shortage, environmental degradation and natural disasters are to a large extent caused by the overarching challenge of climate change, while the rapid urbanisation is a general trend that in itself has a significant impact on climate change. Measures for adaptation to climate change must be integrated into strategies for poverty reduction to ensure sustainable development and for meeting the Millennium Development Goals and beyond. Sustainable monitoring systems and systems for land administration and management should serve as a basis for climate change mitigation and adaptation as well as prevention and management of natural disasters. In facing the climate change challenge the role of land professionals is twofold: • Monitoring change such as sea level rise and environmental degradation through global positioning infrastructures and data interpretation and presentation; • Implementing adaptation and mitigation measures into land administration systems and land use management and building systems for disaster risk management. The linkage between climate change adaptation and sustainable development should be self-evident but is not well understood by the public in general. Land professionals should take a leading role in explaining this linkage to the wider public. This should also ensure that the land management perspective attracts high-level political support and recognition.

Quantification of Available Solar Irradiation on Rooftops to Locate Solar Photovoltaic (PV) System Using LiDAR Data and Orthophotograph

Nur Shafiqah Mohd Eris and Abd Latif Zulkiflee (Malaysia)

Key words: Geoinformation/GI; GNSS/GPS; Photogrammetry; Remote sensing; Spatial planning; Solar Photovoltaic System, Solar Irradiation

SUMMARY

The world's energy demand is rising steeply as the world population increases drastically since last few decades. The abundant and renewable solar energy has been innovated due to the finite resources shortage crisis. The solar energy can be converted into electricity energy by using a high technology system known as solar photovoltaic (PV) system. The excessive amount of solar radiation expose to the Earth is more than enough to be used to generate electricity. There is an important factor to be considered before do any solar photovoltaic (PV) system installment. Many solar photovoltaic (PV) manufacturers do not consider on the available amount of solar irradiation on the PV panel locations such as on rooftops, facades or on ground. The electricity energy generation is affected if the panels do not expose to the sufficient amount of solar radiation. By using remote sensing and Geographical Information System (GIS) technology, the amount of solar irradiation on a certain surface area at a specific period of time can be measured. In ArcGIS software, the Solar Radiation on Spatial Analyst tool can be used to analyze the amount of available solar irradiation on certain location based on the acquisition data. The analysis is depending on the data itself as the time configuration can be set whether to make analysis within a day, multiple days or whole year with monthly interval. From the result, the analyses are made within a day but on three different time period which are on morning, afternoon and evening. The available amount of solar irradiation is difference between those periods of time due to the sun position and shading made by other obstructions. All analyses produced results that show the direct radiation and diffuse radiation respect to the duration of time observation. From the result, it can be analyzed that the site area has a great potential to use solar photovoltaic (PV) system to generate electricity. This research is one step forward to have an accurate observation on determine the available amount of solar irradiation before make any solar photovoltaic (PV) installment. Continuation from this research is necessary to upgrade a better solar irradiation analysis regarding on other related factors that may affect the electricity performance made by solar photovoltaic (PV) system.

From Cadastre to Land Governance: a Cadastre 2014 Outlook

Stig Enemark (Denmark)

Key words: Cadastre; Land governance

SUMMARY

This short paper provides an outlook from the publication “Cadastre 2014” as launched at the FIG Congress in Brighton, UK, July 1998. The publication has achieved an incredible impact in terms of advocating the importance of cadastral systems and their structure as a kind of backbone in market based societies. This impact can hardly be overestimated. However, an outlook is necessary to adapt the traditional cadastral concept to include more flexible approaches for meeting the global challenges ahead. The paper facilitates an understanding of how the cadastre has evolved over recent years into the broader concept of Land Administration in support of sound Land Governance. The role of land professionals and FIG is underlined in this regard. The paper also looks ahead towards the role the role of the cadastre within the wider concept of concept of spatially enabled society, and, on the other hand, the need for a more flexible approach to cadastral concepts as a basis for building adequate systems of land governance in developing countries with very limited cadastral coverage.

Urban Planning in Morocco Between the Theoretical Basics and Legal Principles

Abdelwahed Idrissi (Morocco)

Key words: Land management; Legislation; Urban renewal;

SUMMARY

The understanding of an enacted regulation is based on the socio-cultural and legal policy environment. One couldn't distinguish only the legal rules and approaches but also a series of answers in the short term. An analysis dealing with the theoretical fundamentals and legal principles may help in understanding the scope and limits of the legal framework. The state of the law reveals a series of enacted texts based on the principles used to control and manage the urban space. Principles such as regulation, health and safety are part of a particular theoretical framework. The alignments, zoning, and the consigning of the cultural values to the second level are sufficient to confirm the procedural nature of the regulation in Morocco. The urban plans are becoming reference for regulation and normative documents while the conceptual investigation is sometimes lacking. The applied methods in urban planning have generated for more than a century, an identity crisis and an efficiency crisis. This study has the aim to arrange the ideas, principles, and rules that affect the process of urban planning. It intends to build perspectives on urban planning and the right to observe the basic foundations and the legal framework underlying the urban prospective. To reach this goal, the study is dealing with two axes. The first axis is focusing on the definition of the conceptual and regulatory framework for the planning predict. The second axis is highlighting the scopes and limits of the regulations by pursuing a possible renewal in the urban field through the renewal of the principles and the overhaul of the legal instruments governing urban planning.

The First Decade: Lessons Learned from SSSI's National YP Network

Simon Callaghan (Australia)

Key words: CPD; Professional practice; Young surveyor;

SUMMARY

Australia's Surveying & Spatial Sciences Institute (SSSI) National Young Professionals Committee (YPs) began a little over a decade ago with the aim of empowering young professionals and students in SSSI's governance. The founding National Young Spatial Professionals Committee developed a space to encourage innovation. With the establishment of regional committees in each state and territory, as well as New Zealand, the YPs have grown into a central force within SSSI. The success of the SSSI YPs has grown over the decade through sustained efforts, but has not been uniform within each region. The special interest group has prospered through two Institute changes and an amalgamation, and recently saw the introduction of free student memberships to ensure the longevity of SSSI. There has been recent discussion as to the definition used by SSSI for YPs, currently 35 years and younger. Despite these pressures SSSI YPs continue to prosper, with many of SSSI's past and present Board Directors coming through the YP ranks. There are valuable lessons that can be learned from the SSSI YP experience over the past decade, applicable to other professional associations establishing young professional groups.

Territorial Cadastre and the Economic – Ecological Justice.

Daniela Lombardi and Lia Bastos (Brazil)

Key words: Cadastre; Land management; "Environmental Valuation" ; "Payment for Ecosystems Services"

SUMMARY

Territorial Cadastre and the economic - ecological justice. The link between the environmental information and the cadastral system, not only aids in the management of natural resources by planning the use and occupation of land, but also becomes a relevant tool in promoting economic - ecological justice. The economic valuation of services provided by the environment, so-called Ecosystem Services, is progressively becoming more prominent on the Sustainable Development Public Policy worlds stage. Ecosystem services are derived from functions or ecosystem processes, directly or indirectly required for the conditions of survival, quality of life and human activities. The valuation of services such as climate regulation, water and biodiversity allows the internalisation of environmental assets, which benefit the population globally, in the economic market. In this context many countries have been developed Payment for Ecosystem Services programs maintaining ecosystems aimed at promoting environmental preservation by direct monetary compensation to those who act restrictively in the occupation and use of land. This in turn generates Ecosystem Services. To conduct the monetary compensation for environmental preservation it is necessary to recognize the social actor that deserves to be rewarded. From there it is easier to establish and measure the physical limits of what is intended to be valued. The territorial cadastre provides information about the legal rights to property on the Earth's surface, providing in an objective way the identification of who is responsible for environmental preservation. So the territorial cadastre framework allows for the scaling of the environmental valuation necessary for the maintenance of ecosystem goods and services incidental to property. The association between the green economy and the multifunctionality structure of the territorial cadastral system enhances the performance of this new proposed action for sustainable development. Thus, this research aims to present how the Territorial Cadastre provides the structure necessary to an efficient implementation and management of the Payment for Ecosystem Services programs thereby promoting economic - ecological justice.

The Environment Place in Spatial Planning: Example of Morocco

Hassan Chtouki (Morocco)

Key words: Spatial planning; environment; sustainable development; Morocco

SUMMARY

The environment place in spatial planning: example of Morocco Hassan CHTOUKI, Morocco
Key words: spatial planning, environment, sustainable development, Morocco
SUMMARY
Economic and demographic growth has generated more and more increasing urbanization accompanied by a deterioration of the natural environment. Have access to a healthy environment became a constitutional right, the State, public institutions and local authorities must work for the achievement of this objective. Thus, it is imperative for these actors to integrate environmental aspect in urban and rural spatial planning as a pillar of sustainable development policies, which launch a good planning environmental approach leading to a balance between built and non-built spaces. For this purpose, urbanism plans are technical and legal instruments whose purpose is not only to predict or determine the harmonious configuration of cities but also to promote the environment and prevent it against the risk of deterioration or irrational use. In this study, we will enlighten readers on the contribution of the Moroccan legal texts in prevention and development of the environment as a field of ecological diversity through spatial planning tools, identify imbalances and dysfunctions related to the inadequacy of the reference texts and practices and suggest solutions that can support global sustainable development in the economic and social fields taking into account the concern of preservation and balance of natural environment.

Living in a Spatially Enabled City

Stéphane Roche (Canada)

Key words: Capacity building; Education; e-Governance; GSDI; Land management; Spatial planning; Smart City ; Spatial enablement ; Spatial skills

SUMMARY

According to Williamson et al., a “spatially enabled society is an evolving concept where location, place and any other spatial information are available to governments, citizens and businesses as a mean of organizing their activities and information”. From a citizen-centric point of view, “spatial enablement” refers to individuals’ abilities to use any geospatial information and location technology as a means to improve their spatiality. Spatiality could be defined as individual or collective condition and practice related to the position-geographical location-of both individuals and groups relative to one another. It typically reflects the spatial actions achieved by individuals, social groups, or organizations. In order to efficiently manage their spatiality and mobility, citizens tend to improve their spatial skills. Human spatiality is based on the five basic spatial skills: (1) Metrics (the ability to measure distances (Euclidean or non-Euclidean)); (2) Location (a matter of finding the "right" location to be or to do something, based on the location of other objects, people and services) ; (3) Scale (the capacity to put one’s actions in perspective; to compare different phenomenon or objects with regard to their spatial resolution or level of granularity) ; (4) Zoning (the ability to delineate areas and define the spatial limits of one’s actions, movements within space) and ; (5) Crossing (the ability to cross through different kinds of barriers, obstacles, security check-points, etc.). The digital age has strong impacts on those skills and then on human spatiality. Spatiality could no longer be explored without respect to info-mobility (mobiquity), location-based social networking... New forms of digital spatiality like inter-spatiality and co-spatiality have appeared. This presentation aims at providing examples of those digital spatialities in order to illustrate what it currently means living in a Spatially Enabled City (society).

Policies and Standards for Building Turkey National GIS Infrastructure

Tahsin Yomralioglu and Arif Cagdas Aydinoglu (Turkey)

Key words: e-Governance; Geoinformation/GI; GIM; GSDI; Legislation; Standards;

SUMMARY

Turkey started e-government actions to build Turkey's National Spatial Data Infrastructure titled as "Turkey National GIS" in 2004. Turkey National GIS actions aim to enable effective use and sharing of geographic data on electronic communication network by developing standards, policies, and technologies. Consecutive actions determined current situation and general vision. However, technical deficiencies result in time and effort losses on production, management, and sharing of geographic data. General Directorate of GIS was established in 2011. Projects were triggered to define geo-data standards and to build legal and administrative structure of National GIS. Hereby, national GIS strategy and the legislation framework were determined to manage geographic information nationally. General administrative structure was designed for National GIS committee and working groups. National GIS portal with metadata is being built to share geographic information. To develop geo-data standards, data requirement analysis was utilized to all stakeholders of National GIS, including 15 of ministries, 88 of general directorates, and 118 of departments. Reference geo-data themes were determined as geodesy, topography, ortophoto, land cover, hydrography, transportation, administrative unit, land registry-cadastral, building, and address. As a result of analyzing existing geo-data, data requirement works, and international standards; Data specifications were designed for these reference geo-data themes. These standards are being tested to use in GIS projects corporately. In this study, experience and expectations were examined to define standards and policies for building Turkey National GIS infrastructure.

Determination Surface Characteristics and Alteration of Koru Mining Area(NW Turkey)by UAV Photogrammetry

Oya Erenoglu, R. Cuneyt Erenoglu and Ozgun Akcay (Turkey)

Key words: Mine surveying; Photogrammetry; Positioning; Remote sensing; UAV

SUMMARY

Biga Peninsula is a rich region in view of current mineral exploration in Turkey. The study area is located near the Koru (Lapseki/Çanakkale) village, in northeastern part of the Biga Peninsula. Koru deposit is hosted by volcanic rocks which are directly related to economically significant mineralization such as Pb-Zn. This deposit is shaped by Tertiary volcanic units including rhyolitic lava and tuffs. In this study, we used ortho-mosaics from Unmanned Aerial Vehicle (UAV) photogrammetry to analyze materials of natural and artificial the objects on surface, to produce maps of study areas, to determine litological differences of geological units, to introduce their contact relations, and finally to detect alteration characteristic on concerning rocks. For this purpose, we employed air imagery using high resolution digital camera integrated to UAV. In this context, UAV technology would be first used to geological researches for producing thematic maps (the rock classifying maps). The lava and tuff lithologies in the Koru mining area have been successfully distinguished using the imagery obtained from UAV. Severe sulphidation, kaolinitization, silicification and iron alteration on tuffs are classified and zoned in the map by image processing techniques in addition to the surface topography. As a result, lithology and mineralization maps can be produced in short time especially for the local areas using UAV technology and image processing.

Organizational Evolution of Land Administration in China since Its Opening-up in 1978: Social-Economic Rationale and Technical Advancement

Rosy Liao (China, PR)

Key words: History; Land management; land administration; social-economic development; social impacts; economic impacts; technical advancement; organizational structure; sustainable land use

SUMMARY

The paper reviews organizational evolution of land administration in China since the opening-up policy was adopted in 1978, which is the year representing the beginning of the latest round of drastic social and economic development in China. In general, there are four landmark restructurings in the setting of land administration in China since the first uniform land administration authority was founded in the year 1986. It is due to such quick social-economic development featured by urbanization and industrialization, that land administration has been strengthened gradually with the administrative status promotion and the organizational expansion. Moreover, the paper is focused on analyzing the behind driving forces which lead to these changes from the social, economic and technical views. The conclusion shows that the appropriate setting of land administration should help improve social and economic development, secure land tenure in the society, guide proper and rational land uses, provide a fair, justice and transparent land market, and most importantly ensure social, economic and ecological sustainability in the future.

UAV Based Monitoring of Adatepe Landslide, Canakkale, NW Turkey

R. Cuneyt Erenoglu, Ozgun Akcay, Oya Erenoglu, Ebru Sengul Uluocak and Zeki Karaca
(Turkey)

Key words: GNSS/GPS; Photogrammetry; Positioning; Remote sensing; Risk management;

SUMMARY

Unmanned Aerial Vehicle (UAV) based photogrammetry has been studied for many years in order to monitor and analyze of changes in the surface characteristics and topography of landslides between different dates. We can easily obtain the displacement rate and extend by the comparison of digital surface models of landslide area derived from UAV based photogrammetry. Furthermore, the ortho-mosaics provide opportunities for analyzing sliding materials and also fissure structure of landslide. In this study, we used a low-cost UAV equipment and digital cameras. The Adatepe Landslide is one of the active landslides in Canakkale and the last activity is occurred on November 15th 2013. The landslide is with an average of 22° slope. We took significant numbers of aerial photographs of the Adatepe Landslide (Canakkale, NW Turkey) during campaign of the UAV based photogrammetry. Using plane image rectification methods, we combined these photographs to an ortho-mosaic. The number of photographs is 42 and 367 for toe region and entire landslide. Note that we obtained two different digital surface models of the Adatepe Landslide by merging aerial photographs to an ortho mosaic by using plane rectifications, i.e. one of the entire landslide and one of the toe region. Finally The generated ortho-mosaic covers the entire sliding area of the Adatepe Landslide with a resolution in level of cm. According to the results, the density of point of our model changes from 0 to 50 points per m². The density of point of the digital surface model of the entire landslide can be shown in the prepared thematic maps. We propose to use the UAV based photogrammetry for analyzing and monitoring the active landslides. The current landslide activity can be obtained by comparing digital surface models for different dates.

Flood Risk Effect in Urban Land Valuation

Florence Galeon (Philippines)

Key words: Valuation;

SUMMARY

The real estate plays a vital role in a country's economy as land values are determinant in urban planning and related economic activities. There are many factors which influence and affect land values in metropolitan areas of the Philippines. All these different spatial factors may vary but they have remained the general basis of land valuation for many years. Being one of the world's most disaster-hit nations, the Philippines face pressing environmental concerns. The experience from Typhoon Ondoy in 2009 and intense rains from Habagat (southwest monsoon) in 2012 have left heavy damages to life and properties in the National Capital Region. These natural disasters altered property and land valuation factors as the demand for those ravaged by the floods have plunged which consequently diminished their economic values. This paper attempts to determine the effect of this apparently new criterion in land valuation-flood risk. Marikina is chosen as the study area for being one of the hardly hit cities during the flood. Market and zonal values are examined to determine the appreciation and depreciation of land values before and after the floods respectively. The former is market-driven while the latter is the amount set by the Bureau of Internal Revenue with the assistance of realtors in the area as the basis for capital gains and other transactions with the government. Land value changes are correlated with a flood risk map and other environmental data to analyze and explain these variations using Geographic Information Systems (GIS). Fieldworks are conducted to gather actual market values for analysis and validation. Results show that lowland areas prone to flooding expectedly registered the highest percentage of drop in land values. Market values were reduced by as much as 45% in critical or high risk areas but interestingly were increased by approximately 8 % in low risk areas of Marikina City. A devastating flood or a 1% AEP flood demonstrates the significance of environmental phenomenon in land valuation of urban areas.

The Utilization Of Spatial Filtering for Tectonic Strain Study Based on SUGAR (SUMATRAN GPS ARRAY) Data 2006 – 2008 Study Case: The September 2007 Bengkulu Earthquake

Meiriska Yusfania, Irwan Meilano and Dina A. Sarsito (Indonesia)

Key words: Deformation measurement; The September 2007 Bengkulu Earthquake; Strain; Spatial Filtering; SuGAR; Velocity Displacement.

SUMMARY

The September 12th 2007 Earthquake (Mw8.4) followed by Mw7.8 earthquake in September 13th, furthermore aftershock with a strong magnitude also happened in Bengkulu. This earthquake was one of the earthquake that observed by GPS continuous station at Sumatera, SuGAR, since 2002. This SuGAR data allowed us to observe the strain with occurred during interseismic dan postseismic process. In this research, time-series analysis being done in spatial domain by using spatial filtering technique. This technique is useful to eliminate outlier data and describe seasonal variation in the region of study. Data in a good group has quality improvement about 0.2-5 mm in horizontal component and 1-7 mm in vertical component, data in a medium group has quality improvement about 2-8 mm in horizontal component and 3-6 mm in vertical component, then data in a bad group has quality improvement about 3-8 mm in horizontal component and 17-30 mm in vertical component. Displacement average value in all station during interseismic are $0.029\text{m}\pm 4\text{mm}$ for horizontal and $0.008\text{m}\pm 8\text{mm}$ for vertical. The average displacement in coseismic are $0.640\text{m}\pm 4\text{mm}$ for horizontal and $0.037\text{m}\pm 11\text{mm}$ for vertical. Furthermore, the average displacement in postseismic are $0.084\text{m}\pm 5\text{mm}$ for horizontal and $0.013\text{m}\pm 10\text{mm}$ for vertical. This research describe the strain tectonic during slip accumulation that observe in the region of The September 2007 Bengkulu earthquake on SuGAR measurement period 2006 until 2008. This research give us compression value $-0.088 \mu\text{strain}$ and extension value $0.282 \mu\text{strain}$.

China's Land Registration : Situation, Challenges and Efforts

He Huanle (China, PR)

Key words: Land management; Security of tenure; land registration

SUMMARY

Land registration in China has a very long history since thousands year ago, but current land registration system in people's republic of China is pretty young since 1980s. But it developed really fast in recent years. China has the particular land tenure system of ownership (state-owned and peasant collective owned) and land use rights. Ownership of state-owned land is don't need registration and most ownership of peasant collective owned land have been registered. Most state-owned land-use right have been registered and certificate and there is still a long way for most use rights of peasant collective owned land to be registered Land registration in China is characterized by these aspects: complete of land registration is the compulsory element for legally land rights transfer. The principles of territorial registration and voluntary application are implemented. registration book is the basis to issue a certificate ; registration information can be queried; only land itself, not include buildings and other attachments of land is registered. Land authorities at or above county level are responsible for land registration. General procedure of land registration includes application, censorship, registration and issuing certificates. The applicant shall submit materials required for registration, including cadastral survey documents. Land registration agency have to censor and to make the decision whether the application will be registered. In recent years, in line with the collective land reform and urban-rural coordinate development, huge efforts have been made by government to improve land registration in china. During 2010-2012, government conducted the total registration of ownership of peasant collective owned land. Registration and certification rate of peasant collective owned land throughout the nation has exceeded 90%. And the total registration of use rights of peasant collective owned land is expected in the following years. In 2013, state council decided to unify real estate registration. National and registration information system is under construction.

Detection and 3D Reconstruction of Unregistered Buildings Using Photogrammetric Image Processing

Dieter Fritsch and Michael Peter (Germany)

Key words: Cadastre; Cartography; Digital cadastre; Geoinformation/GI; GSDI; Photogrammetry; Urban renewal; Dense Image Matching; Semi Global Matching; Mathematical Morphology; 3D Constructive Solid Geometry

SUMMARY

National Mapping and Cadastral Agencies (NMCAs) fly countrywide aerial data collections with Ground Sampling Distances (GSD) of 20cm and, most recently, 10cm, or even less. Using Dense Image Matching (DIM) algorithms like the Semi-Global Matching (SGM) (Hirschmueller, 2005) could easily deliver 3D point clouds of 100 points per sqm. The Institute for Photogrammetry, University of Stuttgart has developed the DIM software SURE (Surface Reconstruction From Imagery), which is available as OpenSource for academic institutions (Rothermel et al, 2012). Due to the geometric constraints embedded in the DIM process the resulting point clouds are of superior geometric quality – are covering roofs, streets and vegetation with noise levels of less than 0.3GSD. Nowadays, digital aerial camera systems deliver colored imagery (RGB & NIR), thus the information content of a colored urban point cloud with GSD@10cm is very impressive and demands for new ideas and follow-up processing (Fritsch & Rothermel, 2013). The “All-In-One” Photogrammetry potential (Fritsch et al, 2012) can easily deliver 3D point clouds, a Digital Surface Model (DSM) and true orthophotos – 3D roof structures and corresponding 3D CSG models for updating building databases are closing the loop in a completely photogrammetric image processing pipeline. This paper reviews current strategies to detect unregistered buildings in cadastral databases and its 3D reconstructions. There are many approaches under investigation, but no solution offers high degrees of automation and, simultaneously, high percentages of success rates. Therefore, we outline a new strategy which is focusing on update strategies for villages and towns. First experiments with the Hessigheim point clouds – SURE deliverables of IGI DigiCAM@50MP imagery for 80/80% overlaps (Fritsch et al, 2013) have justified experimental investigations with simple image processing algorithms. With GSD@5cm the SURE DIM delivers very dense point clouds, which have to be filtered to differentiate between building features and vegetation. This filtering is accomplished by an opening operator of mathematical morphology – the result is a Digital Terrain Model (DTM). The difference dataset $dDSM=DSM-DTM$ hides unregistered buildings to be detected by some thresholds, e.g. $threshold@3m$ with simultaneous input of the ALKIS database. After the detection of unregistered buildings those can be reconstructed by a wall-fitting process and intersected with the vectorial roof structures. Those structures are found automatically with the methods described in Brenner, 2001 and Kada, 2009. There are some adjustments

necessary which are also outlined in this paper. A puzzle of the image processing pipeline is given by figure 1.

Exchange of Best Practices of GEO Education to Meet Changing Labour Market Needs in Europe

Paula Dijkstra and Bettine Baas (Netherlands)

Key words: Capacity building; Curricula; Education; Young surveyor; Attracting new generations and students Innovation in surveying curricula Life-long learning Labour Market demands

SUMMARY

Educating the next generation and making sure they select the courses that make them fit for their professional life in the surveying and geospatial industry is differing in every country. Each country has its own challenges with the number of new Young Surveyors and linking the students to the needs from the labour market, both in quality and quantity. In Europe there is a growing demand for an adequate number of well-trained students on level in fields of land surveying, mapping data collection, storage processing, delivering and turning data into information. But the GEO education community cannot keep up the pace and are not producing enough qualified graduates. To tackle the mismatch in quantity and quality we can learn from each other with examples from tools, insights and methods. In the Netherlands a foundation was established in 2008. Within the foundation the education sector and the labour market in the Netherlands joined forces for the development of the geo education on vocational, master and bachelor level. The approach of the foundation is based on three pillars: innovation in education, recruitment of young people for the GEO profession and promoting the cooperation between education and employers. After 5 years time the outcomes of the approaches can be measured. And more important, the outcomes contain valuable information for countries with similar challenges. To extend the lessons learned, and thus by enhancing the relevance, the experiences of the Netherlands are shared and exchanged in the Life Long Learning Project on 'Geo Skills Plus' with partners from Belgium, Bulgaria, Lithuania and international branch organisations CLGE and EuroGeo. With the dissemination of the Dutch insights and the first results of the European project this paper contributes to a more harmonized education community and labour market, worldwide.

Determination of the Cultivated Tobacco Fields Using SPOT-6 Satellite Images: a Case Study in Tavas Plain, Denizli, Turkey

Elif Sertel, Sinasi Kaya and Berk Ustundag (Turkey)

Key words: Remote sensing;

SUMMARY

Determination of the cultivated tobacco fields using SPOT-6 satellite images: a case study in Tavas Plain, Denizli, Turkey Muhittin Karaman¹, Elif Sertel^{1,2}, Sinasi Kaya^{1,2}, Berk Ustundag³ 1 ITU, Center for Satellite Communication and Remote Sensing, 34469, Maslak-Istanbul, Turkey 2 ITU, Department of Geomatics, 34469, Maslak-Istanbul, Turkey 3 ITU Agric. & Environ. Inf. Res. Center, 34469, Maslak-Istanbul, Turkey mkaraman@itu.edu.tr, sertele@itu.edu.tr, kayasina@itu.edu.tr, berk@berk.tc

ABSTRACT One of the important industrial products of Turkey is tobacco which has been extensively planted in Aegean Region of the country. Manisa, Denizli, İzmir, Muğla, Aydın, Afyon, Kütahya and Uşak are the cities in this region where the cultivation of tobacco has been practiced. Based on the statistical information, 80.000 tones of tobacco had been produced in Turkey over a total area of 1.080.770 da in 2012. The cultivation of tobacco rate of Aegean Region is 79 % with a total tobacco production rate of 72% comprising the biggest portions compared to the other regions of the country (TÜİK, 2013). 19.470 tons of tobaccos were produced over approximately 260.951 da area in Tavas Plain, Denizli which was selected as study area in this research. Tavas plain includes two important districts namely Tavas and Kale and total tobacco production of these districts are 7% and 8 % respectively, supplying 15 % total tobacco production of Turkey. Tobacco yield of the country has increased to 74 kg/da in recent years whereas tobaccos cultivated in Tavas Plain has better yield of 78 kg/da. It is important to monitor agricultural areas sustainably and accurately and produce up-to-date agricultural inventory maps in order to support regional agriculture policies and strategies, to determine the amount of subsidies and to improve agricultural planning. Remotely sensed data has been widely used for agricultural applications like monitoring agricultural areas, identification of different crop types, production of crop maps and yield estimation. This research aims to identify cultivated tobacco field in Tavas Plain and determine physical changes over these areas during different phenological phases using recently launched high resolution SPOT-6 satellite data. SPOT-6 images were obtained on 30.04.2013 and 24.07.2013, having a spatial resolution of 1.5 m and four different bands in the spectral domain. These images were classified using ISODATA unsupervised classification algorithm to identify the spatial extent of tobacco fields. Three different classifications were conducted using different parameters to analyze the accuracy and performance of each classification to identify tobacco fields. The usability of SPOT-6 images for agricultural purposes especially for tobacco delineation was also investigated.

Spatial Data Infraestructure for the State of Santa Catarina, Brazil: Relevance and Challenges.

Thobias Furlanetti (Brazil)

Key words: Cartography; e-Governance; Land management; Photogrammetry; Spatial planning; Spatial Data Infraestructure

SUMMARY

Spatial Data Infraestructure for the State of Santa Catarina, Brazil: Relevance and Challenges. For efficient public state management, advanced geographical knowledge is vital in order to resolve problems concerning territoriality. On the one hand technological development has enabled. The use of modern tools and technologies in the acquisition, processing, integration, analysis, publication and display geographical data information. Bearing sustainable development in mind, the state of Santa Catarina, Brazil has invested in a free access geographical reference data base, and a geographical information sistema for the public. Given the tittle Aerophotogrametric Mapping, the first step of the project in 2010, was to the aquisition of geographical reference data on a high scale throughout the state os Santa Catrina. For instance: Coloured and infrared ortophotos, digital altimetric models and hydrograph system. The last official mapping of this state was at the end of the 70's. The second step of the project concernes the development of a Geographical Information System called SIG@SC, it stores infra-structure data that had previously been aquired with 100 terabytes of storage, as well as the tools for the administration, access, and availability of this data through the internet, webmaps and espacial data servers. The adquies data is presently available and being used in a vast arrays, for exemple: research, by private enterprise, for public management projects at local, state and federal level, in environmental planning and management, in hydro resourses, infra-structure projects, logistics, public safety, programmes and health projects among others. The multiple uses shows the fundamental importante of this project for sustainable development of the starte. Nontheless there are still many challenges to overcome in the área of cartography in Santa Catarina State. There are no legal instruments yet enacted to control or standardize geographical information, in order to avoid the duplication of public resources and optemize the aquisition, the production, and the diffusion of data bases for public use. Thus this paper presents the challenges and relevance, comparing what has been done and which path to tread.

Hydrographic Control Measurements of Sediment in the Accumulation Basin of the HPP Salakovac using Multibeam Echosounder

Almin Dapo, Bosko Pribicevic and Branko Kordic (Croatia)

Key words: Hydrography; hidrographic measurement; multibeam echosounder; Neretva river; HPP Salakovac

SUMMARY

This paper describes the work of hydrographic surveying reservoir basin HPP Salakovac for control measurements of sediment. HPP Salakovac is located on the Neretva River in the Republic of Bosnia and Herzegovina. It was necessary to conduct hydrographic survey of the bottom of the reservoir and the coast from the HPP Grabovica to HPP Salakovac in total length of about 25 km, and the tributaries. The average width of the accumulation basin is 150 meters, with depths up to 40 m and the flow rate at the HPP Salakovac up to 860m³/s. Hydrographic survey performed by the Faculty of Geodesy, University of Zagreb. For hydrographic survey was used multibeam echosounder Odom ES3-M. Measurements performed by the multibeam echosounder are to be compared to the initial survey done before the establishment of the accumulation basin and should be used to create the recent model of the accumulation and as control measurement of the sediment in the accumulation.

Hydrographic Education and Training at Universiti Teknologi Malaysia

Rusli Othman, Kamaludin Mohd Omar, Ahmad Shahlan Mardi and Usmuni Din (Malaysia)

Key words: Education; Hydrography; Hydrographic Education; Training; UTM HYDRO 1; UTM HYDRO II

SUMMARY

Universiti Teknologi Malaysia (UTM) is one of the academic institutions in Malaysia that offers hydrographic courses in Malaysia. Malaysia being a nation that is surrounded by sea, the importance of hydrography is significant as many hydrographic activities involving bathymetric survey are being carried in Malaysian waters. A nation that also involves in oil and gas exploration in deep waters especially in South China Sea since 1980s, the need of qualified and professional hydrographers is so imminent. This paper will look at courses offered to geomatic students of Faculty of Geoinformation Science and Engineering, UTM on basic hydrography and related subjects at undergraduate level. This paper will also discuss on two important professional courses in UTM namely UTM HYDRO I and UTM HYDRO II course which is equivalent to Category B and A respectively, both are recognized by the International Hydrographic Organization (IHO) of the International Federation of Surveyors (FIG). UTM is the only academic institution in this part of the region that offers these two professional courses to surveying and marine communities in Malaysia and its neighbouring countries.

