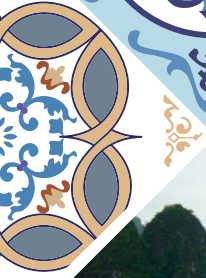


# FIG Working Week 2019



22-26 APRIL 2019  
HANOI, VIETNAM

"Geospatial Information  
for a Smarter Life and  
Environmental Resilience"

Organised by

[fig.net/fig2019](http://fig.net/fig2019)

Platinum Sponsors







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*Dear Colleagues and Friends,*

It is a great honour and pleasure for me to welcoming you

to the FIG working week 2019 in Hanoi, Vietnam with the overall theme “Geospatial information for a smarter life and environmental resilience”. This well-chosen topic shows clearly that the knowledge, the skills and the products of our profession today are important contributions for the well-being and improvement of our societies.

Together with our Vietnamese organisers, we are proud to present here the overall programme book. As you can see, the activities and the formats are manifold. Our plenary speakers will address the overall theme from different points-of-view. The focal points are technical solutions and approaches through organisation and initiatives.

The technical sessions were organized and composed by our ten Commissions. The topics of the presentations are reflecting the huge bandwidth of our profession. Special formats are a session on history, the events of our Young Surveyors and the two pre-conference workshops on BIM for Surveyors and RFIP.

Do not miss the special sessions we have planned together with UN Habitat GLTN, FAO and the World Bank and the special sessions organised by our Platinum members.

Since decades, our profession is facing technical, environmental, economic and social questions in complex mixtures and combinations. FIG will continue to provide a global platform for professionals, scientists, practitioners and partners. During the week, there are a lot of possibilities and opportunities to meet, to discuss and to exchange.

We would like to thank our Vietnamese colleagues, the Vietnam Association of Geodesy, Cartography and Remote Sensing (VGCR) for hosting the FIG Working Week 2019. This year will be important for the Vietnamese community of surveyors with the 60th anniversary of Surveying and Mapping Day of Vietnam and the 30th birthday of the VGCR (1989–2019).

Together with my Council I would like to wish all participants as well as our partners and sponsors useful discussions, interesting presentations, inspiring panels and a wonderful time here in Vietnam.

With best regards.

**Prof. Dr. Rudolf Staiger, FIG President**



*Dear colleagues and friends,*

It is an honor and great pleasure for me and the Vietnam Association of Geodesy, Cartography and Remote Sensing (VGCR) to welcome and invite you all to the 2019 FIG Working Week in Hanoi, Vietnam.

It is our utmost honor and prestige to host this very big event on the special occasion of the 60th anniversary of Surveying and Mapping Day of Vietnam (14/12/1957 – 14/12/2019) and the 30th anniversary of VGCR (1989–2019).

With the overall theme “Geospatial information for a smarter life and environmental resilience”, it is a great chance for Vietnam to promote our achievement and progress in the field of surveying and data management. In particular, it is an important opportunity

for great development and connection for the Vietnamese professionals, experts and surveyors to approach to the world’s scholars as well as the occasion for the world experts to help Vietnam to address all our concerns and issues as the fact that Vietnam is one of the most five countries in the world being suffered consequence from climate changes, especially the threat of sea level rise.

Hanoi – a city of safety, beautiful landscapes, delicious cuisines, and charming people is waiting for you.

I look forward to welcome you to Hanoi, Vietnam in April 2019.

**Mr. Tran Bach Giang**

**Chairman of Vietnam Association of Geodesy, Cartography and Remote Sensing (VGCR)**



*Dear friends and colleagues,*

It is my pleasure, and on behalf of local organizing committee, to welcome all of you to FIG Working Week Hanoi 2019.

Hanoi is the capital of Vietnam, a very old city established in 1010 by The King – Ly Cong Uan and well-known as the land of civilization through thousands years of history.

Nowadays, Hanoi is the centre of politics and culture in Vietnam. There are many universities, one of the very first university for royal members is Van Mieu Quoc Tu Giam, national museums such as Historical Museum, Ethnic Museum, Art Museum etc. Beside man-made structures, there are also many attractive natural landscapes worth to visit such as Hong River, Hoan Kiem Lake, Ho Tay Lake etc. All of these interesting places are very easy to access from the National Conference Center (FIG Working Week Hanoi 2019 venue), you may take a taxi about 10 minutes or just simple go for walk.

From the early days of Hanoi, the Chinese, French and Japanese were living here together with the local people of Vietnam and developed the uniquely diversified Vietnamese foods which is also served today. You may find and enjoy Pho, Nem, Bun Cha etc. almost everywhere in Hanoi, at reasonable price.

Taking part at FIG Working Week Hanoi 2019, you and your companies will have chance to come, visit and enjoy special local traditional culture performances at one of the best orchestra built in French time from hundred years ago.

Beautiful city, attractive landscapes, friendly people welcomes you to Hanoi. We do believe you and your companies will have unforgettable time when joining FIG Working Week Hanoi 2019.

**Mr. Trinh Anh Co**

**Chair of Local Organising Committee  
Co-conference Director**



Vietnam – finally, here we are! From near and from far, young and experienced, all kinds of people, presidents, director generals, managers, students, professors, specialists, exhibitors, sponsors, partners – well, in other words participants at the FIG Working Week 2019. Participants with a multitude of purposes to attend. Participants with multifarious backgrounds.

Participants who want to meet other participants. Participants who want to learn and exchange. Participants who want to bring home new impressions, new friendships, new inspiration, new ideas.

Ever since VCGR, the local member association and host won the bid I have been looking forward to this moment. To welcoming all of you to Hanoi. For Vice President Mikael Lilje, who has been a wonderful collaborator for this Working Week, and me the Regional Conference in 2009 in Hanoi was an unforgettable and special experience (and my first acquaintance with FIG). And now we are here again! Since then, much has happened around the world – but FIG Working Weeks remain... The conference does not remain unchanged. Each year new things are tried out, there are differences due to the host country and city; but always busy days with a packed programme. This year, the local host has invited all participants to a special cultural performance at the opera. Do not miss this unique experience.

Council, Commissions, Networks, Permanent Institutions and Task Forces are crucial for the development of technical programme. Also, all the abstracts and papers that we have received through the open call from our participants. The cooperation with our institutional partners is likewise central – this is where progress and development will happen. Our exhibitors are our key to the industry and I will encourage you to meet with all of them. Our sponsors are vital – without our sponsors there would be no Working Week. Thanks to all who have contributed to this Working Week – in one way or another. A special thanks to Mr Trinh Anh Co and the Local Organising Committee, and to Ms Hanh Nguyen Hong and her team – they have done an astonishing job to welcome all of you to this wonderful city of Hanoi and to the friendly country of Vietnam. And to Claudia, Katja and Maria for their steady and engaged work, and finally Mikael Lilje for always being a fixed point.

And thanks to you – all of you = our participants. Welcome to the Family of FIG. We hope you will enjoy this busy week, and we hope that you will return in the coming years to the FIG Family

### **Louise Friis-Hansen**

FIG Director and Co-Conference Director

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## International Federation of Surveyors (FIG)

FIG is the premier international organisation representing the interests of surveyors worldwide. It is a federation of the national member associations and covers the whole range of professional fields within the global surveying community, including surveying, cadastre, valuation, national mapping professionals, geodesy, geospatial experts and quantity surveyors.

FIG was founded in 1878 in Paris and was known as the Fédération Internationale des Géomètres. This has become anglicized to the International Federation of Surveyors. It is a UN-recognized non-government organisation (NGO), representing more than 120 countries throughout the world, and its aim is to ensure that the

disciplines of surveying and all who practise them meet the needs of the markets and communities that they serve.

The FIG vision is of a modern and sustainable surveying profession in support of society, environment and economy by providing innovative, reliable and best practice solutions to our rapidly changing and complex world, acting with integrity and confidence about the usefulness of surveying, and translating these words into action.

FIG has been organising international surveying conferences since 1878. The first one was held in Paris 18–20 July when representatives of national surveying associations of six countries met to establish the organisation. This year's Working Week is the 80th major international surveying conference that FIG has organised.



## Vietnam Association of Geodesy, Cartography and Remote Sensing (VGCR)

Vietnam Association of Geodesy, Cartography and Remote Sensing (VGCR) is a non-government organization, which has purposes to support professional activities of surveying and mapping in all fields and applications. It is a professional association of surveyors working in geodesy, land survey, hydrographic survey, cartography, remote sensing from the whole of Vietnam.

VGCR was established on 20th December 1989. The overall vision of the VGCR is to propagate professional knowledge and expertise to upgrade competence of its members and to awake people on the role and contribution of the profession for the socio-economic development, environment protection and the guard of the social safety.

From the time of establishment, VGCR's activities have focused on national collaboration for the progress of profession through the scientific research, technology development, training, public awareness, etc. These activities include organizing conferences, forums, workshops, seminars in national, regional and international range for professional discussion and development, promoting the professional consultancy and service, carrying out the inspection, supervision for important projects related to the fields of surveying, mapping and geomatics. Since 1994, VGCR became member of FIG.

### Conference Steering Committee

- Dr. Prof. **Rudolf Staiger**, President FIG
- Mr. **Tran Bach Giang**, Chairman VGCR
- Mr. **Trinh Anh Co**, Co-Conference Director
- Ms. **Louise Friis-Hansen**, Co-Conference Director (FIG)

### Local Organising Committee

- Mr. **Trinh Anh Co**, Head of LOC and Co-Conference Director
- Dr. Prof. **Vo Chi My**, Deputy Head of LOC
- Dr. **Phan Duc Hieu**, Deputy Head of LOC
- Dr. Prof. **Dang Hung Vo**, Senior Advisor of LOC
- Mr. **Hoang Kim Quang**, Secretary of LOC

- Members:**
- |                                      |                            |
|--------------------------------------|----------------------------|
| Assoc. Prof. <b>Pham Van Cu</b>      | Dr. <b>Ngo Duc Mau</b>     |
| Assoc. Prof. <b>Tran Xuan Truong</b> | Dr. <b>Nghiem Anh Tuan</b> |
| Mr. <b>Nguyen An Dinh</b>            | Ms. <b>Dang Thanh Thao</b> |
| Dr. <b>Pham Minh Hai</b>             | Ms. <b>Do Thu Thuy</b>     |
| Ms. <b>Nguyen Hong Hanh</b>          |                            |

### FIG Office

- Mr. **Mikael Lilje**, FIG Council representative
- Ms. **Louise Friis-Hansen**, FIG Director and Co-Conference Director
- Ms. **Claudia Stormoen Pedersen**, Conference Manager
- Ms. **Maria Bargholz**, Finance and Administration
- Ms. **Katja Lambertsen**, Assisting Event and Support Manager

# Your work is your **reputation.**

## Make Your Mark.

Everything you do in the world leaves a mark. There's no room for errors or inefficiencies. You want accurate, reliable, and intelligent solutions. You need the most progressive tools in precision technology, so you can turn your ideas into a reality.

That's why we're committed to providing you with proven solutions—so you can make your mark with permanence.

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Come see  
us at the  
Trimble Booth



## Registration and Conference Service

The FIG Registration desk is open as follows:

### InterContinental Hanoi Landmark 72

- Saturday 20 April: 8:00–12:00, Sunday 21 April: 8:00–17:30

### Vietnam National Convention Center

- Monday 22 to Thursday 26 April: 8:00–17:30, Friday 26 April: 8:00–14:00

## Badges

Each registered delegate will receive a name badge. The badge will be your official pass and must be worn to obtain entry to all sessions, exhibition and social functions.

**Delegate/Young Surveyor pass:** includes admission to all technical sessions and exhibition, lunches, coffee breaks with refreshments on the three conference days, Welcome Reception, Opening Ceremony, Vietnamese Cultural Performance as well as the Farewell Reception.

**Exhibitor pass:** Includes access to the exhibition area as well as all lunches, coffee breaks with refreshments, Welcome Reception, Opening Ceremony, Vietnamese Cultural Performance and the Farewell Reception.

**Accompanying Person:** Welcome Reception, Opening Ceremony and the Vietnamese Cultural Performance.

## Refreshments and Lunches

Refreshments will be served during the morning and afternoon breaks at coffee stations in the exhibition on the 2<sup>nd</sup> and 3<sup>rd</sup> floor. On 23–25 April lunches will be served in rooms 343 and 347 on the 3<sup>rd</sup> Floor. Lunch and coffee on 22 and coffee on 26 April are for General Assembly attendees.

## Bag and Certificates

Each full delegate will receive a conference bag. Certificates of attendance and presentation will be sent by email after the conference.

## Speakers' Preparation Desk

The speakers' preparation desk is located next to the Registration Desk. You are required to bring your PowerPoint presentation to the staff at the desk for upload at least 2 hours prior to the start of your session. Your presentation will be on the laptop in the session prior to your presentation. Please note that you cannot bring your presentation to the session room.

In order to allow the session to run smoothly and in fairness to other speakers, all presentations are expected to adhere strictly to the time allocated.

## Conference Web Site and Technical Programme

- Conference web site: [fig.net/fig2019](http://fig.net/fig2019)
- [fig.net/fig2019/technical\\_program.htm](http://fig.net/fig2019/technical_program.htm) and FIG Conference Web App

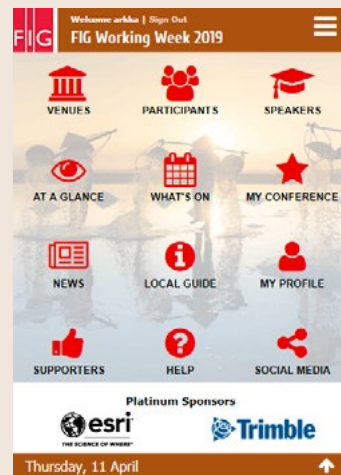
## Wireless Internet

Wireless Internet is available at Vietnam National Convention Center.

- Wifi name: [fig\\_hn2019](#)
- Password: [Wwhn2019](#)

## Conference Web App

The free FIG Conference Web App at [fig.net/app](http://fig.net/app) allows you to get the latest information about the programme. The FIG Conference Web App has everything you need to know about the conference... all conveniently accessed via Internet with your smart phone or tablet, or any other computer!



Some of the FIG 2019 app features include:

- Technical programme with PDFs
  - List of speakers and participants
  - Creation of personal conference programme
  - Exhibitor profiles & booth locations
- Detailed instructions at [fig.net/fig2019/app.htm](http://fig.net/fig2019/app.htm).



Quangpraha | Pixabay

**Few countries in the world have had such a rapid development as Vietnam during the last decades. Hanoi, the city where the FIG Working Week 2019 is held, has grown extremely quickly during the last decades. This urban transition puts intense pressure on keeping the pace with rising demands for transport, infrastructure, social services, housing, environmental controls, data management and public amenities.**

Further to this development, Vietnam is considered as one of the countries most affected by climate changes. Hanoi is particularly at risk as it is situated in a low-lying area near the mouth of a major and unpredictable river.

Smart living is a major key to the fight against climate change. The FIG Working Week will focus on tackling the challenges by working towards a smarter life both through the development of smart cities and also in rural areas. Spatial information, big data, surveying, BIM, land administration and much more are essential factors in this development. The theme of the Working Week:

“Geospatial information for a smarter life and environmental resilience” addresses these challenges that are crucial not only in Vietnam but for many all over the world.

### Beyond the information age

New technologies and the overall trend of automation in the society are changing the role of surveyors and other professions in the world. While many recognised the importance of maintaining the core role and responsibilities of key professions, others have suggested the need to adapt to a changing world moving from the information era to new frontiers. What is the next era? Are we already in the experience age? Or the automated era? How do we need to prepare in the public, private and academic sectors?

### Smart cities

Smart cities are an urban development concept based on achieving sustainable development by using new technologies and multiple information sources to optimise resources. Hanoi has set the target to turn into a smart city by 2030. Many cities, especially in Asia, are going through the same transformation. What are the lessons learnt? What are the challenges? What are the key steps to consolidate a smart city? How do we monitor progress? Are our citizens benefiting from Smart cities? How to fund required investment to achieve a smart city?

### Climate change and disaster management

Over the past years, due to climate change, the frequency and intensity of natural disasters have increased, such like floods, landslides, inundations, droughts, soil and water salinity and other calamities. Vietnam is considered as one of the countries most affected by climate change.

How to monitor climate change? How to prepare the society for its short-term and long-term consequences? How can we know, mitigate and respond before and after disasters?

