FIG Commission 7
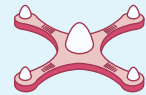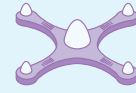# Annual Meeting 2019

"Digital Twin, Smart Cities and Smart Land Information"
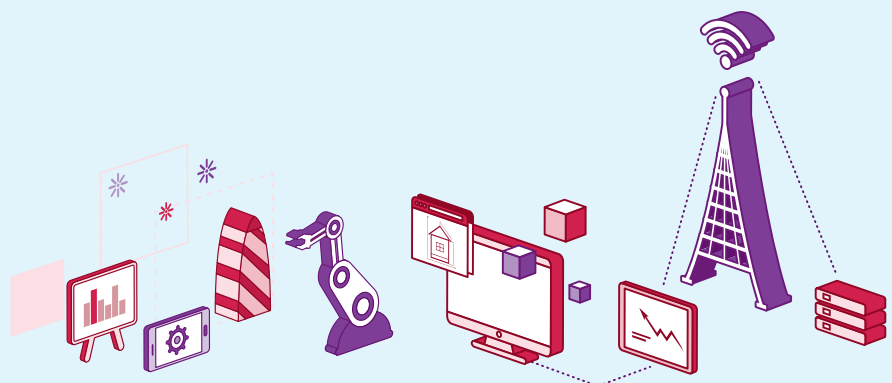
5(Mon) - 9(Fri) August, 2019
Seoul, Korea

MOLIT
Ministry of Land,
Infrastructure and Transport

FIG

LX

Contents

Overview

Title	**FIG Commission 7 Annual Meeting 2019**
Theme	*Digital Twin, Smart Cities and Smart Land Information*
Date	5 (Mon) - 9 (Fri) August, 2019 / 5 days
Venue	Novotel Ambassador Gangnam, Seoul, Korea
Hosted by	MOLIT Ministry of Land, Infrastructure and Transport FIG
Organized by	LX
Website	www.com7figseoul.com

FIG Commission 7
Annual Meeting 2019

Program at a Glance

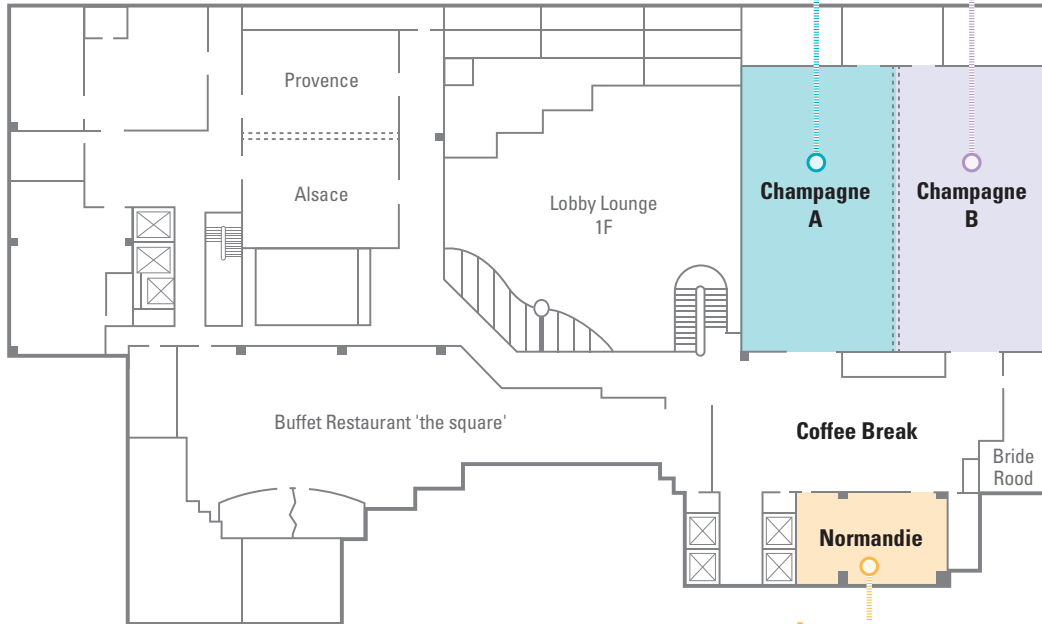| Time	Sun, 4 Aug.	Mon, 5 Aug.	Tue, 6 Aug.	Wed, 7 Aug.	Thu, 8 Aug.	Fri, 9 Aug.
09:00 - 10:00			Registration		Country Reports & Working Group Reports	Technical Tour (Panmunjom)
10:00 - 11:00			Seminar	10:20 - 12:20 Opening Ceremony - Smart Geospatial Expo		
11:00 - 12:00		Registration			11:00 - 11:20 Coffee Break	
					11:20 - 12:30 Closing Session	
12:00 - 13:00		Lunch	Lunch	12:20 - 13:20 Lunch		
13:00 - 14:00		Opening Ceremony	Seminar	13:20 - 14:00 Exhibition Tour - Smart Geospatial Expo	Lunch	
14:00 - 15:00		Seminar	Seminar	14:00 - 15:40 Joint Conference with Expo		
15:00 - 16:00		Coffee Break				
			Coffee Break			
16:00 - 17:00	Registration	Seminar	Seminar	15:40 - 21:00 City Tour & Dinner		
17:00 - 18:00			Seminar			
18:00 - 19:00	Informal Get-Together	Welcome Dinner	Dinner		Farewell Dinner (Han River)	
19:00 - 20:00						

* The program is subject to change.

Floor Plan

Main Venue : Novotel Ambassador Seoul Gangnam (130, Bongeunsa-ro, Gangnam-gu, Seoul)

2F

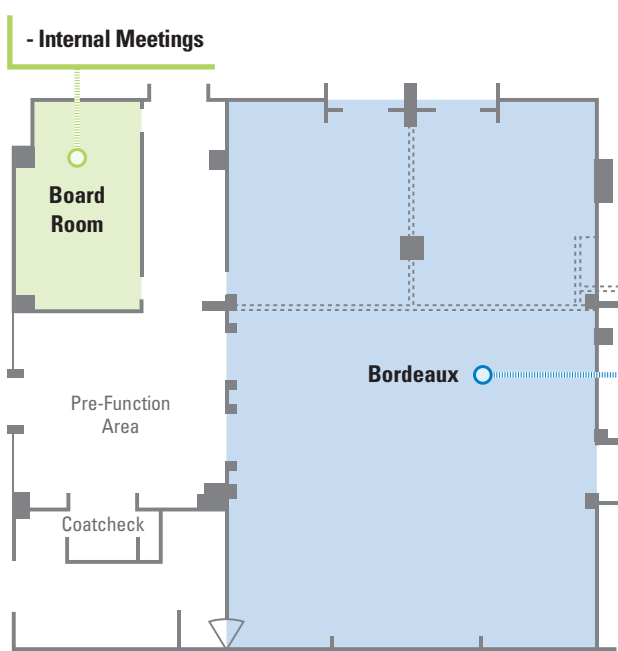- **Opening Ceremony** : Mon.
- **Seminar & Annual Meeting** : Mon., Tue., Thu.