Application of 3D Laser Scanning for Deformation Measurement on Industrial Objects

Luka Babic, Almin Dapo and Bosko Pribicevic (Croatia)

Key words: Laser scanning; 3D terrestrial laser scanning; deformation measurement; industrial objects

SUMMARY

Of the many facets of laser scanning application the most prominent and effective one is without a doubt the one for deformation analysis purposes. Laser scanning has provided surveyors a means to conduct comprehensive survey of objects in need of deformation analysis, thus allowing for a throughout inspection and ascertaining of all causes of deformations. In comparison to conventional survey techniques and methods this constitutes a significant progress for all professions included in this field. Not only does it make the analysis process more efficient, accurate and comprehensive but it also makes it more cost effective, as all relevant analytics can be conducted from the same data set, i.e. the point cloud. Practical examples given in this paper further substantiate those claims. These works were preformed in petrol refineries on the request of construction engineers, which, by itself, is the indicator of required accuracies. When the same principles are applied to other high accuracy deformation analysis projects, one can easily ascertain the benefits of using laser scanning technology for the purposes of these types of projects.

Geodetics Measurements within the Scope of Current and Future Perspectives of GNSS–Reflectometry

Danijela Ignjatovic Stupar (France), Guangxi Zhang (China, PR), Vibha (India) and Andrew Lee Chee Hau (Malaysia)

Key words: GNSS/GPS; Remote sensing; "GNSS- Reflectometry"

SUMMARY

The main operational use of GNSS is geo-spatial positioning; nowadays the potential of reflected, refracted and scattered GNSS signal could be also successfully used in remote sensing application. The GNSS-Reflectometry is in an ascending way to obtain accurate results compare to the other Earth observation's techniques. The GNSS-R technology showed its ability for sensing the ocean and sea roughness, land and soil moisture, atmosphere, ionosphere and cryosphere, and monitoring wind speed and wind-driven waves. Another approach of GNSS-R is to the Remote sensing application for monitoring the Earth's environmental traversing of snow thicknesses and ice altimetry, impacted by the global warming. Under the Global Navigation Satellite Systems, GPS is the one which almost fully covers the globe. So, GPS gives the opportunity to be used for GNSS-Reflectometry's experimental research and its application. The paper will focus on investigation of direct and reflected MW GPS signals using the instrumentation and theoretical principles to collect and process data during different missions. It will be discussed about implementation of GNSS-reflected measurements in monitoring the current situation and future disasters prediction such as prediction of tsunami, monitoring ocean eddies, flooding and the other observations of the Earth. The space geodetic techniques and new mathematical approaches take benefit from the Global Geodetic Observing System to improve the accuracy of the measurements in remote sensing application using this GNSS-R technology. Analysis will also focus on the capabilities of this technique in terrestrials measurements and if it is possible to replace by the present techniques of remote sensing. In the near future, GNSS-Reflectometry is expected to flourish as an emerging application in the field of remote sensing obtaining fast and accurate results.

Hydrographic Survey of the River Bed Bosut with Subbottom Profiler to Determine the Thickness of Sedimentary Deposits

Almin Dapo, Bosko Pribicevic and Emanuel Bulic (Croatia)

Key words: Hydrography; subbottom profiler, sedimentary deposits, river Bosut

SUMMARY

Watercourse Bosut has total length of 132 km. The mouth of Bosut is located in Serbia at the place Bosut and the source is at Županja, along the Sava embankment. Specificity of Bosut is a very small drop the bottom bed, and the floodgates and barriers which attempted regulation of the water level. All this led to more unfavorable water flow, which during the summer almost stops completely. As a consequence, there is a rapid growth of aquatic plants and a large muddy sediment as a result of decomposition of plant mass in the stream. These reasons lead to the gradual reduction in the volumetric capacity of the riverbed, the total volume of water, and also reduce the amount of water that can be stored in the stream, and thus reduced ability to use water for irrigation but also for other purposes. Therefore, hydrographic survey of the river bed Bosut by using subbottom profilers was conducted through the entire length of 96 km of the watercourse Bosut to determine the thickness of sedimentary deposits and based on that to develop adequate rehabilitation measures. This paper presents a survey of the river bed Bosut by subbottom profiler and the results obtained.

Evaluation of GOCE's Global Geopotential Model to The Accuration of Local Geoid (Case Study on Island of Java, Indonesia)

Bagas Triarahmadhana and Leni Heliani (Indonesia)

Key words: "Geoid and Gravity"

SUMMARY

Determination of the geoid can be done by two methods : geometric and gravimetric. Geoid determination geometrically with co-site GPS and Levelling measurements, whereas in gravimetric geoid determination using three components, namely shortwave, medium wave, and long-wave components. Long-wave components using global geopotential models, generated by gravity satellites such as CHAMP, GRACE and GOCE. Until this, several global geopotential models (GGM) of GOCE have not been evaluated for their accuracy in modeling the geoid applied locally in Indonesia. Based on these problems, this study was conducted to evaluate the global geopotential models to the GOCE geoid accuracy locally with a case study on the island of Java, Indonesia. Gravimetric geoid modeling using SRTM data as short-wave components, terrestrial-gravity data as medium wave components, and global geopotential models of GOCE as long-wave components. Five GGMs GOCE used consisted of three approaches, namely DIR, TIM and SPW. Degree of GOCE's models ranged from 210 to 250. Gravimetric geoid formed will be controlled by 49 Geodetic High Points of known geometric geoid value. The results showed that the highest accuracy of Java's geoid undulations generated by the model SPW-R1 of 0,644 meters, while the lowest accuracy generated by TIM-R3 models at 0,703 meters. In addition, the study also showed that SPW approach more closely than the model DIR and TIM. The amount of accuracy approach model SPW, DIR, and TIM row is 0,644 meters, 0,698 meters and 0,697 meters. Keywords : Evaluation, GGM of GOCE, Local Geoid, Island of Java Indonesia.

Linking the Land Information Systems in the Philippines Using the LADM as a Global Schema

Romer Kristi Aranas, Engineer, Rhodora Gonzalez and Louie Balicanta (Philippines)

Key words: Cadastre; Digital cadastre; e-Governance;

SUMMARY

The Philippines has multiple land registration agencies which have their own separate and isolated land administration systems. This result in the duplication of software development and redundant and sometimes conflicting data. These undermine the security of tenure as well as inconvenience the citizens and other users of said data. Connecting these systems would therefore enable better coordination between the agencies and offer significant savings in manpower and resources. In this paper, an approach for integration of the existing legacy systems using the LADM as a global schema is proposed. The LADM is extended to accommodate the existing Philippine land administration systems data models. The resulting data model is a minimal country profile that accommodates the existing databases and should serve as a contribution in the development of the full LADM country profile for the Republic of the Philippines.

Semi–Autonomous Surveying System with Robotic Total Station and Unmanned Ground Vehicle

Raul Friedmann and Luis Veiga (Brazil)

Key words: Engineering survey; Positioning; Geodesy; semi-autonomous surveys; Robotic total station; autonomous land vehicle; topographic automation.

SUMMARY

This work deals with topographic automation and presents the development of a semi-autonomous surveying system that operates inside an area defined by a simple closed polygon. The system consists of a robotic total station Leica TCRA 1205 R100, an unmanned ground vehicle (1:8 scale) specially developed for this application, a Leica GTZ4 360° surveying prism and subsidiary systems for tilt measurement, data communication and vehicle movements control. The survey linear density can be specified by the reference size cell parameter. The control system is done in real time by a Matlab script that simultaneously monitors the vehicle position through the total station, controls its movements and collects the measured points coordinates. Within the survey area, the system seeks to position the vehicle to collect a series of evenly spaced points and, based on this sample, generates a digital terrain model (DTM). The developed 4x4 vehicle has an independent direction control system in each wheel and its functional geometry enables a movement repertoire broader and more versatile than the traditional Ackermann steering geometry. The system efficiency in managing this task was evaluated by experimental surveys in two structured environments. In these situations the system was able to automatically control the vehicle, collect the coordinates and generate the DTM. This paper presents the overall system composition, the test areas, the survey results and statistical indicators of the positional quality obtained. Besides the development of a complete semi-autonomous survey system, its ability to perform the work without human presence inside the survey area contributes (1) to the operators safety in hazardous areas and (2) to collect information directly related to the terrain (with sensors for specific use) an that can not be obtained by remote systems.

Official Committees of Valuation Experts and Taxation in Germany

Maximilian Karl (Germany)

Key words: Property taxes;

SUMMARY

Official committees of valuation experts and data In Germany official committees of valuation experts exist since 1960. They've been established legislatively to ensure transparency and to prevent speculation in real estate after the lapse of price maintenance in that sector. Only in 2013 about 1.000.000 transactions have been registered nationally by the committees of valuation experts which equals a total volume of approximately 160 Billion Euro. Comprehensive data are derived from sales contracts. These data organise the real estate sector in a transparent way and also serve as important tools for appropriate valuation of real estate. Besides deriving standard land values this means particularly property yields, conversion factors, index series and units of comparison. Those data relevant to valuation of real estate are especially required by the financial administration to guarantee fair taxation of German citizens. Tax valuation of real estate Valuation of real estate is crucial particularly in three sectors: 1. Capital transfer tax and gift tax 2. Real estate tax and real estate transfer tax 3. Profit and surplus assessment Regarding capital tax of standard land value various kinds of development status as well as their features and the plot ratio have to be considered. Built-up properties are generally calculated in a comparison-, asset value- and income approach to valuation method. Again the relevant data regarding valuation of real estate of the committees of valuation experts are essential as only by these values (factors of asset value, property yields, etc.) reference to the real estate sector can be established. Especially factors of asset value, conversion factors and property yields are of fundamental importance. As to land tax which represents a crucial part of the communal fiscal revenue for the most part the current taxable values are taken account of. To establish fair taxation for these outdated values currently a reform of land taxation is being discussed which in turn will draw on property values (derived from standard land values) and generalised building costs. Here again data (standard land values, property yields, factors of asset value, etc.) of the official committees of valuation experts are required. Transfer tax is based on the respective purchase prices which are matched by the market values of real estates. As to income-based tax always the partial value is calculated. In fact this value is based on the market value as well but also considers the specific advantages and disadvantages of value incurred by businesses because of acquisition or removal of real estate at business property. Conclusion Data of official committees of valuation experts therefore represent one of the most fundamental aspects of tax valuation of real estate which in turn is essential to ensure fair taxation.

Public –Private Collaboration Model in the Cadastral Workflow in Denmark

Jakob Højgaard-Geraae (Denmark)

Key words: Cadastre; Digital cadastre; e-Governance; History; Land management;

SUMMARY

The structure of the Danish cadastral system is in many ways peculiar when compared to other cadastral systems in the world. The first thing you might notice is that there has been a separation in the registering of information about private property – the separation, which is due to historical reasons, is resulting in a register under the Danish Geodata Agency containing information about the physical location and a register in the Land Registration Court containing information about the rights and restrictions of private property. Another characteristic of the Danish cadastral system, which this paper will focus on, is that there is a fairly clear division of the tasks in cadastral processes, a division that puts some work/responsibility in the private sector and some in the public sector. In practice, the division (that is established by law) roughly means that the practical work is carried out by the private sector while the registration is performed by the public sector. This paper will reveal that the division has both strengths and weaknesses regarding trust, efficiency, economy and quality. The paper will focus on

- The historical background of the division of the cadastral work
- The allocation of responsibilities and work in practice
- Relations to the citizens / customers
- Pros and Cons
- Challenges due to the division between the private and public sector

The Monitoring of Fast Progressive Landslide Movements in Taşkent/Konya via Rapid Static GNSS Techniques

Mustafa Zeybek, Ismail Sanlioglu and Temel Bayrak (Turkey)

Key words: Deformation measurement; GNSS/GPS; Positioning; Landslide

SUMMARY

Landslides, which leave deep scars in the topography and occur quite fast in a short time, are one of the most dangerous types of natural disasters. Therefore many methods have been developed for the monitoring of landslides. The technique of GNSS is one of the most widely used techniques for the prediction of landslides. In this study scope was covers GNSS works on the progressive Taşkent / Konya landslide. This study site was chosen as a result of the landslide that destroyed the Balcılar road, which provided transportation in the Taşkent province between the other towns and villages in the Tashkent district. Recently, due to the impact of global warming, the sudden and excessive rains trigger landslides in this region. However, the landslide size had been determined by coordinate changes which were obtained by means of the rapid static GNSS method and with the help of statistical algorithms that had been used for fast analysis. The field studies, which were conducted three different times in 2010, had been evaluated. According to the results of this analysis over 1m landslide movements were determined. Thus, revealing that we are able to provide the time to take the necessary precautions so that landslide damage can be prevented. In this paper, the data acquisition, analysis of data, and evaluation of the process's stages are presented. As a result, we'll show that GPS techniques are reliable, inexpensive and a good technique that enables high accuracy in predicting fast and constantly moving landslides.

Development of a Web-based Cadastral Survey Project Management Information System in Support to the Lands Management Bureau of the Philippine Government

Randolf Vicente (Philippines)

Key words: Cadastre; Capacity building; e-Governance; Land management; Professional practice; Cadastral Surveys; Web-based MIS; public investment management

SUMMARY

The Philippine's Department of Environment and Natural Resources through the Lands Management Bureau (LMB) has been engaged in the full-scale implementation of Cadastral Survey Projects which mirror the government's seriousness to pursue programs that bring immediate and substantial benefits to the poor. Since inception until to date, the Cadastral Survey Program has encountered inadequacies in contract administration and operations management. With the substantial increase of cadastral surveys for the years 2012 to 2014, LMB deemed it wise to infuse a component which institutionalizes a project management tool for use by the officials and technical staff of the LMB and the Lands Management Services based in the field offices. Due to limited expertise, a private business firm was commissioned to design and develop the Web-based Cadastral Survey Project Management Information System or CSPMIS. It was aimed at supporting the individual project profiling, contract administration, document and action tracking, and monitoring and evaluation of the physical and financial status of projects. About 10 system modules were initially developed and have already facilitated the automated near-real time project feedback mechanism in support of project management. Noteworthy is the increase in internal capacity wherein over 60 End-Users were trained in CSPMIS utilization. A fully documented policy was also formulated to provide the specific guidelines in operationalizing the system, from End-Users until top management. Sets of Technical Documentation and Users' Manuals were likewise provided to LMB. The CSPMIS has significantly contributed to LMB's improvement in the internal project life cycle management, better feedback mechanism, initial enrichment in operationalizing procurement transparency and accountability measures, and jump started productivity development towards public investment management.

The Contribution of the Regional Reference Frames to the Global Geodetic Reference Frame Implementation

Joao Torres (Portugal)

Key words: GNSS/GPS; Reference frames; Reference systems;

SUMMARY

The International Terrestrial Reference Frame (ITRF) is being used worldwide more and more as the global geodetic reference frame with respect to which the national and continental reference frames are established and maintained. On the other hand, the national and continental geodetic infrastructures, in particular GNSS Continuously Operating Reference Station (CORS) networks, contribute for the overall improvement of the ITRF realizations. The International Association of Geodesy (IAG) structure contains the Sub-Commission 1.3: Regional Reference Frames, composed by six regional Sub-commissions that operate mostly at continental level, responsible for the definitions and realizations of regional reference frames and their connection to the ITRF. Moreover, it is the home of two Working Groups addressing theoretical and technical key common issues of interest to regional organisations: Integration of Dense Velocity Fields into the ITRF and Deformation Models for Reference Frames. A summary of the activities developed within the Sub-commission Regional Reference Frames is presented, encouraging the countries within each regional sub-commission to re-define and modernize their national geodetic systems compatible with the ITRF, as well as examples on the solutions adopted for the transition from traditional reference systems (geodetic datums) to ITRS and its ITRF realizations and their impact within the user's community.

Social Tenure Domain Model: an Implementation of a Pro–Poor Land Rights Recordation Tool Using Open Source Technologies

John Kahiu, Solomon Njogu and Danilo Antonio (Kenya)

Key words: Geoinformation/GI; Informal settlements; Land management; Low cost technology; Security of tenure; STDM; Land Information; GLTN; Open Source Software; Python

SUMMARY

Recent developments in Geo-Information and Communication Technology (ICT) have had a positive impact on the development of cadastral systems and geospatial data infrastructures (GSDI). These developments such as database management systems (DBMS), information system modeling standard UML (Unified Modeling Language), free and open source software (FOSS), and positioning systems have greatly improved the quality, cost effectiveness and performance of cadastral systems. However, there still exists a gap in the development of tools that model people-land relationships independently from the level of formalization, or legality of these relationships. This paper discusses the design choices and development processes of a geographic information system (GIS) that implements the Social Tenure Domain Model (STDM). STDM provides a land information management framework that integrates formal, informal and customary land systems, as well as the corresponding administrative and spatial components. By doing so, the model describes relationships between people and land in an unconventional manner, and as such it has the power to tackle land administration needs in communities, such as people in informal settlements and customary areas. The paper describes the development and implementation of STDM version 0.9.5 tool, which has been specifically customized to address land information requirements of the urban poor in the context of undertaking settlement upgrading initiatives in Mbale Municipality, Uganda. The tool is a GIS desktop-based client-server application with capabilities of capturing social tenure relationships between households and structures; generating simple reports, charts and certificates for analytical purposes. It is built on top of Quantum GIS and PyQt APIs using Python, and connects to a PostgreSQL/PostGIS spatially-enabled data repository. The tool is primarily aimed at community leaders and local municipality officials, who can use it to identify the tenure status of community members including any existing supporting documents such as scanned copies of agreements, audio or video recordings; it also provides the socio-economic standings of the community members based on various variables that are captured during the data collection stage in the field. The potential scope of additional users may include private real-estate developers or national governments wishing to undertake critical infrastructural projects that may require compensation of affected community members hence, the tool can be used to identify specific households that are going to be affected and their corresponding tenure status in order to compute the appropriate compensation required.

The Webb Chart: A Simple Fast Method for Valuing Fractional Interests

Dennis A. Webb (USA)

Key words: Education; Professional practice; Standards; Valuation; Fractional interest; partnership; undivided interest; multidisciplinary; tenants in common; joint venture

SUMMARY

The Webb Chart embodies 20 years of market data and observations and 10 years of intense development in the U.S. in an easily-used collaboration tool that helps valuers breeze past blind spots that have existed for decades. Discover how fractional ownership affects value in a way that is easily understood and communicated – for the benefit of valuers, lawyers, taxing authorities, property owners and their partners. This simple tool values interests in limited partnerships and other holding companies, general partnerships and joint ventures, direct ownership (tenants-in-common) and circumstantial impairment of real estate assets themselves. Multidisciplinary valuation naturally generates blind spots that often frustrate judges, tax authorities, lawyers and especially valuers. Major collaborative efforts to resolve these blind spots began 10 years ago with a collaborative endeavor between the taxing authorities and the principal valuation associations in the U.S. At that time a) my textbook on fractional interests in real estate was published; b) the U.S. Congress gave extraordinary powers to the IRS deal with compliance issues; and c) a series of valuation symposia was begun at the behest of IRS. The Webb Chart offers the cumulative results of these efforts. The Webb Chart is a simple, clear and essential but easy-to-learn Key to Fractional Interest Understanding – A tool for interdisciplinary collaboration that penetrates and dissolves history's blind spots. The Webb Chart takes valuation technology developed at great effort in the U.S. and makes it available for all valuers and users of fractional interest valuations. It is now possible to build a domestic valuation best practice in this interdisciplinary field.

Developing Land Registry and Cadastre Base Data Model for Land Management Applications

Arif Cagdas Aydinoglu and Halil Ibrahim Inan (Turkey)

Key words: Digital cadastre; Geoinformation/GI; GIM; Land management; Real estate development; Standards;

SUMMARY

Content about land registry and cadastre data in Turkey is being developed based on the Land Registry and Cadastre Information System Project (TAKBIS). In this project, software development and pilot application studies were performed for the automation of services served by central and local bodies of General Directorate of Land Registry and Cadastre (TKGM). But, this project has some deficiencies regarding managing geographic data because of the inclination of preserving traditional data management approaches, poor quality of geographic data, and problems about temporal changes. Turkey National GIS (TUCBS) is an e-government project aiming at establishing Turkey National Spatial Data Infrastructure that enables effective geographic data management and meets national level requirements and the INSPIRE implementation rules. Designing Land Registry-Cadastre Data Theme (TUCBS.TK), one of the base data themes of Turkey National GIS (TUCBS), is discussed in this study. Specifications for base geo-data themes including land registry and cadastre were designed by considering all stakeholders of TUCBS. Requirement analysis for TUCBS.TK was conducted by TUCBS stakeholders including 10 of ministries, 24 of general directorates, 25 of departments. It was declared that land registry and cadastre data is used in 77 GIS-related works. In this context, existing geographic data, data requirement, and international standards such as ISO/TC211, INSPIRE, and OGC were analysed. In developing TUCBS.TK data theme standard, ISO 19152 Land Administration Domain Model (LADM) which was accepted as international standard with the leadership of International Federation of Surveyors (FIG) is used as the base international standard. Features of INSPIRE Cadastral Parcels data theme were also taken into account. In addition, scientific studies (Kaufmann and Steudler, 1998; UN-ECE, 1996; van Oosterom et al., 2006; Inan, 2010) and data modeling foresights of TAKBIS were considered. To design geographic data model; temporal data management, topological data structure, administrative units, non-registered areas, etc. were added to TUCBS.TK data theme beside requirement analysis. In this study, TUCBS.TK application schema compatible with the LADM was summarized and evaluated. Its similarities and differences and accordingly the basic contribution to further LADM development for Turkish land administration system were presented and discussed. Example feature types within TUCBS:TK data theme are spatial easement, group of full-partition parcels (surrounded by natural or man-made features) used for legal indexing or conventional data management, group of parcels for the designation of a land management activity, basic land parcel types and geodetic control points.

The Road from Planning to Expropriation: A Cross-national Analysis

Nira Orni and Rachelle Alterman (Israel)

Key words: "expropriation" "compulsory acquisition" "property rights"

SUMMARY

The Road from Planning to Expropriation: A Cross-national Analysis Nira Orni & Rachelle Alterman Israel Comparisons between countries are intended to help the compared countries learn from each other. When comparing Australia with Israel we will need to decide who will learn from whom. Since Australia is a federation of states, we chose one of the Australian states for the comparison – the state of Victoria. There are similarities between the planning systems and the expropriation arrangements of the two compared states, Israel and Victoria. The planning tools in both systems are statutory schemes. When approved, these schemes are binding, unless amended by a statutory procedure. In both countries, a long period of time can pass between the approval of the planning scheme that designates land for public purpose and the actual transfer of the land to the public. We found out that during this time the landowner may encounter hardship and his property rights are harmed. In our paper we compare the different ways in which the laws of Victoria and of Israel deal with this situation. We discovered that Victoria's compulsory acquisition system has formulated a method which reduces the harm caused to the landowner by giving him greater control over the timing of the compensation. We believe that this method can be a model for other countries using the same planning system. On the other hand, Israel recognizes the ongoing linkage between the landowners and their land after the expropriation, while Victoria does not. The linkage is expressed by the landowner's right to get his land back if the public purpose is no longer needed. We evaluated both systems on the basis of the criterion of the balance between property rights and public needs. Jacobs, Marcus 2010 Law of Compulsory Land Acquisition, Lawbook Co. Gurran, Nicole 2011 Australian Land Use Planning Principles, Systems and Practice, Sydney university press Keywords: expropriation, time, reservation, compensation, property rights

FIG publication on International Boundary Making

Haim Srebro (Israel)

Key words: History; Land management; Photogrammetry; Positioning; Reference frames; Standards; International boundaries; boundary delimitation; boundary demarcation; boundary documentation; boundary maintenance

SUMMARY

Stability of international boundaries is of utmost importance in peace keeping throughout the world. Surveyors play a central role in the boundary making process. International boundaries of a state define the territorial limits of its sovereignty and the area where its laws are applicable. 193 UN member states have more than seven hundred international boundaries on land and in the sea. The lack of clarity in defining international boundaries between states has been one of the main reasons for territorial disputes and ensuing wars. Lord Curzon stated more than one hundred years ago: 'Frontiers are indeed the razor's edge on which hang suspended the modern issue of war and peace' (Curzon, 1907). This FIG Publication elaborates on the process of boundary making, focusing on land boundaries between states and regarding the role of the surveyor in the process. Its purpose is to propose a comprehensive methodology for establishing a boundary making process between two states that wish to constructively and fairly settle their international boundary together. It begins with preparations for an agreement and continues with boundary delimitation, boundary demarcation, boundary documentation, and boundary maintenance. The methodological part includes a model for initiating a boundary making process, an order of precedence of boundary definitions, and a model for the boundary chapter in a peace agreement. Part two includes practical cases. Many lessons can be learned from these diverse cases regarding disputes and regarding the models and mechanisms used for dealing with the issues. This FIG Publication may serve statesmen, international legal advisers and surveyors. This FIG Publication has been initiated and edited by Dr Haim Srebro, who has developed the methodology of a process driven boundary making model following forty years of practical experience. The practical part of the publication has been prepared by senior practical professionals, with expertise in boundary delimitation and demarcation. Three of them served as Director Generals of national surveying and mapping organizations (William Robertson in New Zealand, Dr. Haim Srebro in Israel, and Buddhi Shrestha in Nepal), and one served as the Head of the UN Cartographic Section (Miklos Pinther). This FIG Publication has been prepared under the framework of FIG Commission 1. It is intended to promote the sharing of methodological knowledge and experience regarding international boundary making and to promote Peace throughout the world.

Obsolete Approach to Land Use

Oksana Sukhova (Ukraine)

Key words: Capacity building; Implementation of plans; Land distribution; Land management; Land readjustment; land use

SUMMARY

The more we practice professional land management the more methods we invent to be engaged in this profession. It's naturally that the world does not stand still. And can hardly be so that any surveyor wants to measure the land with a sazhen if there are optical instruments for this? But if in the issue of measuring the earth's surface the consensus can be reached, then the question of land use is still open. With the course of time the society striving for the progress have chosen extensive methods of land exploitation that have led to its exhaustion as a resource. Over the past hundred years the civilization aimed at maximizing profits had lost sight of the key principle of land use based on its usefulness. As a reward we got such major problems as hunger of the world population, deterioration of environmental conditions, loss of biogeocenosis, changing in temperature of the planet. Nowadays all the thoughts and efforts of scientists and public figures are aimed at solving such consequences of the problem mentioned above but not the problem itself. In this regard, this article is designed to attract the attention of scientists and the public to the need to reconsider the approaches to land use, using the experience of generations of our ancestors, and analysing an application of methods to solve this problem to the conditions of the regions with different economic development levels

The Issue of Value and Price in Land Market Research

Alexander Woestenburger (Netherlands)

Key words: Cadastre; Legislation; Spatial planning; Urban renewal; Valuation;

SUMMARY

This paper discusses the reciprocal relationship between land value and the negotiated transaction price of land. In a market that is characterized by many inefficiencies we may hold the hypothesis that price does not equal value (Wyman, Seldin & Worzala, 2011). This hypothesis raises the question of how value and price relate to each other. We present a conceptual framework that understands land transaction outcomes through the lenses of their transaction processes. These processes are shaped by judicial boundaries, laws, regulations and actor behavior. We argue that, together, those institutional aspects determine the interplay between land value and price. In order to allow for transactional aspects in land market analyses, this conceptual framework challenges conventional methodologies and data sources and calls for the use of a combination of both quantitative and qualitative research approaches towards land market research. The framework is applied to two Dutch land market segments: the market for rural land and the market for inner city building land. A hedonic price analysis of rural land prices, based on notarial deeds of purchase, shows the institutional richness of notarial deeds as data source for land market research purposes. It shows the greater explanatory power of including transaction characteristics and with that, it sheds a different light on the use of appraised value or transaction price data in hedonic land market analyses (Ma and Swinton, 2012). Next, an in-depth analysis of inner city land transactions reveals that both value and price are determined during the land transaction process. This finding is different from the causal relation we expected; namely that transaction processes cause a land price to deviate from its value. We conclude that the interplay and difference between land value and land price, caused by the institutional transaction context, should be subject to land market analysis, rather than just the focus on price or value. ----- Ma, S. and Swinton, S.M. (2012), "Hedonic valuation of farmland using sale prices versus appraised values", *Land Economics*, Vol. 88 No. 1, pp. 1-15. Wyman, D., Seldin, M. and Worzala, E. (2011), "A new paradigm for real estate valuation?", *Journal of Property Investment & Finance*, Vol. 29, No. (4/5), pp. 341-358.

Sustainable Real Estate Development in Kenya: an Empirical Investigation

Catherine Kariuki, Nicky Nzioki and Jennifer Murigu (Kenya)

Key words: Real estate development;

SUMMARY

SUSTAINABLE REAL ESTATE DEVELOPMENT IN KENYA: AN EMPIRICAL INVESTIGATION CATHERINE KARIUKI, MR. NICKY NZIOKI, DR. JENNIFER MURIGU DEPARTMENT OF REAL ESTATE AND CONSTRUCTION MANAGEMENT, UNIVERSITY OF NAIROBI. Email address: ckariuki@uonbi.ac.ke, jmurigu@btopenworld.com, lantmetri@gmail.com, This study investigates how a real estate development team tackles issues of sustainable real estate development. It is based on a field survey of some developments in Nairobi City, in Nairobi County. The study found how corporations have responded to the need of sustainable property development within the building industry. Some of the questions responded to included, what does sustainable development mean, as stated elsewhere, integrating the decision making process across the organization, so that every decision is made with an eye to the greatest long term benefits. Does it also mean, in Nairobi, eliminating the concept of waste and building on natural processes and energy flows and circles recognizing the interrelationship of our actions with the natural world. Is sustainable development considered at the design and construction stages? Are the aspirations of the occupiers are met and for the investor that issues of obsolescence risk is considered. The findings show the extent sustainable development was practised. They also show how these buildings meet the requirements of green buildings. Key Words: Sustainable development, real estate, natural processes, design, construction, green building.

Survey Summer School Pilot @ Dublin Institute of Technology – a Review of a Weeklong Promotional Event for Secondary Level Students.

Helen Murray O'Connor (Ireland)

Key words: Capacity building; Education; Young surveyor; Career promotion Raising awareness Survey Summer School Dublin Institute of Technology (DIT) Society of Chartered Surveyors Ireland(SCSI)

SUMMARY

For the survival and indeed strengthening of the land/property and construction professions in Ireland it is imperative that there is an ever growing awareness of the cross-sectional nature of these disciplines and how integral the related competencies are to a modern society and economy. Such an awareness is necessary, among secondary school students, their parents and indeed, the general public. It became apparent to the School of Surveying and Construction Management at the Dublin Institute of Technology (DIT), Bolton Street, Dublin, Ireland, that to continue to attract high calibre students, additional promotional and marketing measures needed to be undertaken. Indeed many professional bodies in Ireland are also becoming increasingly more proactive in career promotion among secondary level students due to a drop in the number of land, property and construction professionals seeking membership. The Society of Chartered Surveyors Ireland (SCSI) works in partnership with the Royal Institution of Chartered Surveyors (RICS), the pre-eminent Chartered professional body for the construction, land and property sectors around the world. With over 4,000 members, the SCSI actively promotes the profession and is committed to enhancing, advancing and enforcing professional standards of the construction, land and property sectors in Ireland. The hosting of the first ever Surveying Summer School pilot for Irish secondary level students (4th and 5th years (16 and 17 year olds)) is planned, the strategic goal of which is to develop a template for a weeklong event which would promote and be reflective of the different land/property and construction programmes of available at the leading academic centre in Ireland for surveying (across all disciplines) in a fun, practical and project-based learning environment. Based at DIT, students from secondary schools will participate in field-based exercises which make for a practical, relevant and fun way to experience the full range of competencies and skills. The 'surveying' content and delivery mechanisms are being collaboratively developed by DIT and SCSI. It is due to occur in late May/early June 2014, and will subsequently be evaluated by the student participants, DIT and SCSI collectively. If this pilot is deemed to have been successful, an annual event will be proposed, the content and format of which will have been informed by and reactive to the evaluation and outcomes of this pilot. This paper outlines the planning, hosting and management of this promotional initiative. It details the integrated practical programme, which will allow students to investigate site value, tenure and planning issues and to plan, execute and manage a

measurement survey, within the context of a 'real-world' development site to professional 'industry' standards. The supervising lecturers will act in the role of the 'client' of the project. This paper concludes with recommendations for other institutions thinking of developing a similar project to attract secondary level students into land, property and construction related academic programmes.