### Urban – rural interdependencies

Rural areas hold for example ecosystem functions and food production systems, while urban areas hold supra-regional services and facilities. Vietnam is currently experiencing one of the most intensive urban transitions in the world. What are the implications for continuing urbanization? Where countries need to focus to get the balance right between urban and rural development? What topics can among others address accessibility of rural and urban areas, infrastructure to connect societies and functions, food security, fair distribution of resources, migration patterns and their effects on rural and urban areas.



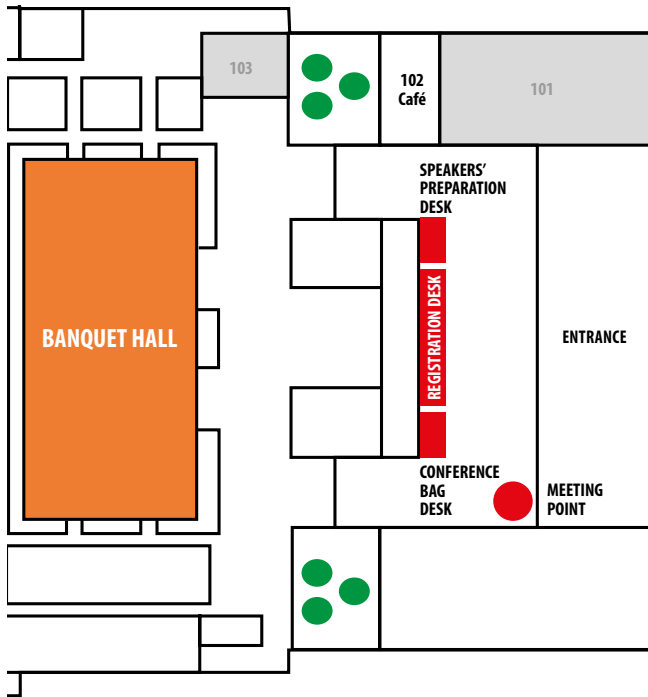
Time	Sat 20	Sun 21 April		Mon 22 April		Exhibition			Friday 26 April				
						Tue 10:30–17:30	Wed 10:30–17:30	Thu 10:30–17:00					
						Tue 23 April	Wed 24 April	Thu 25 April					
07:00		Reg. InterContinental Landmark 72 8–12 8–17:30		Registration NCC 8:00–17:30		3RD FIG YOUNG SURVEYORS ASIA AND THE PACIFIC MEETING	Registration 8:00–17:30	Registration NCC 8:00–17:30	Registration NCC 8:00–17:30	Registration NCC 8:00–14:00			
08:00					Newcomers Session								
09:00	REFERENCE FRAME IN PRACTICE SEMINAR	REFERENCE FRAME IN PRACTICE SEMINAR	BIM FOR SURVEYORS	3RD FIG YOUNG SURVEYORS ASIA AND THE PACIFIC MEETING	General Assembly Part 1		Opening Ceremony	Plenary Session 2	Plenary Session 3	General Assembly Part 2			
10:00					Coffee / Tea		Coffee / Tea	Coffee / Tea	Coffee / Tea	Coffee / Tea			
11:00					General Assembly Part 1 (cont.)		Plenary Session 1	Technical Sessions	Technical Sessions	General Assembly Part 2 (cont.)			
12:00													
13:00					Lunch (Only GA attendees)		Lunch	Lunch	Lunch	Farewell Reception			
14:00					General Assembly Part 1 (cont.)		Technical Sessions	Technical Sessions	Technical Sessions				
15:00													
16:00													
17:00													
18:00												FIG Commissions Annual Meetings	
19:00											Vietnamese Evening / Opera Performance 18:30–20:30 Hanoi Opera House		
20:00										Welcome Reception Hanoi Daewoo Hotel, Poolside	Vietnamese Evening / Opera Performance 20:30–22:30 Hanoi Opera House	Commission Dinners / Free evening	Gala Dinner 19:30–23:00 Luc Thuy Restaurant
21:00													
22:00													
23:00													



NCC

The FIG Working Week 2019 is held at Vietnam National Convention Center (NCC), which is one of the three biggest Convention Centers in Southeast Asia.

21.01°N 105.79°E  
 Gate 1, Thang Long Avenue  
 South Tu Liem, Hanoi, Vietnam  
<http://ncc.gov.vn>



### First Floor

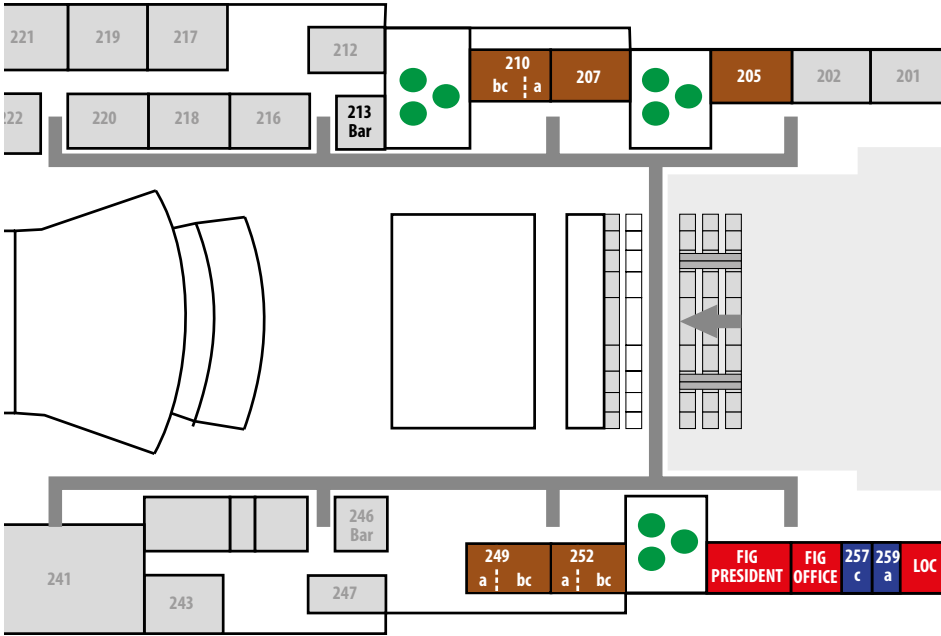
Banquet Hall	General Assembly 1, Opening Ceremony, Plenary Session 1
Registration Desk	See opening hours below
Speakers' Preparation Desk	Same opening hours as the Registration Desk (Friday closed)
Conference Bag Desk	Same opening hours as the Registration Desk (Friday closed)

### Registration Desk

The FIG Registration desk is open as follows:

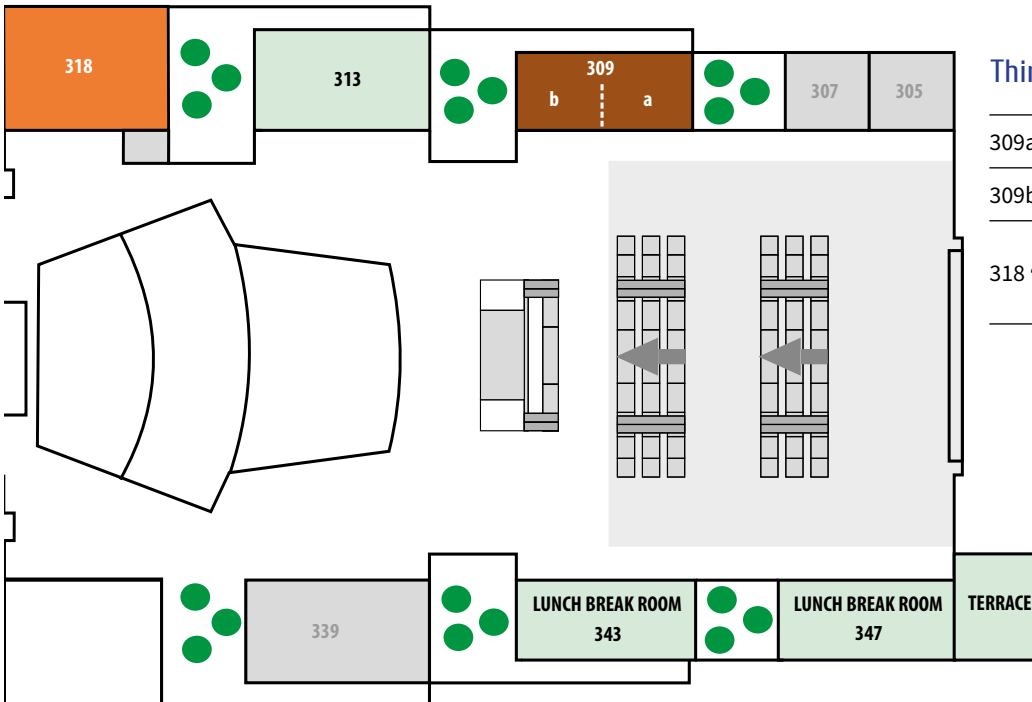
Sat 20 April 08:00–12:00	InterContinental Landmark 72 5th floor
Sun 21 April 08:00–17:30	InterContinental Landmark 72 5th floor
Mon 22 – Thu 25 April 08:00–17:30	NCC 1st floor
Fri 26 April 08:00–14:00	NCC 1st floor





## Second Floor

205 "LX KOREA"	Technical Sessions
207 "FIG FOUNDATION"	
210a "ArcGIS"	
210bc "TRIMBLE"	
249a "LEICA GEOSYSTEMS"	
249bc "SOUTH"	
252a "RIPRO"	FIG President's Room
252bc "GEO-PLUS"	
254	FIG Office
257ab	FIG Meeting Room I
257c	FIG Meeting Room II
259a	LOC
259bc	



## Third Floor

309a "MAKE YOUR MARK."	Technical Sessions
309b "ESRI"	
318 "SURVEYORS ROOM"	Plenary Sessions 2 & 3, General Assembly II



## Tuesday 23 April at 9:00-10:30 Vietnam National Convention Center, Banquet Hall (Phong Khanh Tiet), 1st Floor

Master of Ceremony: Prof. Dr. **Vo Chi My**, Vice President and Secretary General, VGCR

The opening ceremony provides a spectacular introduction to the FIG Working Week, its theme, and its unique location – a festive start of the week.

### Welcome Addresses

- Minister Mr. **Tran Hong Ha**, Ministry of Natural Resources and Environment MONRE
- Mr. **Tran Bach Giang**, Chairman of VGCR
- Mr. **Trinh Anh Co**, Co-Conference Director and Chair of Local Organising Committee
- Prof. Dr. **Rudolf Staiger**, President of FIG

### Keynote Speaker



#### Dr. Mika-Petteri Törhönen

Lead Land Administration Specialist;  
Social, Urban, Rural and Resilience Global  
Practice,  
The World Bank

#### Secure Tenure for all Men and Women; The World Bank's Land and Geospatial Program with a Special Reference to Achieving SDGs

This presentation will feature The World Bank's developing land and geospatial program in Asia and globally, and explore international frameworks and goals on land tenure in comparison with the existing efforts and investments in achieving them. The presentation will highlight challenges of our time that put pressure on land as well as emerging opportunities that are being provided by disruptive technologies, private public partnerships and opportunities in the globally changing perception of the importance of land and tenure.

Dr. Mika-Petteri Törhönen is a global land tenure, policy and administration professional with 28 years and continuing work ex-

perience from over 30 countries in Europe, Africa, Asia, Near East and Central America. Mika holds the position of Lead Land Administration Specialist at the World Bank's Global Land and Geospatial Unit. He leads the World Bank's land and geospatial program development in South East Asian and South Asian countries

### Opening of the Exhibition

At the end of the Opening Ceremony, the exhibition will be opened by Prof. Dr. **Rudolf Staiger**, FIG President and Mr. **Tran Bach Giang**, Chairman of VGCR.







The programme is underpinned by high-level presentations in three plenary sessions covering topics within the overall theme “Geospatial information for a smarter life and environmental resilience”. The specially invited presenters set the agenda for each day, sharing insight into their own experience and pitfalls, as well as presenting their vision and predictions.

## Plenary Session 1 – A Smarter Life and Environmental Resilience through Organisational Approaches

Tuesday 23 April 11:00–12:30, Banquet Hall (Phong Khanh Tiet), 1st Floor, NCC



**Prof. Dr. Pham Van Cu**

*(replacing Prof. Dr. Dang Hung Vo National University of Hanoi)*

National University of Hanoi

Former Vice Minister at Vietnam

Ministry of Natural Resources and Environment

### Timing – Spatial Information System is the Informative Infrastructure to Develop the Smart World

Currently, all over the world people’s efforts have been focused on moving from the “electronic” stage to the “smart” stage under the impact of 4 generations of technology to create the development of humanity: mechanization, electrification, information-telecommunication technology and AI. The Presentation provides an analysis of the human development under Alvin Toffler’s view of three civilizations: agricultural, industrial and informative civilization.



**Mr. Gary Johnston**

Head of the National Positioning Infrastructure

Branch at Geoscience Australia

### UNGGIM-AP Approaches to a Smarter Life and Environmental Resilience

The United Nations Global Geospatial Information Management (UN-GGIM) initiative is an intergovernmental mechanism for setting directions and making joint decisions on the production, availability and use of geospatial information within national, regional and global policy frameworks. To achieve this in an integrated way, Member Nations have implemented three organisational structures. The first is the UN-GGIM Committee of Experts, the second is a series of thematic sub-committees and working groups and lastly, regional entities aligned to each of the five UN regional commissions has been created. This presentation will ex-

*Pham Van Cu is professor in geography having 45 years of experience in remote sensing and spatial data analysis. He has moved to the National University of Vietnam in 2006 after 33 years working at Vietnam Academy of Science and Technology. Former associate researcher and then professor of CARTEL at the University of Sherbrooke, Québec, Canada, visiting professor of the university Toulouse France and different French speaking universities in the world, Prof. Pham Van Cu has more than hundred scientific articles, book chapters and books. He was supervisor of more than twenty PhD students in Vietnam, Canada and France. He was and is working as consultant for ADB, JICA, CIDA and actually for the World Bank in remote sensing applied to solar energy use in urban areas. Prof. Pham Van Cu is actually the member representative for Asia Pacific Region of the Council of Orientation of the Institut francophone pour le développement durable (IFDD) of the Francophonie basé à Québec, Canada.*

plere the trio of intergovernmental approaches through the lens of the global geodetic reference frame, a key body of work for UN-GGIM, and identify how each is contributing towards the UN’s efforts to create a smarter life and environmental resilience and, through that, sustainable development.

*Gary Johnston is the Head of the National Positioning Infrastructure Branch at Geoscience Australia. Gary’s professional career has focused on Geodetic Surveying, particularly the application of the Global Positioning System (GPS) to measuring the changing shape of the Earth. In 2014 Gary was elected to the chair of the International Global Navigation Satellite System (GNSS) Service (IGS) Governing Board. Gary is also the co-Chair of the Sub-Committee on Geodesy under the United Nations Global Geospatial Information Management Committee of Experts. In Australia Gary oversees the Positioning for the Future Program. This program aims to develop and deliver a precise positioning capability for all Australians..*



**Prof. Dr. Rudolf Staiger**

FIG President

**FIG 2019–2022 Volunteering for the Future**

During the last 30 years, our world changed significantly in almost all aspects. The technical progress, combined with the political and social changes modified our professional and private life in many ways.

However, there is also an impact on the conditions and activities of our Federation, which is leading to the very important question: How do we have to prepare FIG for a good and prosperous future?

One part of the answer will be the Council's work plan for the next 4 years.

*Rudolf Staiger spent 6 years in industry with KERN and Leica-Geosystems as Systems Engineer, Product Manager and Software Developer. From 1994 to 2005 he was teaching Surveying Engineering at the University of Essen (Germany). Since then he teaches in Bochum where he also served as Vice-President of the University for Research & Transfer (2009–2016). Rudolf has been active in FIG for many years. He was the Chair of Commission 5 (Positioning and Measurement), Vice-President 2011–2018 and now President 2019–2022. His language abilities are German, French and English.*

## Plenary Session 2 – A Smarter Life and Environmental Resilience through Science and Innovation

**Wednesday 24 April 9:00–10:30, Room 318 (“Surveyors Room”), 3rd Floor, NCC**



**Dr. Phan Duc Hieu**

Director General of Department of Survey and Mapping of Vietnam

**Modernizing Geodetic Infrastructure for the Fourth industrial revolution in Vietnam**

After nearly 60 years of establishment and development of the Surveying and Mapping industry of Vietnam a new law on surveying and mapping was passed in June 2018. A lot of work is now lying ahead for implementation and realization of the provisions of the Law on life to meet the requirements of development of the country in the new situation. There is urgency to improve and modernize the basic geodetic infrastructure to serve the industrial revolution 4.0 in Vietnam and respond to climate change.