- **Lunch** : Mon., Tue., Thu.
- **Dinner** : Tue.

Provence

Alsace

Lobby Lounge 1F

Champagne A

Champagne B

Buffet Restaurant 'the square'

Coffee Break

Bride Rood

Normandie

- **VIP Room & Secretariat Office**

B1

- **Internal Meetings**

Board Room

Pre-Function Area

Coatcheck

Bordeaux ○ - **Welcome Dinner** : Mon.

Smart Geospatial Expo 2019 Venue : Coex (513, Yeongdong-daero, Gangnam-gu, Seoul)

- Joint Conference
- Exhibition Tour
- Opening Ceremony

Gangnam Station

ASEM-gil

West Gate

Loading Dock / Rooftop Parking Gate

Terminal

City Air Tower

Oakwood

Seven Luck Casino

COEX InterContinental Hotel

Textile Center

Hyundai Department Store

City Airport

3F Conference Room (South) #307

3F Hall C

3F Loading Dock

3F Auditorium

Bongeunsa

South Gate 1

Grand InterContinental Hotel

Food Court

1F Hall A

3F Hall D

1F Hall B

2F Conference Room North 201 - 211

1F Grand Ballroom 101-105

Teheran-ro

South Gate 2

4F Conference Room (South) 401 - 403

3F Hall E 331 - 336

coex

North Gate 4

Exit 5

Coex-Artiuma

Trade Tower

ASEM Tower

GATE 4

Millennium Plaza

GATE 2

GATE 5

GATE 1

ASEM Plaza

Bongeunsa-ro

Samseong Stn. Line No.2

Exit 6

East Gate

Suseo

Coex Parking Lot

ASEM Parking Lot

Yeongdonggyo(Br)

Yeongdongdae-ro

Jamsil

Park Hyatt Seoul

Korea Electric Power Corporation(KEPCO)

Daily Program

4th Aug. (Sun)		
16:00 - 18:00	**Registration for FIG Commission 7 Delegates**	1F Lobby
18:00 - 20:00	**Informal Get-Together**	1F Lobby Lounge

5th Aug. (Mon)		
11:30 - 12:00	**Annual Meeting Registration**	2F Lobby
12:00 - 13:30	Lunch	2F Champagne Hall B
13:30 - 14:00	**Opening Ceremony** · Mr. Chang-hak Choi, CEO of LX · Dr. Daniel Paez, Chair of FIG Commission 7 · Mr. Woo-Jun Sohn, Director General of MOLIT · Dr. Orhan Ercan, Vice President of FIG · Mr. Oumar Sylla, Head of Land Dept. of UN Habitat/GLTN	2F Champagne Hall A
14:00 - 14:30	**Introduction of MOLIT**	
14:30 - 15:00	**Introduction of LX**	
15:00 - 15:30	Coffee Break	2F Lobby
15:30 - 16:00	**Presentation of Korean Cadaster**	2F Champagne Hall A
16:00 - 17:30	**Sharing Experiences of Surveyors** · Korea · Colombia · Turkey · Australia · Netherlands	
17:30 - 18:00	Break Time	
18:00 - 19:30	**Welcome Dinner** · Nanta Performance	B1F Bordeaux Hall

* Presentation files can be downloaded on our website (www.com7figseoul.com)

6ᵗʰ Aug. (Tue)

09:00 - 10:00	**Seminar Registration**	2F Lobby

10:00 - 12:00	**S1.** ~~**Smart City and Digital Twin**~~ ~~**Chair**~~ ~~**Ms. Mira Jung**~~ ~~(Korea)~~	2F Champagne Hall A

Data Driven Smart City Services
Mr. Hyung Tae Kim (Korea)

Digital Twin and Smart Spaces
Mr. Sanghee Shin (Korea)

The Next Generation of Smart City: Augmented City and Digital Twin
Mr. Jong-Sung Hwang (Korea)

Digital Twin (Digital Hub) Case Study for Smart City
Mr. Sangkwan Nam (Korea)

Smart Data and Smart Processes Building Capacity to Upgrade Fit-for-purpose Land Administration
Mr. Ian Harper (Australia)

Disaster Mitigation of Smart Structures in South Korea under Complicated Loads: State-of-the-art
Dr. Mosbeh Kaloop (Egypt)

12:00 - 13:30	Lunch	2F Champagne Hall B

13:30 - 15:30	**S2. Cadaster and Land administration** Chair **Dr. Daniel Paez** (Colombia)	2F Champagne Hall A

Fit-for-purpose Land Administration: From Concepts to Practical Applications
Mr. Danilo Antonio (Philippines)

Entrepreneurship in Land Administration Drivers, Blockers, and Enablement
Dr. Rohan Bennett (Netherlands)

Principles and Lessons Learnt from Land Administration PPP Modelling: A Private Sector Perspective
Mr. Dezhi Yu (China)

Modernising Land Administration Systems
Mr. Nick Land (UK)

Choosing Precision Based on the Aimed Objective; The Experience of the Reform of the Québec Cadastre
Ms. Chrystine Maltais (Canada)

Positional Framework to Support Land Information Systems
Mr. Neil Ashcroft (Singapore)

15:30 - 16:00	Coffee Break	2F Lobby

16:00 - 18:00	**S3. Cadaster 4.0** Chair **Dr. Orhan Ercan** (Turkey)	2F Champagne Hall A

AI Unmanned Mobile Technology Based on Digital Twin Smart City Construction
Mr. Suk Gu Kim (Korea)

An Introduction to the Implementation Process and Results of the Address System in S.korea
Aetti Kang (Korea)

Design and Development of Ladm-Based Cadastral Data Model: A Case of Mongolian Cadastre
Dr. Buuveibaatar Munkhbaatar (Mongolia)

Smart City Government as a Platform: Inclusive or Monocentric?
Ms. Haesoo KIM (Korea)

History of Foundation and Development of 'Cadastral Science' in Korea
Dr. Byoungchan Ryu (Korea)