Displacement and Resilience: Practices of Informal Place Making in the Cities of Georgia

Joseph Salukvadze (Georgia)

Key words: Informal settlements; displacement; resilience; Georgia

SUMMARY

Internally displaced persons (IDPs) emerged since the early-1990s as a result of violent ethno-political conflicts and Russo-Georgian war of 2008 on the territory of Georgia. They represent a distinct social group in terms of identity and role in the society, and are labeled as one of the most vulnerable population groups. Almost half of IDPs (more than 113,000 persons) reside compactly in several 'Collective Centers' that comprise former public non-residential buildings. The proposed presentation aims at examining of how IDPs change buildings and adjacent spaces of their new residence in order to adjust them to their residential requirements, implementing by this informal place making practices as a measure of residential resilience. The study employs field observations, as well as quantitative and qualitative research methods based on 900 semi-structured interviews with IDPs and several in-depth interviews with different stakeholders dealing with IDP settlement issues. The study shows that an extremely acute aspect of IDPs existence in almost every city of Georgia is a necessity to forcefully occupy their living spaces and settle non-residential buildings with further adjustments of acquired spaces for living purposes. A shortage of living space and a will to improve the living standards pushed IDPs to extend their living spaces. As a result they have deteriorated safety, healthiness, and image of the living place for a few square meters of extra living space, but the problem of space and safety stays as it was. The utility provision is mostly very poor or non-existent in such collective centers. Due to the lack of living spaces in the majority of collective centers people started the appropriation of public space or "no-man's-land/space" around their living area or inside the buildings. About 20% of non-resettled IDPs report that they engage in some kind of agricultural activities on squatter land around their living space. Such residential resilience process practiced by IDPs usually leads to deterioration of buildings and surrounding areas, and severely destroys an image of IDPs in eyes of local population. Consequently, the implemented resilience and coping approaches, although imposed by external circumstances, do not add to IDPs' capital, presents them as 'negative space producers' and confront them with the rest of population. Although regular Georgian citizens often apply for unhealthy 'do-it-yourself' practices themselves, IDPs' cases of negative impact on built and natural environment are considered as extreme.

Public–Private Partnerships in Planning and Land Development; the Opportunities and Challenges in the Kenyan Economy

Wafula Luasi Nabutola (Kenya)

Key words: Affordable housing; Education; Informal settlements; Real estate development; Risk management; Security of tenure; Spatial planning; Urban renewal;

SUMMARY

FIG CONGRESS 2014 – KUALA LUMPUR, MALAYSIA: FIG COMMISSION 8 Public-private partnerships in planning and land development; The Opportunities and Challenges in the Kenyan Economy Introduction: The notion of Public Private Partnerships (PPP) is as old as civilization, only perhaps it was not called PPP, but from time immemorial, various authorities (national and local) have engaged corporates and citizens to meet pressing public needs. Over time these informal arrangements have taken on a whole new meaning. Policies and legislations have been passed in various national or state or indeed county assemblies to give these arrangements the force of law, in order to protect the parties involved. Literatures on success or otherwise of PPP: Literature on PPP shows that there has been success, as well as some serious challenges. In Australia, USA, Canada, India and some parts of Africa, notably in South Africa, PPP became the fall back position for delivering public services, especially infrastructure, today it is the norm. PPP has not always thrived, for example; the City of Paris Water supply reverted back to the public sector when a study demonstrated savings and better services than were being proffered by the private sector. Statement of the topic of my paper and my research question: Given that the PPP principles and ideals are more or less standard, why is there so much variety in success? What are the underlying factors that influence the success or lack of it in these otherwise noble initiatives, which go to fulfill a public need? For a long time Kenya has practised centralized form of government, but following the promulgation of Kenya Constitution 2010, many decision making mechanisms were devolved to the 47 newly created Counties. The counties have been granted major mandates, and they do not have the capacity to discharge these. They are going to rely on the private sector to meet their services delivery obligations. Methodology: My research is mainly empirical, with a touch of theories to underpin it. So it will be quantitative and qualitative, citing examples from the field and from existing professional reports Value and Potential Beneficiaries: Of what value are findings; to whom will they be of use? I see the National and 47 County Governments; the private sector and ultimately the citizens are the beneficiaries. This would conform to the new constitution and render some of the fears and doubts harmless. Wafula Luasi NABUTOLA; Consultant - in – Chief; MyRita Consultants Apt. B11 Wambugu Gardens, Wambugu Road Parklands, Westlands P.O Box 8824 00100 NAIROBI, KENYA Skype: wafula.nabutola Tel 254 20 352 5515 Cellular 254 722 617 444/254 735 328 359 “Engaging the Challenges – Enhancing the Relevance”

Methodology for the Production and Updating of Agricultural Land Use/Cover Data Set

Halil Ibrahim Inan and Ismail Dursun (Turkey)

Key words: Cadastre; Geoinformation/GI; Land management; Agricultural land use/cover classification, fixed boundary, LPIS, cadastral parcel

SUMMARY

The Common Agricultural Policy (CAP) of the European Union has been dependent on Land Parcel Identification Systems (LPIS). Major spatial data content of LPIS are land parcels (cadastral parcels, physical blocs, farmer blocs, agricultural parcels or their combination) and ortho products (ortho imagery or ortho photos). Classification of land parcels depends on the need and extended use of the system for other purposes and thus vary country by country. In Turkey, similar development has been experienced since the beginning of 2000s. In terms of land use/cover classification in the establishment of LPIS like systems in Turkey, land parcel types (updated only by land owners if required by a land administration or management process) registered in the land registry system were used in the very beginning. Later the need to support the system with spatial land parcel data combined with ortho photo or ortho imagery in order to check land use/cover of land parcels declared to be used for agricultural purposes by farmers, has been raised. Later on, the need by many government institutions (including the Turkish Statistical Institute) or private companies for similar yet complete (in geographical extend, without depending only on declarations by farmers) data (on the amount and type of agricultural land) has come on the agenda. In this study, within a national project (no 112Y027) financially supported by the Scientific and Technological Research Council of Turkey, a methodology for the production and updating of Agricultural Land Use/Cover data set was developed and tested in a pilot study area which composed of three districts (Elagoz, Karahoyuk, Vatan) situated in Kocasinan County, Kayseri Province of Turkey. The methodology used in this study is essentially based on the delineation of fixed (over years) agricultural land boundaries which may be identified by trees, stones, infertile strip of land or other natural or man-made barriers which lie through boundaries. To assist in this boundary adjudication process two or more data sets of ortho imagery or ortho photo (ortho images of 2010 and 2013 in this study) were used. Additionally cadastral parcel boundaries were utilised as the supporting evidence (probability of any fixed boundary) in the cases when fixed boundaries were not be able to be delineated without any ambiguity. Agricultural land is classified by five very well defined land use/cover classes of (1) Fertile Land (including fallow land), (2) Planted Agricultural Land (orchard, olive grove, vineyard and other interpretable local trees), (3) Greenhouses and Fields with Protecting Cover, (4) Meadow and Grassland, (5) Abandoned Agricultural Field. Beyond the delineation of fixed agricultural boundary, the methodology incorporates strategies to determine un-fixed boundaries of non agricultural land in three additional classes (6) Small Pieces of Infertile Land which is

Adjacent to Agricultural Land, (7) Infertile Land (rough, hilly, arid land), (8) Built-Up Areas and Development Regions. The methodology has been further refined in terms of boundary delineation with support of edge detection algorithms and infrared bands, and also in terms of updating procedures.

Measuring the Land Tenure Security of Sub Saharan Africa's Rural Poor

Marie-Christine D. Simbizi, Jaap Zevenbergen and Rohan Bennett (Netherlands)

Key words: Land management; land tenure security; indicators; rural poor; Sub-Saharan Africa; measuring

SUMMARY

The search for more comprehensive land tenure security in developing countries has opened a new land administration paradigm based on pro-poor approaches. However, little is being done to provide governments with proper pro-poor tools and indicators for measuring land tenure security. Land administration agencies lack a comprehensive set of indicators to measure tenure security in a comprehensive and inclusive fashion. More precisely, pro-poor indicators of tenure security are still under-developed. We argue that this helps to explain why many Sub-Saharan African countries lack baseline data or information on the state of tenure security. The overall challenge has been the absence of a theoretical understanding of tenure security: one that captures its complexity and contextual aspects in an inclusive fashion. Recently, a contribution was made that delivers a more holistic conceptualisation of land tenure security of the rural poor in Sub-Saharan African context. However, this new concept still needs to be operationalized. To do so, this paper uses a systems-based approach to derive a comprehensive set of indicators that represents the total land tenure security enjoyed by the rural poor in Sub-Saharan African context. The proposed multi-aspects framework contains baskets of indicators reflecting six key interactions that, within land tenure systems as a whole, emerge into tenure security. The value added by the multi-aspects framework is discussed by comparing proposed indicators to those used for the evaluation of land related interventions in Rwanda, Ethiopia, and Ghana. It was found that the proposed framework provides indicators on institution harmony, legitimacy and trustworthiness, balance of land restrictions and land rights, update and maintenance of land registry and associated spatial information, which are practically missing for the three case studies. Three main applications of the proposed multi-aspects framework are anticipated: (1) evaluating the state of tenure security (baseline data), (2) evaluation of the progress towards national land policy objective achievement, (3) assessment of the contribution of land tenure reform intervention vis a vis national land policy objective.

Case Study: Minnesota Department of Natural Resources; an Investment in the Administration of State Lands.

Jonathan Haupt (USA)

Key words: Land management; Standards; State land management;LADM;

SUMMARY

The ability for a government in both developed and developing economies to establish transparent land administration processes plays a vital role in maintaining trust and confidence between the government and the people. Once technologies are in the hands of subject matter experts including land registrars, commissioners, attorneys, surveyors, and other relevant stakeholders, government has boundless opportunities to improve how its services and strengthen its decision making abilities to ensure land and natural resources are administered responsibly and transparently. This paper will explore an example of how the State of Minnesota in the United States (U.S.), with a technology solutions provider, Thomson Reuters, implemented a state-wide enterprise land administration system. The paper will draw a focus to how the new technology better equips the State in the two important areas of: • fostering transparency in land ownership, use and administration; and • attracting responsible land-based investment for local benefits and common resource management. Minnesota encompasses 51 million acres of land. More than 10% of the surface estate and more than 25% of the mineral estate are State-owned and administered. More than 5.5 million acres are designated in state forests, wildlife management areas, parks and recreation areas, or other land management programs. The state-owned lands are administered by the Minnesota Department of Natural Resources (DNR), consisting of 2,700 employees. In 2009 the State provided the DNR the financial and political backing to modernize its land administration technologies. Loosely structured business processes and data capture were replaced with more than 150 land transaction types in an automated workflow-centric system based on the ISO 19152 Land Administration Domain Model (LADM). This presentation describes: • Why the DNR needs a reliable land and interest inventory and a transparent view of pending and historical land and minerals transactions for all stakeholders. • Why an extensive data conversion project was carried out to ensure each right, restriction and responsibility was represented accurately in the inventory. • Why an accurate and transparent inventory is critical to applications that help citizens and stakeholders identify property characteristics, acquired and granted interests, and spatial information (location, area, and extent). • The challenges and benefits of implementing the LADM, and why the long-term gains for the State are still not entirely recognized. Conclusion The needs and challenges of the Minnesota DNR are not unlike other government agencies responsible for the stewardship of public land resources nor does it differ from the mission of other nations seeking to gain a more transparent, efficient and responsible investment in the administration of State-owned lands. Because of strategic

technology investments, the DNR is now better positioned to pursue its mission and prepare for tomorrow's challenges.

Mobile Digital Imagery Mapping – a Case Study of a 2500kms Project

Jon Warren and Arnab Bhowmick (USA)

Key words: Cartography; e-Governance; Engineering survey; Geoinformation/GI; Land management; Automated Asset Inventory Management

SUMMARY

Snohomish County Mobile Mapping Pilot Project, Snohomish County, Washington The Asset Maintenance Management System (AMMS) committee, of Snohomish County Public Works, was looking to develop a roadway asset collection and management system to provide geographic based location and attribute data for the county's roadway facilities. The goal was to collect, identify and inventory the assets within the County's right of way and those under their current maintenance program. David Evans and Associates (DEA) was the prime consultant, with GeoAutomation and Geocopia as team members for the project. DEA provided the project and contract management, data research, survey control, mission planning, field data collection guidance and support, data extraction and mapping support, and QA/QC for the asset location and attribute data accuracy. DEA was responsible for mapping and collecting roadway attributes for: pavement markings, above ground utility facilities, signs, guardrails, barriers, planter strips, retaining walls, curb, gutter, sidewalk, ADA ramps, traffic signals, and luminaires. Deliverables included: ESRI based GIS feature data sets, post-processed data, detailed images, and software to view and extract data (x, y, and z values of each unique pixel), and a positional control and accuracy statement of within 0.3m. The average accuracy was within 0.2' in x, 0.2' in y, and 0.2' in z values. GeoAutomation, of Belgium, provided the computations and processing of the tracks and poses for the imagery geographic positions, and data extraction and mapping support. Geocopia, of Montreal, Quebec, provided the personnel and vehicle, with the 14 cameras and 17 computers, for recording and processing 37 terabytes of imagery. The GeoAutomation® system is very unique technology that utilizes digital imagery and pixel matching of 14 cameras, recording images at a rate of 21 images per second per camera, providing a constant 360 degree view, on a mobile vehicle platform at traffic speeds. This provides the ability to perform roadway asset inventory mapping (sub 1.0') or Design Grade (sub 0.05') accuracy mapping, from your desktop computer, without putting personnel in traffic. The mapping from your desktop computer can be accomplished by the DEA Team, and/or by the client's staff, because it does not require any significant training or interpretation of millions of points of lidar data. They also provide the software to view, extract, and populate into other CAD based software programs (ESRI, AutoCad, and Microstation). The system is simple to use and the images are only 250KB of data.

Open Source Tools for Integrated Production Information on Forest Areas – Case Study: Spatial Analysis of Forest Fragments in Rio Grande Do Sul State, Brazil.

Emanuel Silva and Laura Goergen (Brazil)

Key words: Geoinformation/GI; Land distribution; Land management; Remote sensing; Open source tools; Forests resources; GIS

SUMMARY

The monitoring activities of forests aims to qualify and quantify properly and provide information necessary for the production of consumer goods in a sustainable manner. In this context, the GIS market in Brazil, like many other countries, but has developed very predominantly, the marketing of computer applications based on the acquisition of licenses. Thus, there is a very large workspace and diverse to develop research with the goal of creating new tools for data processing by integrating existing Open Source tools but also to produce new technologies for spatial analysis resources natural. The Brazilian Federal Universities, Government institutions and the community that develops free software in Brazil, has achieved a very significant and successful, for the production of knowledge and new developments in Open Source GIS. The software I3Geo, produced by the Ministry of Environment, in a web environment, presents the database of natural resources in many regions of Brazil. It is an Open Source tool that allows configuration and therefore the proper use with the production needs of spatial information. Also, in this context, the Federal University of Santa Maria, has a research group that develops geo-based programming solutions and integration of Open Source tools. For this work we used one of the three geographic blocks with approximately 1,500 km² of a total of 6,000 km², being monitored use and land cover for the years 2012, 2013 and 2014. The choice of these areas aimed to test the potential of integration of Open Source tools in the production and analysis of spatial information of forest fragments. The methodology of the study consisted of the following steps: a) thematic mapping of forest fragments using sensor images REIS, RapidEye satellite in GIS environment SPRING System (Georeferenced Information Processing) produced by the National Institute for Space Research of Brazil, b) integration of Tools Python (programming language), R, GoogleEarth, and I3Geo QuantumGIS, for the production of spatial analysis and c) production of reports, charts and graphs for the interpretation and spatial analysis. The results of the integration of Open Source tools, it can be stated that the analyzes produced new information spatialized statistically characterizing forest fragments in the area chosen. We conclude that the integration of Open Source software's possible to develop complex spatial analyzes of great value in decision-making. The software's used were effective in the qualification, quantification, analysis and availability of spatial information in a web environment.

Challenges of Upgrading Housing in Informal Settlements: A Strategic Option of Incremental Housing

Fahria Masum (Germany)

Key words: Informal settlements; Security of tenure; incremental housing, stakeholder participation

SUMMARY

Informal settlements development has been recognised as one of the important phenomena of cities especially in developing countries which triggered by high rate of rural-urban migration results in housing shortage, mainly for poor. Therefore, a search for solutions to informal settlements and the rising need for formal housing delivery have been a challenge and issues of high importance for many developing countries. Though many efforts have been given to the effective planning and policy approaches to formalise/ legalise the housing in informal settlements, in many cases the efforts remain ineffective. This paper suggests that formalisation or legalisation is highly contextual and associated with prevailing land tenure system. Furthermore, different stakeholders involved directly or indirectly in the informal settlement development processes influence the context also. Therefore, in analysing their extent of participation in housing formalisation process it is vitally important to take into consideration the context (socio-economic, historical, cultural and political aspects) of the country. The paper argues that a wide range of formalisation options should respond to the diversity of the needs of lower income people. Local situations and needs must be assessed and evaluated prior to the definition of the goals of formalisation policy. Therefore, the paper came up with the conclusion that it is crucially important to begin the formalisation process with the present and future need assessment and inquiry into the socio-political-cultural perspective to enhance the capacity of the community to improve and develop their housing. The paper also highlights few recommendations along with incremental housing approach that could be made to ensure that participation yields better results to realise a number of potential benefits.

Management of Farmers' and Farmland Information: A Case Study in Turkey

Ismail Dursun, Abdurrahman Geymen and Omer Faruk Inan (Turkey)

Key words: Cadastre; Geoinformation/GI; IACS/LPIS, Farmer, Farmland, Land Registry, Web Services

SUMMARY

As a result of the dramatic change in The Common Agricultural Policy (CAP) of the European Union in 1992 from coupled to de-coupled payment system, establishment of Integrated Administration and Control Systems (IACS) and Land Parcel Identification Systems (LPIS) as the spatial part of IACS have been required to manage related agricultural land information. Similarly, IACS/LPIS like systems (Farmers Registry System, Farm Registry System, Agricultural Monitoring and Information System) in Turkey have been developed since the early 2000s. Yet, they are largely dependent on the declaration information by farmers. So, they cannot include all farmers' and farmland information which makes them inadequate for the needs of different institutions which serves not only for agricultural policy but also for other sectors. The Turkish Statistical Institute had the leading role in this context for the production of reliable agricultural statistics in a convenient way by collaborating with the Ministry of Food, Agriculture and Livestock for further development of current systems, which is still not adequate for meeting the needs of other institutions. In this study, based on the conducted survey with all related institutions which need similar data on farmers', farmland and agricultural crops, data requirement analysis was done. In order to serve for similar yet different data requirements, a pilot application in Elagoz district of Kocasinan County, Kayseri Province, Turkey were carried out within a national project (no 112Y027) financially supported by the Scientific and Technological Research Council of Turkey. In this pilot application, access to all available data sources (through web services or by replication depending on the database structure and services available) which include civic and address information of inhabitants, cadastre parcels data, ownership data in land registry, farmers', farmland and agricultural crop data declared by farmers previously was established. In addition to available data sets, an agricultural land use/cover dataset produced previously within the project is used for the determination of agricultural land to be visited. Required additional information was collected through visits to either land owners, users (farmers) or alternatively (in the case of unavailability) district headman. All available data was analysed, developed by reclassifying or collecting additional information, and converted into a standardized data structure in the cases this is required. For spatial data management sub-parcel data structure was used. For attribute data, different levels of agricultural land classifications and also agricultural product classifications were used. Temporal data management issues were also handled. Deficiencies (in some rare cases) of the methodology used in the pilot application have been further studied. As the second part of the pilot

application, studies in order to serve farmers' and farmland information to related institutions via web services were carried out. In the development of web services availability of data content and use rights were designated exactly with the needs of the related institutions. Intellectual property rights were neglected in this stage of the pilot application and only one sample web service was currently developed for the Turkish Statistical Institute.

Free Geographic Basic Data – “a Driver for Growth and Efficiency Both in Private and Public Economy”

Torben Juulsager (Denmark)

Key words: Cadastre; e-Governance; GSDI; Land management; Professional practice;

SUMMARY

This paper focuses on elements of the Danish “eGovernment Strategy 2011-2015” with the subtitle “The path to future welfare”. The political main purposes with the strategy are - Capitalization of a massive public digital effort - A more efficient public administration - To provide a basis for growth in the private sector The presentation will describe the initiatives in one of the main programs under the Strategy: “Good Basic Data for everyone”, and in particular the geospatial project “The Property Data Program”. The Program and the associated project – arise from an economic and strategic agreement between the Danish government and Local Government Denmark. Basic principles are - Re-using of data that has already been recorded - Free available public-sector basic data for both commercial and non-commercial use In relation to property data this means among other - An infrastructure will be established which ensures that information on real properties and buildings, including their owners, is registered uniformly and securely in the authentic registers in the real property domain (Cadastre, Register of Property Owners, Building and Dwelling Register) - Basic data on real properties will be improved and harmonized according to a commonly agreed definition of real property

Maps: an Essential Instrument in Tourism Industry Development

Theophilus Akinola, Felix Odeyemi and Peter Suru (Nigeria)

Key words: map,tourism,tourism marketing

SUMMARY

ABSTRACT Tourism industry is one of an important sector in developing economy of any nation, one of the fastest and largest growing industries in the world. Nigeria is yet to fully harness the benefits of the tourism industry. In order to derive her fair share of the boom in this industry, the Nigeria Government formulated a National Tourism Policy in 1990 to promote tourism development and growth in the country. Unfortunately, Nigeria is still crawling in harnessing her potential in this industry. To be candid, most parts of Nigeria have a wide range of existing potential attractions. These are Sites and Monuments, Hospitality Centres, Festivals and Dances. The role of maps as an important instrument in tourism development is discussed, especially in developing the right and positive image amongst tourists. The research in this thesis is an important step in the examination of the role and design of maps for tourism industry development and marketing. Simply, this research intends to demonstrate the continuing importance of maps for tourism destination guide and as a marketing tool. A map provides information on existence, the location of, and the distance between ground features, such as populated places and routes of travel and communication (Akinola, Odeyemi and Suru 2011). Maps provide general information to tourist at a glance (Olomo 1993). This research include the literature review, exploratory survey, content analysis, and preliminary survey with GPS in picking the location of tourism attraction site within the state. It also identified and mapped major tourist attractions in Osun State. This research emphasized a dire need for the design of specialized maps on recreation and tourism in the state and the nation at large. It's should be design in a way that their contents and graphic conception should be properly carried to ensure maximum legibility and clarity of information it displayed.

Tightly Coupled Integration of Stand-alone GPS and MEMS-based Inertial Systems

Mahmoud Abd Rabbou and Ahmed El-Rabbany (Canada)

Key words: GNSS/GPS; GPS-PPP-INS- Integrated navigation system.

SUMMARY

At present, most integrated GPS/INS systems use differential GPS techniques. This is mainly due to the high accuracy of differential GPS in comparison with standalone mode. Unfortunately, this involves the deployment of a base station, which limits the range of navigation area and increases the cost and complexity of the system. With the development of precise point positioning (PPP), which is capable of providing decimeter to centimeter positioning accuracy without the need for a base receiver, it is possible to develop a high accuracy GPS/INS system based on one GPS receiver only. This research develops new algorithms for the integration of GPS PPP and MEMS-based IMU for precise positioning and attitude determination. Un-differenced ionosphere-free linear combination of carrier-smoothed code measurements is considered. Tropospheric delay, satellite clock, ocean loading, Earth tide, carrier-phase windup, relativity, and satellite and receiver antenna phase-center variations are accounted for using rigorous modeling. Tightly coupled mechanism is adopted, which is carried out in the raw measurements domain. Linear and nonlinear filters are developed to merge the GPS and inertial measurements. The performance of integrated system is analyzed using a real test scenario.

Professional Education for Cadastral Development in Russia.

Nadezda Kamynina (Russia)

Key words: Cadastre; Cartography; Curricula; Digital cadastre; Education; Land management; Legislation; Professional practice; Young surveyor;

SUMMARY

Provision of human resources is one of the strategic objectives for the successful development of any improvement of the industry. The basis of the needs of today's higher education system is the development and implementation of teaching methodology, based on modern principles of international integration and quality assurance. For a proper understanding and definition of employer, academic community should be based on the content of sectoral qualifications frameworks, as is already done in many countries. It is equally important to establish basic understanding of the industry as a whole. Application of land for real estate - it's not just a geometric operation, it also includes the process of defining and distribution of property rights, which implies a complex qualified professionals employed in the industry. The paper discusses the possible approaches to the development of qualifications frame-works in the field of land management and inventory and their adaptation to the European qualifications framework and methodology adopted for the organization of the educational process and quality control system.

Training and Human Capacity Building in the Land Sector in the Context of Implementation of New Land Policies and Reforms in Land Administration Systems: Some Reflections from Kenya

Jasper N Mwenda and Peter Ngau (Kenya)

Key words: Capacity building; CPD; Land management;

SUMMARY

Many developing countries are reexamining their land administration systems with the objective of realigning them to address current challenges within their national contexts. At attainment of independence from colonial rule, many developing countries particularly those from Africa, maintained land administration systems that are deeply rooted in previous colonial systems but current trends indicate an increasing desire to introduce land reforms that address present-day citizen needs in a more effective manner. For effective implementation of land reforms and implementation of new land policies it is widely acknowledged that training and human capacity building are imperative. Various initiatives towards this objective have been launched by international organizations such as FIG, UN HABITAT, GLTN, FAO and a number of donor agencies such as SIDA, DFID, GIZ and JICA. Many training and human capacity initiatives in the land sector have tended to focus on training for specific projects or subsectors that donors deem to be priority areas. A recent study carried out in Kenya in 2011 has demonstrated the need for holistic and comprehensive sector-wide review of the training and human capacity assessment in the land sector as a precursor to design of training and human capacity building programs for effective implementation of new land policies and implementation of major land reforms. The study also revealed that the design of these programs is further complicated because it involves a multiplicity of trainees, training institutions, training programs, professional organizations and stakeholders and requires a clearly organized and structured approach for effective implementation. It is hoped that this paper will give a starting point for debate and useful feedback from interested professionals and organizations with regard to training and human capacity building in the land sector. Countries that are facing the same challenges as Kenya may also find some of the highlighted issues to be of benefit.

The Post 2015 Development Agenda: Responding to the G8's Call for Improved Land Governance and the Open Data Charter in the East Asia Region.

Keith Clifford Bell (USA)

Key words: Cadastre; e-Governance; Security of tenure; Millennium Development Goals; Post 2015 Development Agenda; G8; Land Governance; Open Data Charter; World Bank; East Asia

SUMMARY

The challenges of sustaining rapid but often fragile economic growth to manage growing urbanization and structural economic transformation that would help reduce rather than increase inequality and poverty, and to utilize natural resources that would provide global public goods, are emerging key issues for the East Asia Region. Land policies are critical for this agenda. Especially in light of the global land grabbing, land governance has clearly emerged as the number one issue for the land sector. Growth and poverty reduction; governance in access to and control over land; sustainable use of natural forests; mining; urbanization; infrastructure development; and foreign direct investments are in many ways integral parts of the broader land challenges of the region. Further, increased and more secured access to land and natural resources for poor people is a key to achieving food security. Land issues can generally only be addressed on a country-by-country basis (or sub-national) as jurisdiction over land is the sovereign right of an individual country or its sub-jurisdiction. There is strong global demand for improving the governance of the land sector, with increasing pressure being placed on institutes such as the World Bank, especially arising from the widely acknowledged global land grabbing through foreign direct investment, especially in agriculture. Generally, the donor, civil society and non-governmental organization communities look towards the World Bank for leadership on land-related issues. The global importance of land governance, including the Principles of Responsible Agricultural Investment (PRAI), was highlighted at the 2013 G8 Summit. The application of the Land Governance Assessment Framework (LGAF), the diagnostic tool developed by the World Bank and its partner agencies, is proving to be invaluable in the identification and mitigation of potential risks in the land sector, monitoring of policy reform, and in the design of interventions in the sector. LGAF is consistent with the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of National Food Security (VGGT) prepared under the direction of the United Nations Food and Agricultural Organization (FAO). To engage in urban, forestry, natural resources, or hydropower, without a more holistic approach to land governance may serve to increase risk. Thus, the undertaking of LGAF, especially in higher risk land sector countries, followed by promotion of the VGGT is seen as being necessary in East Asia. The report of the High Level

Panel on the Post 2015 Development Agenda concluded that the post-2015 agenda is a universal agenda with global goals and national targets that include secure rights to land and property, increase agricultural productivity and sustainable agricultural and fishery practices. Implementing the Post-2015 Development Agenda and monitoring its impact has a critical spatial information element that can provide the key that unlocks the wealth of existing knowledge about people to land relationships, about social, environmental and economic matters leading to sustainable development – provide such spatial information is reliable and accessible. The importance of information about land and natural resources, and open public access, was also identified at the 2013 G8 Summit, under the Open Data Charter. It is widely acknowledged that the majority of government information is spatially referenced. Increased awareness about how countries’ natural resources are used, how extractive revenues are spent, and how land is transacted and managed, is fundamental to good governance and sustainable development. East Asia has been at the forefront of the Spatial Enablement of Government and Societies (SEGS) agenda, which is now being pursued under the United Nations Initiative on Global Geospatial Information Management (UN-GGIM). Further, spatial information, especially based on the cadastre, is also vital to the United Nations’ System of Environmental and Economic Accounting (SEEA), and they are now being piloted in East Asia. This paper reports on the World Bank’s support for, and collaboration with other agencies and governments for improved land governance, open data and fit-for-purpose land administration systems in the East Asia Region.

Pro Poor Land Administration

Christiaan Lemmen, Jaap Zevenbergen (Netherlands) and Stig Enemark (Denmark)

Key words: Cadastre; Informal settlements; Land management; Low cost technology; Professional practice; Standards; Land Administration Domain Model, Social Tenure Domain Model, LADM, STDM

SUMMARY

Governments need information to govern – this implies the availability of a complete overview of all people to land relationships. It is estimated that about 75% of the people to land relationships world wide is not documented. A substantial part of this concerns the urban and rural poor. An overview of those relations is urgently needed - in many places with poverty one can find landless people, victims of forced evictions or land grabbing, gender inequality and discrimination, etc. Pressure is increasing: land gets scarce. In the last two decades a lot of progress has been made in pro poor approaches in land administration. Recognition of all people to land relationships (informal, customary and formal) is the foundation: UN Habitats ‘Continuum of Land Rights’ is a paradigm shift. This new way of thinking was adopted by the profession and unconventional and innovative approaches have been developed. Approaches for fit for purpose cadastres and for pro poor land recordation that can be aligned with progressive development of land administration systems are available. This paper provides an overview of those developments with a focus to further operationalisation and implementation. Experience from practise confirms the value of the new approaches. A continuum in spatial units, in accuracy, in approaches and technology can be applied in data acquisition and maintenance – for spatial as well as administrative data. The paper introduces aspects of Pro Poor Land Administration from a practical perspective.