*Dr. Phan Duc Hieu has been Director General of Department of Survey, Mapping and Geo-information of Viet Nam since September, 2014. He got his bachelor degree from Moscow in Photogrammetry and later Doctor degree in Photogrammetry and Remote sensing from Hanoi Geology and Mining University. Dr. Phan Duc Hieu has worked as Engineer in the Geodetic and Cartographic Division in General Department of Geology and minerals (GDGM), General director of Geodetic and Cartographic Division in GDGM, Deputy of General director of Vietnam corporation of Natural resources and Environment (VINAREN), President of Director Board of VINAREN and finally 2013-2014 he was President of Director Board of VINAREN. Hereafter he was appointed Director General.*



**Mr. Ron Bisio**

Vice President  
Trimble Geospatial

**Applying Geospatial Technology to Enable Sustainable Palm Oil Production**

The United Nations Development Programme has stated that 16 million jobs in Indonesia depend directly or indirectly on palm oil production. As part of United Nations Sustainable Develop-

ment Goal 12 the world has committed to responsible consumption and production of resource intensive commodities such as palm oil. This presentation will examine the role of surveying and geospatial technology in sustainable agriculture, with a special emphasis on the use of unmanned airborne systems (UAS) and object-based image analysis technology to improve palm oil plantation management.

*Ron Bisio is Vice President of Geospatial at Trimble. He joined the company in 1996 and has held several marketing, sales and general man-*



agement positions prior to taking over worldwide responsibility for Trimble Geospatial in 2015. He earned a master's degree in business administration from the University of Denver, a master's in regional



### Prof. Dr. Dr. h.c. Harald Schuh

President of IAG International Association of Geodesy

#### **The Sustainable Development Goals (SDG's) from IAGs Perspective**

The IAG (International Association of Geodesy) is the international scientific organization under the umbrella of IUGG (International Union of Geodesy and Geophysics) promoting scientific cooperation and research in geodesy. Its GGOS (Global Geodetic Observing System) is in charge of coordinating and integrating the various space geodetic techniques as well as bringing together geometric space techniques with physical geodesy and merging terrestrial measurements with airborne observations and data obtained from space.

planning from the University of Massachusetts and an undergraduate degree in geographic information systems & cartography from Salem State University in Salem, Mass.

An overview will be given about the current organization of IAG and GGOS and their main goals and tasks. Special emphasis will be put on the contribution to the sustainable development goals.

*Harald Schuh is the elected President of IAG, Past President of the IAU Commission 19 "Rotation of the Earth", and was Chair of the International VLBI Service for Geodesy and Astrometry (IVS) from 2007 to 2013. He has engaged in space geodetic research for more than 35 years with special focus on VLBI (Very Long Baseline Interferometry) and Earth rotation. Since 2012, he is Director of Department 1 "Geodesy" at the Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences and professor for "Satellite Geodesy" at Technische Universität Berlin. Harald Schuh is author or co-author of about 390 publications with the main subjects VLBI, GNSS, Earth rotation, geodynamics, geodetic reference frames, troposphere, and ionosphere.*

## Plenary Session 3 – A Smarter Life and Environmental Resilience through Initiatives

Thursday 25 April 9:00–10:30, Room 318 ("Surveyors Room"), 3rd Floor, NCC



### Dr. Khamarrul Azahari Razak

Senior Lecturer, Research Fellow  
Razak Faculty Technology and Informatics,  
Disaster Preparedness and Prevention Center,  
Malaysia –Japan International Institute of Technology,  
Universiti Teknologi Malaysia (UTM)  
Kuala Lumpur

#### **Geo-led Horizon Scanning Programme for Disaster Risk Reduction (DRR): A New Insight into 2030 Global Vision**

This talk explores a new, joined-up approach to horizon scanning characterized by modern and advanced geospatial technology to help inform current policy making in disaster risk reduction and management. It urges the need for geo-smart innovation and cross-sectoral partnership to strengthen science-based decision making. Geo-led solutions, which promote a collaborative, data-driven and evidence-based is a way forward to reduce current

disaster risk and prevent new, emerging risk. This session also promotes a Transdisciplinary Approach (TDA) for building societal resilience to disaster in a changing climate. Collective action by our profession is critical to support targets and goals underlying Sendai Framework for Disaster Risk Reduction 2015-2030 and 2030 Agenda for Sustainable Development.

*Dr. Khamarrul Azahari is currently a Co-Chair of Climate Change and Disaster Risk Reduction Working Group, Global Young Academy, the voice of young scientists around the world. He is a senior lecturer at Razak Faculty Technology and Informatics, and also a full research member to the Disaster Preparedness and Prevention Center (DPPC), Malaysia-Japan International Institute of Technology, Universiti Teknologi Malaysia (UTM) Kuala Lumpur. He received a PhD from Utrecht University, Faculty of Geosciences, the Netherlands, with cooperation of Faculty of Geoinformation Science and Earth Observation, University of Twente, United Nation University (UNU) Disaster Risk Management (DRM) Centre for Spatial Analysis and Risk Management*



## Ms. Ulla Kronborg

Chief Advisor,  
Danish Agency for Data Supply and Efficiency  
Member of the INSPIRE Committee

### Sharing is everything

Data is an asset. Some even call it the new raw material that forms the basis for value creation in society. To unlock data's potential you need a good, solid digital infrastructure – just as you need roads to get the most out of a car. Data infrastructure is the fundament for promoting data sharing and consumption and is becoming essential for the operation of a society. Cities and citizens are becoming smart. Data is created everywhere and all the time and as we are evermore digitally connected in floating local, regional and global networks we need to be able to share data across borders – administrative as well as geographical. In short, we need interoperability. Interoperability as a concept covers areas of legal, organizational, semantic and technical nature and provides the fundament for good data management and value creation. The interoperable data

infrastructure is set up on commonly agreed, international standards, modelling rules, and service level agreements. It is ideally based on transparency and openness that provides users with well-documented and well-structured data. This presentation will evolve around some general principles for the setting up and maintenance of an interoperable data infrastructure, drawing in a few examples from the INSPIRE initiative.

*Ulla Kronborg has a Master of Science in Geography, diploma degree in Leadership and Management. National INSPIRE contact point, member of EU expert groups; NSPIRE MIG, ISA WG Geospatial Solutions, TAEX. Part of the agency's engagements in: UN-GGIM, EuroGeographics, Copernicus. Appointed Expert to the EU Commissions JRC in relation to the ELISE program. Vice President of the Danish association for spatial information and board member of the Nordic Geoforum. National/international speaker and university teacher. Daily works with SDI value creation in public sector digitization, innovation projects, business developments, target strategies and User Centric Information Architecture.*



## Young Surveyors Network

### Everyone's Contribution Counts

The FIG Young Surveyors Network was established in 2006, and 13 years on it is a thriving Network with ideas and energy to disperse into the main body of FIG.


The theme, Everyone's Contribution Counts aims to inspire FIG delegates to contribute their knowledge and skills, in some way, for the betterment of the profession and environment.

The Young Surveyors will tell the story of "The Starfish on the Beach" followed by members of the Young Surveyors Network on their contribution to the future of the profession, and what they have achieved by being involved with FIG.




### Category A – Platinum Level

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 Leica Geosystems	Leica Geosystems AG www.leica.com
 Trimble	Trimble Navigation Ltd www.trimble.com

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A number of attractive and informative Technical Tours have been organised to complement the conference experience. These tours will visit sites and organisations of particular interest to delegates. The Meeting Point will be located at the registration desk. Meeting time 10 minutes prior to departure time. Tickets may be available for purchase (20 EUR) from the Registration Desk.

## Tuesday 23 April

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### TT1 – Visit to Ground Satellite Receiving Station, Department of National Remote Sensing (RSD)

Time: 13:00–16:45

A technical tour is organised to the Department of National Remote Sensing (RSD) an agency of the Ministry of Nature Resources and Environment (MONRE). The RSD's main tasks include using remote sensing technology for investigation and monitoring natural resources and environment; acquiring, processing satellite images and redistributing them to users in Vietnam; applying satellite images for topographic map updating and creating for medium and smaller map scales (mainly 1/25000 and 1/50000); and researching, implementing and transferring technology in the field of remote sensing and cartographic mapping).

Currently RSD manages and operates only one modern satellite and receiving image station located near Hanoi. This receiving station, funded by the French Government and EU, has the capability to receive low, middle and high resolution images from many remote sensing satellites.

Participants will be briefed on the activities carried out by RSD.

## Wednesday 24 April

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### TT2 – Visit to Vietnam Natural Resources and Environment Corporation

Time: 13:00–15:15

Vietnam Natural Resources and Environment Corporation (TMV) is under the Ministry of Nature Resources and Environment (MONRE). Components of TMV are:

- Aerial Photo-Topography company (APT)
- Cadastre and Engineering Survey company (CESC)

- Geodetic and Topographic Division (GTD) (under Department of Geology and Minerals of Vietnam)

TMV has subsidiary networks of companies and partners all over Vietnam. TMV is the most advanced corporation in the field of survey and mapping in Vietnam and one of the most important parts of their business is aerial survey and mapping. Currently TMV owns many high technological equipment such as GNSS CORS RTK network, RMKTop CarlZeiss aerial camera system, CityMapper Leica LiDAR airborne system, hydrographic survey system etc.

A visit to TMV is the best way to explore survey and mapping technology in Vietnam.

## Thursday 25 April

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### TT3 – Visit to Navis International Collaboration Centre

Time: 13:00–16:30

A technical tour will be organised to the University of Science and Technology where the NAVIS Centre will be visited. The NAVIS Centre was established as a project co-funded by the European Union, through the collaboration among European and Asian partners focuses on research and development of satellite navigation technology, in South-East Asia.

The mission of Navis is to act as linking entity between Europe and South East Asia in the field of Global Navigation Satellite Systems (GNSS). Navis aims to ease cross-links between EU and South-East Asia actors to promote European Global Navigation Satellite System technology and reinforce international collaboration among players.

**FIG Working Week is much more than a conference with technical sessions. FIG Working Week is also administrative and organisational meetings, forums and sessions, pre-events, and special sessions with partners.**

Pre-Conference Events	Date	Time	Location
3rd FIG Young Surveyors Asia and the Pacific Meeting	21 April 22 April	09:00–18:00 07:00–16:30	Intercontinental Landmark 72 – see <a href="http://fig.net/fig2019/youngsurveyors.htm">fig.net/fig2019/youngsurveyors.htm</a>
Reference Frame in Practice Seminar and BELS+ Training	20 April 21 April	08:30–18:30 08:30–17:30	Intercontinental Landmark 72 – see <a href="http://fig.net/fig2019/rfip.htm">fig.net/fig2019/rfip.htm</a>
BIM for Surveyors	21 April	09:00–17:00	Intercontinental Landmark 72 – see <a href="http://fig.net/fig2019/bim.htm">fig.net/fig2019/bim.htm</a>

FIG Sessions	Date	Time	Location
General Assembly – Session 1	22 April	09:00–16:30	Banquet Hall, 1st Floor
Newcomers Session – Introduction to FIG Working Week	23 April	08:00–08:45	309b (“ESRI”)
Speed Networking – Join the FIG Young Surveyors Network for some speed networking over the lunch break!	23 April	12:30–13:30	Banquet Hall, 1st Floor
FIG Director Generals Forum	23 April	14:00–15:30	205abc (“LX KOREA”)
Mapping the Plastic	23 April	14:00–15:30	252bc (“GEO-PLUS”)
Connecting the Dots	23 April	16:00–17:30	210a (“ArcGIS”)
Africa Capacity Development Network – Morning Meeting	24 April	07:45–08:45	309a (“Make Your Mark.”)
Asia & the Pacific Capacity Development Network – Morning Meeting	24 April	07:45–08:45	309b (“ESRI”)
FIG Academic Forum on the VGGT	24 April	11:00–12:30	210a (“ArcGIS”)
Member Association, Regional Bodies and Regional Networks Forum I & II	24 April	11:00–12:30 14:00–15:30	252bc (“GEO-PLUS”)
<i>The Land Surveyors Role in the Era of Crowdsourcing and VGI – presentation of the new FIG Publication No. 73</i>	24 April	14:00–15:30	207abc (“FIG FOUNDATION”)
History Session	24 April	14:00–15:30	249a (“LEICA GEOSYSTEMS”)
Fit-for-Purpose Land Administration – Experiences in Practice	24 April	14:00–15:30	309a (“Make Your Mark.”)
Annual Meetings of FIG Commissions. Open for all interested. After the meeting each commission organises a dinner (self-paid).	24 April	17:30–18:30	Various
Special Session on the Sustainable Development Goals & FIG	25 April	11:00–12:30	309b (“ESRI”)
FIG Task Force on Governance	25 April	14:00–15:30	210bc (“TRIMBLE”)
FIG Presidents Meeting – How can the member associations influence FIG and our events?	25 April	15:30–18:00	210bc (“TRIMBLE”)
FIG General Assembly – Session 2	26 April	09:00–12:30	318 (“SURVEYOR’S ROOM”)



FIG Sessions with Partners	Date	Time	Location
Integrated Geospatial Information Framework (IGIF) (World Bank & FIG)	23 April	14:00–15:30	210bc (“TRIMBLE”)
Roundtable Discussion on Land Records Completion and Modernization (World Bank & FIG)	23 April	16:00–17:30	210bc (“TRIMBLE”)
Technology Contribution to Improve Tenure Governance (FAO & FIG)	23 April	16:00–17:30	205abc (“LX KOREA”)
Good Practices in Land Administration in the Asia Pacific Region (FIG, UN-Habitat/GLTN, LX Korea and China Land Surveying and Planning Institute (CLSPI))	24 April	11:00–12:30	249bc (“SOUTH”)
Strengthening Democratic Spaces to Balance Societal Priorities in Spatial Planning (FAO & FIG)	24 April	14:00–15:30	205abc (“LX KOREA”)
Strengthening Partnerships in Land Governance in the Asia Pacific Region (FIG, UN-Habitat/GLTN, LX Korea, CLSPI, FIG Asia Pacific Capacity Development Network, VGCR, UN-GGIM)	24 April	14:00–15:30	249bc (“SOUTH”)
Developing Capacity for Geodetic Infrastructure and Systems I & II (FIG AP CDN, UN-GGIM-AP WG, UN SCoG ETCB)	25 April	11:00–12:30 14:00–15:30	249bc (“SOUTH”)
Social Tenure Domain Model – Development and Application at Country Level (FIG YSN and UN-Habitat GLTN)	25 April	14:00–15:30	210a (“ArcGIS”)
Master Class: Learning Session on the Use of Technology (World Bank & FIG)	25 April	16:00–17:30	207abc (“FIG FOUNDATION”)

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## Social Programme

**FIG Working Week would not be anything without the interaction and networking of our participants. Join these events to get to know your fellow peers.**

Event	Date	Time	Location	Details
Welcome Reception	22 April	19:30–21:30	Hanoi Daewoo Hotel, Poolside, 360 Kim Ma Str., Ba Dinh Dist.	All participants are invited
Vietname Cultural Performance	23 April	18:30–20:30 20:30–22:30	Hanoi Opera House – Nhà hát lớn Hà Nội	All participants are invited
FIG Commission Dinners	24 April		To be decided by each commission – check <a href="http://www.fig.net/fig2019">www.fig.net/fig2019</a>	Fee: Individual payment
Gala Dinner	25 April	19:30–23:00	Luc Thuy Restaurant, 16 Le Thai To Street, Hoàn Kiếm	Fee: 90 EUR*
Farewell Reception	26 April	12:30–15:00	Vietnam National Convention Center – Room 313	All participants are invited. Hosted by FIG Working Week 2020, Amsterdam, Netherlands

\*) Limited number of tickets will be available at the registration desk.

## Accompanying Persons Programme

Registered accompanying person for the FIG Working Week are invited to attend the Welcome Reception,

Opening Ceremony and the Vietnamese Cultural Performance as well as the Farewell Reception.

## Social Tours

**A range of social tours will be offered for participating delegates and accompanying persons.**

Event	Meeting Point	Date	Time	Cost
Cooking Class	NCC, 1st Floor	22 April, 25 April	13:00–17:00	48 EUR
Hanoi – Bat Trang Cyclo Tour	NCC, 1st Floor	23 April	13:00–17:00	35 EUR
Hanoi – Handicraft Villages	NCC, 1st Floor	24 April	13:00–17:00	35 EUR
Water Puppet & Cyclo Tour	NCC, 1st Floor	24 April	13:00–17:00	30 EUR
Museum Of Ethnology & Tran Quoc Pagoda	NCC, 1st Floor	25 April	13:00–17:00	30 EUR
Hanoi – Phu Yen – Ho Chi Minh – Siem Reap (Visit to Cambodia)	Your hotel	27 April – 2 May		1,510 EUR per person when 2 sharing a room 1,820 EUR per person in a single room
Hanoi – Halong – Hanoi	Your hotel	27–29 April		340 EUR per person when 2 sharing a room 450 EUR per person in a single room

Limited number of tickets will be available at the registration desk.