18:00 - 19:30	Dinner	2F Champagne Hall B

Daily Program

7th Aug. (Wed)		
09:40 - 10:20	**Move to the Smart Geospatial Expo Venue**	1F Lobby
10:20 - 12:20	**Opening Ceremony**	Coex 3F Auditorium
12:20 - 13:20	Lunch	
13:20 - 14:00	**Exhibition Tour**	Coex 3F Exhibition Hall
14:00 - 15:40	**Joint Conference** · Global Technology Policy Conference	Coex #307
15:40 - 18:00	**City Tour (Two Options)** · KT 5G Square · Samsung D'light	
18:00 - 19:30	Dinner · Insa-dong	
19:30 - 21:00	**City Tour** · Changgyeonggung Palace Nighttime Viewing	

8th Aug. (Thu)		
09:00 - 11:00	**Country Reports** · Turkey Dr. Orhan Ercan · Colombia Ms. Evamaría Uribe · Netherlands Mr. Theo Splithof · Newzealand Mr. Nicholas Stillwell · Taiwan Prof. Simon Chien Yuan Chen **Working Group Reports**	2F Champagne Hall A
11:00 - 11:20	Coffee Break	2F Lobby
11:20 - 12:30	**Closing Session** · Wrap-Up	2F Champagne Hall A
12:30 - 14:00	Lunch	2F Champagne Hall B
14:00 - 18:00	**Free Time**	
18:00 - 18:30	**Move to the Sevit Island (Han River)**	1F Lobby
18:30 - 20:00	**Farewell Dinner**	3F Rive Gauche, Gavit Island

9th Aug. (Fri)		
08:40 - 10:00	**Move to the Tour Site**	1F Lobby
10:00 - 12:30	**Technical Tour** · Panmunjom (Joint Security Area)*****	DMZ
12:30 - 13:30	Lunch	Imjingak Park
13:30 - 15:00	**Arrive at Hotel**	

*   Dress Code
There are strict dress code guidelines for the JSA area. Visitors are not to wear clothes such as ripped jeans, sleeveless tops, mini-skirts, shorts, military clothes, exercise clothes, round-neck T-shirts and sandals. Men are requested to wear business shirts.

**   Due to the security regulations, all visitors must bring their passports on the day to access the JSA area.

***Please kindly note that the tour site is subject to change, pending unforeseen circumstances. If we were to change the original tour site due to the unforeseen circumstances, we do have a we do have a contingency plan.

FIG Commission 7
Annual Meeting 2019

Novotel Ambassador Seoul Gangnam

Smart Geospatial Expo 2019

Insa-dong

Changgyeonggung Palace

KT 5G Square
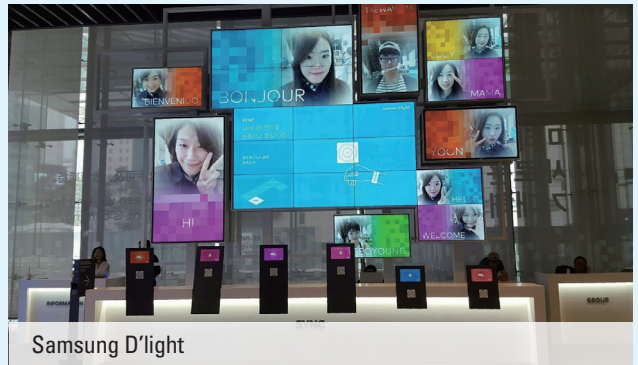
Samsung D'light

Gavit Island in the Han River

Panmunjom (Joint Security Area)
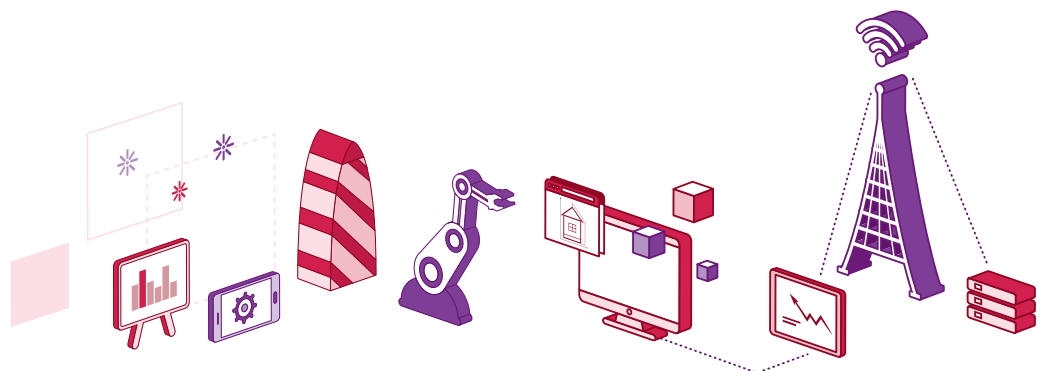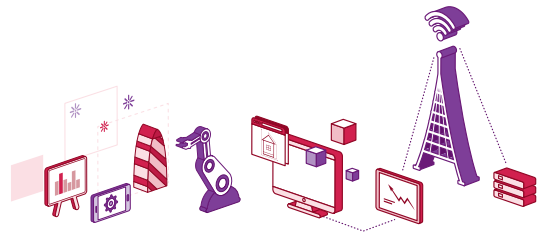
Data Driven Smart City Services

Hyung Tae Kim

Korea

Keywords

Smart City, Spatial Data, Analysis, Urban Simulation, Digital Twin

Summary

This study is to introduce how LX has derived the smart city services based on the urban issues of Jeon-ju City. It starts with identification of current urban issues by interviewing local official. Next, current data are visualized on the maps and digital twin model of Jeon-ju city. This process gave us insight on how to solve those problems. There are three main issues related with solar energy and heat wave.

The first issue is heat wave. Jeon-ju city is located in a basin topography and this causes a high temperature in summer days. Especially in urban areas, heat island is a problematic phenomenon.

One of the solutions is to set up shelters and shade canopies in proper areas. The data were applied on maps by GIS to decide where to set up those urban furniture and to figure out how many facilities are needed. The data used in this analysis include data from heat island measuring sensor, satellite imagery, air temperature, and etc. Applying GIS technology helped identifying distribution pattern of types of people vulnerable to heat. These types include elders who live along, people aged over 65 or under 14, and so on. The spatial criteria for shelters and canopies were set up by integrating these findings. Final sites suitable for those facilities were chosen according to the criteria drawn above.