Marine Spatial Planning in Hellas; Recent Facts and Perspectives

Chaiditsa Bolanou and John Kiousopoulos (Greece)

Key words: Spatial planning;

SUMMARY

Marine Spatial Planning in Hellas; Recent Facts and Perspectives Chaiditsa Bolanou, MSc. Student in Department of Geodesy and Geoinformation Science, Technical University of Berlin. bolanouch@gmail.com John Kiousopoulos, Professor, Spatial Analysis Lab. Technological Educational Institute of Athens kionas@teiath.gr Abstract The increasing demand for marine resources and economic activities at sea has brought to the foreground discussions about Marine Spatial Planning (MSP). In the era of globalization, of over-population and of environmental risks, the sea is a vast field available for a plethora of uses, such as transportation, food and energy resources, strategy and defense, recreation, etc. As a result of these anthropogenic activities, the conflicts among the uses at the sea should be managed properly. In this framework, marine spatial planning is dedicated to the protection and the management of the marine environment and its ultimate goal is to achieve economic, environmental and social objectives. Several countries around the world have already begun a process of MSP, while in the European Union have been made remarkable steps for the approach of MSP through the Integrated Maritime Policy. Hellas, as it is surrounded by sea, has vital interest on the marine environment and is heavily dependent on it. Nevertheless, the marine spatial planning notion seems to be not so widespread among the Hellenic administration. Only after the establishment of the related European regulations, specific attempts are written down concerning the launching of MSP in Hellas. Indeed, the experience of many countries and the legislation of European Union can be used as guidance, after the creation of the appropriate legal and governmental background that is necessary for a marine spatial plan. This article aims to present an overview of marine policy in Hellas, and all the steps that have been achieved to this direction during the last decade. In addition, after a brief overview of the international experience, the expected difficulties and the anticipated benefits of a likely implementation of MSP in Hellas are going to be displayed in detail. The potential implication and significant role of surveying engineers is going to be fully illustrated. Special care will be given to the geopolitics hindrances and the priority of marine spatial policy among the policies of a State being for six years in recession. Keywords: Marine Spatial Planning, Marine Environment, Ecosystem Based Management, Marine Use, Surveying Engineer, Marine Policy, Hellas.

GNSS Integration into Cadastral Surveying and Surveyors' Practices in Anambra State, Nigeria

Matthew N. Ono and Chukwubeze U. Onwuzuligbo (Nigeria)

Key words: GNSS/GPS; Legislation; Professional practice;

SUMMARY

GNSS Integration into Cadastral Surveying and Surveyors' Practices in Anambra State, Nigeria Ono M. N. and Onwuzuligbo C. U. Dept. of Surveying and Geoinformatics Nnamdi Azikiwe University, Awka, Anambra State The GNSS technology which its first component – GPS has brought tremendous services and improvements to the surveying practices and Surveyors is still bringing many innovations. The surveying profession in Anambra State in the South East zone of Nigeria is yet facing a lot of challenges in fully integrating this technology in the surveying practices by the surveyors. This study has tried to explore and highlight these challenges through thorough exploratory studies and very long years of practice and experiences in the class room. The phobia of new technology with its accompanying cost implications have become barriers to steady and fast integration in the everyday cadastral surveying practice. But, the aim of survival has introduced some sharp practices or tendency of cutting corners. Hence, the obvious advantages of the GNSS technology are not fully harnessed and this has slowed down the gains in having well coordinated cadastral surveying practices by surveyors in the zone and by extension in other zones. The outcomes or consequences are slow down in land acquisition, alienation and genuine development efforts. This is has become counterproductive to well intentions of various good legislations on land governance and administration by government. So, the surveyors must act fast and follow the modern trends and technology in order to actualize all the benefits. Again, government should show more concerns in the genuine implementation of the legislations it has made. **Keywords:** GNSS, Cadastral Surveying, Land Governance, GPS Technology, Ligislations

Survey Professional Ethics in Nigeria – On a Downward Spin?

Theophilus Akinola and Gaius Ojo (Nigeria)

Key words: Cadastre; Professional practice; Ethics, Nigeria

SUMMARY

Among other duties, a surveyor is obligated to promote the highest level of professional practice to the end of delivering high quality and efficient service to their clients. Founding fathers of the surveying profession in Nigeria, with less refined tools and many hurdles to surmount, painstakingly and religiously adhere to the rules and ethics of the profession, leaving in their wake monuments of professional significance. In recent times, however, the character and status of the modern Nigerian surveyor is being questioned, especially in areas of cadastral concerns. It is not uncommon to see forged survey plans used in land registrations and approving building plans. Survey beacons demarcating parcel boundaries are seen with archaic identities, which is a tell-tale sign of foul play to the discerning eye. These, amongst many other anomalies, are perpetrated by unscrupulous elements that profit themselves on the ignorance of the populace. More disheartening is the scourge of using the wrong tools on the job. Equipment like handheld GPS and compass, both intended for use as approximate tools are now being used on precise jobs intended for registration. This paper researches into the immediate and remote causes of this menace. It discusses a number of malpractices and ethical misconduct marring the image of the Nigerian Surveyor. It also outlines the roles shouldered on the surveyor, both individually and as a body, in order to redeem their image.

ISO 19100 Conformity Model of Cartography Quality

Analía Isabel Argerich and Marcela Elizabeth Montivero (Argentina)

Key words: Cartography; Geoinformation/GI; GSDI; Standards; ISO 19100; Model of conformity

SUMMARY

It is recognized that information is an expensive resource and there are difficulties in accessing suitable geographic information. The clear need for all countries and all levels, to access, integrate and use of spatial data from various producers, has generated over the last decade, the concept of Spatial Data Infrastructure (GSDI, 2001). Initiatives to implement Spatial Data Infrastructures (SDIs) have shown that harmonization of standards for obtaining and exchanging geographic information is one of the pillars that must be considered, because standardization processes based on, tend to make compatible digital geographic information, facilitating the election, the sharing and reuse of data. The Technical Committee of ISO (International Standardization Organization) TC211 "Geographic Information / Geomatics" was created in 1994 to standardize important aspects of the geographical information description, management and services. TC211 has published standards that we distinguish as "ISO 19100 family". The widespread application of standard procedures in Latin American countries, mainly in the agencies themselves that generate digital geographic information, recognizes two limiting factors. First factor is the writing and publication of ISO standards in the English language. Then the Spanish translation should be careful to preserve the semantics of the integration of emerging concepts of information technology and geographical sciences. Moreover, mechanisms to implement the requirements regulated demand the development of sufficient examples that can be used to guide the necessary procedures to achieve compliance. In Spain, Argentina, Mexico, Cuba and Colombia, has successfully translated most of the standards of the ISO 19100 family and the process of terminology harmonization is already underway. The translation of standards in Argentina has been in charge of the National University of Catamarca (LatinGEO) and has been supported by the National Geographic Institute. This paper proposes to develop a model under ISO 19100 for the quality of geographic data, and gives some examples on how to determine and report quality according to different products. For this, it is used a comparative design in relation to the aspects covered by ISO 19113, 19114, 19115, 19115-Part 2, and 19138, and a descriptive design in relation to the quality elements to be determined in topographic and thematic cartography, from different sources.

Legal Aspect of Participatory Mapping on Formalisation of Right of Indigenous Community to Land in Indonesia

**Rizqi Abdulharis, Andri Hernandi, Asep Yusup Saptari and Alfita Puspa Handayani
(Indonesia)**

Key words: Land management; Legislation; Security of tenure;

SUMMARY

Participatory mapping has emerged as an alternative to collect spatial data. UNOSAT (United Nation Institute for Training and Research-Operational Satellite Applications Programme) are hosting five activities that are involving participatory mapping such as GISCorps, HPGloe, Google Map Maker, Open Street Map and GEO-PICTURES Asign application. Even participatory mapping has been employed for collecting real-time data within disaster management phases. In Indonesia, participatory mapping has also been utilised on the identification of 265 indigenous communities' areas with total extent of 2.4 million hectares. Such an activity has been done by Aliansi Masyarakat Adat Nusantara (AMAN/National Indigenous Community Alliance) in cooperation with Jaringan Kerja Pemetaan Partisipatif (JKPP/Participatory Mapping Working Group). Nonetheless, even though AMAN and JKPP have been able to map indigenous communities' areas, it was predicted that in 2013 disputes over possession of indigenous communities' areas would still escalate. On one hand, participatory mapping of indigenous communities' territories has increased the degree of completeness of spatial data in Indonesia. On the other hand, such a mapping has amplified tensions among indigenous communities, as well as public and private sector. This is particularly due to the existence of incorrect perception on participatory mapping in almost every sector in Indonesia. Participatory mapping has been mostly done solely by the communities without involvement other sectors. This contradicts the semantics of participatory itself, which underlines sharing the weight of efforts on problem resolution. Having reviewed the existing regulations on spatial data, as well as protection of indigenous community in Indonesia, it is discovered that participatory mapping has not been well-regulated. Particularly in the process of defining boundary of indigenous communities' territories, it is urged that adjudication should be embedded in such a process. Furthermore, milestones of participatory mapping, from employment of base map to quality assurance procedure, are highlighted in this paper. By providing comprehensive analysis on participatory mapping, it is expected that regulations on participatory mapping would soon be promulgated and participatory mapping would be able to act as an alternative for not only increasing the completeness of spatial data in Indonesia but also acting as a means for resolving the nation's problems.

On Being Passive–Aggressive: Using Passive Control to Augment and Improve the US National Spatial Reference System

Michael Dennis (USA)

Key words: Engineering survey; Geoinformation/GI; GNSS/GPS; GSDI; Positioning; Reference frames; Reference systems; Passive control; Active control; NAD 83(2011/PA11/MA11) epoch 2010.00; CORS; National Geodetic Survey

SUMMARY

The mission of NOAA's National Geodetic Survey (NGS) is to define, maintain, and provide access to the National Spatial Reference System (NSRS). The NSRS is the official reference system for latitude, longitude, height, scale, gravity, and orientation throughout the United States and its territories. In 2012, NGS completed the National Adjustment of 2011 (NA2011) Project, a nationwide adjustment of NGS "passive" control (physical marks that can be occupied with survey equipment) positioned using Global Navigation Satellite System (GNSS) technology. The adjustment was constrained to current North American Datum of 1983 (NAD 83) latitude, longitude, and ellipsoid heights of NGS Continuously Operating Reference Stations (CORS). The CORS network is an "active" control system consisting of permanently mounted GNSS antennas, and it is the geometric foundation of the NSRS. The CORS coordinates constitute a new realization called "NAD 83(2011/PA11/MA11) epoch 2010.00." The part of the realization name in parentheses is the "datum tag", which refers to the year the realization was completed (2011) and the tectonic plate to which the coordinates are referenced ("2011" refers to the North America plate, "PA11" to the Pacific plate, and "MA11" to the Mariana plate). The 2010.00 epoch indicates that the published coordinates represent the location of the control stations on January 1, 2010. Constraining the adjustment to CORS at a common epoch optimally aligns the GNSS passive and active control, providing a unified reference frame that is consistent across both space and time. To create the passive control networks, 4267 individual GNSS survey projects were combined into an overall network of 81,055 stations, including 1195 CORS used as constraints. The stations were connected by 424,711 GNSS vectors observed between April 1983 and December 2011. Because of the large size of the networks, least-squares adjustments were performed using Helmert blocking strategies. Differential movement of stations both within and between tectonic plates was accounted for using the NGS Horizontal Time Dependent Positioning (HTDP) software to transform GNSS vectors to the common 2010.00 epoch. For the final constrained adjustments, the median point accuracy of the passive stations was 0.9 cm horizontal and 1.5 cm in ellipsoid height (at 95% confidence). The NA2011 Project represents a significant step toward a more integrated, coherent, and accurate NSRS. More than providing updated positions and heights, it also improved the quality of and access to NGS data. In addition, it gave experience and insight into the process for performing such large

adjustments, which will lead to better results in the future. For example, it will help in executing a nationwide vertical adjustment of the passive GNSS network to determine GNSS-derived orthometric heights on passive control (and CORS), likely to occur in 2014. NGS will also perform nationwide geometric and vertical adjustments of the passive GNSS network as part of the transition to new geometric and vertical datums, planned for 2022. In the interim, other adjustments of large passive networks may be done as part of the NGS mission to provide accurate, reliable, and consistent georeferencing throughout the US and its territories.

Static and Dynamic Monitoring of Civil Engineering Structures by Microwave Interferometry

Spencer Garry and Mark Bell (Australia)

Key words: Bridge surveying; Engineering survey; Tunnel surveying; microwave, interferometry, static, dynamic, radar, displacement

SUMMARY

The microwave interferometry has recently emerged as an innovative technology, suitable to the non-contact vibration monitoring of large structures. This presentation addresses the application of a non-contact vibrometer, designed for dynamic testing and monitoring of large structures. The new system consists of a radar sensor able to simultaneously measure the (static or dynamic) displacement of several points of a structure with high sensitivity. In the presentation the sensor and its major characteristics are first described; subsequently, application to the measurement of ambient vibration response of a structure is detailed. In order to highlight the reliability and accuracy of the radar technique, the natural frequencies identified from radar data were compared to the corresponding quantities obtained by using more conventional techniques. The results of the investigation highlight the accuracy and the simplicity of use provided by microwave remote sensing, as well as its effectiveness to simultaneously measuring the static and the dynamic response of entire structures such as bridges, towers, building, poles and cables.

Deformation Analysis Using L-estimates Method

YI Xiaodong (China, PR)

Key words: Deformation measurement;

SUMMARY

As for closing range photogrammetry, it is important to improve the precision of image points when considers some key factors such as the selection of camera station and photography method, the distribution of control points and the procession of image data analysis etc. L-estimates theory is an effective method to diminish or eliminate measurement error of image points. Combining the practice of ship-lock deformation , tests improving effect of the image data quality using L-estimates under different condition.

Land Governance in Gabon : Challenges and Opportunities

Samuel Nguema Ondo Obiang (Gabon)

Key words: Cadastre; e-Governance; Land management; Legislation; Professional practice; Property taxes; Young surveyor;

SUMMARY

Land Governance in Gabon : Challenges and Opportunities Under the " Strategic Plan Emergent Gabon (PSGE), Vision for 2025 and Strategic Orientations for 2011-2016 " which is the declination Programs and Actions of Society Project "Future with confidence ", base on which His Excellency Ali Bongo Ondimba , President of the Republic , Head of State , acceded in 2009 to the highest office in Gabon , a major land reform was committed after the National Forum on land held in Libreville from 11th to 13th July 2011. After presentations already made in 2009, 2011 and 2013, including land issues in Gabon, and in view of dysfunctional governance and land management still relevant here and there, we want to continue to bring our modest contribution on this issue in the context of sustainable development. Knowing that according to Alain Durand Lasserre, Emeritus Research Director at the CNRS, in " The land question in Africa 2050 " (October 2012) , land dynamics in Africa can be analyzed under the three angles of systems and land tenure , land governance and land markets, it therefore seemed appropriate to communicate during FIG WW 2014 in Kuala Lumpur on " Land Governance in Gabon : Challenges and Opportunities ", with a particular emphasis on bulding capacity, young surveyors, promoting a better utilization of resources, failure factors of land governance, effects of bad / poor governance and benefits of good governance. In a context of reduced state and weakening their capacity for land governance and taking into account available data on the evolution of the different factors affecting land dynamics observed over the past three decades, the qualitative scenario long-term trend that is likely to prevail in Gabon may be characterized by loss of control over land but also the " setting aside " of certain areas for future enhancement. Samuel Nguema Ondo Obiang Cadastre Chief Engineer at the Ministry of Housing, President of the Association of Professional Engineering Topographic of GABON (APIT - GABON) BP 512 or 23856 - Libreville - GABON Tel: +241 06 27 25 53/07 14 30 93 Email: ngonobsam@yahoo.fr or apitgabon2011@yahoo.fr .

Implementation and Analysis of Altimetric Geodesic Structures for Detection of Building Pillar Settlements with Employment of Optical Leveling

Andrea De Seixas, Jose Roberto De Seixas and Jose Jorge De Seixas (Brazil)

Key words: Deformation measurement; Engineering survey;

SUMMARY

A densely urban space occupied by buildings requires the definition and materialization of the planimetric and altimetric geodesic structures. The implementation of Bench Mark at construction sites allows the realization of planimetric and altimetric references stable and with quality. They are very important because they allow monitoring of the implementation of the project and detection of risk situations or imminent risk, or areas subject to collapse, landslide and/or sliding. In this context will be presented in this paper two application cases of Bench Marks. In the first case to the achievement of a stable system of altimetric reference and in the second case for the study and analysis of settlements of the building pillars. The physical establishments of fixed points defining an altimetric reference of the Bench Mark type, in the vicinity of the structure buildings, provide the studies of realization of vertical movements of these buildings. The definition and realization of a reference system is of fundamental importance for the analysis of the measurement and monitoring of the work. The update of the NBR 6122/96 to NBR 6122/2010 resulted in Brazil, among others, the requirement of settlements measuring in building constructions from more than twenty floors. This has increased the demand for vertical control surveys of buildings constructions. The implanted altimetric geodetic structures defined by the Bench Marks and determined by the geometric leveling method, materialize in this work an altimetric reference system for the standards establishment for altimetric reference and investigation of vertical displacements of pillars structure of the buildings. The work area is located in the neighborhood of the Yellow House Section in the Metropolitan Region of Recife – PE. This work aims as objective to approach the measurement of three Bench Marks implemented in the vicinity of an urban block and altimetrically determined by mean the geometric leveling method of highest accuracy with the use of digital level and Invar rod with barcodes. Then presenting the analysis of pillar settlements of the buildings with the use of high precision optical level from the altimetric references established by the Bench Marks.

Precise Point Positioning Using Combined GPS and GALILEO Observations

Akram Afifi and Ahmed El-Rabbany (Canada)

Key words: GNSS/GPS; Positioning; PPP; Galileo; Dual frequency; GGTO

SUMMARY

Precise Point Positioning (PPP) has been carried out using dual-frequency ionosphere-free linear combinations of carrier-phase and pseudorange GPS measurements. Dual-frequency GPS PPP technique has been proven to be capable of providing positioning solutions at sub-decimeter level in static positioning. This is achieved through rigorous modeling or estimation of all errors and biases. This paper takes the benefits of the newly launched Galileo satellites to produce a combined GPS/Galileo PPP solution. In addition to the traditional GNSS errors, integration of GPS and Galileo systems introduce additional biases that have to be modeled. These include Galileo hardware delays, GPS/Galileo time offset (GGTO), and different reference frame offset. Hardware delay exists in both satellites and receivers while GGTO and reference frame offsets exist due to the fact that Galileo and GPS systems use different time and reference frames. This paper shows that sub-decimeter level accuracy of the combined PPP solution and 20% improvement in the convergence time.

Benefits of a Modernized Papua New Guinea Geodetic Datum

Robert Moludobu Rosa (Papua New Guinea)

Key words: Capacity building; Geoinformation/GI; GNSS/GPS; Implementation of plans; Positioning; Reference frames; Reference systems; Standards; "datum compatability" "static datum" "land policy issues" "benifits from booming mineral resource sector"

SUMMARY

Abstract A National Geodetic Datum supporting Land programs and urbanization in Papua New Guinea. The Geodetic Datum itself also has issues that requires continuous updates and improved network precision to stay tuned with the rest of the countries in the region. A modern Geodetic Datum for Surveying and GIS mapping with the latest spatial technologies to support planning on social issues and environmental degradation and monitoring the rate of development and depletion of resources. A Datum that is also compatible with countries in the region to measure change based on a Common platform. A Common Geodetic Datum. Paper also examines the distortions of a Geodetic Datum based on the dynamic plate tectonics and the ITRF transformation without dynamic considerations.

Developing Local Government Capacity for SDI Development in Indonesia

Mulyanto Darmawan Darmawan, Heri Sutanta and Adi Rusmanto (Indonesia)

Key words: Capacity building; GSDI; local government, capacity, SDI development, law and regulation

SUMMARY

Abstract Indonesia has just enacted the Law on Geospatial Information no 4/2011. This law is aimed to foster the development of geospatial data and information as well as their utilization throughout the whole government institutions. In the aspect of spatial data infrastructure, prior to the enactment of this law, there is the presidential Decree 85/2007 on the National Spatial Data Network. Amongst government regulations, these two regulations serve the needs of central and local government. Their implementation is facilitated, managed and directed by Badan Informasi Geospasial – BIG (the Indonesian Geospatial Information Agency). With regard to the numerous geospatial data that have been produced nationally, the current effort is directed toward more effective and efficient data sharing among key stakeholders in the framework of national spatial data infrastructure (NSDI). Developing an NSDI for a vast archipelagic country with more than 500 districts/cities and 34 provinces possesses a unique challenges. The geographical location of Indonesia that spans more than 5,000 km east to west, 1,500 km north to south, and spread over ten thousand of islands is the first big challenge. It creates difficulty and high cost for developing a reliable internet connection, not to mention about the production of large scale map covering the whole region. The second challenge is the availability of trained and skilled staff at the local government level. The third is on the different level of political will of each local government as a result of regional autonomy. The form and size of local government agencies mandated to manage spatial data are varied, from none to sufficient. Funding difficulty is also important factor hindering the creation of local SDI. To respon to these challenges, BIG developed several strategies, including: providing technical assistance, develop a national geoportal based on proprietary and open source software, conducting focus group discussion and training, as well as engaging local universities as strategic partners. This paper is part of the research on NSDI development to acknowledge SDI leverage in the local regional capacity development, describes efforts in detail, identify issues and challenges, and presents the findings.

Keywords: local government, capacity, SDI development, law and regulation

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Decentralisation and Good Governance in Land Administration Systems

Samsudin Salfarina (United Kingdom)

Key words: Cadastre; Land management; "decentralisation", "good governance"

SUMMARY

In recent years, there has been increasing interest in the importance of decentralised systems and good governance in land administration. Therefore, it has become necessary to develop a strategic assessment framework to determine the relative relationship between a decentralised land administration system and good governance that might affect the performance of the delivery of services. The purpose of this paper is to optimize the variables and extract the principles to develop a Decentralised Land Administration Governance Assessment Framework (DLAGAF). The opinions among land administration experts were evaluated through a questionnaire survey, which has highlighted the key principles and variables for assessing good decentralised land administration governance. The results derived from Confirmatory Factor Analysis (EFA) indicate that the principles can be grouped as follows: sustainability principles, transparency, efficiency and effectiveness principles, responsiveness principles, clarity and simplicity principles, security and stability principles, consistency and impartiality principles. The six factors extracted showed strong validity and reliability. Therefore, this research recommends that future studies are required to consider this assessment framework from the perspective of local land administration experts.

Poverty for Sale: the Socio–Economic Impact of the People of Sinazongwe

Mweembe Muleya Mudenda (Zambia)

Key words: Implementation of plans; Land distribution; Young surveyor;

SUMMARY

POVERTY FOR SALE: The Socio-Economic impact of the people of Sinazongwe With Lake Kariba as the main water source, vast mountainous land resource, the people of Sinazongwe remain poor to bare minimum for a number reasons. Why this poverty? Drought and floods has been the order the day such that people have no food in barns. People feed on one meal or no meal at all but just fruits. Social amenities such schools and hospitals are far apart. There is need to put climate change measures, proper land distribution and a voice for the people of Sinazongwe.

Applicability of Rotary UAV(Unmanned Aerial Vehicle) for Vegetable Crop Investigation

Insu Lee, Jihun Kang, Kil jae Lee and Myong Kun Lee (Republic of Korea)

Key words: Photogrammetry; UAV(Unmanned Aerial Vehicle), Crop, Investigation, Vegetable, Mapping

SUMMARY

UAV(Unmanned Aerial Vehicle) has been used in the wide fields such as a military reconnaissance, a heritage site documentation, a precise agriculture mapping, a construction site mapping, etc. around the globe. But, UAV is unfortunately in its infancy in most of the field, especially in the private sector in South Korea. Therefore, most UAV vendors are trying to explore the new killer applications and promote sales in South Korea. This study deals with the applicability of Ultra-light rotary UAV for vegetable crop investigation. The result shows that UAV photogrammetry proves to be very reasonable to see how well vegetable grows, especially in inaccessible areas and in dangerous sites.

Monitoring the Dynamics of Stream Corridors by Means of Remotely Sensed Data and GIS

Ali Erturk, Esin Bitik, Sinasi Kaya and Aysegul Tanik (Turkey)

Key words: Geoinformation/GI; Remote sensing; Stream Corridors, Monitoring

SUMMARY

Stream corridors are complex and dynamic patches in stream ecosystems. Natural or minimally altered stream corridors of different sizes tend to be physically heterogeneous, with diverse patterns and types of habitats. Smaller stream corridors vary along the stream channels, whereas larger river corridors show variations lateral to the stream channels and along them as well. Fluxes of energy, water, and materials throughout the stream corridor system create a dynamic three-dimensional (length, width, depth) mosaic of habitats and physical features. These physical features change with time and contribute to the high level of biological diversity typical of stream corridors. Human activities may fragment connections, such as between the stream and its flood plain, preventing or diminishing natural processes important to many species. Removal of riparian vegetation simplifies the physical structure of stream habitats as well making them inhabitable to some of the local organisms living along the streams. This study is devoted to develop the tools for quantification the temporal changes such as fragmentation of stream corridors. The case study area is the province of Istanbul (Turkey), where the changes between the years 1987-2011 were analyzed and quantified. The application of the tool developed in this study as well as the results for the case study will be presented in the full manuscript.

Why technical standards are not enough for professionals working in land, property and construction and the importance of international standards on ethics

Gary Strong (United Kingdom)

Key words: Professional practice; Standards; International ethical standards; trust; ethical relativism; client and public protection;

SUMMARY

The paper will explore the opportunities and very real benefits that could be afforded not only to professional working in land, property and construction but also to clients, the public and society more generally by the setting, promotion and monitoring of international standards on ethics. The paper will focus on the following issues: •Trust and reputation – how no individual, organisation, profession, sector or country is immune from the loss of trust or reputation. •The importance of ethical standards and conceptual frameworks supporting individual professionals and firms/organisations to make appropriate decisions when faced with ethical issues. •The interaction between technical standards, regulatory standards and ethical standards, the importance of all three why professional should be asking themselves are they doing the right thing as well as are they complying with standards. •The work being done by RICS and others on international standards around valuation, measurement and ethics – the link with the global economy. •Why ethical standards lend themselves to being international standards. •Some of the drivers and tools available to help embed ethical standards: •Conceptual frameworks – case studies, guidance, decision trees, help lines •Ethics and continuing professional development •Acting ethically is good for business •Losing/regaining trust and reputation – at what price? •Raising standards of behaviour and working through the challenges of ethical relativism. •Monitoring and regulating ethical standards – protecting clients, the public and society.

Spatial Approximation of Terrestrial Laser Scanner Profiles by Considering Observations with Stochastic Information

Hamza Alkhatib, Claudius Schmitt and Ingo Neumann (Germany)

Key words: Engineering survey; Laser scanning; free-form curves approaches; uncertainty modelling; Monte Carlo simulation

SUMMARY

The monitoring of structure works, as bridges, tunnels and embankment dams, is in various engineering disciplines an important task. The main goal of this monitoring includes the evaluation of their life cycle, and the developing of concepts to increase their expected life as well. The geodetic task, hereby, is to deliver independent concepts for both, the measurement metrology and evaluation methods in order to provide the deflection with or without load. Deformations in structure works, to be monitored, could be determined frequently by means of kinematic terrestrial laser scanning (k-TLS). In an interdisciplinary project between the Geodetic Institute and the Institute of Solid Construction (both at the University of Hanover), a prestressed concrete bridge has been investigated. As contactless surveying approach, the k-TLS was used to measure the deflection of the bridge construction. The deflection time series resulting from approximated laser scanner profiles are processed by means of artificial neural networks (ANN's) to provide an independent and absolute reference strain values. In further research works, the nonlinear profiles have been spatially approximated using approaches of free-form curves, B-Splines and Bézier-curves. These show much better results compared to the section wise block mean values around discrete profile positions. Statistical hypothesis tests have shown, that resulting residuals of the free-form curves approximation still contain random and systematic effects, which arise from the sensor itself, from the surface structure of the object and from the environment. In many cases, the uncertainty of output parameters is computed by assuming that the distribution function of the measurements is normally distributed with zero mean and equally weighted and stochastically independent variance-covariance-matrix. This assumption may be unjustified and the uncertainty of the output quantities (parameter and residuals) so determined may be incorrect. One tool to deal with random and systematic uncertainties of the input parameters and the resulting mixed-distribution of the output quantities is given through the Monte Carlo techniques. This study deals with two main topics: the refined simulation of different configurations by taking different covariance structures of the input parameters (2-D coordinates of TLS profile), and the statistical analysis of the resulting residuals in order to improve the physical observation models.

I–SRI, an SDI Readiness Index for Local Government in Indonesia

Heri Sutanta, Head of Research Centre for SDI Development, Trias Aditya, Purnama Santosa, Diyono and Dany Laksono (Indonesia)

Key words: e-Governance; Geoinformation/GI; GSIDI; SDI readiness index; local government; assessment; Indonesia

SUMMARY

Developing SDI at local government level faces different challenges than that of at the central government. While there are fewer impediments at the central government level, the situation commonly found at many local governments is far from ideal. They encountered various problems such as the availability of qualified personnel, good IT infrastructure, availability of reliable internet network and subscription, clear vision and support from the district leaders, and lack of spatial data. To overcome these problems, firstly a thorough assessment on the SDI readiness needs to be conducted. We propose I-SRI, Indonesian SDI Readiness Index as a measure for local government in Indonesia. The aim of I-SRI is to portray the current status of SDI readiness and implementation at the district/city and provincial government in Indonesia. The index resulted would be beneficial for developing policy for appropriately providing assistance for those who need most and awarding recognitions for those who perform well. Such index should portray all aspects of SDI: policy and institutional aspect, human resources, technology, and spatial data availability. In the I-SRI, these four aspects were elaborated into more detailed sub-components of pre-requisites element of readiness. Each sub-component was then assigned individual weight based on their importance. Similarly, the main components were also assigned individual weight. The weights of the main and sub-components were determined using expert judgment method based three separate workshops. Finally, the indexes were obtained by summing all the multiplication results of the weight of the main components and sub-components and then normalize them to obtain a value of 0 to 100. This paper presents the method to develop the I-SRI and the initial findings for some districts/cities and provinces in Indonesia.

Land Administration of Communal Land: Lessons from the Ejidos in Mexico

Grenville Barnes (USA)

Key words: Cadastre; Security of tenure; communal tenure; Mexico; land administration

SUMMARY

How property rights in Latin American countries have been formalized in local and indigenous communities and their subsequent evolution is of particular relevance to countries in sub-Saharan Africa and elsewhere which are trying to formalize customary land administration. Within Latin America, Mexico has led the way both in terms of land reform as well titling of local communities. It is one of the few countries which has both a long history of titled communities and an extensive area of land under community titles. Almost half of the land area of Mexico is comprised of registered communal land known as ejidos and approximately 80% of the country's forest resources fall on ejido land. Ejidos are recognized as legal entities and are registered in a special registry known as the National Agrarian Registry or RAN. There is a uniform governance structure within all ejidos in Mexico and the governance rules are usually reflected in internal regulations which control how natural resources are distributed and managed. Although private titles were given jointly in the name of the original applicants, these came with restrictions which made it illegal to alienate, subdivide or mortgage any of the land within the community. In 1992 the Mexican constitution was changed to allow communities to alienate land provided there was majority support for this amongst the ejido leaders. At that time, many scholars predicted that this option to alienate would lead to the dissolution and ultimate disappearance of the ejido. Although about 10% of ejidos had opted for this individualization by 2009, it is clear that ejido tenure is quite resilient and unlikely to disappear in the near future. The land tenure debate in sub-Saharan Africa has for decades been dominated by the so-called 'land question' – how to deal with customary tenure within formal land administration systems that favour individual private property. For the most part this debate has been a binary one; should customary tenure be treated as communal property or should it be converted to private individual property. Ejido land tenure in Mexico, and its evolution over the past 50-80 years, demonstrates that individual and communal tenure can co-exist within communities that are titled in the name of the community leaders. Also of relevance to the African land question is the land administration system that has been constructed to deal with ejido property rights and the linkages between the ejido registry and the public registry which handles individual property rights outside the ejido sector. This paper describes the land administration system in Mexico, with an emphasis on the ejido sector. It explains how community land tenure in Mexico has evolved over the past century. Both of these components of the study will contribute to the CoFlas (Costing and Financing of Land Administration Services) and customary tenure GLTN tools that are under development.