Thank you to our sponsors and supporters, we really do appreciate you being part of the FIG Working Week 2019!

## Platinum Sponsors

**ESRI** – Esri’s geographic Information system (GIS) technology has given clients the power to think and plan geographically for over 40 years. Used today in more than 350,000 organizations worldwide, GIS helps cities, governments, universities, and Fortune 500 companies save money, lives, and our environment. GIS helps you understand and question data in ways that reveal relationships, patterns, and trends. ESRI supports the implementation of GIS technology on the desktop, servers, online services, and mobile devices.

**TRIMBLE** – Trimble Geospatial solutions provide high-quality, productive workflows and information exchange, driving value for a global and diverse customer base of surveyors, engineering and GIS service companies, governments, utilities and transportation authorities. Trimble’s innovative technologies include integrated sensors, field applications, real-time communications and office software for processing, modeling and data. Using Trimble solutions, organizations can capture the most accurate spatial data and transform it into intelligence to deliver increased productivity and improved decision-making. Whether enabling efficient use of natural resources or enhancing the performance and lifecycle of civil infrastructure, timely and reliable geospatial information is at the core of Trimble’s solutions.

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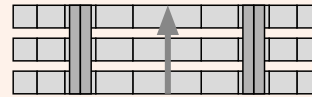
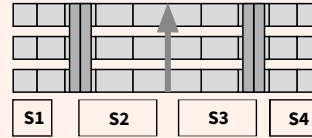
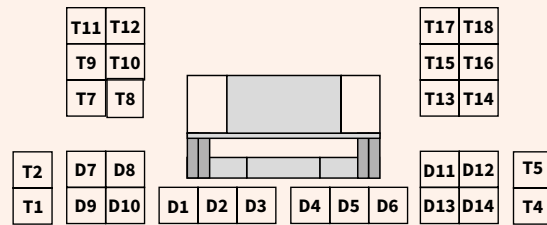
### EXCLUSIVE WATER SPONSOR



An exhibition is running concurrently with the conference, showcasing the latest and best in surveying and spatial products and services.































### Opening Hours

The exhibition is open from Tuesday 23 April to Wednesday 24 April at 10:30–17:30 and Thursday 25 April from 10:30–17:00.



**NCC**

**2ND & 3RD FLOOR**

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	CHC Navigation	D1+D2		ComNav Technology Ltd.	D13+D14		Vietnam Natural Resources and Environment Corporation	T13
	Geo Plus	D3		ChinterGEO Alliance	T1		Beijing PIASAT Information Technology Co., Ltd	T14
	SuperMap	D4+D5		Department of Survey, Mapping and Geo-information of Vietnam	T2		Chinese Federation of Surveying & Mapping (Taiwan)	T15
	Leishen Intelligent System Co., Ltd	D6		Survey and Aerial Mapping One Member Limited Liability (SAMCOM)	T4		FIG Working Week 2020 Netherlands	T16
	SpaceWill	D7		BELS+: Building European Links toward South East Asia in the field of EGSS	T5		Changzhou Futian Photoelectric Technology Co., Ltd	T17
	RIPRO Corporation, Japan	D8		Hi-Target International Group Ltd.	T7+T9		Guangzhou Geosurv Information Technology CO., Ltd	T18



GeoConnect Asia 2020

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**KOREA LAND AND GEOSPATIAL INFORMATIX CORPORATION****S1**

LX is a public organization contributing to the national development through the management of the national cadastral system and the protection of land property rights.

Since 1977, LX has been offering time-saving and satisfactory cadaster survey with its advanced geospatial technology. LX values globalization, innovation, responsibility, trust, communication and harmony to lead the smart society via national geospatial information platform.

**TRIMBLE****S2**

Trimble Geospatial solutions provide high-quality, productive workflows and information exchange, driving value for a global and diverse customer base

of surveyors, engineering and GIS service companies, governments, utilities and transportation authorities. Trimble's innovative technologies include integrated sensors, field applications, real-time communications and office software for processing, modeling and data. Using Trimble solutions, organizations can capture the most accurate spatial data and transform it into intelligence to deliver increased productivity and improved decision-making. Whether enabling efficient use of natural resources or enhancing the performance and lifecycle of civil infrastructure, timely and reliable geospatial information is at the core of Trimble's solutions.

**FIG Platinum Member Session – TRIMBLE:** Transforming the Way the World Works, Wednesday, 24 April 11:00–12:30 in 210bc ("TRIMBLE ROOM")

**ESRI****S3**

Esri's geographic Information system (GIS) technology has given clients the power to think and plan geographically for over 40 years. Used today in more than 350,000 organizations worldwide, GIS helps cities, governments,

universities, and Fortune 500 companies save money, lives, and our environment. GIS helps you understand and question data in ways that reveal relationships, patterns, and trends. ESRI supports the implementation of GIS technology on the desktop, servers, online services, and mobile devices.

**FIG Platinum Member Session – ESRI:** WebGIS Land Administration Systems Tuesday, 24 April 14:00–15:30 in 210a ("ArcGIS ROOM")

**LEICA GEOSYSTEMS****S4**

Revolutionising the world of measurement and survey for nearly 200 years, Leica Geosystems is the industry leader in measurement and information technologies. With a wide portfolio of innovative geospatial solutions and services, they

deliver value every day to those shaping the future of our world. Leica Geosystems is part of Hexagon, a leading global provider of information technology solutions that drive productivity and quality across geospatial and industrial landscapes.

**FIG Platinum Member Session – LEICA GEOSYSTEMS:** Harnessing Digital Transformation through Reality Capture for Smart Change Thursday, 25 April 11:00–12:30 in 249a ("LEICA GEOSYSTEMS ROOM")

**CHC NAVIGATION****D1 + D2**

CHC Navigation designs, manufactures and markets a wide range of competitive and reliable GNSS receivers and provides complete positioning solutions for surveying, construction, GIS and etc. in more than 100 countries. ISO 9001 certification applies to all aspects of CHC's every development process and workflow, covering all steps from the initial design to the final delivery. =CHC's international partner networks are bringing professional support to end-users everywhere around the world.

**GEO-PLUS****D3**

Geo-Plus is widely known in the Canadian software technology market in AEC (architecture, engineering, construction). Since the beginning of the business in

1987, thousands of worldwide clients have used our products and services. Our Vision suite includes more than 16 3D measurement, 3D structure, geometry, cadastre and document management software related to the territories. Most of our software are fully integrated with AutoCAD®, Civil3D®, MicroStation®, PowerDraft® and Bricscad® platforms. Our line of solutions is consistently at the forefront of CAD/GIS technology. The key to the success of our company and the reason for choosing us is the innovation of our products and the promptness of the technical support service.

In conclusion, whatever land management industry you're in, there is a Geo-Plus solution to make your life easier and increase your productivity.

**SUPERMAP SOFTWARE LIMITED****D4 + D5**

SuperMap Software Co., Ltd. is an innovative GIS platform software and service provider. It was founded in 1997 with headquarters in Beijing. Now, SuperMap has become one of the largest GIS platform manufacturers in the world.

**LEISHEN INTELLIGENT SYSTEM CO., LTD****D6**

LeiShen devotes itself to providing all kinds of advanced LiDAR with satisfying performance, reasonable price and stable leadtime. Owning core technology and 2 automation plants (ISO) in China, we deliver LiDAR and its solutions to more than 1000 clients worldwide.

**SPACEWILL****D7**

Located in Beijing, SpaceWill Info Co., Ltd. ('SpaceWill') is a leading provider of Earth Observation satellite data and geospatial information services. We're the commercial marketing operator of SuperView-1 and the authorized distributor of Chinese Imaging Satellite Data: GF-4, GF-3, GF-2, GF-1, ZY-3, ZY-3 02, HJ-1A&B etc

**RIPRO CORPORATION, JAPAN****D8**

No.1 Japanese Recycled Plastic Survey EcoStake Manufacturing Company

**HANGZHOU JIACE IMPORT AND EXPORT CO., LTD****D9**

Hangzhou Jiace Imp. & Exp. Co., Ltd. was founded in 2009, and has production bases in Hangzhou and Ningbo, China. We specialize in the production and sale of surveying instruments, microscopes and optical lenses. Surveying instrument: DSZ1, G, B, DSZ series optical level and GE electronic level.

Hangzhou Jiace constantly provide customers with quality, stable products. We are open and work with customers to produce products that meet market requirements.

#### **SOUTH SURVEYING INSTRUMENT GROUP**

**D10**



Established in Guangzhou in 1989, the South Group has been developed as a provider for GIS solutions, which integrated with R&D, production, sales and services over the past decades. South Group always putting efforts on industry informatization and the increasing value for GIS applications, our service is fully covered the survey equipment, precise measurement system, data process project, GIS system and smart city application, etc.

#### **INTERNATIONAL FEDERATION OF SURVEYORS (FIG)**

**D11**



#### **GPS LANDS – RIEGL LIDAR**

**D12**

GPS Lands is RIEGL Laser Measurement Systems GmbH distributor in South-east Asia Region. RIEGL is a performance leader in research, development and production of terrestrial, industrial, mobile, bathymetric, airborne and UAS-based laser scanning systems. RIEGL's innovative hard- and software provides powerful solutions for most application fields in surveying

#### **COMNAV TECHNOLOGY LTD.**

**D13 + D14**

ComNav Technology (Stock Code:833972) is an Original Equipment Manufacturer (OEM) that develops and manufactures GNSS OEM boards, Receivers and Solutions for high-precision positioning applications worldwide. Backed by our team dedicated to GNSS technology, GNSS products you choose from ComNav Technology today will be never outmoded in the future.

#### **CHINTERGEO ALLIANCE**

**T1**

CHINTERGEO, in recent 20 years, as China's largest and one of the world's famous surveying and mapping instrument exhibition, the annual exhibition records the progress of surveying and mapping technology, witnesses the historical changes of surveying and mapping industry.

#### **DEPARTMENT OF SURVEY, MAPPING AND GEO-INFORMATION OF VIETNAM**

**T2**

Department of Survey, Mapping and Geo-information of Vietnam attached to the Ministry of Natural Resources and Environment has been designated as the function institution in the exercising the state administration of survey, mapping and geospatial; organizing public services on survey, mapping and geospatial in Vietnam.

#### **SURVEY AND AERIAL MAPPING ONE MEMBER LIMITED LIABILITY (SAMCOM)**

**T4**

SAMCOM would like to express our special thanks to all customers and partners for your interest and trust in our brand. At present, the Company has nearly 1,000 technicians and staffs who have many years of experience in geodesy, cartography, remote sensing, 3D, geographic information and industrial printing. With their strength and attention in investment into mod-

ern machinery is making SAMCOM become the leading company in survey, mapping and database producing sector in Vietnam.

#### **BELS+: BUILDING EUROPEAN LINKS TOWARD SOUTH EAST ASIA IN THE FIELD OF EGNS**

**T5**



BELS+ is the 2nd phase of the "Building European Links toward South East Asia in the field of GNSS – BELS" project funded by The Framework Programmes for Research and Technological Development Horizon 2020. The project aims at promoting the EU GNSS technology in the South East Asia region.

#### **HI-TARGET INTERNATIONAL GROUP LTD.**

**T7 + T9**

Hi-Target is a professional surveying and mapping instrument manufacturer and solution provider from China. Areas of business range from land surveying, hydro graphic surveying and airborne surveying system to integrated solution. With intensive capital investment in R&D, Hi-Target has built a strong R&D team to support the development of top-quality products and it has collaborated with more than 10 prestigious universities in technological surveying research.

#### **SHANGHAI E-COMPASS SCIENCE & TECHNOLOGY CO., LTD**

**T8**

Shanghai e-Compass Science & Technology Co., Ltd, located in Shanghai, specialized in surveying, GIS, integrating R&D, manufacture and sales; main products include high-precision GNSS receivers, GIS data collectors, combined inertial navigation products, and data application solutions like displacement monitoring systems, precision positioning service systems.

#### **SHENZHEN NIERBIN TECHNOLOGY CO. LTD**

**T10**

Shen Zhen Nierbin Technology Co.,Ltd. is a Comprehensive Surveying Instrument accessories enterprise which integrated products development, design manufacturing, and sales. We have skilled workers, innovative engineers and high quality sales staffs. We are market oriented and depend on technology innovation to provide customers with excellent products and services. We focus on providing customers with "one-stop" solutions! The main products includes Surveying Instrument accessories: Prisms, Cables, Batteries and Chargers.

#### **FIG XXVII CONGRESS, CAPE TOWN, SOUTH AFRICA**

**T11**

The FIG General Assembly, at its meeting held at the 2018 Congress in Istanbul, Turkey, elected the South African Geomatics Institute (SAGI) to be the local host for the FIG Congress in 2022.

#### **FIG WORKING WEEK 2021, ACCRA, GHANA**

**T12**

Licensed Surveyors Association of Ghana and Ghana Institution of Surveyors will be the local hosts of the FIG Working Week 2021. The Ghanaian Associations are experienced professionals and great hosts as they successfully organized the FIG Regional Conference in 2006. [www.fig.net/fig2021](http://www.fig.net/fig2021)

#### **VIETNAM NATURAL RESOURCES AND ENVIRONMENT CORPORATION**

**T13**

Vietnam Natural Resources and Environment Corporation is a State-owned enterprise, operating in the following fields: Basic investigation, collection and processing of geographical information, building environmental resources database and other sectors.

**BEIJING PIESAT INFORMATION TECHNOLOGY CO., LTD T14**

Beijing PIESAT Information Technology Co., Ltd. (PIESAT for short) is focusing on its mission for advancing the research and application of satellite technologies (Remote sensing satellite and Navigation satellite). Founded in 2008, PIESAT is dedicated to providing professional services and application solutions for the society. PIESAT has independently developed software – Pixel Information Expert (PIE), offering its users integrated solutions of geospatial information application.

**CHINESE FEDERATION OF SURVEYING & MAPPING (TAIWAN) T15**



We are on behalf of Chinese Federation of Surveying & Mapping(CFSM), integrating Taiwan social groups relating to Mapping, Surveying and Geomatics. Dedicating to improvement of academic and technology mentioned above, motivating development of entire industry. The exhibition of CFSM has received support from Ministry of the Interior, R.O.C. (Taiwan),

**FIG WORKING WEEK 2020, AMSTERDAM, NETHERLANDS T16**

With the theme Smart Surveyors for Land and Water Management, the FIG Working Week 2020, will address issues and concerns directly affecting FIG's members, focusing on sensing technologies and new spatial data processing technologies based on the ever developing and integrating fields of geodesy and geo-information.

Being in the Netherlands, the FIG Working Week will in particular facilitate the exchange of knowledge, skills and technical expertise in integrated land and water management to address the impacts of climate change, mobility and urban growth. [www.fig.net/fig2020](http://www.fig.net/fig2020)

**CHANGZHOU FUTIAN PHOTOELECTRIC TECHNOLOGY CO., LTD T17**

Changzhou Futian Photoelectric Technology Co.Ltd., located in No.8 Ziya He Road, New District, Changzhou city, Jiangsu province of China, is a high-tech enterprise, which specialises in development and production of automatic level, laser plumb aligner, electronic theodolite and total station.

**GUANGZHOU GEOSURV INFORMATION TECHNOLOGY CO., LTD T18**

Guangzhou Geosurv Information Technology Co.,Ltd is specialized in surveying and mapping instruments including GNSS receiver, GIS data collector, Surveying and Post-process software, CORS, Aerial equipment of which widely serves various surveying tasks.

**GEOCONNECT ASIA 2020**

We look forward to welcoming you to Asia's new exhibition and conference for the geospatial industry: GeoConnect Asia 2020 will be held from 18–19 March in Suntec, Singapore. From mid May please look at the event website [www.geoconnectasia.com](http://www.geoconnectasia.com) The surveyor community is very welcome to join us.