The second solution is to plant as many as trees in the urban area. Trees and shrubs in urban can prevent heating ground by blocking solar radiation. This is what Jeon-ju city is planning to execute. For the efficient use of budget, available spaces are drawn by several criteria, like current land use, urban plan, etc. This work includes GIS utilization. After figuring out available spaces, suggestion of proper type of trees on each area. There are many factors influencing this process, like PM distribution, soil grade, population, etc. All these are integrated in a GIS data set and produced the result, after which the planting simulation was conducted on the digital twin model of Jeon-ju City. It helped us how efficiently each type of tree have an effect on its environment.

The second issue is solar power generation. The amount of solar power generated depends on the daily solar radiation on surface of each solar panel. To estimate the quantity of solar energy, the digital twin model of Jeon-ju city was used. It helped us to understand where to install the solar panels first to efficiently yield the solar power and estimate how much money can each household save after introducing solar power generation for home use.

Contact

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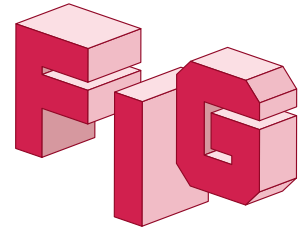
Digital Twin and Smart Spaces

Sanghee Shin

Korea

Summary

'Digital Twin' is a digital replication of real world objects, processes, phenomena that can be used for various purposes. Digital twin concept backs to manufacturing industry in early 2000s for the PLM (Product Lifecycle Management) purposes. It is based on the idea that a digital informational construct about a physical system could be created as an entity on its own. Definitions of digital twin emphasize the three important levels or characteristics. At first, there should be connection between real physical world and corresponding virtual world. To do this, Level 1 digital twin provides virtual 3D models. Secondly, this connection between real world and virtual world is established by generating (near) real time data using sensors or IoT. This is called Level 2 digital twin. Thirdly, Level 3 digital twin carries out certain analyses, predictions, and simulations using virtual 3D and (near) real time data.

'Smart Spaces' are interactive environments where humans and technology can openly communicate with each other in a physical or digital setting. Examples of smart spaces include smart cities, smart factories, and smart homes. 'Smart Spaces' is one of Garner's Top 10 Tech Trends for 2019. As spaces are going through digital transformation with 4th industrial revolution, there are many attempts to apply digital twin technology to manage urban, spatial, and industrial issues around the world. Those attempts look set to play an increasingly important role in the creation of smart cities, smart factories, and smart homes. Bringing the virtual and real worlds together in this way can help to give better analysis, visualization, and simulation to the decision-making process. This will be a multi-way process with iterative feedback among stakeholders.
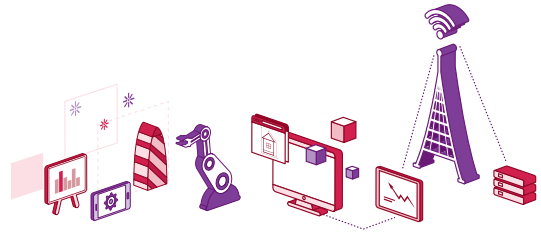
In this seminar, I'll share my real experiences in carrying out digital twin and smart space projects. Also I'll talk about what I've learnt from these projects.

Contact

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Presentation Summary

Session 1. Smart City and Digital Twin

The Next Generation of Smart City: Augmented City and Digital Twin
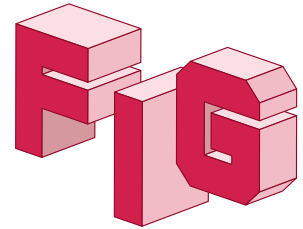
Jong-Sung Hwang

Korea

Summary

Smart City has undergone several stages of development. It aimed to achieve sustainable growth in the mid-1990s and to improve city efficiency in 2000. After 2010, Smart City began targeting intelligent services. And now, the new concept of an augmented city is emerging as the future of Smart City. In a word, an augmented city means a city that augments its citizen physically and cognitively. Citizens living in Smart City can do physical activities and functions that they can not do in other cities without being augmented by the city. The digital twin, which links real space and virtual space, serves as a core platform for these augmented cities. The digital twin provides a basic platform for robotics which enables people physically and AR / VR which supports cognitive enhancement. In contrast to the current digital twin that has operated separately from the real space, the digital twin of the future will merge with the real space.

Contact

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	Lead Researcher, National Information Society Agency
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Digital Twin (Digital Hub) Case Study for Smart City

Sangkwan Nam

Korea

Summary

This study is a study on spatial data construction technology and platform technology for smart city support. We have been working on a layer-based work for spatial information, but we have to change the concept to LOD (Level of Detail) based. We need to define what type of data is required for each LOD, what services are available, and it is necessary to construct data for the service. In addition, various types of data must be adapt interoperability with the system. And the system should be implemented for seamless service so that 2D and 3D, indoors and outdoors, ground and underground can be continuously visualized and utilized. In order to support various services of Smart City, city's digital twin technology that can reflect whole city as realistic 3D is indispensable. For this purpose, various buildings, roads, and facilities in the city should be modeled on an object basis. In addition, this modeling should provide a foundation for integrating existing static information such as administrative information, address information, and dynamic data such as IoT and CCTV. In this study, we present the technical content and cases study of the various demands.

Contact

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Presentation Summary
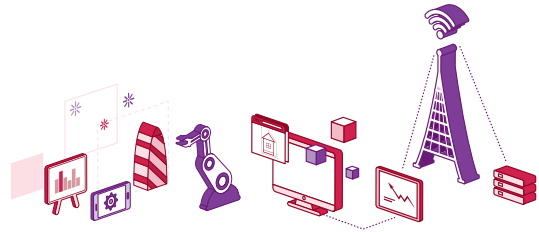
Session 1. Smart City and Digital Twin

Smart Data and Smart Processes Building
Capacity to Upgrade Fit-for-purpose Land Administration

Ian Harper

Australia

Summary

For the last 10 years, FIG fit-for-purpose (FFP) concepts have focused on land reform projects in developing countries but they are also relevant to developed countries. FFP highlights the need of using resources properly to try to maximize positive outcomes from the land administration system.

In Australia, development of land administration systems has been different in each state and territory. In New South Wales (NSW) the digital representation of survey data, spatial upgrading and management processes have facilitated the highest levels of automation in content verification and spatial analysis. The Northern Territory (NT) uses the same application but the processes and outcomes are much simpler, in line with Fit for Purpose (FFP) principles.

The Northern Territory Parcel Fabric survey database system has been developed over 20 years with a very limited budget. The foundation application process has not changed but has been refined to provide efficiencies and some automation. Measurements from all survey plans on public record have been captured into the smarter data structure during that time.