Virtual Surveying: Mapping and Modeling Cadastral Boundaries Using Unmanned Aerial Systems (UAS)

Grenville Barnes and Walter Volkmann (USA)

Key words: Cadastre; Land management; Security of tenure; Spatial planning; UAV;

SUMMARY

The fusion of positional, navigational and imaging technologies and the ability to mount these on unmanned aerial vehicles (UAVs) has opened up new opportunities for local mapping and monitoring in support of land administration. In this paper we describe a pilot test undertaken in Albania to develop a UAV-based approach for cadastral mapping to support land registration and improve existing cadastral records. This work was funded through a World Bank innovation grant within the ECA Region. In this paper we focus on the legal function of a cadastral map within the particular context of Albania. Like many other countries in the ECE in the early 1990s, Albania embarked on an ambitious land privatization program to support the conversion of state farms and cooperatives to private marketable properties. Over the ten year period from 1995 to 2005 first registration was completed in approximately 2000 of the 3200 cadastral zones in the country. This registration is based on paper maps of questionable quality and which are not connected to the national coordinate system. The poor quality of these maps has hindered land acquisition for infrastructure investments as well as the on-going legalization of informal settlements, restitution/compensation and functioning of the land market. In addition, these paper cadastral maps are degrading from the wear and tear of routine use and there are no backup copies to protect against fire or other damages that might occur. As a result, the very tenure security that these cadastral maps are designed to support is being undermined. The World Bank-funded Land Administration and Management Project (LAMP) begun in 2007 is specifically designed to “improve the efficiency and effectiveness of land administration and management through enhanced tenure security and improved urban planning.” The UAV approach described in this paper is designed to facilitate this project goal. A UAV approach provides high resolution, up-to-date aerial imagery and offers a means of resolving boundary issues in focal areas. Because 3-D geo-referenced spatial models can easily be derived from UAV imagery, this approach can also provide the control to integrate and improve the quality of existing maps. The paper will describe how this was done in Albania to improve the spatial quality of existing cadastral maps. The UAV methodology will be described in three stages: mobilization (acquisition, assembly and testing of the UAV), field work (reconnaissance, ground control, flight planning in Albania, image acquisition), and post-processing of imagery (photogrammetry, quality assessment, production of 3-D models). We will also discuss issues and problems that arose in the field testing of this methodology and propose solutions to these problems.

Integration of Wetlands as Urban Open Space in Kochi, Kerala, India.

Jonu Thomas (India)

Key words: Land management; Real estate development; Spatial planning;

SUMMARY

Kochi is considered as the commercial capital of Kerala. The State Government through different investments and policies is developing Kochi into a global city as mentioned in the Draft Development Plan, Kochi 2031. The Kochi city region covers an area of 369.72 sq. km with a population of 11.64 lakhs (2001 census). Urban open spaces have become an important part of the planning process, providing areas of recreation, green buffers, carbon sink and thus influencing the Quality of life. The new concept of compact city includes integration of open spaces within the urban fabric. Kochi city region lacks in designated open space (0.31% of total area), but has vast expanse of water bodies (18.96%) and wetlands (11.6%) and paddy (6.9%) which is degrading at an alarming rate. The large extent of wetlands in Kochi makes it an important part of the urban system, at the same time being ecologically sensitive. Presently, the local bodies cannot develop new open spaces due to private ownership of land, low land availability and high land price. The study aims at integrating wetlands as open recreational space creating a dual advantage. This will help in conserving the wetlands and solve the deficiency of designated open spaces in Kochi to certain extent. Various parameters like extent, type, location, condition and utilization of wetland has been considered for the study. The study concludes in a positive manner, proposing that the existing wetlands can cater to the open space requirement of Kochi city region.

Analysis of Landslides Susceptibility by Topographical Criteria, a Study in Southern Brazil

Gabriel Lima and Lia Bastos (Brazil)

Key words: Risk management;

SUMMARY

In November 2008, Santa Catarina was affected by another catastrophe, a heavy rain event triggered floods and mass movements, affecting several municipalities. The Vale do Itajaí region was the worst hit. Geotechnology has been developing and expanding its areas of applicability. In the past twenty years mathematical models have been developed and applied in landslide mapping (CHI et al. 2002). This study applied a probability model proposed by Chung and Fabbri (1999) for landslide susceptibility mapping. Using GIS for processing indirect cartographic information in a mathematical model, variables were analyzed to see which had more or less likelihood to promote landslide susceptibility in the study area and the Translational Slides Susceptibility Map by Alto da Bacia do Ribeirão Belchior was drafted. An inventory of translational landslides by Alto da Bacia do Ribeirão Belchior was also done, complementing the inventory performed by Bauzys (2010). The model applied revealed a great potential for the landslides susceptibility analysis, however, it not achieved a great result with the variables used. According to the prediction rate of 10% and 30% of the increased susceptibility area were predicted approximately 20% and 40% of the landslides, respectively.

GRAV-D: Using Aerogravity to Produce a Refined Vertical Datum

Daniel Roman, Simon Holmes, Xiaopeng Li, Vicki Childers and Theresa Damiani (USA)

Key words: Hydrography; Legislation; Positioning; Reference systems;

SUMMARY

The National Geodetic Survey holds primary responsibility for maintaining access to the National Spatial Reference System inside the United States for all commercial, engineering, and scientific applications. This includes the geometric and vertical datums. In 2022, the NGS intends to update the existing datums, NAD 83 and NAVD 88, respectively. The topic of this paper focuses specifically on the impending vertical datum, which will be realized through GNSS technology and a gravimetric geoid model. This geoid model will be based on GRACE, GOCE and other satellite models to be consistent with the World Height System being established through cooperative efforts in the International Association of Geodesy. However, the existing surface gravity data is replete with systematic errors that degrade the derived vertical heights dm-level uncertainty. The Gravity for the Redefinition of the American Vertical Datum (GRAV-D) Project has collected data over nearly half the U.S. states and territories. Significant portions of this data have now been absorbed into a regional geoid height model that spans nearly a quarter of the Earth's surface centered on North America. The aerogravity data bridge the gap in scales between the signal determined from satellite observations and that from the surface data. Significant (dm-level) errors in the geoid derive from biases in surface gravity surveys that span regions below the scale of resolution for GRACE or GOCE missions. Hence, the aerogravity have been required to implement a refined model that is more consistent. The resulting model has been placed online for inspection of proposed new vertical heights for select regions. Several prominent errors have been detected primarily in the littoral regions, where the impact on heights along the shoreline is most significant. Efforts continue to develop more refined techniques for combining these data with a goal of providing the model by 2022 shortly after completion of final aerogravity collection.

Comparison of Open–Source and Commercial Solutions for Coordinate Transformations in Geodesy and Geoinformatics

Damir Medak, Milan Rezo and Mario Miler (Croatia)

Key words: Geoinformation/GI; GNSS/GPS; Positioning; Professional practice;

SUMMARY

Many countries in central Europe share the history of surveying techniques for establishing geodetic networks and land management systems. Transition from "old" geodetic datums and cartographic projections to modern global geocentric systems based on satellite positioning is still a long-term process. There are several reasons for the delay: a large number of legacy maps still in official use, lack of completely new survey to get the full coverage with up-to-date spatial datasets, etc. Another important issue is the necessity for personnel training in acquiring the new knowledge. Surveyors developed many ingenious ways in order to overcome the problem of multiple co-existing spatial reference systems. This paper shows the comparison of current open-source and commercial packages that can be used for the transformation of coordinates between various geodetic datums. Special attention has been devoted to the aspects related to current needs of geoinformation systems, since it is not always practical to perform high accuracy transformations. The case studies shown range from engineering survey applications to large-scale geoinformation systems.

Is Affordable Housing Still Viable in Metropolitan Urban Development?

Winrich Voss (Germany)

Key words: Affordable housing; Cost management; Implementation of plans; Land readjustment; Valuation;

SUMMARY

Is affordable housing still viable in metropolitan urban development? The housing market in metropolitan regions all over the world is generally characterized by strong demand, insufficient supply and extraordinary price level (in absolute terms as in increase rates). There is a fast increase in the number of households which have to pay more than 50 % of the disposable income for housing. In Germany's main cities the markets (housing prices and rents) are at a hype since 2010, after a long period of very smooth market conditions. Most of the new housing projects of the last decade have been developed in view of the upper market segment. Additionally the number of social housing units with regulated rents gets less and less. The rising rents cause an increase of land prices and the spiral goes on. On the other hand in Germany the Federal Housing Promotion Act commits municipalities to care for sufficient building land and thus support affordable prices or rents of flats. But the municipalities do not have strong legal implementation tools at their disposal to implement housing policies. A typical (former) model consists of the intervention of public housing authorities into the market and subsidizing the difference between affordable and market prices (as tax reduction or direct subsidy). The result is a divided market, with many side effects and an expensive and inefficient solution. The paper deals with a new land and housing policy approach which is implemented now in some main German cities called comprehensive land models (Baulandmodelle). The comprehensive land models support different aims: Supply of affordable housing (e. g. fixed proportion of the total floor space), aims according to the quality of buildings (incl. climate protection requirements) and the covering of infrastructure costs related to the development. The models are based on a strategic municipal land policy approach which provides guidelines. For the implementation in particular urban development contracts are used, but also interim acquisition models and the classical land tenure through land reallocation is used. The models, presented in the paper, are implemented in Munich, the Munich model of socially equitable land use (SoBoN), and the Stuttgart development model (SIM) are presented in detail in its regulations. The existing land models in big cities take the approach of voluntary land tenure models based on urban contractual arrangements that guarantee the owner a minimum participation in the planning - related land value increase.

A Proposed Architecture for Distributed and Version–Based Geospatial Data Sharing

Saeed Nadi (Iran)

Key words: Cadastre; Digital cadastre; e-Governance; Geoinformation/GI; GIM; Implementation of plans; Land management; Spatial data Sharing, SDI, Distributed database, Versioning

SUMMARY

Developing systems to facilitate spatial data sharing have proven to be crucial for realizing e-government. A variety of organizations collaborate in land administration due to the diversity of activities in this business. In order to be able to adapt this various activities, it is required to enable organizations to share their data by utilizing appropriate frameworks and technologies. These frameworks and technologies assist the organizations in implementing seamless land administration. One of the most important parts of this framework is the facilities to share spatial data between these organizations, including legal rules and technical tools as a spatial data infrastructure. In this paper, a new spatial database architecture is proposed to utilize, update and analyze spatial data in a shared environment. The proposed model supports versioning of data and provides two level of quality control when an update introduced to data. Each update will firstly be applied on an isolated version named business version where will be checked to be acceptable regarding the business rules. Then accepted updates will be introduced to the second isolated version named technical version where will be checked to be spatially, topologically and cartographically true. After these quality controls the update will be released to be accessible by all the users. This ensures the accuracy, integrity and consistency of spatial database during distributed update process. A prototype system is developed to further investigate the proposed model. Distributed spatial database architecture is utilized for the development of the proposed model as the prototype system to satisfy data sharing in multi-unit organizations like municipalities. The implemented system is used and tested as an infrastructure in the Shahinshahr municipality near Isfahan metropolitan in Iran using more than 100 users over 200 spatially referenced layers. The paper finally explains that service oriented architecture of the system can resolve many issues relating to the shared utilization, updating and analyzing spatial data.

LADM and its Role in Establishing Cadastral Systems

Christiaan Lemmen (Netherlands)

Key words: Digital cadastre; Standards; Land Administration Domain Model, LADM, Social Tenure Domain Model, STDM

SUMMARY

Considerations for the design and development of the ISO standard for the Land Administration Domain Model (LADM) were: - it will cover the common aspects of land administration all over the world; - it will be based on the conceptual framework of 'Cadastre 2014' of the International Federation of Surveyors (FIG)]; - it will be as simple as possible in order to be useful in practice; - the geospatial aspects follow the ISO/TC 211 conceptual model. The conceptual framework of 'Cadastre 2014' finds its foundation in the famous and widely recognised publication of Jürg Kaufmann and Daniel Steudler published at the FIG Congress in Brighton, United Kingdom in 1998: 'Cadastre 2014. A vision for a future cadastral system'. In his review in GIM International Kaufmann observed: 'the editorial team of the LADM was the first to undertake action to get to the bottom of this important issue. Now that the LADM has become an official ISO standard, that statement is strongly underpinned' This paper discusses the LADM functionality as based on Cadastre 2014. Some of the functionalities of LADM are related to a professional debate which will be highlighted in the paper. It must be noted that LADM is a generic domain model. It is expandable and it is likely that additional attributes, operators, associations, and perhaps even additional classes, will be needed for a specific region or country.

Nasarawa Development Platform: a Progress Report on the Development of Spatial Data Infrastructure in Nasarawa State – Nigeria

Ibrahim Usman Jibril (Nigeria)

Key words: Implementation of plans; Informal settlements; Land management; Remote sensing; Spatial planning; Aerial Photos & Mapping; Computerized Land Administration; Geographic Information System; Land & Property Registration; Land use Planning; Urban Renewal

SUMMARY

Nasarawa State Government initiated Nasarawa Development Platform Project in 2012, to address land administration and management issues as well as the issue of unplanned and unregulated settlements. Karu's proximity to Abuja City is a major focal point because of its ability to generate much needed revenue as well as equally important reason of addressing squarely the problem of urban poor in respect of land ownership and its attendant social consequences. Digital Aerial Mapping, Nasarawa Geographic Information Services and District Planning/ Urban Renewal of three important townships in the State are three components of NDP at a cost of UD\$16,876,561.00 and completion period of 24 months. The goal is to have well-structured land database in GIS environment, ensure preparation and issuance of secured land title documents for all land/property owners. In short the project aims at developing a spatial data infrastructure to assist the Government in taking decisions from an informed position in all aspects of its development activities. Nineteen months on the result so far is significant and encouraging. Two third of the state's land mass have been flown at 25cm and 6 townships at 10cm resolution. The acquired data are undergoing processing. Line and Land use cover maps are under preparation all to be deployed in GIS database. The remaining part of the state is expected to be flown and covered fully by the end of the year 2013. Data capture of the existing land records in the State is at advance stage. Retrieval of land files is now easier from Archives/Registry, while issuance of new land title documents has started and has significantly changed land administration procedures in the state. First Planning report is ready with wide ranging proposals including that of urban renewal.

The New Application of GEONET for Multi-GNSS Observation and Height Determination with New Japanese Geoid Model

Basara Miyahara, Tomoaki Furuya, Tokurou Kodama, Toshihiro Yahagi and Masaki Murakami (Japan)

Key words: GNSS/GPS; Positioning; Reference systems;

SUMMARY

The Geospatial Information Authority of Japan (GSI) has been operating the GNSS Earth Observation Network system (GEONET) since 1996, as a fundamental national infrastructure for surveying, crustal deformation monitoring and precise Location Based Services. With the advance of multi GNSS environment, more users require GNSS data other than GPS, such as GLONASS, Quasi Zenith Satellite System (QZSS), Galileo, and so on. In response to these demands, GSI updated most of the receivers and antennas of about 1,300 GEONET stations by the end of March 2013. While GSI registered six GEONET sites as IGS stations, four of them became IGS multi-GNSS monitoring stations. GSI started to provide QZSS and GLONASS data besides GPS data, from May 13, 2013. RINEX files, including GPS, GLONASS and QZSS data, of 30 seconds epoch are available from download site of GSI. Moreover, one second epoch data for a network-based RTK-GNSS positioning is usable for all over Japan by the private sectors' service. GSI also determined the orthometric heights of 850 GEONET stations by leveling survey from the first order leveling bench marks. Geoid heights of those stations are also calculated from the orthometric heights and ellipsoidal heights determined by GNSS observation. By combining the geoid heights and Japanese gravity geoid model, JGEOID2008, Japanese geoid model, GSIGEO2011, which cover the whole area of Japan, will be established by the end of March 2013. Utilizing the new geoid model, orthometric height determination by GNSS observation is authorized as public survey. GSI also defined the new work operation procedure of the survey, including this height determination method.

Systematic Land Regularization in Lesotho

Jan Van Bennekom-Minnema (Netherlands), Jakob Riise (Denmark) and Ian Corker (United Kingdom)

Key words: Cadastre; Digital cadastre; Informal settlements; Land management; Security of tenure; Systematic Land Regularization

SUMMARY

Systematic Land Regularization in Lesotho A new efficient way to do systematic regularization. The USAID funded Millennium Challenge Corporation (MCC) and the Government of Lesotho signed a five year Compact in 2008 to facilitate reduction of poverty through economic growth in Lesotho. Systematic Land Regularization was one of the projects under this Compact. The Systematic Land Regularization Project was awarded in March 2012 to the Joint Venture COWI-ORGUT formed by Danish company COWI A/S and Swedish company ORGUT SA. The main objective was to assist the Lesotho Land Administration Authority (LAA) with the regularization of 46.000 urban and peri-urban parcels. Given the very tight time schedule of 16 months for the realization of a project of this kind, involving a very large amount of data, COWI-ORGUT developed a work concept, in which field data collection, quality assurance and control, and data management and delivery were purely digital. The problems associated with manual systems, like reading claimant's handwriting and transcription errors are non-existent in a digital approach, and a full QC trail from field data capture to distribution of leases is established. For the collection and handling of spatial data a general boundary survey system was used, where land parcel boundaries was defined on the basis of the properly demarcated physical objects and features identified in the orthophotos. Only if physical boundaries could not be seen in the orthophotos additional GPS surveys were performed. The system involved an entirely digital and adaptable workflow based data management process and environment for rights adjudication, which recorded all activities, providing a detailed status of any adjudication record throughout the project as well as the automatic generation of statistics at any time. This was an extremely important tool as bottlenecks and problem areas were detected at an early stage, enabling a continuous and proactive adjustment and optimization of the process. A focus point was to make women and minors aware about their land rights, and special community meetings were held to facilitate this awareness. All the field team leaders were female lawyers, who could give special guidance about the gender issues. In a relatively short period the project registered 48000 surveyed parcels and rights adjudication records, exceeding the project targets. These adjudication records have been handed over in a complete database, and Land Administration Authority is currently well underway with registration of these adjudication records, expecting to complete lease distribution to claimants by the end of 2013.

Land Grabbing in the Oil and Gas Regions of Ghana– Emerging Problems and Challenges

Joseph Mensah Adiah, Edward Attimo Amihyiah Kwesi and Humfrey Amegadoc (Ghana)

Key words: Land Ownership, Land- grabbing, Land- compensation, Oil and Gas Development, Jomoro Regions, Coconut Plantation

SUMMARY

LAND GRABBING IN THE OIL AND GAS REGIONS OF GHANA– EMERGING PROBLEMS AND CHALLENGES (By Kwesi, E. A. A., Amegadoc Humfrey and others; University of Mines and Technology, Tarkwa, Ghana) Abstract The oil and gas companies and other related private firms as well as individuals are said to be grabbing large tracts of land in the coastal regions of the Jomoro District of Ghana, where the deposits are found. One of the emerging and potentially difficult problems to deal with involves compensation issues which if not properly handled can cause recurring socio-economic problems that in turn can retard the development of the oil and gas industry. Land compensation (for what a piece of land is being used for before the onset of a new project on it) is an important problem in all land-based developments. Even air-based and water-based projects have some impacts on land and thus involve compensation issues. These regions in Jomoro are mostly farming communities whose indigenes have little or no employable skills to be engaged in the oil and gas development projects in the area. They have long depended on their farm-lands for survival and as the main source of economic resources for themselves and their future progeny. These people expect adequate compensations that cover their future economic securities and not only payments for the present crops or uses of the land. This paper discusses the potential land acquisition and compensation problems that can develop in the oil and gas regions of the Jomoro District, and ways of dealing with them effectively. It also highlights the importance of geo-information technology and the role of surveyors in solving such problems. Key Words: Land Ownership, Land- grabbing, Land- compensation, Oil and Gas Development, Jomoro Regions, Coconut Plantation

Application of GIS to Landfill Site Selection in Ilorin, Kwara State Nigeria.

**Alaaya Bolaji Abdulhaleem, Adetimirin Oluwafemi Idowu and Mustafa kayode Abdulrazaq
(Nigeria)**

Key words: Geoinformation/GI; Basement complex; Pre-cambian era; Tectonic; spatial distribution; landfill; Database Design; GIS; Entities; Spatial Analysis

SUMMARY

In Nigerian urban centers, the municipal service that has seemed to fail most strikingly is waste collection and disposal. The service is frequently inadequate with a preponderant proportion of the refuse generated remaining uncollected and with large parts of the cities particularly the low-income cores receiving little or no attention. In most towns, the service is unreliable, irregular, and inefficient. The onus is often on local government to provide a service for solid-waste management, but a fundamental deficiency of this system is the failure of the Government to assume basic responsibility in raising sufficient funds to provide acceptable level of service (Onibokun and Kumuyi, 1999). Waste management is a global environmental issue which has been posing a lot of threat on the community and the state at large. There is a considerable amount of disposal of waste without proper segregation which has led to both economic and environment sufferings. There is a tremendous amount of loss in terms of environmental degradation, health hazards and socio-economic decadence due to direct disposal of waste. It is better to segregate the waste at the initial stages where it is generated, rather than going for a later option which is inconvenient and expensive. There has to be appropriate planning for proper waste management by means of analysis of the waste situation of the area. Geographic Information system serves a veritable tool for landfills Site Selection

Improving Access to Housing in Africa using Environment–Friendly Alternatives

Abdulkadir Hassan (Nigeria)

Key words: Affordable housing; Informal settlements; Low cost technology;

SUMMARY

Access to decent and affordable housing in developing countries especially Africa has continued to be very challenging. Despite availability of environment-friendly alternatives in the continent, a lot of people lack access to decent shelter, as such they force to live in substandard conditions, which expose them to variety of risks. Africa is endowed with several green-compliant alternatives such as plantation, waste and other hybrid options. The continent also holds over 30% of global mineral reserves and hosts about half of the remaining world's arable land. With these riches, Africa could be able to innovatively use alternative options to make shelter cheaper and affordable. Also using the green compliant technologies will also not only save the environment but will result in income through carbon credits to be earned. The carbon credits will help in making housing cheaper and affordable. The paper will therefore examine how environment-friendly alternatives could be utilised using locally available materials to make housing cheaper, affordable and efficient. It would review how using such materials will result in earning from carbon market to support the poor in accessing housing. The paper would also recommend how African countries can benchmark other countries that successfully used similar or related approach.

Analysis of Time Series About IGS Stations in Turkey Using AR and ARMA Models

Ismail Sanlioglu and Tahsin Kara (Turkey)

Key words: GNSS/GPS; Positioning; IGS Stations, Time Series, Autoregressive Models

SUMMARY

The Global Navigation Satellite Systems (GNSS) are used for navigation and precise geodetic position measurements. Data from receivers on the permanent stations have been analyzed at the International GPS Service Analysis Centers (IGS-AC). The softwares of AC are used to produce these time series and other useful data products. Horizontal and vertical displacements are represented on the time series. IGS station position time series mainly consist of trends, discontinuities and seasonal variations. The seasonal variations include displacements due to mass transfers at the Earth's surface (loading), thermal expansion of ground and monuments, other local deformations and artificial variations. Wavelet analysis shows that seasonal movements of station elevation are periodic. In most stations, there are biannual, annual and biennial variation terms. One of the effective methods to study time series is autoregressive moving average (ARMA) model series, which consists of autoregressive (AR) model, moving average (MA) model and ARMA model, in which the systematic characteristic is studied only from system output in the view of systematical identification. AR model and ARMA model are mainly used in geodetic studies. In this study, ARMA model had been applied to modeling GPS time series of IGS stations in Turkey. The coordinate components (north, east, up) of IGS station position time series was separately analysed in terms of time series using autoregressive and autoregressive moving average models which are the linear time series methods. The reason why especially linear time series models were chosen is that when coordinate components of station data are studied, northing ve easting components can be monitored to increase linearly. Also, degrees of northing and easting components are one degree in auto-regression and partial- auto-regression graphics and their autocorrelations are in downward tendency in the positive direction; and decreasing suddenly in the positive direction after the first degree, their partial-autocorrelations make small changes in both positive and negative directions. It can be said that these tendencies are consistent with the auto-regression model, among the models of time series.

Development and Implementation of Land Information Systems: Building an Effective Partnership to Reform Uganda's Land Administration and Management System

Gasant Jacobs (South Africa) and Nadege Orlova (France)

Key words: Cadastre; Capacity building; Digital cadastre; e-Governance; Land distribution; Land management; Land readjustment; Spatial planning; Urban renewal; Valuation; land information systems, cadastre data integration, data conversion, technology management

SUMMARY

Abstract: Thomson Reuters and IGN France, with World Bank funding, completed Phase 1 of a four year project in Uganda to build a more transparent and efficient land administration system. The Project demonstrates the importance of a long-term national commitment to create an enabling legal framework and provides important lessons on creating an effective technical partnership to improve the land administration foundation for Uganda. The development and implementation of Uganda's Land Information System (LIS) was formally initiated through the growth of a policy and legal framework in the 1990s, which resulted in the Land Sector Strategic Plan (LSSP) 2002–2012. The foundation of this Plan, however, dates back to a number of legal and regulatory developments and LIS studies carried out in the late 1980s. The Project's main objective was to contribute to the establishment of an efficient land administration system in Uganda, to facilitate and improve the delivery of basic land services to the population and improve land tenure security. The Project, concluding in early 2014, is implemented through five components: Detailed Design; Data Conversion and Data Acquisition; Registration and Cadastral Data Integration; LIS Implementation (including software development and training); and Review of the Design and Preparation for the Roll Out of the LIS. Phase I of the LIS development included the design of the LIS and piloting in six (6) Ministry Zonal Offices. This paper concerns Phase I, which is now complete, of which Thomson Reuters has supported. Phase II will enhance the Land Information through inclusion of land use; land valuation and survey functions; enhancement of system security and transition to online services for Client. This Phase has yet to commence. The Project offers several achievements and lessons learned including: • The effective decentralization of land administration and management services to the six (6) Ministry Zonal Offices of Jinja, Mukono, Wakiso, Kampala, Masaka and Mbarara which handle 60 to 70% of land transactions in Uganda; • Improved transparency and system integrity through the new ability to generate reports on staff performance and transactions of the Land Administration system; • The digitization of all leasehold and freehold titles through a new LIS management system; • The identification and elimination of problems of double plotting and double referencing for titles, common with the manual system of operation; • The new ability of LIS users to carry out instant LIS searches; • Creation of new digital base maps which include data on forests

and forest reserves, road reserves, water bodies and enhance the quality assurance and quality control capacity of surveys and mapping. This case study will examine the interrelated factors of an enabling legal framework, effective technical partnerships, and a national commitment by the Government of Uganda to develop and scale its new LIS and Land Administration System.

Identification Cadastrale Préalable (PreCad) au Royaume de Belgique Utilisation de la Référence d'un Plan de Délimitation et du Nouvel Identifiant Parcellaire Réservé pour cette Parcelle

Marc Vanderschueren (Belgium)

Key words: Cadastre; e-Governance; Land management; Legislation; Professional practice; Real estate development;

SUMMARY

L'Arrêté royal Arrêté royal complétant les règles d'identification des immeubles dans un acte ou document sujet à la publicité hypothécaire et organisant le dépôt préalable d'un plan à l'Administration générale de la Documentation patrimoniale(Cadastre)et la délivrance par celle-ci d'un nouvel identifiant. Lorsqu'un acte concerne une nouvelle parcelle cadastrale à créer, l'identification de cette parcelle dans l'acte est complétée par: -la référence d'un plan de délimitation ; -le nouvel identifiant parcellaire réservé pour cette parcelle. Cette référence et le nouvel identifiant parcellaire réservé doivent être demandés auprès de l'Administration générale de la Documentation patrimoniale(Cadastre) L'Arrêté ministériel portant exécution de l'Arrêté royal concerné -contenu d'un plan de délimitation d'une nouvelle parcelle cadastrale à créer, autre qu'un lot privatif à créer dans le cadre des articles 577-2 et 577-3 du Code Civil(copropriété) ; -contenu d'un plan de délimitation relatif à la création de lots privatifs dans le cadre des articles 577-2 et 577-3 du Code Civil -modalité de présentation d'un plan à l'Administration générale de la Documentation patrimoniale(Cadastre) - communication des nouveaux identifiants parcellaires Deux Phases -1ère phase (1er janvier2014) Mention de la référence du plan de délimitation dans l'acte ou au document soumis à la publicité hypothécaire -2ème phase(entrée en vigueur à une date déterminée par le Ministre des Finances) Mention des nouveaux identifiants parcellaires réservés pour ces parcelles dans l'acte ou au document soumis à la publicité hypothécaire Dépôt et Communication Dépôt d'un plan auprès de l'Administration générale de la Documentation patrimoniale (Cadastre) -auprès du service plan de la direction régionale dans le ressort de laquelle se situent les parcelles faisant l'objet du plan -de préférence via mail -dans l'un des formats suivants : Papier, PDF, DXF of SHP Communication de la référence et de nouveaux identifiants parcellaires par l'Administration générale de la Documentation patrimoniale (Cadastre) dans les vingt jours calendrier

Multi-Temporal Satellite Imagery for Urban Expansion Assessment at Sharjah City /UAE

Rami Al-Ruzouq and Abdallah Shanableh (United Arab Emirates)

Key words:

SUMMARY

Change detection is the process of identifying differences in land cover over time. As human and natural forces continue to alter the landscape, it is important to develop monitoring methods to assess and quantify these changes. Recent advances in satellite imagery, in terms of improved spatial and temporal resolutions, are allowing for efficient identification of change patterns and the prediction of areas of growth. Sharjah is the third largest and most populous city in the United Arab Emirates (UAE). It is located along the northern coast of the Persian Gulf on the Arabian Peninsula. After the discovery of oil and its export in the last four decades at UAE, it has experienced very rapid growth in industry, economy and population. The main purpose of this study is to detect urban development in Sharjah city by detecting and registering linear features in multi-temporal Landsat images. This paper used linear features for image registration that were chosen since they can be reliably extracted from imagery with significantly different geometric and radiometric properties. Derived edges from the registered images are used as the basis for change detection. Linear features extraction, feature matching, image registration and pixel-pixel subtraction has been implemented using multi-temporal Landsat images for Sharjah City. It has been shown that straight-line segments have high semantics and be used for accurate co-registration as well as main element for a reliable change detection procedure. Results illustrate that highest range of growth that represented by linear features (building and roads) have been accrued during 1975 – 1976 and stand for 36.24 % of the total urban features inside Sharjah city. Moreover, result shows that since 1975 to 2010, the cumulative urban expansion inside Sharjah city is 71.9 %.

Progress Towards a New Geodetic Datum for Australia

Nic Donnelly (New Zealand), Gavin Evans, Roger Fraser, Joel Haasdyk and John Dawson
(Australia)

Key words: Deformation measurement; GNSS/GPS; Positioning; Reference frames; Reference systems; Remote sensing;

SUMMARY

For several years, the government jurisdictions that comprise the Permanent Committee on Geodesy (PCG) of the Intergovernmental Committee on Surveying and Mapping have been undertaking preparatory work for a new geodetic datum for Australia. A modernised datum is required to support the ever-increasing accuracy needs of the geospatial community. Many applications are beginning to utilise absolute positioning techniques, which provide positions in terms of the International Terrestrial Reference Frame (ITRF). Any new datum needs to efficiently support these emerging positioning technologies, which provide dynamic positions that need to be integrated with the static spatial data used in digital maps. Consequently, rigorous accounting for crustal dynamics is essential in a modernised geodetic datum, even for a stable continent such as Australia. Work to prepare for a new dynamic datum, tentatively scheduled for release in 2020, is well underway. It is proposed that the datum will be aligned with the latest version of ITRF, through the regional realisation provided by the Asia-Pacific Reference Frame (APREF). Crustal dynamics will be incorporated using a deformation model. The datum will be designed to adapt quickly to the availability of new measurements and better models, ensuring that it remains fit-for-purpose even as technology and applications continue to advance. One of the key features of the modernised datum will be the creation of a seamless national network of all geodetic marks, down to ‘street level’ control. These marks currently have their coordinates calculated by the responsible state or territory, introducing discontinuities at the borders due to differences in methodology. In the modernised datum, each jurisdiction will provide its measurements and metadata to create a national dataset from which hundreds of thousands of homogenous coordinates will be generated using rigorous least squares estimation software operating on high-performance computing infrastructure. This national approach will also ensure strong connections to the national continuously operating reference station (CORS) network, enable the correction of distortions in the existing datum, and for the first time enable the rigorous calculation of uncertainty. This paper will discuss the technical aspects of the proposed new datum, and the progress made to date. It will also outline future steps, including decisions still to be made. Finally, it will include details of the user consultation that has been carried out to help determine the requirements of a modernised geodetic datum.