## TECHNICAL PROGRAMME

### FIG's Technical Work is led by ten Commissions:

Commission 1	Professional Standards and Practice – Ms. <b>Winnie Shiu</b> , Hong Kong SAR, China
Commission 2	Professional Education – Assoc. Prof. <b>David Mitchell</b> , Australia
Commission 3	Spatial Information Management – Prof. Dr. <b>Hartmut Müller</b> , Germany
Commission 4	Hydrography – Prof. Dr. <b>Mohd Razali Mahmud</b> , Malaysia
Commission 5	Positioning and Measurement – Dr. <b>Daniel R. Roman</b> , United States
Commission 6	Engineering Surveys – Ms. <b>Maria Joao Henriques</b> , Portugal
Commission 7	Cadastre and Land Management – Dr. <b>Daniel Paez</b> , Colombia
Commission 8	Spatial Planning and Development – Ms. <b>Marije Louwsma</b> , Netherlands
Commission 9	Valuation and the Management of Real Estate – Mr. <b>Ben Elder</b> , United Kingdom
Commission 10	Construction Economics and Management – Mr. <b>Alan G. Muse</b>

### The Scientific Committee of the Peer Review Papers

#### Chief Editor:

- Prof. **Volker Schwieger**, Germany

#### Members:

- Prof. Dr. **Chryssy Potsiou**, Greece
- Mrs. **Gerda Schennach**, Austria
- Prof. Dr. **Hartmut Müller**, Germany
- Prof. **Heidi Falkenbach**, Finland
- Dr. **Jesper Paasch**, Sweden
- Ms. **Maria Joao Henriques**, Portugal
- Ms. **Marije Louwsma**, Netherlands
- Prof. **Yerach Doytsher**, Israel

## Saturday, 20 April 2019

## REFERENCE FRAME IN PRACTICE SEMINAR AND BELS+ TRAINING – DAY 1

SATURDAY, 20 APRIL 08:30–18:30

VENUE: HANOI 1, INTERCONTINENTAL HANOI LANDMARK 72

CHAIR: DR. DANIEL ROMAN, CHAIR FIG COMMISSION 5, UNITED STATES

Two combined technical seminars will be held. The Reference Frame in Practice (RFIP) seminar will be held the first day, while the Building European Links toward South East Asia in the field of EGNSS (BELS+) seminar will be on the second day. The RFIP will provide the international context for many global and Asia-Pacific

regional geodetic initiatives as well as overviews of reference frames with multiple national case studies to highlight how different countries are implementing these global initiatives. The BELS+ seminar will provide Training and Awareness to surveyors through the South East Asia region on the use of GNSS tools and data,

including a discussion focused on activities at the Research Centre in Vietnam.

For more information, please visit [www.fig.net/fig2019/rfip.htm](http://www.fig.net/fig2019/rfip.htm). Registration is required. Tickets available for purchase from the Registration Desk.

## FIG COUNCIL MEETING

SATURDAY, 20 APRIL 09:00–17:00

VENUE: DA LAT, INTERCONTINENTAL HANOI LANDMARK 72

CHAIR: PROF. DR. RUDOLF STAIGER, FIG PRESIDENT, GERMANY

- By Invitation only

## Sunday, 21 April 2019



## 3RD YOUNG SURVEYORS ASIA AND THE PACIFIC MEETING

SUNDAY, 21 APRIL 08:30–16:30

VENUE: HANOI 2+3, INTERCONTINENTAL HANOI LANDMARK 72

CHAIR: MS. MELISSA HARRINGTON, CHAIR, FIG YOUNG SURVEYORS NETWORK, UNITED STATES

## Geospatial Information for a Smarter Life and Environmental Resilience

The 3rd Young Surveyors Asia and the Pacific Meeting is a two day event that provides an environment for Young Surveyors from different cultures, countries, academic qualifications, and

professional experience to discuss the issues facing their region, and plan for a resilient future. Join us to connect and learn the importance of geospatial information and how it can be used to create harmony among the spatial, social, economical and environmental aspects of a city and inhabitants.

For more information, please visit [www.fig.net/fig2019/youngsurveyors.htm](http://www.fig.net/fig2019/youngsurveyors.htm)

Registration is required. Tickets available for purchase from the Registration Desk.

## BIM FOR SURVEYORS

SUNDAY, 21 APRIL 09:00–17:00

VENUE: HANOI 4, INTERCONTINENTAL HANOI LANDMARK 72

CHAIR: MS. MERCY IVORTYER, NIGERIA

Digital change and BIM are likely to significantly affect the future of the surveying profession. Do we need a more symbiotic relationship between technologists and surveyors? What should, or can, surveyors do to affect technology? What aspects of professionalism in surveying remain relevant in the changing technological landscape? Clearly, the answers lie in where professional surveying judgement can continue to add value, how our work processes can be consistently applied and how data-driven decision-making can be improved.

## Scope of the Workshop:

- What is the state of play of digital change and exemplars of best practice?
- What do technologists need from surveyors and vice versa?
- What does this technology suggest for the future of the surveying profession?

For more information, please visit [www.fig.net/fig2019/bim.htm](http://www.fig.net/fig2019/bim.htm). Registration is required. Tickets available for purchase from the Registration Desk.

## ACCO MEETING

SUNDAY, 21 APRIL 08:30–17:00

VENUE: DA LAT, INTERCONTINENTAL HANOI LANDMARK 72

- By invitation only

## REFERENCE FRAME IN PRACTICE SEMINAR AND BELS+ TRAINING – DAY 2

SUNDAY, 21 APRIL 08:30–17:30

VENUE: HANOI 1, INTERCONTINENTAL HANOI LANDMARK 72

Second day of the seminar. For more information, please visit [www.fig.net/fig2019/rfip.htm](http://www.fig.net/fig2019/rfip.htm)

## Monday, 22 April 2019

## FIG GENERAL ASSEMBLY – PART 1

MONDAY, 22 APRIL 09:00–16:30

VENUE: BANQUET HALL (PHONG KHANH TIET), NCC

CHAIR: PROF. DR. RUDOLF STAIGER, FIG PRESIDENT, GERMANY

At the General Assembly the Council Work Plan will be presented by President Rudolf Staiger, All Commission and network work plans will also be presented.

- For all FIG members
- Open for observers



## 3RD YOUNG SURVEYORS ASIA AND THE PACIFIC MEETING – DAY 2

MONDAY, 22 APRIL 07:00–16:30

VENUE: HANOI 2+3, INTERCONTINENTAL HANOI LANDMARK 72

Second day of the meeting. For more information, please visit [www.fig.net/fig2019/youngsurveyors.htm](http://www.fig.net/fig2019/youngsurveyors.htm)

## CHARITY DANCE

MONDAY, 22 APRIL 16:30–17:30

VENUE: FOYER, FIRST FLOOR, NCC

## ...put on your chance shoes

WE WANT TO DO GOOD – and give back.

With this charity dance we will support:

**GET KIDS INTO SURVEY** – a mission is to raise standards and get young people into the surveying industry.

**FIG FOUNDATION** – an independent body under FIG established for raising funds to finance surveying education development projects and supporting young surveyors. The minimum donation will be 10 EUR.

## WELCOME RECEPTION

MONDAY, 22 APRIL 19:30–21:30

VENUE: HANOI DAEWOO HOTEL, POOL SIDE, 360 KIM MA STR., BA DINH DIST.

All delegates, registered accompanying persons and exhibitors are invited to attend the official Welcome Reception. This is an excellent opportunity to renew old friendships and make new acquaintances as you are welcomed to Hanoi. Join the welcome reception at the 80 meter long pool side at the most popular five stars hotel in Hanoi. With a warm atmosphere, traditional Vietnamese music and canapes this will be a great way to start a successful FIG Working Week and enjoy the arrival to the lovely city Hanoi.



**Tuesday, 23 April**

	205abc ("LX KOREA")	207abc ("FIG FOUNDATION")	210a ("ArcGIS")	210bc ("TRIMBLE")	249a ("LEICA GEOSYSTEMS")
08:00–08:45	Newcomers Session – 309b ("ESRI")				
09:00–10:30	Opening Ceremony – Banquet Hall (Phong Khanh Tiet)				
10:30–11:00	Morning Break – 2nd and 3rd floor, Exhibition Area				
11:00–12:30	PLENARY SESSION 1: A Smarter Life and Environmental Resilience through Organisational Approaches – Banquet Hall (Phong Khanh Tiet)				
12:30–13:30	Speed Networking – C: YSN – Banquet Hall (Phong Khanh Tiet)				
12:30–14:00	Lunch Break – 3rd floor, LUNCH ROOM (343 + 347)				
14:00–15:30	FIG Director Generals Forum	TS01C: GIS Applications – C: 3	Platinum Member Session – ESRI: WebGIS Land Administration Systems	Integrated Geospatial Information Framework (IGIF)	TS01J: ISS – Tools for Land Administration, Land Governance and Management I
15:30–16:00	Afternoon Break – 2nd and 3rd floor, Exhibition Area				
16:00–17:30	Technology Contribution to Improve Tenure Governance	TS02C: ISS – GIS Applications	Connecting the Dots – C: YSN	Roundtable Discussion on Land Records Completion and Modernization	TS02J: ISS – Tools for Land Administration, Land Governance and Management II

**Wednesday, 24 April**

07:00–08:48	FIG Foundation Meeting – 254 ("FIG COUNCIL MEETING ROOM")				
07:45–08:45	Africa Capacity Development Network – Breakfast Meeting 309a ("Make Your Mark. ROOM")		Asia & the Pacific Capacity Development Network – Breakfast Meeting 309b ("ESRI ROOM")		
09:00–10:30	PLENARY SESSION 2: A Smarter Life and Environmental Resilience through Science and Innovation – 318 ("SURVEYORS ROOM")				
10:30–11:00	Morning Break – 2nd and 3rd floor, Exhibition Area				
11:00–12:30	TS03H: Urban Planning and Housing – C: 8	TS03C: Geospatial Analysis – C: 3	FIG Academic Forum on the VGGT	Platinum Member Session – TRIMBLE: Transforming the Way the World Works	TS03J: Digital Construction – C: 10 and 6
12:30–14:00	Lunch Break – 3rd floor, LUNCH ROOM (343 + 347)				
14:00–15:30	Strengthening Democratic Spaces to Balance Societal Priorities in Spatial Planning	TS04C: The Land Surveyors Role in the Era of Crowdsourcing and VGI, presentation of the new FIG Publication No. 73 – C: 3	TS04B: Enhancing Surveying Academic Networks – C: 2	TS04A_1: International Boundaries – C: 1	TS04J: History Session
				TS04A_2: Professional Ethics and Standards – Part 1 – C: 1	
15:30–16:00	Afternoon Break 2nd and 3rd floor, Exhibition Area				
16:00–17:30	TS05H: Land Governance and Implementation Strategies – C: 8	TS05C: Spatial Data Infrastructure SDI – C: 3	TS05B: Innovation in Surveying Pedagogy and Curriculum – C: 2	TS05A: Professional Ethics and Standards – Part 2 – C: 1	TS05J: Improving Cost Management – C: 10
17:30–18:30	FIG Commissions Annual Meetings – Various				

**Thursday, 25 April**

09:00–10:30	PLENARY SESSION3: A Smarter Life and Environmental Resilience through Initiatives – 318 ("SURVEYORS ROOM")				
10:30–11:00	Morning Break – 2nd and 3rd floor, Exhibition Area				
11:00–12:30	TS06H: Smart Cities – Emerging Tools and Applications – C: 8	TS06C: 3D Cadastre – C: 3 and 7	TS06B: Professional Development Experiences and Pathways – C: 2	TS06A: Women in Surveying – C: 1	Platinum Member Session – LEICA GEOSYSTEMS
12:30–14:00	Lunch Break – 3rd floor, LUNCH ROOM (343 + 347)				
14:00–15:30	TS07H: Mapping, Monitoring and Planning Spatial Developments – C: 8	TS07C: National Spatial Data Infrastructure NSDI – C: 3	Social Tenure Domain Model – Development and Application at Country Level	FIG Task Force on Governance	TS07J: Europe and New Trends in Land Administration – C: 7
15:30–16:00	Afternoon Break – 2nd and 3rd floor, Exhibition Area				
15:30–18:00	FIG Presidents Meeting – How can the member associations influence FIG and our events? – 210bc ("TRIMBLE ROOM")				
16:00–17:30	TS08H: Adaptive Strategies for Climate Change – C: 8	Master Class: Learning Session on the Use of Technology			TS08J: Ten Years of Law on Geoinformation in Switzerland – Trends, Challenges and Impact – C: 7



**Tuesday, 23 April**

<b>249bc ("SOUTH")</b>	<b>252a ("RIPRO")</b>	<b>252bc ("GEO-PLUS")</b>	<b>309a ("Make Your Mark.")</b>	<b>309b ("ESRI")</b>	
					08:00–08:45
					09:00–10:30
					10:30–11:00
					11:00–12:30
					12:30–13:30
					12:30–14:00
TS01I: Urban Challenges – C: 7, 8 and 9	TS01F: UAV – from Sensors to Applications – C: 6	TS01D: Mapping the Plastic – C: 4 and YSN	TS01G: Modernizing Land Administration – C: 7	TS01E: Deformation in Frames – C: 5	14:00–15:30
					15:30–16:00
TS02I: Land and Property Markets – C: 9	TS02F: Engineering Surveys – Contribution to Data Collection and Mapping – C: 6	TS02D: Maritime Zones and Charting Applications – C: 4	TS02G: Future Land Administration – C: 7	TS02E: Geometric Reference Frames – C: 5	16:00–17:30

**Wednesday, 24 April**

					07:00–08:48
					07:45–08:45
					09:00–10:30
					10:30–11:00
Good Practices in Land Administration in the Asia Pacific Region	Member Association, Regional Bodies and Regional Networks Forum	TS03D: Russian Session – Modern Geospatial Challenges I	TS03G: FFP and Community Mapping – C: 7	TS03E: Gravity, Geoids and Vertical Change – C: 5	11:00–12:30
					12:30–14:00
Strengthening Partnerships in Land Governance in the Asia Pacific Region	Member Association, Regional Bodies and Regional Networks Forum II The Forum will be chaired by representatives from all partners	TS04D: Russian Session – Modern Geospatial Challenges II	TS04G: Fit-for-Purpose Land Administration – Experiences in Practice	BELS+ Special Session: Galileo – Status and Innovative Solutions for Precise Positioning	14:00–15:30
					15:30–16:00
TS05I: Land Value and Compulsory Acquisition	TS05F: Engineering Surveys – Developing our Methods – C: 6	TS05D: Marine Geospatial and Surveying Techniques – C: 4	TS05G: Risk and Disaster Management – C: 7 and 8	TS05E: GNSS Techniques and Applications – C: 5	16:00–17:30
					17:30–18:30

**Thursday, 25 April**

					09:00–10:30
					10:30–11:00
TS06I: Developing Capacity for Geodetic Infrastructure and Systems I	TS06F: French Session – Structures «Géomètres» et Déontologie/Ethique	TS06D: Remote Sensing for Hydrography – C: 4	TS06G: Land Challenges in Latin America – C: 7	TS06E – Special Session on the Sustainable Development Goals & FIG	11:00–12:30
					12:30–14:00
TS07I: Developing Capacity for Geodetic Infrastructure and Systems II	TS07F: French Session – Bonnes pratiques : évolutions	TS07D: ISS – Applications Using Earth Observations and Remote Sensing	TS07G: Examples of Land Administration in Africa – C: 7	TS07E: Multi-Sensor Positioning – C: 5	14:00–15:30
					15:30–16:00
					15:30–18:00
TS08I: Valuation Frontiers – C: 9	TS08F: French Session – Nouvelles Technologies		TS08G: Emerging Land Administration Trends in Asia – C: 7	TS08E: Cost-Effective Positioning – C: 5	16:00–17:30

Tuesday, 23 April

## NEWCOMERS SESSION

**TUESDAY, 23 APRIL 08:00–08:45**  
**VENUE:** 309B ("ESRI ROOM"), NCC  
**CHAIR:** DR. **DIANE DUMASHIE**, FIG VICE PRESIDENT, UNITED KINGDOM  
**RAPPORTEUR:** MS. **LOUISE FRIIS-HANSEN**, FIG DIRECTOR, DENMARK

## New to the FIG Working Week?

Join us at the session for newcomers to meet members of the council, the FIG Office and other participants who will experience the FIG Working Week for the first time. Do not miss this opportunity to learn more about FIG, on how to maximize your conference experience and making most of your attendance. First time attendees will be introduced to the programme, the keynote speakers, the sessions tracks, the roundtable discussions, the sponsors and social events.

The official Opening Ceremony of the conference will immediately follow the newcomers session. We look forward to seeing you there!