Geodata Australia associates have provided applications and guidance in the implementation of FFP in the Northern Territory. The fundamentals to improving FFP and existing land administration in developed states are:
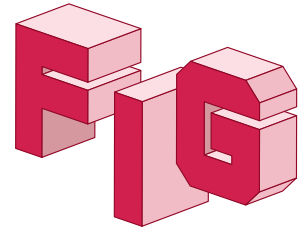
Data intelligence – can be basic but requires the capacity to manage all types of data on its merits. This includes but is not limited to survey and mapping records (digital and other), GNSS, cadastral features identified from imagery, crowd-sourcing, etc. The spatial integrity of different data is attributed and stored in the process so good quality data is not corrupted by poor quality data. i.e. Smart Data

Flexibility in the process to provide a local solution for simple upgrading without on-line resources or high quality computing capability. The COTS Parcel Fabric survey database used by the Northern Territory is a single executable file which uses a different configuration file for each jurisdiction. This provides options to users to set up specific data capture fields and exposes different tools as required for different jurisdictions. i.e Smart processes.

That local processing should be supported by local data capture resources as they are the most knowledgeable of the local issues. The benefit of this is that it empowers and employs local resources. Ideally, capacity should be in place for the local outcomes to feed seamlessly to the regional or state land administration authority which then feeds the authoritative database back to local users in a timely manner. There would be many variables as to how this would work best in different jurisdictions. i.e. Smart implementation.

Contact

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Disaster Mitigation of Smart Structures in South Korea Under Complicated Loads: State-of-the-art

Mosbeh R.Kaloop, Egypt

Jong Wan Hu, Korea

Keywords

Complicated loads, Smart Structures, Monitoring

Summary

The constructions are invariably exposed to a variety of loads. Recently, natural hazards such as earthquakes, storms, and water waves were shown increasing happened in South Korea, which induce dynamic effects. Furthermore, sudden or continuous settlements of structures affect the cycle-life of structures. Nowadays, the state of the art of structural control, monitoring system and development sensors have moved from research to implementation stage with several buildings, bridges, and other systems. Although the researchers have developed and improved the concepts of structural health monitoring (SHM) systems and control systems of structures the development of evaluation tools of structures under complicated loads are still limited. This study describes the backgrounds, motivations and recent history of smart structures developments to various types of structures. Extensive smart structures and disaster mitigation tools in South Korea are summarily categorized and listed. The evaluation tools in time and frequency domains of structures and are presented and discussed. The integration monitoring system and benchmark solution for assessing structures behavior under complicated loads effects are discussed. Furthermore, principals of research in the evaluation of smart structures development for multi-hazard scenarios and integrated SHM and control systems are included. Finally, existing problems and promising research effort in smart structures to mitigate disaster effects are discussed, highlighting challenges and future trends.
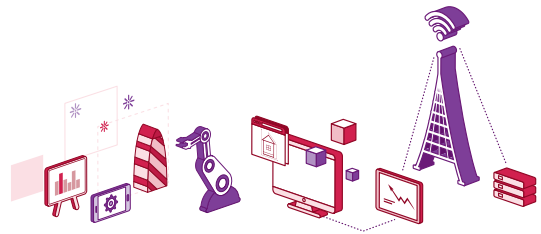
Acknowledgments

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Presentation Summary

Session 2. Cadaster & Land Administration

Fit-for-purpose Land Administration: From Concepts to Practical Applications

Danilo Antonio

Philippines

Keywords

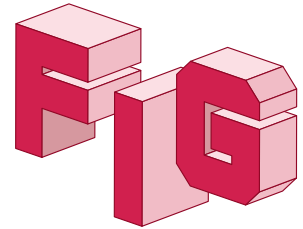Land Administration, Continuum of Land Rights, Fit-for-purpose, Innovation, GLTN

Summary

Securing land tenure and property rights is fundamental to shelter and livelihoods, and for the realisation of human rights, food security, poverty reduction, economic prosperity and sustainable development. Securing land and property rights is particularly important to address gender discrimination and the disadvantages faced by the poor, indigenous people and other vulnerable groups linked to inequitable and insecure access and tenure to land. Many countries globally recognize this, and they have introduced new land policies, especially in Asia and Africa. Often it is not possible for these countries to implement pro-poor and gender sensitive land policies, because the underlying tools and practices do not always exist or have not been sufficiently documented and disseminated. Emerging from the 1990s some organizations and individuals have been trying to address this issue but have struggled with the scale of the challenge geographically and conceptually. Most developing countries use conventional land administration systems which cover less than 30 percent of the country, leaving up to 70 percent of citizens with no legal documentation or recognition.

Global Land Tool Network (GLTN) was established to contribute in addressing this challenge with the framework of Sustainable Development Goals (SDGs), New Urban Agenda and Voluntary Guidelines on the Governance of Tenure of Land, Fisheries and Forests (VGGTs). It is an alliance of global and regional partners that promotes land reform, tenure security and improved land management in rural and urban areas. Central to its work and advocacy is the promotion of the continuum of land rights approach and development of inclusive, gender responsive and fit-for-purpose land tools and approaches to accelerate efforts to securing land and property rights for all. One of the key enabler of this campaign is addressing the challenge brought by conventional approaches to land administration system as being expensive, rigid and slow. GLTN, working with Kadaster International and key land experts, came up with the guide for country level implementation of the fit-for-purpose land administration. Fit-For-Purpose solutions provide opportunities for land administration systems to deliver benefits, including secure tenure rights, to a wide range of stakeholders within a relatively short time and for a relatively affordable costs in a flexible manner. It provides structured guidance on building the spatial, legal and institutional frameworks in support of designing country-specific strategies for implementing FFP land administration. It contains the analysis and operational advisory guidelines to implement the approach.

This paper will unearth the concepts of the fit-for-purpose land administration, the need for the approach, its key elements, supporting tools and its potential advantages in supporting scaled-up approaches to securing land and property rights for all and for other development outcomes. It will provide specific examples for Nepal and Uganda where country-wide strategies were in place including the implementation of various land tools to demonstrate practical applications for learning purposes. It is hope that countries, particularly in developing countries, and land professionals could learn from this approach, reflect on its need for country or project implementation and work towards its adoption and implementation.