Urban cadastral initiative in Afghanistan: A foundation for the formalization of land rights in informal settlements

Gabriel Arancibia (Canada)

Key words: Cadastre; Digital cadastre; e-Governance; Land distribution; Land management; Legislation; Security of tenure; Spatial planning; Standards;

SUMMARY

Afghanistan is a country with a real necessity of setting land regularization policy and land administration legislation framework to respond for the increasing urbanization demand, the agriculture expansion and the growing return of Afghans from abroad. The cadastre is one of the responses to build a secure inventory of the public and private land, as well as to solve the land ownership conflicts and to develop a solid economy after continuous years of civil war by securing the land tenure and attract investment in this country. Between 2011 until the end of 2013, the Land Administration Reform in Afghanistan initiative (an USAID funded project) has developed a series of activities to create a legislation framework, institutional strengthening and performing a capacity building plan to key land related government agencies. The lead US company Tetra Tech engaged Thomson Reuters Aumentum as a technical subcontractor for implementing the geospatial infrastructure of the government institutions, using their software solutions. This paper describes one particular pilot activity of LARA's project, the urban cadastral survey in two informal settlements in the Jalalabad municipality, which is defined as a key factor for achieving the formalization of land rights and the community upgrading. The urban cadastral initiative was performed at the end of this project, between March until September 2013, in two marginal and fragile settlements. This initiative gives the opportunity to achieve a series of significant results: • Pave a way to build a digital geospatial database for the municipality and the Afghan Land Authority (Arazi/AGCHO) in a limited period of time; • Define a methodology to gather land right documents (ownership evidences), building characteristics, public services and parcel boundaries; • Populate the geospatial database using digital cameras, scanners, filling form by interviewing occupants and portable GPS equipment to survey parcel boundaries and footprint of buildings, digital orthophotography and GIS software. • Integrate these datasets with current converted property books database at the municipality as well as the Afghan Integrated Cadastral and Registry System (AICRS); • Define a workflow process data collection system adapted to the municipality using a simplified GIS solution (OpenTitle™ from Thomson Reuters Aumentum); • Create report system for public data verification and conformity approval; • Identify informal land parcel and define procedure for formalization using the results of the cadastral survey. This paper attempts to explain the main difficulties and challenges for building a geospatial infrastructure in post-conflict zones, where providing private information is a real challenge or sometime impossible to gather. This data collection process methodology can be replicated in other post-conflict areas if there is political will and by the collaboration of the local people.

Side Event: Operationalisation of the Continuum of Land Rights – A One Day Workshop

Christiaan Lemmen (Netherlands)

Key words:

SUMMARY

UN Habitat requested Kadaster to organise a side event in Kuala Lumpur on the operationalisation of the Continuum of Land Rights. This side event will be parallel with the FIG Congress. How this will be organised is not yet completely clear.

Task Force on Property and Housing: A Study on Informal Development in Europe and Central Asia

Chryssy Potsiou (Greece)

Key words: Land management;

SUMMARY

to come

Task Force on Property and Housing: A Study on Property and Housing

Chryssy Potsiou (Greece)

Key words: Land management;

SUMMARY

to come

Nondestructive Load Testing of a Single-Span, Cable-Stayed Bridge: Testing Design, Instrumentation and Preliminary Results

Vassilis Gikas, Phaedon Karydakis, Thanassis Mpimis and George Piniotis (Greece)

Key words: Bridge surveying; Deformation measurement; Engineering survey; Photogrammetry; Positioning; Bridge load testing; microwave interferometry; digital image correlation; digital inclinometer; precise leveling

SUMMARY

This paper presents the testing design, the instrumentation and preliminary results derived from a full-scale load test undertaken at a single-span, cable-stayed bridge using variant monitoring techniques. The primary objective of the project is to assess the level of structural integrity of the bridge based on systematic comparisons between analytical models and the parameters derived from the monitoring data for a multitude of specifically designed static and dynamic load tests. Also, a key objective of this work is to build a database of high capacity, multi-sensor bridge monitoring data to assist in research related to optimal sensor placement and sensor integration for bridge performance assessment. The deformation monitoring scheme consists of four independent systems used to provide complementary displacement data for the deck, the cables and the pylons. Deck monitoring is accomplished using a combination of ground-based microwave interferometry (GBMI), digital image correlation (DIC), digital inclinometers and precise leveling, whereas GBMI and DIC are used to track cable and pylon movements respectively. Currently, the field tests are underway, whereas data pre-analysis follows a stepwise and event-based process with preliminary results outlined in this article.

Crossborder Interoperability of Land–Use Information

Falk Wuerriehausen and Hartmut Mueller (Germany)

Key words: Digital cadastre; e-Governance; GIM; GSDI; Land management; Spatial planning; Standards;

SUMMARY

In the context of Spatial Information Management information produced by spatial planning, by land registry and by real estate cadastre plays an important role. To guarantee for easy seamless access this information has to be interlinked not only within national borders but also cross-border. From the sharing of heterogeneous data in the context of cross-border SDI, new value creating insights are gained. However, information management within small-scale administrative structures often led to the uncoordinated definition of features and, consequently, to heterogeneous databases. Such heterogeneity substantially hinders inter-administrational cooperation at the operational level as well as information exchange between the different levels of public administration, may it be at the local, the national or the supranational scale. Interoperability, therefore, is a central concept in dealing with spatial data. The paper presents a study analysing spatial information interoperability in the field of planned land-use information. Special emphasis is given to the aspects of semantic interoperability. A case study addressing the in depth analysis of planned land-use documents will demonstrate in which way a conceptual transformation process can be developed to pave the way for cross-border interoperability. Semantic interoperability between two different land-use data systems will be achieved by formulating adequate transformation rules between the two systems' specifications. Such rules provide an indispensable and highly valuable base for the development of Web Map Services (WMS), as well as for download services which are able to process comprehensive spatial data based on different, even municipal, spatial data themes. Integrated data concepts and data models can help to guarantee for the smooth cooperation even in a heterogeneous environment of organization units.

Capability Building in State Land Management: New Zealand Experience

Craig Harris (New Zealand)

Key words: Capacity building; Land management;

SUMMARY

Issues of capability can arise throughout the reforms of management of state land. It is not an area with few academic qualifications and much of the knowledge of the particular issues with state land is held by only a few. For many government agencies, land management is secondary to the delivery of vital services such as schools, roads or hospitals. In New Zealand, the establishment of a Crown Land Centre of Expertise (CLCoE) within Land Information New Zealand has allowed issues of capability across government to be considered in a more detailed manner. The vision of the CLCoE is to be a leader in the management of Crown land (the generic term for state land in New Zealand). The aim is to ensure that government buys and sells land in a way that advances the public interest and protects private rights and that government land is put to its best use. The paper identifies the CLCoE initiative, and focuses in particular on the steps being taken to build capability across government and in the private sector, which in New Zealand's market economy, provides many of the day-to-day services associated with state land management. This includes efforts to increase expertise and staff capability, not only within LINZ but in other agencies, and establishing mechanisms to share specialist technical knowledge across government.

Modern Acquisition Technology of Spatial Data as a Basis of Environmental Engineering and Planning Projects

Ninkov Tosa and Bulatovic Vladimir (Serbia)

Key words: Engineering survey; Laser scanning; Photogrammetry; Remote sensing; Spatial planning; Urban renewal;

SUMMARY

MODERN ACQUISITION TECHNOLOGY OF SPATIAL DATA AS A BASIS OF ENVIRONMENTAL ENGINEERING AND PLANNING PROJECTS Toša Ninkov1*, Vladimir Bulatović2, Zoran Sušić3, Dejan Vasić4 ABSTRACT Abstract text. This work present summary of possibility advanced geodetic technologies for creating 3D digital topography maps for using in spatial and urban planning and for all other spatial related activities. Paper also give detailed review of: 1) Creating orthophoto maps and digital elevation models from high resolution satellite images; 2) Advanced methods for data acquisition using mobile LIDAR system from the air, and Mobile Lidar DynaScan for corridor mapping ; 3) Application of SenseFly eBee UAV system for photogrammetric measurements areas covered by Civil and Environmental Engineering, Regional and Urban Planning projects. All modern acquisition technologies will be presented with their applications on realized projects in Nigeria, Qatar and Serbia. On the basis of this presentation will be to show that they provide multiple savings in time and labor resources in the realization of a 3D digital maps and models as the basis of design in Civil and Environmental Engineering, Regional and urban projects. Key words: orthophoto map, remote sensing, digital elevation model (DEM), digital terrain model (DTM), laser scanning, UAV system

The Reasons to Succeed and to Fail a GNSS RTK Positioning Infrastructure Project

Lui Vincent (Hong Kong SAR, China)

Key words: Cadastre; Digital cadastre; GNSS/GPS; Positioning; Professional practice; Reference frames; Reference systems; GLONASS, GPS, GNSS, Centralized Processing, RTK, RTCM corrections, NTRIP, Positioning Infrastructure, Integrity Monitoring, business, operator, concession, marketing, project management

SUMMARY

Most of the GNSS Network RTK projects have been developed by the economical justification that an active geodetic network would reduce the cost of maintaining a traditional geodetic network where the maintenance of the benchmarks and the control survey were a significant part of the owner's budget. A GNSS Network RTK can also be justified where there was no geodetic network to assist the creation and the maintenance of a Spatial Data Infrastructure to support land governance and cadastre operations. We also have seen the decision to deploy such technology as part of prestige from governmental organizations but without a clear analysis of user's need and business plan leaving such positioning infrastructure with only few users and a request to re-engineer the approach. The author has been in charge of both the development of the technology and also the promotion, the design and the implementation of numerous GNSS Network RTK positioning infrastructures worldwide. That paper is dealing with the reasons the author has indentified to make such project a success or a failure. Is there still a future for such infrastructure and what would be the conditions to make them sustainable? What is the real economy? Is selling corrected observations the only product and how the users are prepared to pay for a service that could be still delivered by setting up their own local GNSS Base Station? How to deal with the security that most countries are concerned with in term of releasing precise coordinates? Will we be able to cope with the new constellations signals? Is Precise Point Positioning the technology that will make the GNSS Network RTK obsolete? Where are the hidden costs and how much the communication infrastructure is affecting the operation expensive? Most of those questions are open and must be reviewed to conclude about the possible changes needed to consider an investment in a GNSS Network RTK of a great value and how optimizing and re-engineering an existing GNSS Network RTK can be carried out and beneficial for the owners of such positioning infrastructure.

Development of Agricultural Land Market and Land Consolidation in the Russian Federation

Alexander Sagaydak and Anna Sagaydak (Russia)

Key words: Land management; Agricultural Land Market; Land Consolidation; Russian Federation

SUMMARY

The main objective of the Russian Government policy in the area of Agricultural Production is to create conditions for efficient use of Agricultural Land and development of Agricultural Land Market as well as Agricultural Land Consolidation meeting the requirements of society and individual citizens to solve the country's food problem. In 2001 the Land Code based on market economy principles was adopted by the Russian Parliament. The Agricultural Land Market Act was introduced in 2003. There are new trends in development of Agricultural Land Market in Russia both at federal as well as at regional level. These trends are in the considerable increase in the Agricultural Land Market Transactions including Agricultural Land Mortgage Transactions over two last years. In 2010 the Agricultural Land Market Act was amended by the special federal law. The amendments have been focused on development of Agricultural Land Market based on Agricultural Land Consolidation. Development of Agricultural Land Market in the Russian Federation is mostly depended on Regional Land Policies. In the Republic of Kalmykia we can observe a unique trend, which is in the increase in the number of private farms and also in the increase in their average size. As a rule, the increase in the average farm size is accompanied with decreasing in their number. There was also a considerable increase in the Agricultural Land Market Transactions including Agricultural Land Mortgage Transactions over the last year in the region. In that sense the following measures must be implemented to strengthen the organizational as well as institutional sustainability of Agricultural Land Market and Agricultural Land Consolidation in the Russian Federation: - The Agricultural Land Market Legislation must be revised. - The institutional framework for implementation of Agricultural Land Market and Land Consolidation must be improved. - The training and retraining programs related to the Agricultural Land Market and Land Consolidation issues must be introduced. - The public relation campaign to strengthen people's ability to understand the role and importance of Agricultural Land Market and Land Consolidation Development must be initiated. - The pilot projects focused on Agricultural Land Market and Land Consolidation Development should be launched in some regions of the Russian Federation to make demonstration effect. -The Agricultural Land Market and Land Consolidation Development experience should be collected, scrutinized and disseminated. -The Agricultural Land Market and Land Consolidation Pilot Projects should be replicated throughout of the Russian Federation.

Introducing Geo–Sensing as the integration of Geodetic and Geotechnical deformation monitoring techniques to contribute on deformation modelling.

Joel Van Cranenbroeck (Belgium)

Key words: Bridge surveying; Deformation measurement; Engineering survey; Risk management; Data fusion, sensor fusion, integration, collocation, monitoring systems, system integration

SUMMARY

The value of a monitoring system is to provide reliable data on timely manner that will contribute to model deformations to support the authorities in their responsibility of preserving people's safety, engineering structures and the environment. Today by using high-precision sensors in automatic mode to control the daily behavior of points located on bridges, dams, buildings, landslides or subsidence area's it is possible to be warned early in advance of motions and deflections diverging from a normal state that could announce potential failures and to face the causes or at least to take actions that will mitigate the impact on the population. Monitoring systems using geodetic instrumentations will most of the time produce a feedback on possible movements from geometric point of view (position domain) and operate from outside while geotechnical sensors will be inside structures or below the ground level. The integration of the measurements from both sensors at the processing level will allow mutual checks and will definitively improve the parameters of the deformation model that is the basis of risk management. The necessary conditions to fulfill such innovative approach are time synchronization and collocation (offset's) which means to create a geometric relationships between the sensors in a common time frame. The contribution of a such new approach can also be seen in the reduction of sensors and the cost of the infrastructure (communication, power supply, maintenance, etc.) The Geo-Sensing is therefore a new approach that goes beyond the simple integration of sensors and even their collocation. Often underlined as a multi-disciplinary approach, the outcome of monitoring projects must be much more effective. Examples of Hydro Power Plants, Bridges and Tunnels projects will illustrate that paper.

Meta Surveying : The New Generation of Surveyors is Rocking.

Nicolas Van Cranenbroeck (Belgium)

Key words: Curricula; Education; History; Professional practice; Young surveyor; Meta Surveying, young surveyors, new generation, the internet of things, social networks, open space

SUMMARY

We are investigating a key driving force for innovation and we are proposing a new concept of „meta surveying“. By surveying we are including land surveying, surveying engineering and geodesy engineering. Known as a traditional profession, surveying use to find legacy in the antiquity. In the end of the last century, spectacular progresses have been made in science and technology that impacted also surveying. Computer, data bases, internet, GNSS and the satellite imagery, radar, telecommunication, automatic target recognition, reflectorless distance meter to cite just a few, all these progresses that transformed somewhere the society have also contribute to change the way surveying is even if the main goal is still to collect on the field data to model the geospatial environment where we are living. Surveying is taking also share on the construction area and on the preservation of our engineering assets as well as for contributing to geophysics and especially in ground motion monitoring. Due to a variety of specialisation, the surveyor tasks have been splitted in various positions. Geomatics has been suggested even to adapt the state of the art along the technologies that contributed to bring so much innovative technology in surveying. But there is a fact today that less and less young people are interested by studying surveying and to become a surveyor. At a point that we can really question ourselves if it will not disappear like many others. Finally every one today can access maps and digital information. Cloud computing is fuelling any request of digital information by bringing on the hands of the street people information that was only managed by specialists. However, there are still a vast gap between geomatics and the street people. There are still conflict between neighborhood and countries about border delimitation. There are still buildings and railway tracks that need to be aligned or control and that is the paradox. We do feel that surveying is lacking of interest by the young generation while the need for surveyors is still there and even increased. What are the problems ? Reconnaissance ? Surveyors have been all the time that kind of second order person that cost much because of the need of expensive instrumentation etc. It was not the case centuries ago but let's face the reality : a surveyor is often assimilated to a technician or a kind of specialised worker. Not more. He is not creating new spaces like the architect, nor he is opening new roads and pipes or bridges like the engineer, but both the architect and the engineer do need the surveyor. The author is an under graduate surveyor student who would like to share that new approach on "meta surveying" especially in the context of information technologies such cloud computing, the internet of things and social networking between humans and geospatial objects. He is getting the feeling that in the 21th century it will be the role of the new surveyors to rock the

traditional establishment and create a new identity for a profession that often rely on antics legacy.

Surveyors Qualification

Henning Elmstroem (Denmark) and Lars Jansson (Sweden)

Key words: Capacity building; Education;

SUMMARY

Surveyors Qualifications The paper will focus on the sum of qualifications that is necessary to obtain a high professional and ethical level of the academic profession involved in the Cadastral and property systems. The elements in the paper is Education, Practise, License, Insurance, Penalty board, Ethical board, Ethical code*, Continuing Professional Development (CPD). It will be shown that the requirements are independent of the political system and it will be shown that a University/High school degree is essential for the profession and for the research and development. Henning Elmstroem – Lars Jansson • The Code used is CLGE “Code of Conduct” www.CLGE.EU

Cadastre as part of Society – Society as part of Cadastre?

Gerda Schennach (Austria)

Key words: Cadastre; Capacity building; e-Governance; Land management; Legislation; Low cost technology; Transparency, Citizens, New technologies, Land policy

SUMMARY

Cadastral systems and structures as instruments for registration of land and tenure have a long history in many countries all over the world. The different approaches are very much linked to cultural background and history. New technologies which are available at low cost nowadays and which may be obtained not only by professionals but as well by non-professional citizens are going to underpin the development of new business models and of a new understanding of the relationship between public authorities, professionals in private practice and citizens. The role of the citizen within the governmental processes is going to be changed – processes need to be customized. How can professionals raise awareness among stakeholders to accept their new roles? It is once more the surveyors to take the responsibility to encourage citizens to be part of the system and take a role in a partnership model, which may increase transparency and security for land tenure in future.

Building the Organization to Improve the Services and the Effect in the Society

Arvo Kokkonen and Pekka Halme (Finland)

Key words: Cadastre; e-Governance; Legislation; organization; land registry; topographic data collection

SUMMARY

The paper describes the development and reasoning behind the recent organizational changes of the National Land Survey of Finland (NLS). The Finnish cadastral administration is built on the Nordic cultural heritage and its practical implementation deriving from the centuries-long co-existence as a part of the Kingdom of Sweden until 1809. Since then our two systems have been developed independently but leaning on a common background and good understanding of the developments in the neighboring country. The changes have taken place in two separate phases. In the beginning of this millennium a well pre-pared step from a traditional governmental agency with line organization to a modern process-oriented organization with 12 regional units was taken. This process was based on several reasons, mostly based on the quality level of the NLS services and products and thus the effect in the society. The services and products, again, are produced in the core processes. The idea was that describing the processes and making the workflows more uniform and introducing a process oriented organizational structure you could offer higher and coherent quality to the customers, independent of where in the country they operated. The organization model also improved the possibilities to enhance the cooperation between the two sectors of the NLS, namely cadastral activities, topographic data collection and later land registry activities. During 2012 and 2013, a new reform was planned with the aim to introduce a new organization from the beginning of year 2014. In this second phase the goal is to take one step further towards a purer process organization with no regional administrative structure. However, all currently existing 35 local offices and their staff will remain. The old structure will be based on nation-wide process orientation and only three administrative units. Most of the steering structure was renewed. With this new structure the NLS expects to reduce the existing regional differences in service levels, simplify the planning and reporting system, and cut cost by at least 3 million Euros annually compared to the situation before the change. The reform project prepared a comprehensive description of the new model and a step-by-step plan for the roll-out of the new structure. The necessary preparatory legislative work was done up front to ensure that the laws were passed in time for the new organization to start in January 1, 2014.

Support to Implementation of Multipurpose Cadastral Information system in Vietnam

Lennart Johansson and Per Sörbom (Sweden)

Key words: Cadastre; Capacity building; Land management; Land Registration; Land Information; Land Administration; SWOT analyze; Cadastre

SUMMARY

Support to Implementation of Multipurpose Cadastral Information system in Vietnam Mr Lennart Johansson, Sweden. Mr Per Sörbom, Sweden Key words: Land Registration, Land Information, Land Administration, SWOT analyze, Cadastre SUMMARY This paper describes co-operation and exchange of experience between Sweden and Vietnam within the area of implementation of a multipurpose cadastral information system. The paper focus on different modes of co-operation and on the exchange of experiences. The co-operation issue was high-lighted in all the six components in the Partner Driven Co-operation program, with the aim to cover several areas within the land management sector. Legislation as the foundation for the development was covered as well as other land related areas e.g. land valuation. The program also had an IT component for the more technical issues. As one of the outputs from the program, several training workshops were carried out. An educational handbook covering selected parts of the outputs from the PDC program was produced in a bi-lingual version (Vietnamese – English). Sweden is now phasing out the governmental international development co-operation in Vietnam within this area. This fact means that there are new challengers to meet towards the goal of the development of a sustainable land management administration in Vietnam. The paper also covers the use of a structured analyses tool with multiple benefits. The method used was a SWOT analyze. The use of SWOT analyze as a powerful tool to - Increase understanding and knowledge about the challenges and within the own organization. - As a structured way to determine demands on the information needs for the future system. - As a structured way to determine demands on the development of the information system. - To serve as a framework to investigate whether the new system meet up to requirements in the deployment and implementation process of the information system.

The reform of the cadastre in Italy

Bruno Razza (Italy)

Key words: Cadastre; Capacity building; Informal settlements; Land management; Property taxes; Real estate development; "Reform"

SUMMARY

In recent years the Building Registry has become most important, cause on the basis of cadastral data and values counted, all buildings are taxed. Therefore, all claim that the Italian Cadastre, established in 1939 with the legal criteria that today are defined as old, will be updated in the technical content and values, in order to define with equity taxes borne by the public owners. The Government has decided to submit to the Parliament a bill that is even called: "Reform of the Land Registry". The Italian Surveyors, who always are the protagonists of the database registry updating, could not remain excluded from this parliamentary and governmental initiatives. For this they presented a project to completely redevelop the Building Registry, so that it becomes a dynamic, updated and upgraded cadastre over time, in the interest of the owners, of the government, and of the whole society.

Processing of Spatial Information and Land Data for Compatible Development and Disaster Prevention

Enrico Rispoli (Italy)

Key words: Capacity building; Land management; Risk management; Security of tenure; Spatial planning; "disaster", "prevention", "compatible development"

SUMMARY

The international scientific community is aware that our planet will face the impacts of climate change and earthquakes, some already underway and others that may happen in the near future. These events will continue to occur most likely even if emissions that influence will be reduced significantly in the coming decades, through the implementation of mitigation policies on a global scale. In fact, according to the evidence presented in the most recent reports of risk assessment in the world in the coming decades, the European region, especially the Mediterranean region, and other continents will be faced with particularly negative impacts linked to climate change, which, combining the effects due to anthropogenic pressures on natural resources, make the areas of the planet a vulnerable and insidious habitat. The possible negative impacts in the coming decades are related primarily to an increase in average and maximum temperatures (especially in summer), an increase of frequency of extreme weather events (heat waves, droughts and episodes of intense rainfall and snowfall) and a reduction of the average annual precipitation and river flows, with resulting possible decline in agricultural productivity and loss of natural ecosystems. The scientific approach to the problems inherent in the process of shaping the natural land (slope instability and fluvial and torrential activity) should be based on some specific aspects that distinguish this kind of analysis from those inherent in the development and normal government of the territory, science of construction and civil and structural engineering. It is in fact studies that have as their object a "material" that the designer does not choose and for which the mechanical, geometrical and hydrogeological characteristics are difficult to define. An explicit expectation on the part of the society's request for absolute protection is added to the inherent difficulty related to the matter. This situation is determined by multiple aspects, including: the difficulty in accepting the occurrence of natural events. People, even those who live in high-risk areas, often consider extremely unlikely to be directly involved in a disaster. In common feeling and to ancient custom, it is believed that having lived a long time in a certain site is in itself a sufficient condition to make analysis of the phenomena and to propose remedies. In addition, the memory of past disasters is often incredibly short. The restrictions on the use of soil based on the hazards are generally unpopular among individuals and entrepreneurs who see them as an undue interference with their freedom of choice. The same subjects, however, after an occurred disaster, often tend to accuse the Government Authority for not having made adequate interventions. Adaptation measures already taken in the broader context of existing policies for the protection of the environment, for the prevention of natural disasters, for the

sustainable management of natural resources and for the protection of health, are not sufficient to take preventive action, even with emergency decision, or to adequately address the consequences of the impacts of climate changes. A clear and coherent strategic approach is needed for the implementation of a plan of action to ensure that prevention and adaptation measures are taken in a timely manner and are effective and consistent across sectors and levels of government involved. It is therefore considered useful for governments that have the task of deciding to be equipped with a geographic information system containing the necessary and useful information to prevent the consequences of disasters on health, on survival of the population and on the preservation of its assets. The Information System of “Limit Conditions of Emergency” affects the level of detection limit with respect to which the manifestation of the adverse event or exceptional practice should be considered likely and resulting in preventive decisions for the preservation and defense of: • the concentrated urban settlements; • the peripheral and isolated settlements; • the strategic and hazardous production plants waste; • the crops of high public interest. Are defined as “LIMIT CONDITIONS OF EMERGENCY” (CLE) those extreme conditions in which for the preservation of the habitat, in relation to the actual intensity with which the earthquake or flood occurs or can be predicted and of the probable consequences (physical and functional damage such as to lead to the interruption of almost all urban functions present, to involve risk for the public, for territory, for the urban settlement, etc..) requires the adoption of decisions aimed at ensuring the strategic functions to overcome the emergency, the accessibility for safeguards and rescue activities and the connection of the site with the local context. This means that the predictions are derived from maps and information systems, often already available, that should be integrated by further data to be established as standards and to be made available to those responsible for the acceleration of decision procedures. Supplementary information to be included in GIS, for example, relate to the following information to be adapted according to the specific places: a) list of possible risks or problems recurring; a) The georeferencing of the areas exposed to specific risks; b) Information on potential harms and on the possibly population involved; c) The emergency plan; d) The identification of infrastructure, buildings and areas that provide the strategic b) functions for the emergency; e) The identification of the structures of accessibility and of connection to the local context c) and any critical items; f) The identification of structural aggregates and of individual structural units that can d) interfere with the infrastructure accessibility and connection to the local context.

Multipurpose use of the Cadaster

Margret Hauksdottir (Iceland)

Key words: Cadastre; Digital cadastre; e-Governance;

SUMMARY

MULTIPURPOSE USE OF THE CADASTER The presentation will describe the large picture of the Cadastral structure in Iceland. Decentralized registration at the place of origin of the data is the first guiding light in management and structure of the Cadaster in Iceland along with the aim to register the data only once. The benefits of decentralized registration is having the new data registered as soon as possible and to assure that the data will reflect the reality. Municipalities are responsible for preregistration in the centralized Cadaster of all new plots and amendments to them as well of all new, abolished and changed buildings. There is a strong focus that other state and local authorities do not establish and maintain their own cadaster with the risk of discrepancies. So in legislation and practise both the state and local government work together in integration of the Cadaster and various systems to fulfil their role. Systems or registers to be mentioned are: • Land Registry • Property Tax System • Farms Register • Sales Contracts Register • Lease Contracts Register • State Properties Register The second guiding light in managing the Cadaster is the multipurpose use of the Cadaster. The use of Cadaster and valuation data has been constantly growing over the last few years. It is most vital to fulfil the expectations of reliable data. There is more demand for free geographical data rather than data from the Land Registry. Registers Iceland has met that demand and offered free geographical data with information on properties location both in text and coordinates from 1st of January 2013. Valuation data and information from sales and lease contracts get a great attention from the media and the financial sector and Registers Iceland publishes over 600 news about the sale and lease market every year. Large number of authorities and companies have direct on line access to the Cadaster Land Registry. Paper based information is hardly sent anymore.

Asia Oceania Multi-GNSS Demonstration Campaign

Kazutoshi Sato (Japan)

Key words: GNSS/GPS; Positioning

SUMMARY

Over the next decade we will see next generation Global and Regional Navigation Satellite Systems being deployed, including GPS, GLONASS, GALILEO, COMPASS, QZSS, and IRNSS. More than one hundred positioning satellites are going to be in orbit. Because of Regional systems of Asian countries, China, Japan and India, people in Asia Oceania region can gain earlier experiences of new signals and services based on multi-GNSS than any other region in the world. This means that Asia Oceania Region is the best place to demonstrate the Multi-GNSS Application. In order to promote Multi-GNSS demonstration in Asia Oceania region, the concept of Asia Oceania Multi-GNSS Demonstration Campaign was proposed to and endorsed by United Nation International Committee on GNSS (UNICG). The campaign consists of three main activities: (1) establishment of Multi-GNSS Monitoring Network as an infrastructure for precise positioning of Multi-GNSS, (2) Multi-GNSS Application demonstrations, and (3) regional workshops which have been held in Asian countries annually. Multi-GNSS Asia (MGA), which is an international organization and open community to organize and promote the campaign activities, was established in 2011. The 29 organizations such as ministries, governmental agencies, research institutes, university and industries participate in MGA, and new participations would be expected for promotion of Multi-GNSS utilization in Asia Oceania region. In this presentation, the current situation of MGA activities including Multi-GNSS Monitoring Network and Multi-GNSS joint experiments will be introduced.

International Valuation Standards Council – Building Trust in Valuation

Elvin Fernandez (Malaysia)

Key words: Valuation;

SUMMARY

The financial crisis exposed weaknesses in the functioning and in the transparency of financial markets and led to a much greater understanding of the importance of valuation. Indeed, the need to improve valuation standards, consistency and transparency was identified by bodies such as the G20 and the Financial Stability Board during the aftermath of the crisis. Sound valuation has been recognised as critical both as an input for the smooth functioning of financial markets and institutions, as well as an output from financial systems in their role of allocating capital efficiently across the economy. Although valuation issues are now seen as integral to today's financial system, historically it has been an activity that has been taken for granted or even overlooked. The result of this lack of recognition of the importance of valuation has resulted in a fragmented professional and regulatory landscape when viewed from a global perspective. The maturity of the profession varies across asset classes. For example, credentials and the accompanying enforcement framework exist for certain aspects of valuing real estate; however, in many jurisdictions, similar attributes are not prevalent for valuation of businesses, intangibles, and financial instruments. Inconsistent stipulations as to who may value certain assets for certain purposes, lack of mutual recognition of equivalent qualifications and excessive fragmentation of the organised profession all act to limit competition and the development of consistent high quality practices across borders. They also create complexity and unnecessary expense for entities with assets that require valuation in different countries. The presentation will examine the work of the International Valuation Standards Council (IVSC) in developing high quality international technical and professional valuation standards. Technical standards include generally accepted principles of valuation and procedures for the undertaking of valuations. Professional standards include establishing codes and benchmarks for the conduct and competency of professional valuers. The overriding objective behind all of these activities is to protect the interest of the direct and indirect users of valuation services.