## OPENING CEREMONY

**TUESDAY, 23 APRIL 09:00–10:30**  
**VENUE:** BANQUET HALL (PHONG KHANH TIET), NCC  
**MASTER OF CEREMONY:** PROF. DR. **VO CHI MY**, VICE PRESIDENT AND SECRETARY GENERAL, VGCR

The opening ceremony will provide a spectacular introduction to the Working Week, its theme, and its unique location – a festive start of the Week.

## Welcome addresses:

- Mr. **Tran Hong Ha**, MONRE Minister
- Mr. **Tran Bach Giang**, VGCR Chairman
- Mr. **Trinh Anh Co**, Co-Conference director and Chair of Local Organising Committee
- Prof. Dr. **Rudolf Staiger**, FIG President

## Keynote:

- **Mika-Petteri Törhönen**, Lead Land Administration Specialist (Finland): Secure Tenure for all Men and Women; The World Bank's Land and Geospatial Program with a Special Reference to Achieving SDGs (10229)

PLENARY SESSION 1:  
A SMARTER LIFE AND ENVIRONMENTAL RESILIENCE THROUGH ORGANISATIONAL APPROACHES

**TUESDAY, 23 APRIL 11:00–12:30**  
**VENUE:** BANQUET HALL (PHONG KHANH TIET), NCC  
**CHAIR:** DR. **ORHAN ERCAN**, FIG VICE PRESIDENT, TURKEY

**Dang Hung Vo**, Prof. Dr at National University of Hanoi (Vietnam): Timing – Spatial Information System is the Informative Infrastructure to Develop the Smart World (10212)

**Gary Johnston**, Head, National Positioning Infrastructure Branch (Australia): UNGGIM-AP Approaches to a Smarter Life and Environmental Resilience (10213)

**Rudolf Staiger**, FIG President (Germany): FIG 2019–2022 Volunteering for the Future (10214)

## GLTN PROFESSIONAL CLUSTER MEETING

**TUESDAY, 23 APRIL 12:30–14:00**  
**VENUE:** 254BC ("FIG PRESIDENTS MEETING ROOM"), NCC  
**CHAIR:** DR. **DIANE DUMASHIE**, FIG VICE PRESIDENT, UNITED KINGDOM

- By invitation only

## SPEED NETWORKING

**TUESDAY, 23 APRIL 12:30–13:30**  
**VENUE:** BANQUET HALL (PHONG KHANH TIET), NCC  
**COMMISSION:** YSN  
**CHAIR:** MS. **MELISSA HARRINGTON**, CHAIR, FIG YOUNG SURVEYORS NETWORK, UNITED STATES  
**RAPPORTEUR:** MR. **KWABENA ASIAMA**, NETHERLANDS

Prepare your name badges, business cards, and notebooks! Join the FIG Young Surveyors Network for some speed networking over the lunch break! This event is open to everyone, and is a great opportunity to meet members of the Young Surveyors Network, FIG Commission Chairs and Conference Delegates at the start of the FIG Working Week.

Tuesday, 23 April 2019 14:00–15:30

## INTEGRATED GEO-SPATIAL INFORMATION FRAMEWORK (IGIF)

**TUESDAY, 23 APRIL 14:00–15:30**  
**VENUE:** 210BC ("TRIMBLE ROOM"), NCC  
**CHAIR:** MS. **KATHRINE KELM**, WORLD BANK,

## Jointly hosted by FIG, World Bank and FAO

The session will present the Integrated Geospatial Information Framework (IGIF) endorsed by UNGGIM Committee of Experts in August 2018. The presentation will include an overview of the IGIF and review in depth the draft IGIF Implementing Guide and the country level action plan methodology which will be out for global consultation at the time of the conference. The Implementing Guide will be presented to the Committee of Experts at the August 2019 UNGGIM meeting. There will also be a presentation by 2–3 countries on how they have used the IGIF methodology for country level implementation.

**Rumyana Tonchovska** (Italy) and **Kathrine Kelm** (USA): Integrated Geospatial Information Framework – How It Works? Good Practices Around the Globe. (9892)

## TS01C: GIS APPLICATIONS

**TUESDAY, 23 APRIL 14:00–15:30**  
**VENUE:** 207ABC ("FIG FOUNDATION ROOM"), NCC  
**COMMISSION:** 3  
**CHAIR:** PROF. **CHARALABOS IOANNIDIS**, GREECE  
**RAPPORTEUR:** MS. **MARIA GRAZIA SCORZA**, ITALY

## Phi Son Nguyen, Anh Tuan Nguyen and Thanh Thuy Nguyen (Vietnam):

Application of Remote Sensing, GIS and Topographical Data for Establishing Soil Erosion Map (9774)  
*This is a peer reviewed paper.*

**Muyiwa Agunbiade** (Nigeria), **Abbas Rajabifard** (Australia) and **Abiodun Oluyomi** (USA): Land Administration Integration Framework for Affordable Housing Production: the Roles of Spatial Data Infrastructures, Institutional Processes and Policies (9805)

**Minh Nguyen** and **Huong Nguyen** (Vietnam): Mapping Landslide Events in Vietnam Using the Global Landslide Catalog and GIS (9994)

**Kaidzu Masaru** (Japan): Integrated Application of Separately Managed GIS Resources for Land Administration (10027)

**Hung Nguyen, Tuan Vu, Hong Quang Nguyen, Minh Duc Nguyen** and **Thi Dieu Dinh** (Vietnam): Research Potential Applications of Sentinel-1 Images for Monitoring Terrain Deformation Using InSAR Method (10032)

## TS01D: MAPPING THE PLASTIC

**TUESDAY, 23 APRIL 14:00–15:30**  
**VENUE:** 252BC ("GEO-PLUS ROOM"), NCC  
**COMMISSION:** 4 AND YSN  
**CHAIR:** DR. **MOHD RAZALI MAHMUD**, CHAIR FIG COMMISSION 4, MALAYSIA  
**RAPPORTEUR:** MR. **GORDON JOHNSTON**, UNITED KINGDOM

**Britta Denise Hardesty, TJ Lawson, Qamar Schuyler, Chris Wilcox** (Australia), **Trang Nguyen** and **Hoa Tran** (Vietnam): Mapping the Plastic along Hai Phong's Urban and Coastal Margins (10175)

**Thang Le Dai** (Vietnam): Overview of Marine Plastic Debris in Vietnam in Relation to International Context (10174)

**Nguyen Thi Thu Trang** (Vietnam): Mapping the Plastic (10176)

**Gordana Jakovljević** (Bosnia and Herzegovina), **Miro Govedarica** (Serbia) and **Flor Álvarez Taboada** (Spain): Remote Sensing Data in Mapping Plastics at Surface Water Bodies (9974)

## FIG DIRECTOR GENERALS FORUM

**TUESDAY, 23 APRIL 14:00–15:30**  
**VENUE:** 205ABC ("LX KOREA ROOM"), NCC  
**CHAIR:** MRS. **GERDA SCHENNACH**, AUSTRIA

- By invitation only

**TS01E: DEFORMATION IN FRAMES**

**TUESDAY, 23 APRIL 14:00–15:30**  
**VENUE:** 309B ("ESRI ROOM"), NCC  
**COMMISSION:** 5  
**CHAIR:** MR. **NIC DONNELLY**, NEW ZEALAND  
**RAPPORTEUR:** DR. **DAN GILLINS**, UNITED STATES

**Ha Dinh Thi Le** (Vietnam): The Correction to Stake-Out Coordinate Points in Constructing Hydropower Project with Height Dams (9820)

**Gilad Even-Tzur** (Israel): Surface Deformation Along the Carmel-Gilboa Fault System by Means of Extended Free Network Adjustment Constraints (9976)

**Jacob Heck and Dru Smith** (USA): Practical Considerations for Determining Euler Pole Parameters for the Terrestrial Reference Frames in the United States (10002)

**Pasi Häkli, Martin Lidberg, Lotti Jivall, Holger Steffen, Halfdan Kierulf, Jonas Ågren, Olav Vestøl** (Norway), **Sonja Lahtinen** (Finland), **Rebekka Steffen** (Sweden) and **Lev Tarasov** (Canada): New Horizontal Intraplate Velocity Model for Nordic and Baltic Countries (10078)

**TS01F: UAV – FROM SENSORS TO APPLICATIONS**

**TUESDAY, 23 APRIL 14:00–15:30**  
**VENUE:** 252A ("RIPRO ROOM"), NCC  
**COMMISSION:** 6  
**CHAIR:** MR. **JOEL VAN CRANEN-BROECK**, BELGIUM  
**RAPPORTEUR:** MR. **MEHMED BATILOVIĆ**, SERBIA

**Pham Xuan Hoan and Le Thi Kim Dung** (Vietnam): Applications of Collection and Processing UAV Data: The Problems and Trend to Resolve (9849)

**Heinz-Juergen Przybilla** (Germany): Investigations on the Geometric Quality of Commercially Available Cameras for Uav Applications (9806)

**Maria Henriques, Tiago Pinto, João Andrade, Duarte Dornellas and Jorge Gonçalves** (Portugal): Project "ELEVAR" – Development of an UAV for Autonomous Photo Surveys of Surfaces (9943)

**Hendriatiningsih Sadikin, Deni Suwardhi and Irwan Gumilar** (Indonesia): Topographic Mapping Using Unmanned Aerial Vehicle (UAV) Technology-Photogrammetry Method (9957)

**Hanh Ngoc Dang** (Vietnam): Evaluation of Forest Fire Detection Model Using Video Captured by UAVs (10095)

**Anh Thu Phan Thi** (Vietnam) and **Kazuyoshi Takahashi** (Japan): The Mapping Accuracy of Low-Cost UAV- Based Laser Scanner System: a Case Study of Hokuyo UTM30Lx Laser Scanner (9871)

**TS01G: MODERNIZING LAND ADMINISTRATION**

**TUESDAY, 23 APRIL 14:00–15:30**  
**VENUE:** 309A ("MAKE YOUR MARK ROOM"), NCC  
**COMMISSION:** 7  
**CHAIR:** MR. **IAN ROSE**, UNITED STATES  
**RAPPORTEUR:** MS. **CHRISTINE MALTAIS**, CANADA

**Paula Dijkstra, Haico van der Vegt and Dorus Kruse** (Netherlands): Strengthening Professional Access to Information About Land (SPATIAL) in the Western Balkan (10026)

**Danilo Antonio, John Gitau and Oumar Sylla** (Kenya): Innovative Customary Land Governance in Zambia: Experiences, Lessons Learned and Emerging Impacts (UN-HABITAT GLTN) (9985)

**Sharad Chandra Mainali** (Nepal): Land Conflict Inventory: A Tool to Strengthen Land Conflict Resolution Mechanism (9850)

**Stefan Wei and Adin Lee** (China, PR): Mobile Mapping System used in Cadastral Surveying (9853)

**Sinan Fidan and Nihat Erdogan** (Turkey): General Directorate of Land Registry and Cadastre (GDLRC) and Private Sector (9978)

**TS01I: URBAN CHALLENGES**

**TUESDAY, 23 APRIL 14:00–15:30**  
**VENUE:** 249BC ("SOUTH ROOM"), NCC  
**COMMISSION:** 7, 8 AND 9  
**CHAIR:** MS. **MARIJE LOUWSMA**, CHAIR FIG COMMISSION 8, NETHERLANDS  
**RAPPORTEUR:** DR. **VU ANH TUAN**, VIETNAM

**James Kavanagh and Nigel Sellars** (United Kingdom): Land Transfer Standards (ILMS) and Land Acquisition – Essential for Emerging Economies (9996)

**Peter van Oosterom, Abdullah Kara, Eftychia Kalogianni, Anna Shnaidman, Agung Indrajit, Abdullah Alattas and Christiaan Lemmen** (Netherlands): Joint ISO/TC211 and OGC Revision of the LADM: Valuation Information, Spatial Planning Information, SDG Land Indicators, Refined Survey Model, Links to BIM, Support of LA Processes, Technical Encodings, and Much More on Their Way! (10079)

**Chao Lin and Junzheng Qiang** (China, PR): The Institutional Reform of Rural Residential Land in China Based on the Comparison with Vietnam (10105)

**Markus Seifert and Hartmut Mueller** (Germany): Blockchain, a Feasible Technology for Land Administration? (10110)

**Chryssy Potsiou** (Greece) and **Steven Nystrom** (USA): UNECE WPLA / FIG Guidelines for Formalization of Informal Constructions within Europe (10171)

**TS01J: ISS – TOOLS FOR LAND ADMINISTRATION, LAND GOVERNANCE AND MANAGEMENT I**

**TUESDAY, 23 APRIL 14:00–15:30**  
**VENUE:** 249A ("LEICA GEOSYSTEMS ROOM"), NCC  
**CHAIR:** DR. **ORHAN ERCAN**, FIG VICE PRESIDENT, TURKEY  
**RAPPORTEUR:** PHD. **DUC MAU NGO**, VIETNAM

**Agnieszka Dawidowicz and Ryszard Żróbek** (Poland): Fit-For-Purpose Land Administration System in Poland (9858)

**Helge Nysæter** (Norway): Status of Coordinates in Norwegian Cadastre (9927)

**Hendry Yuli Wibowo** (Indonesia): Implementation of Complete Systematic Land Registration in Order to Modernize Indonesian Land Administration System (9931)

**Stephanie Michaud** (USA) and **Martin Westers** (Germany): Increasing Cadastral Survey Productivity to Tackle Undocumented Land Rights Worldwide: a Case Study (9940)

**Bambang Edhi Leksono, Nadya Nur Khoirinnisa, Ratri Widayastuti, Putri Rahmadani and Andri Harpiandi** (Indonesia): Solutions for Quality Improvement of Slum Settlement with Limited Area Using Vertical Land Consolidation Concepts in Urban Village (case Study: Babakan Surabaya Urban Village, Bandung City, Indonesia) (9965)

**Wang Jinmei, Yang Weifang, Yang Shuwen and Yan Haowen** (China, PR): Spatial Distribution Characteristics of Color Steel Plate Buildings in Lanzhou City (9966)

**Natalia Sajnog and Katarzyna Sobolewska-Mikulska** (Poland): Technical Infrastructure as a Barrier to Rational Land Use in Rural Areas – Case Study of Poland (10011)

**Sudarman, Bambang Edhi Leksono, Ratri Widayastuti, Winna Putri Pertiwi and Putri Rahmadani** (Indonesia): Fit for Purpose Land Administration (FFP-LA) Implementation to Accelerate Land Mapping in Sayang Village, Sumedang Regency, Indonesia (10020)

**FIG PLATINUM MEMBER SESSION – ESRI: WEBGIS LAND ADMINISTRATION SYSTEMS**

**TUESDAY, 23 APRIL 14:00–15:30**  
**VENUE:** 210A ("ARCGIS ROOM"), NCC  
**CHAIR:** MR. **BRENT JONES**, UNITED STATES



Seldom does a game changing technology come to cadaster. It has now. WebGIS changes everything. Presenters: **Timothy Fella, Nick Land, and Katherine Smyth**



**ROUNDTABLE DISCUSSION  
ON LAND RECORDS  
COMPLETION AND  
MODERNIZATION**

**TUESDAY, 23 APRIL 16:00–17:30**  
**VENUE:** 210BC ("TRIMBLE ROOM"), NCC  
**CHAIR:** DR. MIKA-PETTERI TÖRHÖNEN,  
 WORLD BANK

**Jointly hosted by FIG and the  
World Bank**

The Roundtable will feature the case of Vietnam in comparison to developments in Pakistan and Indonesia in completing comprehensive Land Records of all properties and modernizing land administration systems through digitalization, online access, interlinking, automation, electronic services and innovation. While case studies are Asia centric, the theme is universal and thus the discussion is open to all delegates who are involved with land records completion and land administration modernization. The core question the roundtable seeks answers for is: How to complete land records within a generation? International specialists from the UN system, Academia and Private Sector will be featured in the Roundtable as discussants, and the floor will be open for the audience to actively participate.

**TECHNOLOGY  
CONTRIBUTION TO IMPROVE  
TENURE GOVERNANCE**

**TUESDAY, 23 APRIL 16:00–17:30**  
**VENUE:** 205ABC ("LX KOREA ROOM"),  
 NCC  
**CHAIR:** MS. RUMYANA TONCHOVSKA,  
 SENIOR LAND ADMINISTRATION OFFICER,  
 PARTNERSHIPS DIVISION, UN FAO

**Jointly hosted by FAO and FIG**

The session aims to share experience and good practices from several countries with different level of complexity of their IT systems and different stages of development. Speakers from Russian Federation, Serbia, Vietnam and Sierra Leone will present their experience in implementation of information technologies for improving tenure governance, key issues, lessons learned and the future plans. The session will provide opportunities for questions from the floor.