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Entrepreneurship in Land Administration Drivers, Blockers, and Enablement

Rohan Bennett and Eryadi Masli, Australia**; Jossam Potel,** Rwanda**;**

Eva-Maria Unger, Austria**; Paula Dijktra, Chrit Lemmen and Kees De Zeeuw,** Netherlands

Summary

There exists a correlation between thriving information-driven economies and the vibrancy of the entrepreneurial ecosystems within. The association is increasingly in the land sector: entrepreneurship and innovation can help with reducing time and costs associated with land rights data collection and administration. Indeed, it can be argued that in the country contexts that hold the 70% of unrecorded land rights, there has been a collective failure to capitalize on entrepreneurism and innovation initiatives – be it in government, the private sector, or civil society. This is not to say that a national land administration system should be fully privatized, or that even significant parts of the cadastral activities or land registration processes should be commercialized. Indeed, in many contexts it can be argued that existing private sector represses land sector progress through rent-seeking and stymieing innovation. The argument underpinning this paper is that the spirit of entrepreneurialism – including notions of creativity and risk taking – should be nurtured within the land sector, both public and private, in order to support fast tracking land rights recording, particularly in developing contexts. To this end, the aim of this paper, building from previous work exploratory work, is to identify the enabling conditions and interventions that better support useful entrepreneurialism in the land sector.

Accordingly, the nature and elements of entrepreneurialism are first explored, leading an assessment of the state-of-play of entrepreneurialism within the sector. Identification of challenges including barriers to entry, capacity issues, and risk aversion are highlighted.

Opportunity assessment for increasing entrepreneurialism in the sector is also undertaken: historical precedence, fit-for-purpose approaches, youth demographics, and the changing nature of work are considered. Cases and examples from various country contexts are used throughout the discussion. Findings are synthesized into a framework intended to support entrepreneurial endeavors in land administration programs. This framework includes the importance of acknowledgement, awareness raising, the idea of 'middle way', and the instigation of 'cadastrepreneurship' ecosystems. The latter includes the creation of supportive government programs, advice services, lobbying groups, incubators, financing mechanisms, and education and training programs.

Contact

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Presentation Summary
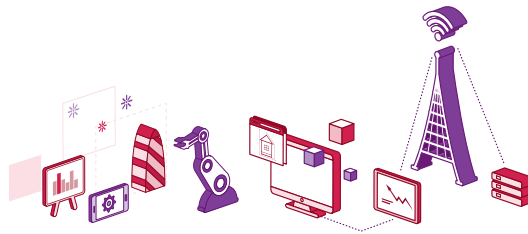
Session 2. Cadaster & Land Administration

Principles and Lessons Learnt from Land Administration PPP Modelling: A Private Sector Perspective

Dezhi Yu

China

Summary

It is well understood that while land administration can generate wealth for governments, in most developing countries, it is a drain on public finances. As the leading firm in managing large scale land projects in developing countries, DAI has been advocating for public-private partnership of land administration, because even after allowing for strong risk adjusted returns to investors, the additional value captured in a 21st century land administration system would greatly boost government revenues while providing property owners with the secure title needed for investment. From the private sector's perspective however, inconsistency of datapoints, complexity of land tenure and policy, and lack of successful precedents have made financial modelling for a land administration PPP extremely difficult. The DAI team will share some principles and lessons learnt from the work-in-process.

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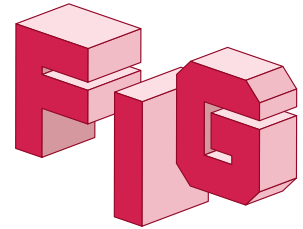
Modernising Land Administration Systems

Nick Land

UK

Keywords

Land Administration, GIS, Standards, SDGs, Smart Cities

Summary

Most countries in the world are working towards modernizing their land administration systems. Ongoing challenges include, keeping authoritative land information current, complete, accurate, and secure while providing access to data across multiple networks to multiple stakeholders – government, business and citizens. Legacy technology puts up barriers that inhibit access to data and complex, highly customized workflows can be cumbersome, inefficient, and costly to maintain. Hard coded, custom systems consume valuable resources to maintain, update, and sustain and are vulnerable to security breaches.

This presentation will provide attendees with an understanding of how to improve and implement new land administration capabilities quickly and easily leveraging ArcGIS and the Esri platform. It will highlight how the cloud, web GIS, mobile devices, global standards and best practices can be applied to build cost effective and sustainable systems of land administration in the context of smart cities, support for the SDGs, and other land related policy goals.

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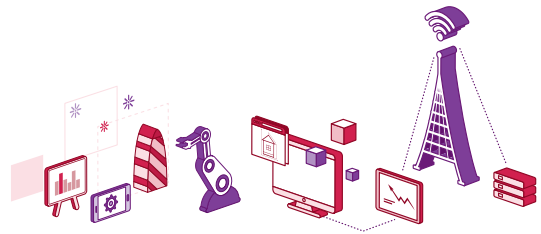
Choosing Precision Based on the Aimed Objective; The Experience of The Reform of the Québec Cadastre

Chrystine Maltais

Canada

Keywords

Cadastre, Precision, Québec, Land survey
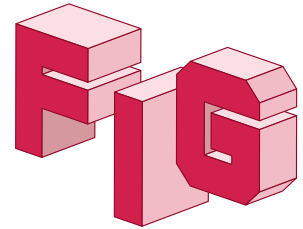
Summary

Nowadays, working tools and know-how allow land surveyors to easily reach precision of a few centimeters. This level of precision being within their grasp, it is legitimate to ask why they would do without it. Is it an option to let go this high-level of precision in certain circumstances, and still get a high level of professional satisfaction? In order to do so, the clear understanding of the project's aimed goal must be the main parameter of evaluation.

When the Government of Québec established the precision standards of its Québec Cadastral Reform Program, the land surveyors had to agree to carry out the cadastral renewal contracts with a precision below the level they could achieve. In order to adhere to the budget and timeline agreed, they had to understand that the quality of their work did not depend on the precision level of their survey, but rather on meeting the government's goal: to have at the end of this ambitious project, a complete, reliable, up-to-date and digital image of the depiction of the province's land subdivisions. A cadastre accurate enough to have the capacity to support the registration of land rights and to serve as the basis for related purposes (property taxation, public utility networks, development, etc.).

It is important to have a clear understanding of the objectives and context of the projects entrusted to the land surveyors in order for them to be able to objectively assess the level of precision required. Even if they know that, don't they have the tendency to think that a high-level of precision will serve better any project?

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Positional Framework to Support Land Information Systems

Neil Ashcroft, Singapore
Dan Roman, Chair Commission 5
Rob Sarib, Chair AP CDN

Summary

This presentation will provide information on how a Positional framework is developed and defined. Then how it then underpins ALL geospatially referenced data layers, such as Land Information Systems. The author has been involved with developing Continuous Operating Reference Station implementation in Indonesia, Philippines, Malaysia, Vietnam and recently Thailand and will discuss usage from his perspective.