Blue Economy

Gordon Johnston (United Kingdom) and Michael Sutherland (Trinidad And Tobago)

Key words:

SUMMARY

to come

Blue Economy – Introduction

Michael Sutherland (Trinidad And Tobago) and Gordon Johnston (United Kingdom)

Key words:

SUMMARY

to come

BIM and the law – the legal obstacles to BIM adoption

Jim Mason (United Kingdom)

Key words: Legislation; Risk management;

SUMMARY

BIM is the hot topic in construction and the governments of developed nations are seeking to improve the rates of adoption amongst the construction industry stakeholders. This paper examines the legal challenges and concerns expressed to the use of the multi-access platform for collaboration and adduces primary evidence to investigate whether the anxieties expressed are real or imagined. In the United Kingdom a recent launch has seen the Construction Industry Council BIM Protocol introduced to the industry. The reception to the protocol has been mixed with some viewing this as an over-simplification of the problems and others unsure whether it covers the areas of contention. Obtaining views and experiences of using BIM and the legal challenges raised will seek to test these notions and draw some conclusions on where efforts need to be concentrated to encourage the take up of BIM.

Geomatics and developments in BIM education in Ireland

Eugene McGovern and Avril Behan (Ireland)

Key words: Curricula; Education; BIM

SUMMARY

BIM (Building Information Modelling) is the process of designing and managing buildings, and other structures, using one coherent system of 3D virtual models. It offers significant savings in cost and time, greater accuracy in estimation, and the avoidance of error, alterations and rework due to information loss. To achieve these benefits surveyors, architects, engineers, constructors and others engaged in the process must work collaboratively. In response, third level educational programmes need to adapt traditional, isolated and un-collaborative modules to a more interdisciplinary approach. Located in Ireland, with over 20,000 registered students, the Dublin Institute of Technology (DIT) provides full-time and part-time programmes from doctoral to apprenticeship levels. Within DIT, the College of Engineering & Built Environment represents all the major disciplines involved with BIM in one location. Previously, the various disciplines tended to function in isolation. Recently, however, a new School of Multidisciplinary Technologies has been created to provide and manage interdisciplinary (and multidisciplinary) programmes and modules within the College. This paper describes the design and implementation of two new programmes, located within the School of Multidisciplinary Technologies, that leverage the knowledge available within the College to produce programmes in the BIM domain that are discipline-specific but are placed within a genuinely collaborative framework. The academic model is considered unique in the sense that collaboration is central to the design and the collaborative modules within the programmes are core. Spatial information plays a central role in the BIM process, particularly in the context of creating a building model (especially of existing buildings), dimensional control during construction and maintaining model currency over the life of a building. This central role was recognised during the design process for these BIM programmes and Geomatics skills were embedded in both the discipline-specific and the collaborative modules. This level of integration of Geomatics skills within streams representing the other disciplines within the BIM domain is hugely significant in terms of raising awareness of Geomatics skills amongst peers. Indeed, as a reflection of the significance of Geomatics within the BIM process, the course team has approved the addition of a further stream within the BIM courses to be known as Geomatics Engineering. This will be a discipline-specific stream but will be fully integrated within the collaborative modules. This is a significant development for the profession of Geomatics in Ireland going forward and, accordingly, this paper also describes design of the new Geomatics Engineering stream.

Special Technical Forum 1 – Next Generation Positioning Infrastructure (PI) – What is it and Why?

Robert Sarib (Australia)

Key words:

SUMMARY

This an open forum to discuss the future role of surveyors, manufacturers, geospatial users and National Surveying / Mapping Agencies in the establishment of the next generation Positioning Infrastructure (PI). Invited presentations on the topics such as – • Current status and reliance on PI and GNSS CORS infrastructure – case studies • Emerging GNSS and non GNSS positioning technology – such as precise point positioning, and terrestrial based positioning systems / networks – “Locata” • The vulnerabilities of GNSS position & timing, • The function of PI as critical infrastructure, • The future PI market / users and stakeholders – such as the role of National Surveying / Mapping Organisations, • The next generation or modernised PI.

Special Technical Forum 2 – UN GGIM AP/FIG/IAG/UN ICG Reference Frames in Practice – The Future

Robert Sarib (Australia)

Key words:

SUMMARY

This is an open forum to discuss the future activities of workshops and seminars to develop reference frames in the Asia Pacific region. Invited presentations on topics such as – • The status of APREF • The workings and findings of FIG / UN GGIM AP / IAG / UN ICG workshops and seminars • The role of FIG / UN GGIM AP / IAG / UN ICG in the future • The next workshops and seminars

Intergrated Housing Development as Instrument to Alleviate Urban Poverty (the case of Addis Ababa)

Solomon Keffa (Ethiopia)

Key words: Land management; Real estate development; Spatial planning; Intergrated housing development; urban poverty; Addis Ababa, Decentralization

SUMMARY

The city administration of Addis Ababa is undertaking a massive integrated housing development program to address the acute housing problem of the city since 2005. Housing supply is not the only goal of this program; instead its ultimate desire is to use Integrated Housing Development Program (IHDP) as a tool to reduce urban poverty, which is the prime problem of the city. Since its launch the program has supplied more than 100,000 houses to citizens and there are near to 100,000 houses which are under construction and expected to be completed in one year time. This program has benefited more than 500,000 inhabitants of the city directly by providing decent and affordable housing. As the vision of the program is to alleviate urban problem, the following activities are integrated as components of the program.

- Job creation for unemployed residents of the city,
- Creating market opportunity to small scale enterprises,
- Promoting affordable housing scheme,
- Promote targeted subsidy to the urban poor,
- Promoting credit facility for the urban poor,
- Promoting saving culture among the urban poor,
- Upgrade/ renew environmentally polluted areas (slums),
- Provision of basic infrastructure like access road, clean water, sanitary facilities, power, green areas and the like,
- Promoting innovative and adaptable construction techniques to reduce cost, wastage, and construction time.
- Promoting economic usage of the scarce urban land.

The paper tries to explain on how the program tried to address each of the above issues, which are crucial in tackling urban poverty, the priority issue of my country. This paper tries also to articulate on the role played by good governance, the initiation, commitment, and determination of the city administration of Addis Ababa, to tackle this severe problem of the city. It will be also discussed how decentralization played an important role in the success of the program. Explanation will be given about the importance of political commitment and mobilizing own resource to ensure the sustainability of the program. The program is trying to put in place an arrangement to ensure housing ownership rights to the urban poor, which always is a life time question of the citizens in general and the urban poor in particular. The aim of this paper is to draw lessons from Addis Ababa's housing development projects and try to show its shortcomings and open dialogues to enrich the ongoing massive program that aimed to alleviate the urban poverty. It is also obvious that other developing countries can learn from this unique success achieved in the Addis Ababa government lead IHDP. This program is already acknowledged by UNHABITAT and many counties send delegates to learn from the program.

Acquisition d'un logement neuf ou ancien, Compréhension et transparence du marché

Francis Gabele (Belgium)

Key words: Cadastre; Land management; Legislation; Professional practice; Real estate development; Reference systems; Valuation;

SUMMARY

Analyse des coûts de construction de catégories de logements en région bruxelloise. Comparaison des prix de vente de logements neufs aux prix de vente de logements déjà construits. Tentative de segmentation de ces prix entre valeur du sol-support et la valeur de la construction en l'état. Décomposition d'un prix de construction d'un logement neuf: gros oeuvre ouvert/fermé, parachèvements et équipements. Compréhension de la valeur d'une construction ancienne: respect des normes actuelles, renouvellement d'installations. Calcul du coût pour réhabiliter un logement: installation électrique, PEB, etc. Détermination du degré d'obsolescence et du taux de vétusté due à l'âge par catégories de logements anciens. Manque de transparence des ratios publiés sous forme de statistiques (macro). Absence (ou non reconnaissance de normes) en matière de mesurage de surfaces, ou d'éléments de confort. Calcul de ratios hors TVA (secteur de la construction) et de coûts de reconstruction pour les assurances (Abex). Impact de la TVA: taux réduit et taux normal. Subventionnement du secteur de la construction (de logements) par les Pouvoirs publics. Comparaison du coût de la construction d'un logement neuf à celui de la rénovation (lourde) d'un logement ancien.

Le Role de l'Ingenieur Geometre Topographe dans La Bonne Gouvernance Du Foncier

Khalid Yousfi (Morocco)

Key words: Affordable housing; e-Governance; Land management; Professional practice; Real estate development; foncier; Développement socio-économique; Royaume du Maroc; L'ONIGT; partenaires locaux; nationaux et internationaux;

SUMMARY

Le foncier joue un rôle très important et prépondérant dans l'essor de l'activité économique de tout pays. Il est la composante essentielle et le levier de toute action de développement socio-économique. sa gestion est la partie opérationnelle qui détermine et fixe les règles régissant la propriété, son usage et sa valeur. Le développement du Royaume du Maroc dépend grandement de la mobilisation de son foncier. l'Ordre National des Ingénieurs Géomètres Topographes (ONIGT) joue un rôle capital, à l'instar d'autres intervenants, à trois dimensions, en rapport avec son patrimoine rural, son patrimoine urbain, et son patrimoine durable, en étroite coopération avec ses partenaires locaux, nationaux et internationaux. Ainsi et devant la multiplicité des grands chantiers, et la diversité des activités sur la thématique foncière et de sa mise à niveau, l'ONIGT, à travers sa vision et ses activités, soulève un certain nombre de questions et propose des actions concrètes pour la bonne gouvernance du foncier afin de répondre aux interpellations et attentes des différents acteurs.

Analysis on Chinese property tax system

Wenhua Guo (China, PR)

Key words: Land management; Property taxes;

SUMMARY

Chinese property tax system was established at the initial stage of market economy. It has played a positive role in improving intensive use of land resources, rational allocating real estate resources and improving the local financial revenue. At present, directly related taxes on real estate has accounted for 40% of the local tax revenue, and accounted for 22% of the local total revenue. The taxes directly related to real estate have become an important source of public finance income, and shows a rising trend. But along with the Chinese housing market increasingly prosperous, problems are gradually highlighted. The most serious problem of the property tax system is the irrational structure, contrary to the developed countries “prefer possession to transaction”, Chinese property tax “prefer transaction to possession”. The transaction and construction tax burden is 9 times of possession tax of real property. The property tax system can't Inhibition on the speculative who assumes liability for the high prices of real estate. The suggestion reform is to reduce the transaction taxes, levy property tax on the basis of integration of the current tenure tax. The property tax can not only provide a stable source of revenue for local, and serve to refrain speculation demand, and promote the healthy development of real estate market.

Comprehensive Analysis System on Detecting Land Cases

Daihong Zhao (China, PR)

Key words: Land management; land detecting

SUMMARY

The Ministry of Land and Resources is in charge of land management. There are a lot of land cases which uses lands illegally. How to find and detect the land cases and grasp the land use change timely, the working group made an information platform on land case detecting by using the satellite image and comprehensive information . In this paper, the author described system architecture and data process on land cases detecting and data collecting.

Land Reclamation Policies and Reform requirements for Coal Mining areas in China

Zhenqi Hu, Prof. (China, PR)

Key words: Land distribution; Land management; land reclamation, compensation

SUMMARY

Land reclamation is the process of recovering land from disturbed or damaged land. It involves a wide range of aspects, therefore, land reclamation is a systematic engineering. Improved policies and legislations could not only regulate reclamation work, but also could promote the implementation of land reclamation. The development of land reclamation policies were divided into 3 stages in China, which are a) before 1988, land reclamation was a kind of spontaneous behavior by enterprise, local government; b) 1988 to 2006, “Stipulation on Land Reclamation” (SLR) was issued in 1988, land reclamation became important and draw attention from public and authorities; and c) 2007-2013, “Land Reclamation Regulation” (LRR) was issued in 2011, land reclamation was involved as part of mine permit application. This paper introduces the development process of land reclamation policies and regulations in China. Some important items in LRR, such as reclamation objects and reclamation obligations, reclamation funds, and the incentive and supervision mechanism, are also included in this paper. Furthermore, 2 reform requirement was proposed, which are, a) incurred but not reported (IBNR) and subtracted losses of farmland in coal mining subsided area; and b) compensation measures for relocation of villages in coal deposit and villages overlapped regions.

GeoDesign Research on Land Use Changing Spatial–Temporal Database

Tingting Xu (China, PR)

Key words: Geoinformation/GI; Land management; Spatial-temporal Database; GeoDesign; Geographic Information Science; Land Use

SUMMARY

The objective of this research is to build a land use changing spatial-temporal database within a specific research area and implement the GeoDesign concept, along with this database, to point out strategic decisions and planning policies of land use management for this area. First, this article discussed the development of geodatabase on different time and spatial dimensions and gave a solution on how to add time dimension to a common land use changing spatial database. Taking Liangjiang industrial zone as the research area, we designed and built the Liangjiang industrial zone land use changing spatial-temporal database for further use. Then, this article introduced a new concept “GeoDesign” and researched on how to apply this new idea into land use management work. At last, based on the land use policy of China and the Liangjiang industrial zone land use changing spatial-temporal database we built, we “geodesigned” the land use changing procedure for Liangjiang industrial zone and answered the following questions: (1).How to use the land use changing spatial-temporal database to describe the land use status within Liangjiang Industrial zone. (2).How the land use management works within Liangjiang industrial zone. (3).Whether the land use management works properly or not. (4).Based on the land use changing spatial-temporal database, under the help of geodesign, how to plan the future land use within Liangjiang industrial zone. (5).What impacts would be made to Liangjiang industrial zone if the land use is changed as we designed. (6).How to make best land use management decisions and plans for Liangjiang industrial zone.

Realising the Multifunctional Cadastral Management under the Big Data

Wenli Feng (China, PR)

Key words: Cadastre; Land management; big data, land survey, multifunction, cadastral management, parcel identifier

SUMMARY

Cadastral management plays a fundamental role in China's land administration, which includes the responsibility of land survey, remote sensing monitoring, land tenure, land registration and land statistic. Since 1984, China implemented successfully two rounds of the National Land Survey Project, and annual survey of land dynamic change as well. Each parcel of data is digitized. Entering the new phase of Big Data, the challenge is how to dynamic monitor the land use change in more scientific way through the application of GIS, RS and GPS and management all resources data in more efficient way, establish the frame of data analysis in one information system. The pilot project is initialized in China since 2012, the main task is establishing the network of the data flow and using the unified parcel code as the identifier to integrate the databases of all resources land use and management data into one platform. The result in 6 pilot provinces had completed and achieved the goal smoothly. The next step is planned to distribute the system nationwide, the objective of multifunctional cadastral management is approaching under the Big Data.

Study on Meta–data based Integrated Management of Spatial data for Land Resource

Chunying Niu (China, PR)

Key words: Geoinformation/GI; Land management; Spatial data for Land Resource

SUMMARY

Land resource spatial data is characterized by multi-source, multi-format, multi-scale and multi-temporal, which makes it complicated to manage. Therefore, it is necessary to setup an integration solution to manage the land resource spatial data. In this paper, we present a spatial data management platform to do the integrating management. It is based on metadata-driven and application oriented. Take advantage of the database technology, we make a use case of the above service system. Firstly, this paper approached the concept of meta-data driven based spatial data management for land resource. Then analysis the data type in land resource management, summarize the meta data for these data and their relationship. Based on the design pattern of the meta data, we can apply the data integration in land resource spatial data management easily. Finally, based on the current database technology, we design the meta-data framework for land resource spatial data management and apply the method based on the framework.

Parental Advisory: Kids, Don't Try This at Home! Surveying in Donald Duck and Mickey Mouse Comics

Jouni Johannes Anttonen (Finland)

Key words: Cartography; Land management; Positioning; Remote sensing; property valuation; aerial photography; land use planning; GPS; land titling; Donald Duck;

SUMMARY

As a Finnish Surveyor in third generation and a die-hard Disney fan, Jouni Johannes Anttonen has always lived with surveying since he was zero years old and continuously been following Donald Duck comics since he was five years old. His presentation introduces the whole spectrum of surveying science-related issues published in Finnish Donald Duck (Aku Ankka) comics, from tachymeter surveying to property valuation, aerial photography to land use planning, GPS to land titling, precise levelling to utilisation of maps for decision-making and beyond, not forgetting land dispute resolution, good land governance and indigenous people's land rights. The first version of this presentation was highly popular in both the FIG International Congress in Sydney, Australia in 2010 and the South East Asia Survey Congress in Manila, Philippines in 2013 and has ever since been requested around the globe to make surveying more interesting and attractive for the new generations of land sector professionals. Every Surveyor is welcome and encouraged to attend the entertaining show to relax a bit in the middle of the jungle of hundreds of slightly more scientific papers' presentations!

OSGeo – Professionally leveraging Open Source

Arnulf Christl (Germany)

Key words: Cadastre; Cartography; Curricula; Digital cadastre; Education; Geoinformation/GI; GSDI; Land distribution; Land management; Low cost technology; Positioning; Professional practice; Remote sensing; Security of tenure; Spatial planning; Standards; Open Source; Free Software, Open Standards; Open Data

SUMMARY

An introduction to Open Source, Free Software and the Open Source Geospatial Foundation. The first part of this presentation details the inner workings of Open Source development and Free Software licensing. It gives a brief history of the development of software in general and explains why for a brief period of a few decades proprietary business models dominated on the market and how they are increasingly replaced by Open Source. The second part of this presentation introduces OSGeo's mission, goals and the organizational structure implemented to achieve them. One recent achievement of the educational sector of OSGeo is the Geo-For-All initiative which lead to the emergence of OSGeo-ICA labs all around the world. They provide access and facilities to Open Source geospatial software, infrastructure and curricula. In the third part we will present an overview of the currently available Open Source tools, programs and software stacks around OSGeo, how and where to get them. The software is collected and bundled on the OSGeo Live distribution available for download and immediate use. OSGeo Live contains software ranging from a full blown spatial data infrastructure to highly specialized tools for data import, manipulation and export and is available completely free of licensing costs. All software is ready to go and used in professional contexts all around the world. Explore OSGeo on you own by visiting the web site at <http://osgeo.org>

History of Surveying & Mapping in Malaysia

Azhari Mohamed (Malaysia)

Key words: History; Surveying, Mapping

SUMMARY

In Malaysia, records show that the earliest survey department was established in the state of Johore in 1885, but surveying works were already carried out a few years prior to that. Most of the early surveys appeared to be in scattered parcels and measurements were of boundary length without bearings. A general survey of those lands under occupation was started by J.O. Moniot in 1851 using plane table and chain but this survey was found unreliable due to its low technical specification and subsequently land administration continued in a state of confusion. The first known cadastral plan was dated 1885 and appertained to a plot of land in Gunong Pulai area. When Mohd Salleh was transferred to Muar and Batu Pahat, he prepared a map of those two districts which is still preserved. A further edition of the state map was prepared in 1907 possibly based on the first one. A copy of this map is still preserved today in the Royal Palace of the Johore Sultan. As in the case of the establishment of the early geodetic infrastructure for the basis of surveying and mapping in Peninsular Malaysia, known as the Repsold Triangulation network, JUPEM obtained the initial position of a point in Taiping in 1885 by directly observing the stars. The principle of triangulation was based on simple trigonometric procedures and basically it consisted of the measurement of the angles of a series of triangles. With the longitude, latitude, and azimuth of the initial points obtained by astronomical observation, similar data was computed for each vertex of the triangles thereby establishing triangulation stations or geodetic control stations. Nowadays, the operational use of satellite techniques in geodesy, geodynamics and surveying started. The United States Department of Defence began to develop the new NAVSTAR GPS and it was in 1987 that this new technology was introduced to JUPEM. This paper shall describe the brief history of survey and mapping in Malaysia, including current trend and some latest development.

History of Leveling Practice in Malaysia

Azhari Mohamed (Malaysia)

Key words: History; Surveying, Mapping

SUMMARY

Like most countries around the world, a nation-wide levelling network in Peninsular Malaysia was first established at the turn of the last century. The first precise levelling programme in Peninsular Malaysia was conducted in 1912 with the first line levelled between Port Kelang and Kuala Lumpur. The first national levelling datum for Peninsular Malaysia, known as the Land Survey Datum 1912 (LSD12) was established in 1912 by the British Admiralty. It was referred to the MSL, based on tidal observations carried out by the HMS Waterwitch between noon of September 1, 1911 and May 31, 1912, at Port Kelang. The FOLN67 contains a total of 2872 km of levelling distances with about 87 lines. It also comprises of 11 primary loops with a total of about 2532 bench marks. Due to the numerous weaknesses inherent in the FOLN67 network, DSMM began to initiate definitive steps in the early 1970's to prepare for a new vertical control for Peninsular Malaysia. The work on the First Order Levelling Network 1967 (FOLN67) started in 1912. However, this first levelling network had its numerous inadequacies, starting with its heterogeneous nature and going further to the fact the measurements were carried out over a long period of time. Due to these shortcomings, the Department of Survey and Mapping Malaysia (JUPEM) began to take definitive steps in 1987 to prepare for a new height control. The new Precise Levelling Network (PLN) was completed in 1999 with more than 5300 bench marks planted. Due to the inadequacies and weaknesses, JUPEM began to take definitive steps in the early 1970's to prepare for a new vertical control for Peninsular Malaysia using three leveling techniques: conventional, motorized and digital leveling. This paper will present a historical look at the various aspects involved in the realisation of the latest vertical control network using the three leveling techniques.

Frameworks, guidelines, land policies in Africa: which place for women?

Claire Galpin (France)

Key words: Education; Land management; Frameworks; land policy in Africa; women right and role; Land Administration; African land deal;

SUMMARY

The land issue is at the heart of African news; every week newspapers report about a land story, which is often violent or even fatal. Real estate is at the basis of development. It must and therefore should be accessible to everyone. The international institutional actors and the main sponsors have since a decade put land policies at the heart of their reflection and have developed frameworks and guidelines for the reinforcement of land rights with particular attentions to women and the most vulnerable groups' rights to improve the living conditions of notably rural populations. Through a review of different documents on land policies produced by international actors, we will make a synthesis of the measures which are recommended for women's access to land and we will try to illustrate initiatives in the light of experience. We will successively study the LPI of the African Union, African development bank and economic commission for Africa consortium, the LGAF framework, FAO guidelines and the white books from the European Union and France.

Simplified Code for condominiums at the use of emerging countries

Jean-François Dalbin (France)

Key words: Land management; Land readjustment; Legislation; Real estate development; Real-estate transactions; Legal registration; Simplified code

SUMMARY

The French Higher Council of Notaries and the French order of licensed surveyors signed in January 2012 a convention for international cooperation and wanted to set up a working group on titling in urban area. The titling process, which is an essential tool to switch to a formal economy, enables the reassurance of real-estate transactions and is based on three pillars : –A precise and concrete identification of the real estate which is concerned on a plan –A secure legal act which will be the legal bound between the real estate and the person –A real estate register which indexes all the legal acts. It determines with certainty who owns what and under which conditions. The owner of the real-estate right will use it, among other things, to get a loan and invest. The identification is used as a basis for the taxes which are necessary to land management. Condominiums enable to find a solution to titling in urban area. It is the status of every built real-estate or every group of built real-estates which property is divided between many people. The draft of the code for condominiums is made of 5 chapters and 79 articles, dealing with the evolution of a condominium from its creation to its end. The purpose is to ensure the preservation of the real-estate, its maintenance and the management of communal areas, while safeguarding the common rights and interests. The divided condominium of a building is established by notary act which is recorded to the land registry containing a declaration of division into many fractions: the lots. Lots are composed of 2 indivisible elements: a private part and a share of communal areas. A private part is a part of a real-estate on which the co-owner holds all the prerogatives of an owner. The share of general communal areas is proportionate to the relative value of every private part compared to the value of all lots, according to its nature, its purpose, its dimensions and its situation regardless of its use. The community of co-owners constitutes a moral person, the co-ownership association.

Presentation of the project of coastal and maritime portal

François Mazuyer (France)

Key words: Coastal Zone Management; Digital cadastre; Marine cadastre; Spatial planning; TERIA GNSS network; GEOLAND portal; coastal and maritime portal;

SUMMARY

After the implementation of the TERIA GNSS network, in the framework of the modernization of its land and technical missions, OGE launched July 1st, 2010 its GEOLAND portal for the use of land surveyors who could thus benefit from a modern tool for the collect, the sharing and the diffusion of land and geographical data. This extranet tool is also open to the general public and offers to every public user and professional dynamic interfaces for the sharing of data. In parallel to this project, OGE was taking part in different researches on the coastline and the sea, and more specifically on the space distribution of uses, activities and conflicts of uses. Following a request from the Water Agency of the PACA region, and from the International Centre for research on environmental issues (ICRED), to index and list on a 3D cartography the different practices and uses in the Mediterranean sea, OGE is currently working on the development of a coastal and maritime portal on the basis of the Geoland tool. The Geoland portal will thus become a unique 3D display portal of land, coastal and maritime data. To test this project, two experimental areas were defined in the regions of Sete and Marseille. The project, which started in November 2012, will last until December 2014 with the demonstration of the functionalities of the portal on the two experimental areas during the 42nd congress of the Order of licensed surveyors which will take place from September 9th until September 11th in Montpellier and which will be dedicated to the risks.

Problems of the allotment in Republic of Benin and approaches of solutions

Léopold Degbegnon (Benin)

Key words: Cartography; Urban Environment; Benin; Land Allotment;

SUMMARY

Improvement of the quality of our urban environment, our framework of life and the fight against the anarchistic occupation of the fields as well public as private as from the unsuitable zones to the dwelling passes by the implementation of a policy of adjustment of urban space: the allotment. The allotments and many assessments made on the administrative and office automation procedures of the allotment in BENIN, shown two periods: a first period going from 3rd settler time at the years 1960, where only the State initiated the allotment and only on the fields registered beforehand according to a regular procedure and a financing available. Thus no dispute noticed. During the second time two movements are pointed out. Indeed, of the accession of the BENIN to National sovereignty at the years 1990, the allotment is tiny room to the simple operations of reorganization of spontaneous habitat so that only socio-economic dimension and the legal aspect were taken into account with the detriment of the technical and financial aspects. After 1990, the sector of the allotments is then opened with all the structures specialized in the field, which are private, mixed or public. This opening made some improvements on the technical level but which of neck rte were lasted with such ensign that the lack of clean financing, the absence of law of town planning and regulation on the habitat, has not approval of existing documents of planning, the defect of preliminary registration of the fields above all allotment have makes inapplicable the law 60-20. However, the attribution of licence to live on fields not registered, misses will to finish with the allotment after (it is with statement the spontaneous habitat) and its consequences, misses coherence in the occupation of the ground to which are added the lack of probity and of rigour of the actors remain and remain the source of the problems during are allotment with the BENIN. It is thus clear that the various causes which are at the origin of these difficulties relate to the absence of documents of planning, with the none respect of the texts and especially with the land policy of the BENIN which preaches the existence of a dualistic mode (the usual system of land tenure and the modern mode). An approach of solution for a new organisation of the allotment with the BENIN is thus necessary and passes not only by rigour in the application of the texts but more especially by a new political it of town planning which would guarantee during the S operations of allotment, the same obligations with the holders of piece some is the system of land tenure . And those, without being unaware of the provisions of low n° 2013-01 bearing Code Land in Republic of the BENIN in particular in its article 511 which sanctions any allotment initiated on a field not registered with not of the State .

Securing the Human Rights and Livelihoods Cambodian Indigenous Communities by Land Registration

Suon Sopha and Kan Vibol (Cambodia)

Key words: Cadastre; Land management; Legislation; Spatial planning; Indigenous Communities; Land Registration; Land Administration; Land Issues; Cadastre; Developing Countries; Post-Conflict Countries; Technical Assistance; Cambodia; Finland; Germany; Canada;

SUMMARY

Securing the livelihoods of the ethnic minorities is an important human rights issue in Cambodia. The Land Administration Sub Sector Programme (LASSP) has supported to develop the legal framework and technical solutions and recently started an effective practical implementation of the indigenous community land registration. This will lead to the permanent security of ownership of their traditional lands. The developed process also leads to the protection of land from outside encroachment, and maintains the culture and identity of the people, especially in the case of spiritual land and burial grounds. This paper highlights the development, achievements and results of the Cambodian indigenous community land registration so far and presents the lessons learnt for improving the land registration system in order to support social stability, economic development and ultimately poverty reduction of ethnic minorities. The development and implementation of the land administration system of post-conflict Cambodia has been supported by Finland, Germany and Canada and is currently largely financed by Cambodia herself according to the principles of the Paris Declaration on Enhancing Aid Effectiveness. However, multiple challenges still remain and further technical assistance is needed to bring the whole Cambodian land administration system to be technically and financially fully sustainable.

La Problématique De La Domanialisation Des Terres En République Démocratique Du Congo

Godelive Phanzu (Democratic Republic of Congo)

Key words: Cartography; Land management; Legislation; Spatial planning; property registration; land ownership; boundary; access to land

SUMMARY

Dans notre pays, les coutumes varient d'une province à l'autre et même d'un district à l'autre. Le droit du sol que nous appelons la propriété foncière coutumière est le fait de groupes sociaux) bien déterminés. Chaque groupe a un nom spécifique), il existe réellement et occupe un domaine. Il a une organisation interne, parfois fondée sur la généalogie. Le droit de propriété foncière coutumière, c'est donc un droit collectif qui s'exerce sur un domaine dont les limites sont par fois vagues, mal définis, contestées, difficiles à identifier, mais existent toujours et sont connus des membres du groupe. L'État n'a pas disposé jusqu'ici les moyens matériels suffisants pour concrétiser les limites de ces domaines et pour s'assurer de la coïncidence de ces limites avec leurs représentations sur les cartes foncières. Le droit écrit divise les terres en deux catégories sur la base d'un critère d'occupation matérielle et visible. Il y a d'une part, les terres indigènes (coutumière) qui sont celles habitées et exploitées par les autochtones d'une manière quelconque conformément aux coutumes et usages locaux et d'autre part, les terres vacantes qui sont celles qui ne répondaient pas à la définition des terres indigènes, bien qu'elles puissent être soumises à la charge de certains droits considérés comme secondaire. Le Chef des terres Le chef des terres exerce une fonction de gérant du domaine. C'est tantôt un descendant du fondateur du groupe, écarté du pouvoir pour une raison quelconque, mais ayant conservé ses pouvoirs magiques et religieux sur la terre, tantôt une sorte fonctionnaire du souverain, nommé par lui, pour la gestion du domaine. Le droit de propriété foncière coutumière) est considéré comme inaliénable. Dans la coutume, l'aliénation s'accompagne des caractéristiques suivantes : a) La possibilité qu'un jour le terrain fasse retour au groupe ; b) L'impossibilité d'aliéner l'entièreté du domaine ; c) Le nom du groupe ou du titre ne peut être altéré, il est toujours lié à une terre déterminée. Le Chef des terres désignait les emplacements à occuper, fixait la destination des terres devenues vacantes, autorisait les étrangers au groupe à s'établir sur des terres du groupement, expulsait les personnes considérées comme indésirables. La principale prérogative du chef des terres, tirée de l'utilisation du domaine collectif par ses sujets, est le droit aux corvées et aux tribus (sorte d'impôt foncier). Le droit de propriété foncière coutumière que nous venons d'examiner superficiellement dans son ensemble sans entrer dans les particularités de chaque province de notre pays est un droit précaire : or, le cadastre est conçu sur les terres bien déterminées, stables et officiellement reconnus par l'autorité du territoire. Régime d'occupation des terres On vient de voir qu'au Congo, l'occupation des terres est caractérisée par la coexistence de deux régimes de tenue du sol fondamentalement différents : - La propriété privée de droit écrit

: - La propriété foncière coutumière : Le régime d'occupation des terres domaniales Les terres que l'État s'est appropriées après une enquête de vacance effectuée sur place par les agents de l'administration et après rachat des droits détenus sur ces terres par les autochtones sont loties dans les centres urbains (appelé par fois régime du livret de logeur), régime proche dans sa conception de la propriété privée de droit écrit. Le régime des lotissements spontanés Dans ce régime, les Chefs des terres cèdent les terres moyennant une redevance en argent et en nature. Ce régime s'est développé plus tard, dans le lotissement domanial et handicape l'organisation d'un cadastre moderne. A nos jours, ces modes et régions d'occupations des terres se transforment, car aucun cadastre n'a suivi cette expansion au changement du régime coutumier en régime intermédiaire décrit par la loi comme la me gestion de l'espace foncier de l'État. Dans sa conception la plus générale, le cadastre répond à un triple besoin. - Une préoccupation politique qui à mesure que le pays se civilise, se transforme en préoccupation administrative et économique. C'est ainsi que le cadastre sert de support à ces nombreux projets publics et privés de génie civil, d'urbanisme, de remembrement - Un mobil fiscal ; - Un besoin d'ordre public ; Ces besoins ne sont pas partout ni à toutes les époques identiquement les mêmes. C'est ce qui explique les différences par fois très considérables qui caractérisent les cadastres d'une époque à l'autre et d'un pays à l'autre. Il est certain que dans des territoires où le droit foncier dérive entièrement de la coutume comme c'est le cas dans certains pays d'Afrique, le cadastre aura son seul champ d'application réduit aux seules terres occupées sous le régime du droit écrit. Donc, une région où le droit foncier est régi par la coutume peut être dotée d'un cadastre dès le moment où les habitants de cette région s'acheminent à reconnaître le droit écrit comme leur propre droit. Il n'existe pas au Congo un cadastre général qui s'étend à l'entièreté du territoire, comme il en existe dans les pays d'Europe. Ceci entraîne que seules les terres régies par le droit écrit ont fait l'objet d'un cadastre. Il existe donc au Congo un cadastre partiel. Il n'est pas limité à telle ou telle partie du territoire, pouvant être définie administrativement, mais à une catégorie de terres : celles qui sont régies par le droit écrit. Classification des terres Jusqu'à l'entrée en vigueur de la loi foncière, il existait une classification des catégories de terres, entres autres : a) Les terres indigènes : celles que les nationaux habitent, exploitent et cultivent de manière permanente. Elles ne sont pas régies par le droit écrit. Elles appartiennent à la coutume. Le cadastre Congolais ne comprend pas les terres indigènes. b) Les terres démoniales, on distingue le domaine public et le domaine privé. - Quelle stratégie adopter pour quitter les systèmes cadastraux traditionnels vu la vitesse accélérée en raison de la croissance de la population arriver à la sécurisation fiable des droits de propriété foncière. - Comment fournir les informations suffisantes et fiables concernant la situation légale d'un terrain. - Comment fournir les prestations de service fiable. - Comment convaincre le gouvernement à apporter une pierre sur l'adaptation de service foncier à la modernisation et à la mondialisation technologique.