- **Maria Paola Rizzo** (Land Tenure Officer and SOLA-OT specialist in the Land Tenure Unit, FAO, Rome): A quick overview: SOLA Suite of Applications and comparative solutions.
- **Jobo Samba**, Deputy Director, GIS and Remote Sensing, Ministry of Lands, Housing and Environment, Freetown, Sierra Leone: Case study of using Open Tenure – Sierra Leone: Using Open Tenure for demarcation of community land
- **Serbian case study:** Using IT tools for informal properties, application for inspectors, building register, Sales-price register, Gender disaggregated data – transparency, accountability, gender equality, interoperability with ID Register and Address register.
- **Russian case study:** IT Module for Surveyors, e-services for surveyors, interagency exchange of information access to information, transparency, role of surveyors for property valuation, land use monitoring, registration of buildings without application (link with building permits).
- **Hong Phong Dinh** (Vietnam): Vietnam National Land Information System in e-Government Architecture (10140)

**CONNECTING THE DOTS**

**TUESDAY, 23 APRIL 16:00–17:30**  
**VENUE:** 210A ("ARCGIS ROOM"), NCC  
**COMMISSION:** YSN  
**CHAIR:** MS. MELISSA HARRINGTON,  
 CHAIR, FIG YOUNG SURVEYORS  
 NETWORK, UNITED STATES  
**RAPPOREUR:** MR. KWABENA  
 ASIAMA, NETHERLANDS

Where are we as an industry going? How do we get there? What challenges are we currently facing? Let's connect the dots, and plan for the future. Join the FIG Young Surveyors Network in a fun an interactive workshop aimed at identifying the challenges that the surveying industry is facing, and finding ways for FIG and the FIG Young Surveyors to contribute, ensuring the future of the surveying profession!

During the workshop, questions will be asked and smaller groups will be formed to focus on a particular topic. From here, action items will be noted for FIG and the FIG Young Surveyors Network.

**TS02C: ISS – GIS  
APPLICATIONS**

**TUESDAY, 23 APRIL 16:00–17:30**  
**VENUE:** 207ABC ("FIG FOUNDATION  
 ROOM"), NCC  
**CHAIR:** PROF. VOLKER SCHWIEGER,  
 GERMANY  
**RAPPOREUR:** DR. THI MINH PHUONG  
 LE, VIETNAM

**Shen Ying, Renzhong Guo,  
Chengpeng Li and Lin Li** (China,  
PR):

Conceptual Model Construction and Analysis of the Full Natural Resources Features Based on Geographical Space (9977)

**Madan Mohan** (India):  
 Geospatial Modelling for Urban  
 Environmental Resilience: A Study  
 of Urban Terrestrial Ecosystem of  
 Delhi Ridge, NCT Delhi (10055)

**Weifang Yang, Haowen Yan,  
Liming Zhang and Xiaomin Lu**  
 (China, PR):  
 Quantitative Spatial Similarity  
 Relations for Automated Map  
 Generalization (9762)

**Liping Sun and Qinci Li** (China,  
PR):  
 An Introduction to the Next Gen-  
 eration of 3D GIS Technologies in  
 China (10172)  
**Eike Barnefske and Harald  
Sternberg** (Germany):  
 Generation of Training Data for  
 3D Point Cloud Classification by  
 CNN (9881)

**Duc Tue Nguyen** (Vietnam):  
 Demand and Development of Geo-  
 spatial Data in Vietnam (10030)

**Charles Paradzayi, Forward  
Dewa and Lorraine Mapungwana**  
 (Zimbabwe):  
 Mapping the Urban Green Space  
 Landscape in Gweru, Zimbabwe  
 (10075)

**TS02D: MARITIME  
ZONES AND CHARTING  
APPLICATIONS**

**TUESDAY, 23 APRIL 16:00–17:30**  
**VENUE:** 252BC ("GEO-PLUS ROOM"), NCC  
**COMMISSION:** 4  
**CHAIR:** MR. GORDON JOHNSTON,  
 UNITED KINGDOM  
**RAPPOREUR:** DR. NAJHAN MD SAID,  
 MALAYSIA

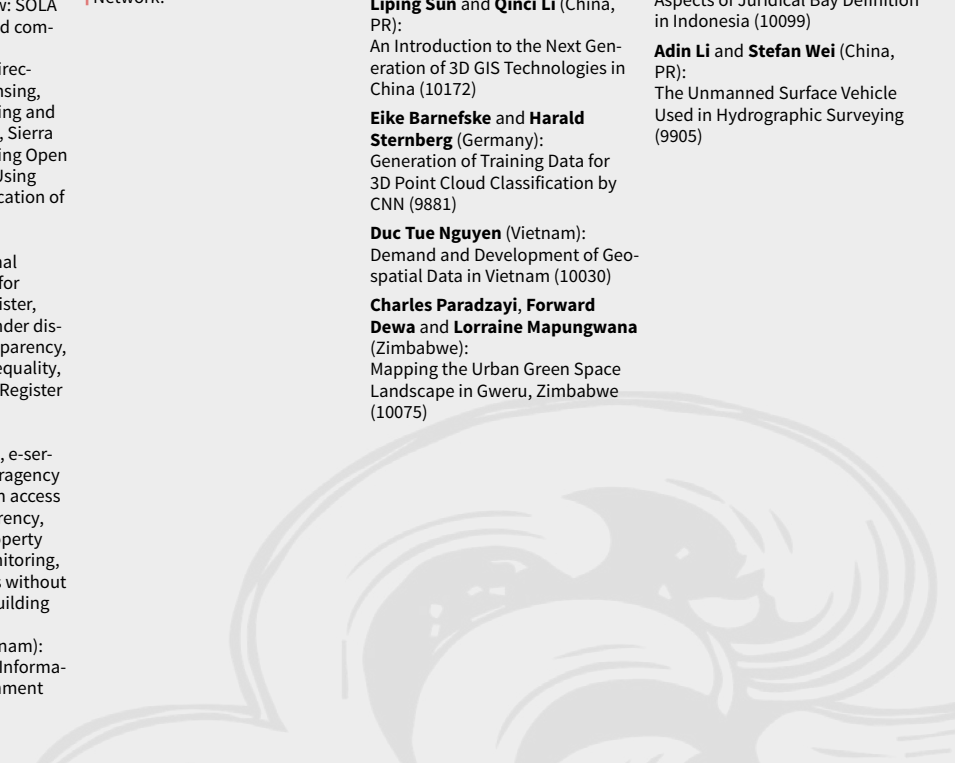
**Simon Ironside** (New Zealand)  
 and **Christophe Vrignaud**  
 (France):

Updating IHO Publication S-44,  
 Standards for Hydrographic Sur-  
 veys – Planning for the Future of  
 Safe Navigation (9960)

**H.M.I. Prasanna, M.D.E.K.  
Gunathilaka and D.R. Welikanna**  
 (Sri Lanka):  
 Variability of the Sounding  
 Datums Around Sri Lankan Coast-  
 line (10065)

**Rio M. Fadhli, Citra A. Putri and  
I Made Andi Arsana** (Indonesia):  
 Confirming Sovereignty in Internal  
 Waters: Legal and Geospatial  
 Aspects of Juridical Bay Definition  
 in Indonesia (10099)

**Adin Li and Stefan Wei** (China,  
PR):  
 The Unmanned Surface Vehicle  
 Used in Hydrographic Surveying  
 (9905)



**TS02E: GEOMETRIC REFERENCE FRAMES**

**TUESDAY, 23 APRIL 16:00–17:30**

**VENUE:** 309B ("ESRI ROOM"), NCC

**COMMISSION:** 5

**CHAIR:** DR. DANIEL ROMAN, UNITED STATES

**RAPPORTEUR:** DR. JACOB HECK, UNITED STATES

**Mohammad Abboud, Jad Youness, Hiba Mousa and Mohamad Nasrullah** (Lebanon):

The Features of the Coordinate Transformation from the Geodetic System WGS84 with the Mercator Projection for Low Latitudes Conditions (10210)

**Nic Donnelly** (New Zealand):

Building a Resilient Geodetic System: a New Zealand Case Study (10118)

**S. K. Singh and Deepak Kumar** (India):

Continuously Operating Reference Stations (CORS) GNSS Network Challenges and Benefits in the Indian Context (9921)

**Hoa Pham Thi, Dung Nghiem**

**Quoc, Thu Trinh Thi Hoai and Huynh Pham The** (Vietnam): The Relationship Between the Vietnam National Coordinate Reference System (VN-2000) and ITRS, WGS84 and PZ-90 (10060)

**Rui Fernandes, Machiel Bos**

(Portugal) and **Yoaz Bar-Sever** (USA): TeroPoint: Online Processing Service for Accurate Positioning at National Level (10090)

**TS02F: ENGINEERING SURVEYS – CONTRIBUTION TO DATA COLLECTION AND MAPPING**

**TUESDAY, 23 APRIL 16:00–17:30**

**VENUE:** 252A ("RIPRO ROOM"), NCC

**COMMISSION:** 6

**CHAIR:** MR. HEINZ-JUERGEN

**PRZYBILLA**, GERMANY

**RAPPORTEUR:** MR. NJIKE CHIGBU, NIGERIA

**Yuchen Yang, Craig Hancock, Georgios Kapogiannis** (China, PR)

and **Ruoyu Jin** (United Kingdom): Integrating Indoor Positioning Techniques with Mobile Laser Scanner to Create Indoor Laser Scanning Models (10050)

**Stefano Cantoni and Giorgio**

**Paolo Maria Vassena** (Italy): Fast Mapping and Geospatial Data Acquisition by Innovative Indoor Mapping System (10087)

**Van Anh Tran, Quoc Cuong Tran,**

**An Binh Nguyen and Trung Anh Tran** (Vietnam): Application of Quasi-Psi Method for Landslide Determination in Northern Mountainous Region of Vietnam by Multi Sensor Radar Satellite Images (9776)  
*This is a peer reviewed paper.*

**Mehmed Batilović, Dejan Vasić,**

**Tatjana Kuzmić and Marina Davidović** (Serbia): Importance of Image and Point Cloud Matching of Road Infrastructure Feature Extraction (10184)

**Vladimír Sedlák** (Slovakia):

Key Technologies on the Integration of Multi-GNSS, LiDAR and Oblique Photogrammetry in 3D High-Quality Reconstruction of Smart City – Košice, Slovakia (9865)

**Styliani Verykokou and**

**Charalabos Ioannidis** (Greece): A Global Photogrammetry-Based Structure from Motion Framework: Application in Oblique Aerial Images (9794)  
*This is a peer reviewed paper.*

**TS02G: FUTURE LAND ADMINISTRATION**

**TUESDAY, 23 APRIL 16:00–17:30**

**VENUE:** 309A ("MAKE YOUR MARK ROOM"), NCC

**COMMISSION:** 7

**CHAIR:** PROF. DR. CHRYSY POTSIOU,

FIG PRESIDENT (2014–2018), GREECE

**RAPPORTEUR:** DR. ANNA

**SHNAIDMAN**, ISRAEL

**Brent Jones** (USA):

Technical Advances in Land Administration (9847)

**Rohan Bennett, Eryadi Masli**

(Australia), **Potel Jossam** (Rwanda), **Eva-Maria Unger** (Austria), **Zeeuw Kees** and **Christiaan Lemmen** (Netherlands):

Cadastral Entrepreneurs Recognizing the Innovators of Sustainable Land Administration (9950)

**Jaap Zevenbergen and**

**Hendrik Ploeger** (Netherlands): What Would Title Registration Bring to a Deeds System with High Quality Land Information? (9972)

**Fredrik Zetterquist** (Sweden):

Transforming Land Administration – a Scenario Study for Future Land Administration (9926)

**Munsung Koh** (Republic of

Korea): Dynamics of Urban Utility and Urban Change: a Case of New Orleans (9898)

**TS02I: LAND AND PROPERTY MARKETS**

**TUESDAY, 23 APRIL 16:00–17:30**

**VENUE:** 249BC ("SOUTH ROOM"), NCC

**COMMISSION:** 9

**CHAIR:** DR. PETER WYATT, UNITED

KINGDOM

**RAPPORTEUR:** DR. TRAN TUAN NGOC,

VIETNAM

**Pete Wyatt** (United Kingdom):

From a Property Tax to a Land Tax – Who Wins, Who Loses? (9737)  
*This is a peer reviewed paper.*

**Felician Komu** (Tanzania):

Dilemma of Regulating Residential Real Estate Markets in Developing Countries- the Case of Tanzania (9818)  
*This is a peer reviewed paper.*

**Malgorzata Renigier-Bilozor,**

**Sabina Zrobek and Marek Walacik** (Poland): AVM Application as a Current Subject of Discussion Between the Property Valuers and Scientists – Polish Background. (9875)

**Olufunke Ajibade, Philips Ogunode and Samuel Oladejo**

(Nigeria): Marketing of Real Estate in South-Western Nigeria: Inhibitors and Facilitators (9876)

**Younghyun Kwon** (Republic of

Korea): Analyzing Indirect Economic Impacts of Wildfire Damages on Regional Economy (9897)

**Olufemi Oyedele** (Nigeria):

Challenges of Investing in Real Estate in Developing Nations (9923)

**TS02J: ISS – TOOLS FOR LAND ADMINISTRATION, LAND GOVERNANCE AND MANAGEMENT II**

**TUESDAY, 23 APRIL 16:00–17:30**

**VENUE:** 249A ("LEICA GEOSYSTEMS ROOM"), NCC

**CHAIR:** PROF. CHRISTIAAN LEMMEN,

FIG HONORARY MEMBER, NETHERLANDS

**RAPPORTEUR:** ASSOC. PROF. DR. TA HAR TUNG, VIETNAM

**Ruth Trujillo and Victor Seda**

(Puerto Rico): 2,975 Hurricane Maria: the Role of Land Surveyors in Infrastructure Resiliency (9848)

**Nikolaos Zacharias** (Greece):

The Role of the Surveyor in the Informal Mediation (10226)

**Vasily Nilipovskiy** (Russia),

**Phung Trung Thanh and Nguyen Van Thinh** (Vietnam): Smart Living and Land Management Information Technologies (10227)

**Ding Yuan, Changbin Wu, Xinxin**

**Zhou and Hao Li** (China, PR): A Multi-Dimensional Cadastral Topological Data Model: Design and Implementation (9869)

**Pham Tuan** (Vietnam), **James**

**Spencer** (USA) and **Thanh Nguyen** (Vietnam): Urbanization in Ho Chi Minh City (10169)

**Danny Raisky** (Israel):

The Transition from Paper Hardcopies to Digital Media in Survey of Israel – a Review (9937)

**K Chan** (Hong Kong SAR, China):

Criticism of Correlated Issues in Managing Hotel Maintenance for Smarter Cities (9775)  
*This is a peer reviewed paper.*

**VIETNAMESE CULTURAL PERFORMANCE**

**TUESDAY, 23 APRIL 18:30–20:30 AND 20:30–22:30**

**VENUE:** HANOI OPERA HOUSE – NHÀ HÁT LỚN HÀ NỘI



THE FIG FOUNDATION

**In cooperation with FIG Foundation and supported by Trimble**

The Cultural Evening has gradually become an indispensable part of a FIG conference week. This year our local host has decided that all delegates, accompanying persons and exhibitors are invited to the Opera House for a special concert, where 50 musicians will perform traditionally Vietnamese music and popular symphonies with folk and ethnic instruments such as monochord, zither, bamboo xylophone, flutes, etc.

## Wednesday, 24 April

STDM ADVISORY BOARD  
BREAKFAST MEETING

**WEDNESDAY, 24 APRIL 07:00–08:45**  
**VENUE:** 257C ("MEETING ROOM L"), NCC  
**CHAIR:** MR. **DANILO ANTONIO**, KENYA

- By invitation only

## FIG FOUNDATION MEETING

**WEDNESDAY, 24 APRIL 07:00–08:48**  
**VENUE:** 254BC ("FIG PRESIDENTS MEETING ROOM"), NCC  
**CHAIR:** MR. **JOHN HOHOL**, FIG FOUNDATION PRESIDENT, UNITED STATES

- By invitation only

AFRICA CAPACITY  
DEVELOPMENT NETWORK –  
MORNING MEETING

**WEDNESDAY, 24 APRIL 07:45–08:45**  
**VENUE:** 309A ("MAKE YOUR MARK ROOM"), NCC  
**CHAIR:** DR. **DIANE DUMASHIE**, FIG VICE-PRESIDENT, UNITED KINGDOM  
**RAPPORTEUR:** **JONGHYUN YOON**, GLTN SECRETARIAT

Coffee and tea will be served for the FIG 2019 networking meeting of African land professionals with the following objectives: to present the plans for the term 2019–2022, to reflect on the meeting held in Botswana, to identify hosts for ARN meetings in 2020 and 2021, to consider the technical roll-out of CORS in Africa and how the Africa Regional Network (ARN) may assist, and to network with old and new friends.