In addition, this presentation will also give an overview of what FIG Commission 5 activities, courtesy of Dan Roman, Comm 5 Chair, are doing and how there are various initiatives, courtesy of Rob Sarib, Chair of Asia Pacific Capacity Development Network, to support the wider understanding and importance of Positional frameworks for other commissions activities and the wider community requiring the authorative where.

Personal Information

A degree qualified land surveyor from UK practising precision Engineering Surveying for 14 years before moving to Leica Geosystems in 1999, where he has been responsible for assisting & developing ASEAN National Survey institutions in owning, building and operating National Continuous Operating Reference Stations (CORS) to support a national geodetic Reference frame for positioning.
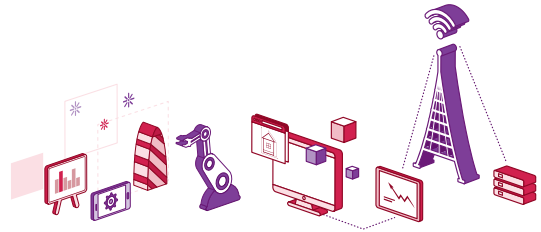
Neil has been supporting various Commission 5 and UNGGIM-AP WG1 activities within the Asian region for the past 6 years.

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Presentation Summary

Session 3. Cadaster 4.0

AI Unmanned Mobile Technology
Based on Digital Twin Smart City Construction

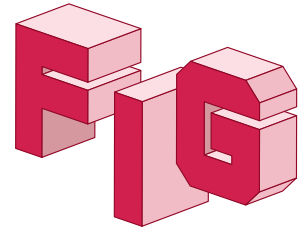**Suk-gu Kim**

Korea

Summary

In the past, most methods for digital acquisition of topographic spatial information were constructed using one-point or multi-point direct measurements, or remote exploration techniques using satellite & aviation. However, rapid changes in the technology for building spatial information are being made actively through the development of various unmanned vehicles and the development of unmanned technologies that can replace manpower, satellite or aerial photography through the fusion of artificial intelligence technologies. In particular, "digital twin," which has recently become a global technology trend, is a concept of virtual models that are expressed equally in physical objects and computers, simulating and simulating digital twins of software-virtualized assets instead of physical assets to obtain accurate information about the characteristics of real assets (current status, productivity, operational scenarios, and so on). Recently, it has become very popular in all industries, including smart city, energy, aviation, healthcare, automobile, and national defense, as digital twin can be used to improve the efficiency of all processes ranging from optimizing assets, minimizing accidents and increasing productivity.

In this presentation, we introduce how to quickly build the target site into a digital twin DB with 3cm accuracy by using the latest image processing technology and various artificial intelligence-free motion systems, and domestic and overseas use cases.

In particular, it introduces the construction and utilization of smart cities through the establishment of digital twin DB and BIM-linked cases for process control and safety management of construction sites in urban areas. In particular, it is proposed to establish digital twin city using drone mapping technology & Digital twin technology for urban areas and to incorporate spatial information on-ground, ground, and ground based on it.

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An Introduction to the Implementation Process and Results of the Address System in S.korea

Jongshin Ko, Aetti Kang

Korea

Keywords

Object Address System, Reference System

Summary

The study shows the background and performance of the implementation of the object address system in S.Korea. A living space is expanded to open spaces and facilities other than buildings, and as the fourth industrial revolution progresses, the number of facilities that need to be identified or guided is gradually increasing. In addition, as new concepts of urban construction such as compression city(high-density cities) and three-dimensional (development) cities increase the number of buildings using overpasses and underground roads, people experience difficulty entering the building entrances through existing roads. South Korea's Ministry of Public Administration and Security(MPAS) confirmed that the current ISO 19160-1 concept model has limitations to handle these complicated circumstances, and established a plan to introduce an object address system. The MPAS established a "Five-year comprehensive plan for implementing address policies" in 2017 to implement the object address project. In 2018, The MPAS carried out "Study on the Advanced Address System for Supporting the Address-Based Innovative Growth Industry". And they held a conference in which industry and academia participated, and proposed the direction and criteria for the promotion of the object address system. In addition, they submitted a draft of a proposed law to the National Assembly of South Korea to enact a law for granting and managing "object address" in 2019. The MPAS decided to give priority to facilities related to public safety. So, they gave object addresses to the pedestrian overpass lift across the country and shared this address with the police and the fire department. They also provided the address data to Internet portal sites so that people could check the location of the pedestrian overpass lifts through portal maps. As a result, when safety accidents took place on the pedestrian overpass lifts, people can clearly express the location of the accident in S.Korea. This year, the MPAS has expanded the scope of address to earthquake evacuation zone and riverside parking lots, and will gradually expand the scope to include tsunami evacuation zone and life saving box. In addition, they will set up delivery points where autonomous driving cars, droids and drones can accurately and easily recognize their destinations, and address them as well. The address is the infrastructure foundation responsible for the safety for the people, helping economic activities and leading the era of the fourth industrial revolution. If the address merges with artificial intelligence voice recognition technology, we expect the address to play an important role in opening a safe and prosperous future.

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Presentation Summary

Session 3. Cadaster 4.0
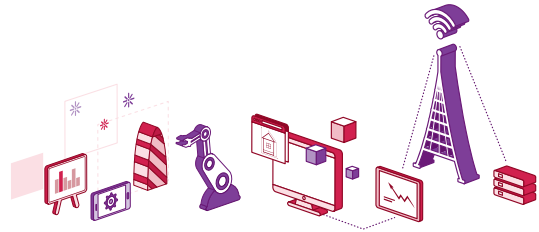
Design and Development of Ladm-Based Cadastral Data Model: A Case of Mongolian Cadastre

Buuveibaatar Munkhbaatar, Mongolia

Sungpil Shin, Moongie Kim, Junehwan Koh, Korea

Keywords

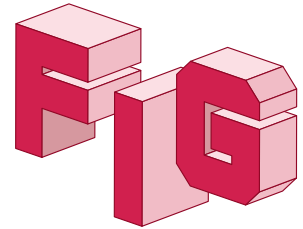Cadastre, Precision, Québec, Land survey

Summary

Cadastral system is developing from the typical parcel-based system to the land objects-based cadastral system based on rights, restrictions and responsibilities worldwide. For the implementation tool for these kind of cadastral systems International Organization of Standardization(ISO) established "ISO 19152, Land Administration Domain Model(LADM)" international standard later in 2012. LADM aims for modeling cadastral and land administration information for the purpose of providing a common vocabulary(ontology) and efficient system development. Many countries in the world are considering the adoption of the LADM for the development of their cadastral system. In this situation, it is necessary to examine the application of LADM in order to adopt it in Mongolia.