Gazetting the PLUS North–South Expressways –The Challenges

Hj Ishak Abu Bakar (Malaysia)

Key words: Cadastre; Land management; Real estate development; Malaysia Government; Public Land; Land Acquisition Act 1960; National Land Code 1965; PLUS North-South Expressways

SUMMARY

PLUS North-South Expressways is one of the major privatization project initiated by the Malaysia Government in 1990's. During construction of the highway, public land was acquired by Government according to Land Acquisition Act 1960 to materialize the project. There are several processes (which involved legal document) have to be followed by government agencies i.e. Department of Director General of Lands and Mines (Federal & States), Department of Survey & Mapping Malaysia, Malaysian Highway Authority and Land Office before such land could be gazette and converted to Government land as required by National Land Code 1965. The paper will highlighted as a concession holder, PLUS's experiences and challenges whilst assisting the Government agency to ensure the whole process completed.

Contractualisation of Environmental Law

Xavier Prigent (France)

Key words: Land management; Legislation; Environment

SUMMARY

The success of a planning operation requires a qualitative process for the production of every actor but also in the production chain of actors. Nowadays in France our elected members are talking about town planning projects while in parallel new texts, new regulations are constantly published. One can therefore ask this voluntary dual question: does the rule make the project or is it the project which makes the rule? Our latine legal system, which is based on the respect of written rules, makes us sometimes forget the complexity of the problematic of the issues which requires a transversality in the approaches. Now, a successful planning project necessarily requires a contextualisation. That's the reason why the French Order of licensed surveyor is currently carrying out a research contract on the contractualisation of environmental law. Should planning be subject to unilateral acts or could it evolve towards contextualisation, pragmatism, negotiation of rules through contract (prospect, public equipments....) while respecting the main principles of planning which are set by collectivity?

Vertical Living Phenomenon in Malaysia

Wan Nor Azriyati Wan Abd Aziz, Zairul Nisham Musa, Noor Rosly Hanif, Ainoriza Mohd Aini and Abdul Ghani Sarip (Malaysia)

Key words: Cadastre; Land management; Real estate development; Vertical living; social decay; service charge; common area;

SUMMARY

Vertical living phenomenon can be traced in all continents in the world more than decades ago. A number of researchers have collectively agreed that many factors contributed to this phenomenon. Amongst the key reasons are the movement of the people to the urban areas, increasing land value, scarcity of land in urban areas as well as life style. While others argued that the vertical development is the answer to the massive housing shortages, especially in major cities in the world such as in South Korea and Japan. This has result in vertical living as the most common style of living for the vast majority of the people. For these environments where high density is inevitable, there are strong opinion that high rise building development created an urban pathology and social decay in residential areas. In addressing this negative impact, in countries such as Australia, Korea and Hong Kong the state has formulated special provision and legislation pertaining to the vertical building development. Zooming into the Malaysia experience, the emergence of vertical building can be traced in the early 1970s. In the context of Malaysia, the management and maintenance of vertical living building can be divided into two stages. The first stage is before the issuance of Strata Title where the property is under the responsibility of the developer as stated in Sec. 191 of the Housing Development (Control and Licensing) Act and the second stage is after the issuance of Strata Title, where the property will be under the responsibility of the Management Corporation (MC) as stated in the Strata Title Act 1985. The facilities and common areas are shared between the residents. The residents pay a service charge as a fee for the facilities provided, while the MC is responsible for managing the facilities. Questions arise as what are the benefits or cost in vertical living and what are the issues and challenges faced by the households living in the stratified properties? Are the residents satisfied with the management of their properties? Using face-to-face survey on 150 respondents lived in vertical residential units in Shah Alam, capital city of Selangor, the findings suggests that majority are pleased with the amount paid for their service charge due to the fact that they received a good management and maintenance services for their properties. There are indeed more benefits than cost gained from living in vertical units but they perceived lack of understanding in the current legislations have led to less level of satisfaction with this type of life style. This suggests that the government need to play more roles in creating awareness amongst the citizens of the rights and responsibility in living in vertical units.

Urbanisation, Internationalisation and Access to Housing

Rahah Ismail (Malaysia)

Key words: Affordable housing; Cadastre; Land management; Real estate development; Urban renewal; Internationalisation; access to housing; housing policy; housing finance policy; property market; foreign ownership;

SUMMARY

The South Johor Economic Corridor, Iskandar Malaysia, was established in 2006 to propel the economy of Malaysia. Taking advantage of its strategic location within the growth triangle of Indonesia, Malaysia and Singapore and situated along the busiest east- west shipping route, Iskandar Malaysia positioned itself as “international city” by reducing trade barriers, increasing human mobility and international financing. In addition Iskandar Malaysia also facilitates property ownership by foreigners. As a result, Iskandar Malaysia is rapidly urbanizing. Many new urban centres emerge and created a strong demand for real estate. Activities in the property market have increased tremendously both in terms of volume and value of properties. The number of foreign ownership has also steadily increased. Iskandar Malaysia has been successful in attracting Foreign Direct Investment, where it ranked first in 2012 as the favourite destination for foreign investment in Malaysia . Foreign direct investment in Iskandar Malaysia has also superseded its initial target of RM 60 billion. With all the success story of Iskandar Malaysia, this paper attempts to look at access to housing by the local people. It examines the residential property transactions by analysing the house price, location of the property and demography of the purchasers. The housing policy, Bank Negara Policy on housing finance and its implementation will also be examined. The research will be based on primary data on property transactions recorded at the Valuation and Property Services Department, Ministry of Finance Malaysia. Data on the implementation of affordable and low cost housing policy will be gathered from the local councils. Interview will be carried out with bankers to study on the impact of prudent lending guidelines on the access to housing. The research will conclude with the current situation on accessibility of housing by the locals amidst the internationalization policy.

Automated processing for 3D Mosaic generation, a change of paradigm

Frank Bignone (Japan)

Key words: 3D Urban Model, Street Imagery, Oblique imagery, Mobile Mapping System, Parallel processing, Digital processing, Street Factory, 3D Application

SUMMARY

During last two years, a boom has been seen in the use of new generation of 3D database mainly pushed by the automatic processing of oblique imageries into real 3D models, known as example as 3D Mosaic. The introduction of such product has changed the way how people are interacting with 3D information and using that 3D information into their geographic system and organization. This paper will focus on the advantages of automated processing for 3D mosaic generation with some real case applications of such final product. Indeed, introducing automatic processing for such database has changed the current paradigm that 3D realistic database can only be acquired and generated with lots of manual work and taking months to get small area. Introducing fast automatic processing gives ability to map a whole city in few weeks and then to make available such data with very dense 3D details to numerous actors which can then integrate it into their application. It opens also real possibilities of asset monitoring, urban management on large scale while lowering the overall cost of 3D database management and maintenance. Demonstration of such automatic processing of large 3D dataset in short time and comparison with classic technology will be shown through numerous real-case examples. Real end-user applications will also be provided showing the benefit of such approach compared to classic means of 3D database production.

The development of the normal heights system in Azerbaijan by the satellite methods

Magsad Gojamanov (Azerbaijan)

Key words: GNSS/GPS; Positioning; Reference systems; Remote sensing; normal height; geodetic coordinates; satellite; ellipsoid; potential

SUMMARY

It is known that as a result of satellite definitions are received spatial geodetic coordinates X, Y, Z of the observation points of artificial Earth satellites. However, geodetic height is unsuitable for the decision of problems, connected with works in the gravity field of the Earth. Therefore, there is a need to move from geodetic height to height in the gravity field. In the paper it was considered a principle to establish a system of the satellite normal heights and on its basis was developed a modern concept of constructing a system of the altitude provision on the territory of the Azerbaijan Republic. The main idea of this concept is that as the plane coordinate system and the high-altitude system are implemented by the same set points of geodetic networks of HGN (high-precision geodetic network) and the SGN-1 (satellite geodetic network).

Geodetic measurements for earthquake studies in Turkey

Haluk Ozener and Bahadir Aktug (Turkey)

Key words: Deformation measurement; GNSS/GPS; Positioning; "Earthquake"

SUMMARY

Determining direction and velocity of tectonic movement in a region, microblock rotations, locations of active faults, slip rates of active faults and slip rates components, shear deformation, magnitudes of earthquake potentials, and pre/co/post-seismic velocity fields can be counted as the main outputs of geodetic methods in tectonics and earthquake-induced deformation. Earthquakes occurred in the last twenty years in Turkey (October 1, 1995 Dinar; August 17, 1999 Izmit; November 12, 1999 Duzce; February 3, 2001 Cay and October 23 2011 Van) have been investigated by geodetic methods, and the results have contributed in many ways to other disciplines. The majority of crustal deformation studies are based on campaign mode GPS survey in the country. However, in the recent years, MAGNET in Marmara region (Marmara Continuous GPS Network) and TUSAGA in western Anatolia (Turkish National Permanent GPS Network) with the current TUSAGA-Active (Turkish National GPS RTK Network / a.k.a CORS-TR) covering the entire Turkey have been established to enhance GPS capability by providing high accuracy and integrity. In this presentation, geodetic infrastructure and geodetic studies for geodynamic research in Turkey is described and discussed.

Engager l'industrie avec la génération future de Géomètres

Thierry Demathieu (Australia)

Key words: Curricula; Education; Génération Y, apprentissage, collaborative, interactive, Autodesk, LISCAD, Melbourne, Australie, Geometre, commercial, industrie, entreprise, universités,

SUMMARY

Agnès King du magazine d'analyse financière australien affirme que d'après un sondage de 300 patrons financier australien "La Génération Y ont les chevilles qui enflent ... Le personnel de moins de 30 ans ont une perception gonflé et souvent délirante de la valeur qu'ils ajoutent à l'organisation". En outre, le site web de news.com.au a publié que «Selon la nouvelle étude menée par le bureau de recherche McCrindle, le métier de géomètre est le meilleur choix pour les étudiants, et le classe comme diplôme le plus sous-estimé de l'Australie ... neuf sur dix des diplômés ont trouvé un emploi à temps plein dans leur domaine de prédilection - avec un salaire moyen de départ de \$A 52,000 par an. " Connecter la génération Y avec l'industrie implique de s'engager avec les deux parties en ayant une compréhension aiguë de leurs différents besoins. Au travers du plan stratégique (Transformer le future) 2015, RMIT relève le défi de nous diriger vers une Université global, urbain et connecté. Global dès leur première expérience, l'université engage la Génération Y en fournissant de l'équipement, du matériel et des logiciels en mettant l'accent sur les compétences et le renforcement des connaissances. Ensuite, ils sont dirigé vers un environnement autogéré pour apprendre de manière collaborative, interactive, et avoir de l'expérience de l'apprentissage mobile qui évolue constamment, et garde les étudiants engagés comme jamais auparavant. Ils organisent des outils et des liens avec nos applications gérées virtuellement de bureau et l'accès au cours spécifiques, les produits Microsoft Windows ® et Office, internet et services d'impression à travers une gamme d'appareils - tous via le réseau sans fil (wifi) du campus RMIT. Ils installent des versions éducatives gratuites de CAO (Autodesk) et des logiciels de calcul (LISCAD), et utilisent le travail d'apprentissage intégré (WIL) Les activités qui intègrent l'apprentissage scolaire avec son application en entreprise. La pratique peut être réelle ou simulée et peut se produire sur le lieu de travail, à l'université, en ligne, en face-à-face ou une combinaison de ces éléments. Les stages d'étudiants payés dans l'entreprise sont une composante importante du travail d'apprentissage intégré (WIL). Les Projets de vie réelles sont abordés pour contester et pour développer la créativité et les connecter avec des émotions. A titre d'exemple, le chemin de fer miniature à Eltham, Nord-Est de Melbourne, un endroit dont ils se souviennent quand ils étaient jeunes devient un projet de vie réel quand ils ont été approchés pour travailler sur le levé et la conception d'une extension dans le parc adjacent. Le Groupe de travail du métier de Géomètre démarré dans l'état du Victoria fait la promotion de l'industrie auprès du grand public grâce à des campagnes et des événements commerciales. Les membres sont l'industrie, les organismes professionnels et les universités.

Il contribue à faciliter le placement des élèves en temps partiel / expérience de travail dans l'entreprise. Gen Y reste connecté par l'organisation de conférences pour l'industrie qui offre un développement professionnel aux membres et étudiant et le placement des élèves dans l'apprentissage intégré au travail dans l'industrie.

Cadastre 2034 – Australian Strategy for Cadastral Reform and Innovation

Bill Hirst (Australia)

Key words: Cadastre;

SUMMARY

The land boundary system of Australia underpins a stable and reliable land-based property rights system that makes a significant contributing role towards economic and social prosperity. The Cadastre 2034 strategy developed by the Intergovernmental Committee on Surveying and Mapping (ICSM) recognises that this function will continue to be an important part of our future. It also anticipates societal demands will change substantially over the next 20 years as new technologies, environmental challenges and social and political influences, which are increasingly dependent on real-time mobile knowledge, gradually transform inherent traditions, practices and thinking. Cadastre 2034 establishes a single philosophy for Australia detailing what the community can expect and what the government has to deliver in the future. Cadastre 2034 will guide the evolution of jurisdictional systems and ensure a coordinated and consistent approach to future policies, legislation, standards, models and research; and provide clear direction for the sector as a whole. The strategy has five goals. These are directed to achieving a cadastre that is: • fundamental to land and property ownership and is sustainably managed; • multipurpose, truly accessible, easily visualised, and readily understood and used; • fully integrated with broader legal and social interests on land; • a representation of the real world, which is survey accurate, 3-dimensional and dynamic; and • a national cadastre based on common nationwide standards. This international launch of the Australian cadastral strategy is a consultation draft. We welcome input and feedback from the international community.

Study for Comparative Analysis of Changes in Shore Line Using Multi Stage Satellite Images (Case Study: Gresik and Bangkalan, Indonesia)

Hepi Handayani (Indonesia)

Key words: Remote sensing; shorelines, delineation, multistage

SUMMARY

The coastline is always a very significant change from year to year . Shoreline changes was caused by many factors such as erosion , sedimentation , currents , tides , and other factors such as human activities . In Gresik and Bangkalan, Indonesia, an example of shoreline change is influenced by the presence of high activity in the coastal zone that serves as a port . One method that can be used to determine changes in the coastline is delineation method. This research employs this method with Landsat ETM 7 satellite imagery and QuickBird . Multi-stage method is also applied to determine the pattern of shoreline change . The results showed that there was a reduction of length in 2002 along the coastline, around -1.65 km in Gresik area. But In 2007 Gresik has the addition of up to 18.05 km, while in Bangkalan there is a reduction amounting to -2.06 km . Reduction of land area occurred in 2002, it is around to 1228.33 ha in Gresik and Bangkalan 147.44 ha. Whereas in 2007, there is additional area of 389.07 hain Gresik and 571.77 ha in Bangkalan.

Land Management in the Context of Urban Regeneration

Theo Koetter (Germany)

Key words: Land distribution; Land management; Spatial planning; Urban renewal; affordable housing

SUMMARY

Social segregation combined with social polarization becomes more and more a serious problem for a sustainable urban development in many towns in Germany. The main reasons are the lack of affordable flats and the lack of suitable building land on one hand and the increasing number of households even in those towns with decreasing population because of the demographic changes on the other hand. As consequence of this development a steadily rise in prices for urban building land, land lease and rents for dwellings can be realized. At the same time the rate of public houses is also decreasing. Because of the low interest rate the building companies are not interested in public credits to build subsidized houses. Hence more and more private households with lower income are not able to rent an adequate flat. They are often forced to disappear in the suburban areas or in disadvantaged urban areas which are affected e.g. by industrial production, traffic and air pollution that lead to bad living conditions. Finally the social segregation in many towns progresses. Therefore some towns in Germany have created a special local land policy to solve this problem. The main targets of these social oriented land use strategies in planned residential areas are 1. to achieve a rate of 30 % of subsidized buildings 2. to shift the development costs for building land to the land owners and 3. to improve urban and environmental quality of inner urban areas. By the example of Munich, Cologne and Stuttgart the strategies for building land development are depicted and the effects of these instruments as well as the chances and borders for improving a social fair urban development are discussed. Furthermore the possibilities and restrictions to transfer this new approach to other towns are shown.

Person, Parcel, Power. An extended model for land registration

Peter Laarakker, Yola Georgiadou and Jaap Zevenbergen (Netherlands)

Key words: Cadastre; Digital cadastre; Land management; Legislation; Security of tenure; Land Registration Theory

SUMMARY

Several authors in land registration have overemphasized the process of recording land interests at the expense of the process of classifying these interests. For instance, Nichols defines land registration as “the process of recording legally recognized interests (ownership and/or use) in land”. Her definition takes “legally recognized rights” as a starting point and thereby reduces the role of the State to a mere administrator of already established rights. Similarly, Henssen’s classical Man-Parcel-Right diagram does not foreground the State as a relevant factor. Arguably, classifying land interests and the State’s role in the classification process have received less attention because classification by the State takes place before land registration. This model of objective, straightforward land registration is at odds with current processes in the domain of land registration. Nowadays, many different State and non-State actors are involved in the process of classification and are influencing the process of registration. Advances in geo-ICT are facilitating this greater involvement as shown by initiatives like OpenCadastralMap, MapMyRights, CommunityLandRights and crowd-sourced cadastral mapping initiatives, in general. The international acceptance of the Continuum of Land Rights also undermines the monopoly of the State in the definition and classification of land rights. In this paper, we present a model of land registration that makes explicit the various classifiers (State, non-State, local, global), their classifying approaches, their rationales and the tensions between them. The model extends Henssens’ classical diagram with the variable State (or Authority or Power). With this extended model we can better understand the legality and/or legitimacy of a land registration system and the authority of the classifier and administrator of the system.

Marine Spatial Planning of China – A tool for Integrated Marine Resources Management

Yingji Mai (China, PR)

Key words: Hydrography; Marine cadastre;

SUMMARY

The situations that China faces are different from those of just a few years ago, because now China not only has to respond to the global challenges of financial crises and climate change, it also has to resolve increasing serious resources shortage and environmental pollution issues. One important way for China to achieve a balanced relationship between population, resources and the environment was to use more marine resources. China is an important coastal country, The wealth of marine resources and the enormous value of marine ecosystem services are and must continue to be an important contributor to the social-economic development in China, which is calling the increase the effectiveness and efficiency of marine resources management. Marine spatial management is gaining considerable importance all around the world. Various countries have started to use marine spatial management to achieve sustainable use and biodiversity conservation in ocean and coastal areas. In China, marine spatial planning is also considered as the cornerstones of the management strategy for the sustainable utilization of it's marine resources. This article introduces the marine resources of China and the zoning and planning schemes in China, such as the Main Functional Division Scheme of the territory of China, the Marine Functional Zoning Scheme, the Marine environmental functional zoning Scheme, and other sectional functional zoning schemes. It also analyzes their problems in practice to call for an integrated approach in marine resources management.

Hydrography at the HafenCity University in Hamburg

Markéta Pokorná and Annette Hadler (Germany)

Key words: Capacity building; Cartography; Coastal Zone Management; Curricula; Education; Engineering survey; Geoinformation/GI; GNSS/GPS; Hydrography; Laser scanning; Marine cadastre; Photogrammetry; Positioning; Remote sensing; Young surveyor; New University Building

SUMMARY

We are living on a blue planet, 70% of our planet is covered with water and about 50% of the sea areas have not yet been surveyed. The new socio-political structures of the ocean might play the key role in the next century. More than half of the world's population live within a 60 km wide coastal strip, and this percentage will rise. Half of all coastal countries do not have any hydrographic services. The developing countries especially will be challenged in the coming years. They will need ships, instruments and the necessary know-how for the hydrographic works. The City of Hamburg is called „The Gate to the World“. Hydrography started in Hamburg in 1985 as a full-time course of study at the Hamburg University of Applied Sciences. It became the only academic institution in Germany offering a program accredited according to the “Standard of Competence of Hydrographic Surveyors”. Since 2009, hydrography continues as a specialisation within the area of Geomatics at the Newly Founded HafenCity University (HCU), and attracts students from all over the world as this specialisation is offered exclusively in English. Geomatics, with its specialisations, overlaps with other branches within the HCU. The FIG/IHO/ICA certified this course at the highest level, Category A. We work in small groups up to a maximum of 20 students and our studies are very practise oriented. We offer excursions on ships, participation in regular International Summer Camps and we offer practices in cooperation with the industry. Planning and Building within the Metropolis is the main focus of the HCU. And all metropolises lay close to water. In March 2014, HCU moved to a new building in the city centre. Hydrography feels more than comfortable to be close to water in the harbour. Hundreds of hydrographers are needed worldwide. To meet this demand our priority is to maintain the highest level of hydrographic education in the highly attractive, international surrounding of the HCU. To enforce synergies within the industry for our students and our future. To keep and intensify the existing relationships with national, international institutes and universities while establishing new cooperations. Our main aim is to have happy and motivated students. Related to the millenium aims of the United Nations we welcome students from the developing countries for the constructive exchange and transfer of know-how.

Mercator's Globes for Murad III's Observatory in Turkey (1569)

Jan de Graeve (Belgium)

Key words: History;

SUMMARY

In 2012 we have celebrated the 500th anniversary of Gerard Mercator born in 1512 and I was fortunate to present a study of his scientific books of his vast library. An exhibition was held in Sint Niklaas, between Antwerp and Ghent near the place where he was born in Rupelmonde I studied his life and work and this is probably, why I stand here to-day. Murad III (1546-1595) Ottoman Sultan of Turkey from 1574 to 1595 ;he expended the empire to the Caspian sea, to Azerbadjan and in the west he got in conflict with the Austrian Empire. His grandfather was Suliman the Magnificent; his father is called Selim II and his mother Nur Banu Sultan, she was born in Venice, but captured at sea when she was 12, and she became a favorite of Selim II. In 1574 Murad III became the sultan succeeding to his father. Shortly after he decided to construct an observatory in Istambul, the works were completed in 1577. In 1579 2 years later the grand vizier Sokahlin Mehmed Pascha was assassinated .The mufti, who had great influence on Murad III had issued a fatwa, to destroy the observatory and all its instruments, A miniature remains of the instruments in the observatory; The globes were to be installed in the Tophane observatory. I was asked if the globes left the workshop of Mercator? I think the 3 instruments left the workshop but never reached their final destination, as no record was found in the archives of the Ottoman court. They were probably ordered by a wealthy client to be offered, or sold to Murad III, and they probably remained in the family until the auctions by Christies in London in the 90es. The destruction of the observatory in 1579, can well be one of the reasons the instruments didn't reach Istambul. The instruments probably remained in the family for 4 centuries, until the auctions by Christies in London in the 90es. They have been attributed to Gerard Mercator's workshop during his Duisburg period. They are not signed but dated 1579 and all three have the same old inventory n° 154. The 3 instruments have the Tughra, the signature of Murad III and cartouches are written in latin and in Turkish. The inscription *omnium regnum mundi rex* is the translation for *sha in sha*. The inscription in the Indian Ocean reads: *Amurates III Magni in coeli Dei soly manus solus omnium regnum mundi rex imperator sulthanus Turcorum 1579* We find the magnetic pole, as we do on Mercator globes also the configuration as on his map of 1569 *ad usum navigantium*. The data are those of Mercator's Ptolomaeus map of 1578 and data his son Romuald published in his map of 1587,

Hydrography, Nautical Charts, Marine Spatial Data Infrastructure and Blue Economy for the “World We Want”

Mustafa IPTES (Monaco)

Key words: Hydrography;

SUMMARY

No human activity can take place in, on or under the sea in a safe, sustainable and cost effective way without hydrographic information. The most widely-known use of hydrographic data is to make nautical charts that enable mariners to navigate their ships and boats safely at sea. However, “Hydrography is much more than just nautical charts” which is also the theme for World Hydrography Day 2014. Hydrography is increasingly being recognized as a fundamental pre-requisite to the development of successful and environmentally sustainable human activities in the seas and oceans. Hydrography is underpinning the Blue Economy which provides jobs and creates wealth for the World We Want. The Blue Economy is much more than the traditional core activities of fishing, maritime trade and passenger ships. To make the best use of hydrographic information for the Blue Economy related activities, it is important to make it easily available through interconnected digital geo-referenced databases accessible via web-based interfaces which are known as Marine Spatial Data Infrastructures (MSDI).

Cosmographia of Sebastian Munster in the 16th Century

Jan de Graeve (Belgium)

Key words: History;

SUMMARY

The city library of Brugge invited me to come and give a Lecture on cosmography in the 16th century. On this occasion the Bruges copy was on exhibit for the BIMCC members on February 18th 2014 Short bibliography*1 Sebastian Muenster was born in Nieder-Ingelheim, near Mainz in Januari 1488 and died in Basel on May 26th 1552. This is the short version. Like many young man he took the orders in Heidelberg. He studied for a short period in Leuven and in Freiburg, he met the cosmographer Georg Reisch, who published the Margaretha Philosophia from 1505 onwards, this book went into many editions. Later in his studies he met Conrad Pellikan, who taught him Hebrew, In Pforzheim he became a catholic priest. In 1515 he lectures philosophy and theology in Tübingen. Here he meets Johannes Stöfler who introduces him to astronomy and higher mathematics. Both Hebrew and applied mathematics will conduct his work and publications. He finally became professor of Hebrew at the University of Basel, where he lectured for the rest of his life. In 1529 he choose for the Reformation church. In 1530 he married the widow of his printer Petri and from then, all publications were printed in Basel by the printing house Petri. This conference will be illustrated with power point illustrations from the original book

Off Plan Sales: Is it an Elixir for Property Financing in Emerging Markets?

Collins Kowuor (Kenya)

Key words: Affordable housing; Property taxes; Quantity surveying; Real estate development; Off-plan property, Property financing, Property development, Housing

SUMMARY

In most emerging markets, the middle class is burgeoning while purchasing power is diminishing due to high cost of living. The consumption level is high while the cost of borrowing to satiate that consumption appetite balloons. One of the products that the middle class seeks to buy is a property, their own property – mostly for own occupation that for investment purposes. This demand coupled with most banks luring the middle class for long-term mortgages, has made most property developers to sell off plan properties. These are also called pre-construction properties and is one way beating high cost of borrowing. Some people even call them paper properties! What is an off plan property? Let me explain it this way; a property developer has land to develop but the development requires a lot of money. The developer has less money and has to borrow from financiers to do the development. Sadly, the cost of finance is too high to be absorbed in the price of the housing units without being uncompetitive. The developer then prepares a concept of the development with nice documentations such as 3D drawings with site, floor and unit plans. Detailed information on financing terms, projected rentals, and so on is also provided. Upon approval of the plans by the approving authority, the developer offers the yet to be developed units for sale. The developer therefore raises enough funds for starting construction of the units. The construction is done in phases to sync with installment payments upon stage valuation. The developer may differentiate discount rates in line with stage of the development. The nearer the development is to completion, the less the discount given and the more expensive the units become. The buyers of off plan units don't have to pay the full purchase price in lump sum thereby reducing pecuniary risk. The discounts offered by developers are usually quite decent which makes appreciation of value of the off plan property rapid. The fact that payments are done by reasonable installments also helps one to plan well in terms of cash flow. However, as with all investments, one needs to be willing to take some risk if one wants a good return. The crux of the matter is to minimize risk by properly researching the property investment. The buyer needs to consider four key factors before buying an off plan property. The developer: One must get as much information as possible about the developer. How long have they been in business? How many developments have they successfully completed? Property type: This will depend on one's own needs and goals. Are you for investment or home or hybrid property? Do you prefer stand alone or gated community? Location: This is a very important consideration, as it will affect future value of the unit and area around the development. Is the necessary infrastructure such as utilities and roads in place? Contract: Make sure that terms and conditions of contract with the developer are clear enough and water

tight. In a nutshell, off plan property can offer both the developer and owner very impressive returns due to reasonable cost of development. For the buyer, simply ask a lot of questions, see many things and use the right people.

Land Administration: Two Speed World – A Study

Megha Datta, Bhanu Rekha Maturi and Arup Dasgupta (India)

Key words: Cadastre; Capacity building; Cartography; Digital cadastre; e-Governance; GNSS/GPS; Land management; Low cost technology; Positioning; Property taxes; Remote sensing; Land Registration

SUMMARY

Presentation will share results of a survey undertaken by a neutral body (not a government agency or private sector service provider) that studied Cadastral Mapping and Land Registration Systems in 22 countries. The survey compared the results between developing and developed countries and leads us to better understand the pain areas of the stakeholders of the land domain, the technologies being currently deployed in achieving this objective and future prospects in this sector. It raises some key questions for all stakeholders involved vis-à-vis the current state of land administration systems, pressing needs of involved stakeholders, and identify gaps in the system, which need to be filled. Open ended questionnaires and interviews were conducted with over 25 participants from different stakeholder communities to generate a holistic picture.

The Changing Role of the Surveying /Spatial Industries Professional – Looking towards 2040

Leonie Newnham (Australia)

Key words: Education; Professional practice; Young surveyor;

SUMMARY

The current definition of a surveyor / spatial industries professional that has been used for the work of the International Federation of Surveyors (FIG) is over ten years old. It now doesn't cover all aspects of relevant professional work. This definition has been widely used in a range of professional and academic work carried out world wide. A group of professionals met in Melbourne Australia on 11 September 2013 to develop this definition so that it represents the scope of the current industry and considers the developments of the future. The outcomes of the workshop are presented in this paper. This is the chance to meet together and reflect on the outcomes and discuss and debate on the future of the profession.

Social media and the professional – how to decide which tool to use!

Leonie Newnham (Australia)

Key words: Education; Professional practice; Young surveyor; social media, social media guide, new ways of doing business

SUMMARY

New ways of working demand new tools. Social media can be a hard thing to navigate for those who have been used to older ways of working. For those already using social media, how do you keep up with the changes and maintain the right tools to communicate with clients? This paper will provide an overview of a social media guide that identifies how and why to make choices on which social media to use and in which business situations. It will provide examples of successful use of social media in our profession from across the world.

Key words:

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