This study aimed to introduce and apply the LADM international standard to the Mongolian cadastre. In order to design and develop the LADM-based Mongolian cadastral data model, analysis of the Mongolian cadastral system and the application of the LADM was done. First, Mongolian cadastral system was analyzed and the core cadastral data model was derived and used for the Mongolian cadastral profile. Then to conform how well the Mongolian cadastral profile is appropriate for the LADM package and level, an abstract test suite in Append ix A of the LADM was conducted. As a result, the cadastral profile of Mongolia corresponds to the LADM conformance level 1 and it is proved that it can be applied to. Developed data model itself was validated against XML schema by XML encoding for the increased the availability of the study result. Also steps towards the development of prototypes for the assessment of the developed LADM country profile has been determined for the further studies.

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Smart City Government as a Platform: Inclusive or Monocentric?

Haesoo Kim, Cheonjae Lee, Sanggyu Shin

Korea

Summary

Central to the entire discourse on smart cities is closely related to the capabilities and development of disruptive technologies such as artificial intelligence and mixed reality. Merging, coordinating and integrating human, infrastructural, social and entrepreneurial capital into the cities are the key instrument in addressing the sustainable development goals of cities. In this regard, government or city as a platform, that enable them to not only produce, provide better public services and build better accountability but also remove silos and design new institutions, by engaging civic society, have emerged as a dominant feature for the realization of smart cities. Despite its popularization of smart cities, however, emphasizing on such a supply-side technology and extreme dependency of an algorithmic approach has accentuated the problem of lacking socio-spatial traits in real smart city fabrics such as social intelligence, cultural artefacts and loco inferences. This paper, thus, critically examines the views and the extent to which smart city governments as a platform has been inclusive or monocentric. This investigation takes the form of a case-study that provide ample evidences around the globe and draw empirically valid inferences regarding city-level governments where already introduced smart city initiatives. This study uses archival data from the grey literature produced from international, (non)governmental institutions and well as think-tanks to explore the key content of smart city initiatives, especially focusing on the vision, culture, process, technology and data attributes. We noted that a number of smart city governments have gradually encouraged notion of co-creation through such as Living Lab, Fab Lab, Hackerspace and Smart City Challenge (e.g., USA) that emphasized governance, cultural diversity and inclusivity as well as aimed to resolve the critical issues of budgetary constraints, procurement standardization. These results further support the spatial enablement and co-existence of artificial and social intelligence within the smart city governments as a platform in the era of platform economy.

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Presentation Summary

Session 3. Cadaster 4.0
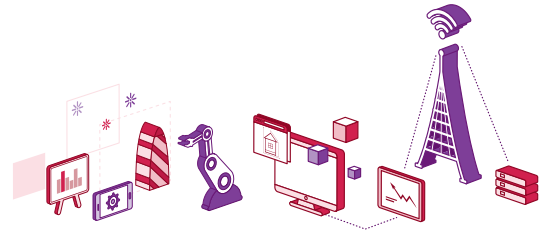
History of Foundation and Development of 'Cadastral Science' in Korea

Byoungchan Ryu

Korea

Keywords

Foundation, Cadastral Science, Educational Institution, English Name

Summary

Korea's modern Cadastral System was established from 1910 to 1924 by make the Cadastral Maps and the Cadastral Books by implementing Land Survey Projects and Forest Survey Projects under the Land Survey Act and the Joseon Forest Survey Act.

However, advanced European countries such as France, Germany, and Netherlands established modern Cadastral System that make the Cadastral Maps and the Cadastral Books about one century earlier than Korea, and established educational institutions such as the ENC. in France, Hannover University in Germany, ITC. in Netherlands, and SSPO in Switzerland and so on.

These educational institutions and universities have opened school subjects such as 'Cadastral Management, Cadastral Surveying, Cadastral Regulation, Land Management, Land Administration, Land System and CIS / LIS / GIS, etc. but There was no school subject called 'Cadastral Science'.

However, in 1972, Won, Y.H. a Korean prof. published the world's first 'Cadastral science' and since 1977, the Department of Cadastral Science has been established at colleges and at universities, and a master's degree course & Doctor's degree course, so 'Cadastral science' 'had been officially recognized as an independent academic. And in 2006, Prof. Ryu. B.C. gave the English name of '지적학(地籍學)' as 'Cadastral Science.'

Therefore, it's necessary to analyze the current situation of the main contents, development history, education system, curriculum and English name etc. of the 'Cadastral Science' and we have to develop continuously the basic theory and academic system of 'Cadastral Science'.

And I'd like to suggests that the term of the 'Cadastral Science' should be registered in Encyclopedia Britannica, and should be developed it into a central academic of the cadastral field.

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Useful Information

Time Zone	Korean time is 9 hours ahead of Greenwich Mean Time (GMT+9)

Currency and Foreign Exchange

- The unit of Korean currency is the WON (KRW). Coin denominations are KRW 10, 50, 100, and 500. Bank notes are KRW 1,000, KRW 5,000, KRW 10,000, and KRW 50,000.

- International credit cards are widely accepted at major hotels, department stores and restaurants.

- The exchange rates are approximately KRW 1,180 per USD 1 and KRW 1,320 per EUR 1. (July 19, 2017)

Transportation

TAXI
- You can readily find a taxi on the street. There are three types: general taxis (orange or grey colors), deluxe taxis (black), and van taxis.
  The basic fare for a general taxi is KRW 3,800. (≒ USD 3.35)
- International taxis have been introduced for the convenience of foreign tourists as the drivers can communicate in English. For these taxis, advanced reservation are required. You can book a taxi through the 24-hour call center. (t. 1644-2255)

Subway
- Since the whole city is extensively-networked through nine subway lines, you can easily arrive at your destination.

Bus
- The Seoul bus system is divided into four colors: blue (main line), green (branch route), yellow (circular route), and red (wide area route). Its fare starts from KRW 1,300 (≒ USD 1.14) and charges KRW 100 for every additional 5 km.

Tax & Tipping

- Tipping is not customary in Korea.
- Value-added tax is levied on most goods and services at a standard rate of 10% and is included in the retail price. Thus, you do not necessarily

Business Hours

Public offices are generally open from 09:30 to 17:00 on weekdays but are closed Saturdays and Sundays, whereas most retail shops are open from 10:00 to 20:00 all week.

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