**Jennifer Whittal** (South Africa): Welcome and presentation of the ARN for the term 2019–2022 (10230)

**Diane Dumashie** (United Kingdom): Reflection on the Last Term and the Meeting in Botswana (10231)

**Derrick Koome** (Kenya), **Clement Ogaja** (USA) and **Eldar Rubinov** (Australia): Developing Africa One CORS at a Time (10022)

**Jennifer Whittal** (South Africa): Workshop and Networking: YSAN, Professional, Academic, and Corporate ARN – Identification of Short and Long Term Goals Together (10232)

PLENARY SESSION 2:  
A SMARTER LIFE AND  
ENVIRONMENTAL  
RESILIENCE THROUGH  
SCIENCE AND INNOVATION

**WEDNESDAY, 24 APRIL 09:00–10:30**  
**VENUE:** 318 ("SURVEYOR'S ROOM"), NCC  
**CHAIR:** PROF. DR. **JIXIAN ZHANG**, FIG VICE PRESIDENT, CHINA PR

**Phan Duc Hieu**, Director General, Depart. of Survey and Mapping and **Tran Bach Giang** (Vietnam): Modernizing Geodetic Infrastructure for the Fourth industrial revolution in Vietnam (10215)

**Ron Bisio**, Vice President, Trimble Geospatial (USA): Applying Geospatial Technology to Enable Sustainable Palm Oil Production (10216)

**Harald Schuh**, President IAG (Germany): The Sustainable Development Goals (SDG's) from IAGs Perspective (10217)

ASIA & THE PACIFIC  
CAPACITY DEVELOPMENT  
NETWORK – MORNING  
MEETING

**WEDNESDAY, 24 APRIL 07:45–08:45**  
**VENUE:** 309B ("ESRI ROOM"), NCC  
**CHAIR:** MR. **ROB SARIB**, AUSTRALIA

The main purpose of this meeting is to discover and share information on FIG activities that are occurring in Asia and the Pacific region.

MEMBER ASSOCIATION,  
REGIONAL BODIES AND  
REGIONAL NETWORKS  
FORUM

**WEDNESDAY, 24 APRIL 11:00–12:30**  
**VENUE:** 252A ("RIPRO ROOM"), NCC  
**CHAIR:** THE FORUM WILL BE CHAIRED BY REPRESENTATIVES FROM ALL PARTNERS

FIG Council believes that these three bodies have similar interests and common topics to discuss which may create some synergy. Therefore we want to bring this year all three bodies together in one common format.

## Wednesday, 24 April 2019 11:00–12:30

FIG ACADEMIC FORUM ON  
THE VGGT

**WEDNESDAY, 24 APRIL 11:00–12:30**  
**VENUE:** 210A ("ARCGIS ROOM"), NCC  
**CHAIR:** DR. **DAVID MITCHELL**, CHAIR FIG COMMISSION 2, AUSTRALIA & MR. **JAVIER MOLINA CRUZ**, FAO, ITALY

**Jointly hosted by FIG and FAO**  
 The 2019 FIG Academic Members Forum is the platform within the 42nd FIG General Assembly where the Academic Members of FIG and other academics gather to discuss about academic responsibilities and prepare actions.

This session focuses on the role of the academic sector in the implementation and dissemination of the VGGTs through a strengthened role of surveyors. A "strengthened role of surveyors" is a connecting entry point to address and discuss the role of academia, especially in mainstreaming the modern data capturing tools (Open Tenure) and fit-for-purpose ICT systems in support of Land Administration (SOLA), developed under the FAO VGGT programme, and targeting both university curricula and continuous professional development courses. Thus surveying students and graduates will be informed about available tools and how to use these tools, they will learn and get experiences.

GOOD PRACTICES IN  
LAND ADMINISTRATION IN  
THE ASIA PACIFIC REGION

**WEDNESDAY, 24 APRIL 11:00–12:30**  
**VENUE:** 249BC ("SOUTH ROOM"), NCC  
**CHAIR:** DR. **DIANE DUMASHIE**, FIG VICE-PRESIDENT, UNITED KINGDOM  
**RAPPORTEUR:** **JONGHYUN YOON**, GLTN SECRETARIAT

**Jointly hosted by FIG, UN-Habitat/GLTN, LX Korea and China Land Surveying and Planning Institute (CLSPI)**

Land administration is key for poverty reduction, economic progress and environmental protection. With the opportunities brought by the international frameworks and the seemingly insurmountable tasks of addressing land issues, the Asia Pacific region, particularly the professionals shall benefit from knowledge sharing and learning. This joint technical session will attempt to feature good practices, innovations, lessons learned and experience in land administration in the Asia Pacific region.

**Objectives:**

- To further sensitize professionals and land on the role of land administration in achieving SDGs and New Urban Agenda
- To share and learn good practices and innovations in land administration in the Asia Pacific region

TS03C: GEOSPATIAL  
ANALYSIS

**WEDNESDAY, 24 APRIL 11:00–12:30**  
**VENUE:** 207ABC ("FIG FOUNDATION ROOM"), NCC  
**COMMISSION:** 3  
**CHAIR:** PROF. **HARTMUT MÜLLER**, CHAIR FIG COMMISSION 3, GERMANY

**Nicola Jammalieh** (Israel): Realignment of Road Network Maps with GPS Tracking Data (9755)

**Thi Bich Phuong Dong** (Vietnam): Positional Accuracy Improvement for Heterogeneous Geodata Integration (9783)  
*This is a peer reviewed paper.*

**Reza Abdullah, Wahyuni Wahyuni, Fahmi Charish Mustofa and Suharno Suharno** (Indonesia): Mobile-based Land Related Data Collector for Land Registration Activities: Usability Tests of Smart-PTSL Application (9804)

**Khanh Giang Le** (Vietnam), **Pei Liu and Liang-Tay Lin** (Chinese Taipei): Road Traffic Accident Black Spot Determination by Using Kernel Density Estimation Algorithm and Cluster Statistical Significant Evaluation (9824)

**Tran Thanh Huyen** (Vietnam): Using High-Resolution Remote Sensing Images to Detect Suitable Rooftops for Solar Pv Installation in Urban Areas in Da Nang City (9880)

**Daniele Brancato, Alessandro DalMasso, Cromwell Manaloto and Luca DalBuono** (Italy): Understanding the Spatial Evolution of Government-Owned Real-Estate and the Challenges of Urbanization and Urban Recovery in Small-Medium Italian Borghi. (10188)

PLATINUM MEMBER SESSION – TRIMBLE:  
TRANSFORMING THE WAY THE WORLD WORKS

**WEDNESDAY, 24 APRIL 11:00–12:30**  
**VENUE:** 210BC ("TRIMBLE ROOM"), NCC



In Trimble, we are transforming the physical real world to the digital: bringing intelligence to the field and powerful capabilities in the office that enable you to deliver high quality information to your clients. In this session we are going to provide a comprehensive overview of the latest Trimble solutions and applications where Trimble solutions are playing a key role in enabling smarter life and contributing to environmental resilience, resulting in increased productivity, safety, ensuring you have the utmost confidence in every decision to protect your brands reputation.

**Presenters:**

- **Boris Skopljak**, Marketing Director, Strategy and Analytics, Trimble Geospatial
- **Stephanie Michaud**, P.Eng. Portfolio Manager for Trimble Land Administration



**TS03E: GRAVITY, GEOIDS AND VERTICAL CHANGE**

**WEDNESDAY, 24 APRIL 11:00–12:30**  
**VENUE:** 309B ("ESRI ROOM"), NCC  
**COMMISSION:** 5  
**CHAIR:** MR. DAVID AVALOS, MEXICO  
**RAPPORTEUR:** DR. KEVIN AHLGREN, UNITED STATES

**Hoa Pham Thi, Thang Nguyen Viet, Thu Trinh Thi Hoai and Bac Nguyen Xuan** (Vietnam): Assessment of the Performance of EIGEN-6C4 Via GNSS/Leveling Data over Vietnam (10058)

**Van Sang Nguyen, Van Tri Vu and Van Tuyen Pham** (Vietnam): Determination of Marine Gravity Anomalies in the Truong Sa Archipelago's Sea Territory Using Satellite Altimeter Data (9770)  
*This is a peer reviewed paper.*

**Tokuro Kodama, Basara Miyahara, Koji Matsuo and Toshihiro Yahagi** (Japan): Airborne Gravity Measurement and New Gravimetric Geoid Model of Japan (9873)

**Daniel Roman and Kevin Ahlgren** (USA): GEOID18: Last U.S. Hybrid Geoid Prior to NAPGD2022 (9933)

**Hoa Ha Minh and Tuan Anh Nguyen** (Vietnam): Results of Experiment of Correcting for the Spherical Harmonic Coefficients of the EGM2008 Based on Detailed Gravity Anomalies Data in an Area of North Vietnam (9821)

**Kevin Ahlgren** (USA): Practical Considerations in Implementing a Geoid Monitoring Service (10062)

**Oyedokun Abiodun, Joseph Odumosu, Abdulmummin Oyekanmbi and Soliu Yussuf** (Nigeria): Analysis of the Performance of Two Gravimetric Reduction Schemes (10131)

**TS03D: RUSSIAN SESSION – MODERN GEOSPATIAL CHALLENGES L**

**WEDNESDAY, 24 APRIL 11:00–12:30**  
**VENUE:** 252BC ("GEO-PLUS ROOM"), NCC  
**CHAIR:** MR. FEODOR SHKUROV, RUSSIAN FEDERATION

Программа: Русскоязычной сессии  
**Открытие русскоязычной сессии**  
 Приветственное слово руководства Международной федерации геодезистов  
 Приветственное слово принимающей стороны (заместитель Генерального директора Управления геодезии, картографии и географической информации Вьетнама)  
 Приветственное слово российской стороны (руководитель Росреестра)

**Feodor Shkurov** (Russia): Modern Geospatial Challenges of Russia (10196)

**Dong Nguyen Dai** (Vietnam): Application and Development of Surveying and Mapping Technologies in Vietnam (10197)

**Elena Mazurova, Igor Stolyarov, Victor Popadyev, Vladimir Gorobets, Roman Sermyagin, Iliia Oshchepkov and Iurii Kuznetsov** (Russia): Modern Geodetic Support of the Russian Federation Territory (10198)

**Ha Minh Hoa** (Vietnam): Experiments of Correction of Spherical Harmonic Coefficients of the Earth's Gravitational Field EGM2008 on the Basis of Detailed Gravimetric Data on the Vietnamese Territory (10199)

**Nadezda Kamynina and Vladimir Oznamec** (Russia): MIIGaIK – International Center for Training Specialists in the Field of Geodesy, Cartography, Cadastre and Geoinformation Technologies (10200)

**Alexander Serov** (Russia): 3-D Digital Model of Moscow City – Unified Platform for Real Property Units from BIM Projecting to Registering Property Rights (10233)

**TS03G: FFP AND COMMUNITY MAPPING**

**WEDNESDAY, 24 APRIL 11:00–12:30**  
**VENUE:** 309A ("MAKE YOUR MARK. ROOM"), NCC  
**COMMISSION:** 7  
**CHAIR:** MRS. ANNE-PIERRE GIRARDIN, FRANCE  
**RAPPORTEUR:** MS. PAULA DIJKSTRA, NETHERLANDS

**Danilo Antonio, John Gitau and Oumar Sylla** (Kenya): Count Me In: the Case of Improving Tenure Security of Slum Dwellers in Peri-Urban Lusaka (**UN-HABITAT GLTN**) (9987)

**Ian Harper** (Australia): Comparisons of Process Automation in Cadastral Digitisation Implementations in Australia – from Fit for Purpose to Digital Rigour in Spatial and Transaction Processes. (10003)

**Stephanie Michaud** (USA): Positioning as a Service for Fit-Purpose Applications (9941)

**Kariyono Kariyono, Djurdjani Djurdjani, Virgo Eresta Jaya and Nandang Iskandar** (Indonesia): Spatial Data Quality Evaluation of Complete Map of Village Land Parcels Information Based on Participatory Mapping Result (9750)

**Quang Cuong Doan, Van Tuan Tran and Khac Hung Vu** (Vietnam): Application of Open Source Technology to Building Cadastral Information System for Land Registration and Complete Cadastral Records System (a Case Study of Hanoi City, Vietnam) (9796)  
*This is a peer reviewed paper.*

**Mau Ngo** (Vietnam): Vietnam Land Information System: from Fit for Purpose to Multi-purpose (9816)

**Marisa Balas, João Carrilho and Kemal Vaz** (Mozambique): The Role of Communities in Land Cadastre Maintenance (9885)

**TS03H: URBAN PLANNING AND HOUSING**

**WEDNESDAY, 24 APRIL 11:00–12:30**  
**VENUE:** 205ABC ("LX KOREA ROOM"), NCC  
**COMMISSION:** 8  
**CHAIR:** PROF. WALTER TIMO DE VRIES, GERMANY  
**RAPPORTEUR:** MS. ROSY LIAO RONG, CHINA

**Edward Kwesi, John Annan, Lewis Hlorvor and Kwame Tenadu** (Ghana): Assessment of Waste Management and Sanitation Services at Local (Municipal) Level— Case Study in the Mining Communities of Tarkwa, Ghana (10004)

**Uchendu Eugene Chigbu** (Germany) and **Danilo Antonio** (Kenya): Rural-Urban Inter-Relationships in an Urbanising World: The Literature Perspective of Nigeria (**UN-HABITAT GLTN**) (10001)

**Lara Brand and Bert Hoeve** (Netherlands): A Coalition of the Willing: Urban Land Readjustment as a Novel Approach for Sustainable Area Development (10076)

**Erwin Van der Krabben, Jinshuo Wang and Datuk Ary Samsura** (Netherlands): Planning Informalities in Chinese Cities: a Gamification Approach to the Adoption of Innovative Land Value Capture Strategies (9916)

**Wafula Nabutola** (Kenya): The Housing Challenges of Officers in the National Police Service in Kenya and How it Impacts Their Performance (10051)

**TS03J: DIGITAL CONSTRUCTION**

**WEDNESDAY, 24 APRIL 11:00–12:30**  
**VENUE:** 249A ("LEICA GEOSYSTEMS ROOM"), NCC  
**COMMISSION:** 10 AND 6  
**CHAIR:** MR. ALAN MUSE, CHAIR FIG COMMISSION 10, UNITED KINGDOM  
**RAPPORTEUR:** MS. MERCY IYORTYER, NIGERIA

**Asep Yusup Saptari, Hendriatiningsih Sadikin and Putri Rahmadani** (Indonesia): Level of Detail Analysis for Property Object and Building Information Modelling Integration (10018)

**Dejan Vasić, Mehmed Batilović, Marina Davidović and Tatjana Kuzmić** (Serbia): Modern Methods of Processing and Extracting Data from Point Cloud (10071)

**Tim Kaiser, Enrico Romanschek and Christian Clemens** (Germany): Using BIM-Elements as Features for the Transformation of Local Point Clouds Created with Structure from Motion (SfM) (10024)

**Jasper Roes and Dorus Kruse** (Netherlands): Improving Quality of the Key Registries with 3D Building Information Models and Linked Data (9936)

**Ali Afsahi** (Sweden) and **Joël van Cranenbroeck** (Belgium): High Rise Building Vertical Alignment Survey Technology – from BIM to Field (9748)

**EDITORIAL BOARD MEETING – PEER REVIEW**

**WEDNESDAY, 24 APRIL 12:30–14:00**  
**VENUE:** 257C ("MEETING ROOM L"), NCC  
**CHAIR:** PROF. VOLKER SCHWIEGER, GERMANY

• By Invitation only

Wednesday, 24 April 2019 14:00–15:30

**BELS+ SPECIAL SESSION:  
GALILEO – STATUS AND  
INNOVATIVE SOLUTIONS  
FOR PRECISE POSITIONING****WEDNESDAY, 24 APRIL 14:00–15:30****VENUE:** 309B ("ESRI ROOM"), NCC  
**CHAIR:** MS. BAERBEL DEISTING,  
BAVAIRIA AND PROF. TA HAI TUNG, HUST

Galileo, the European Satellite Navigation System, is smoothly flying toward its Full Operational Capability Phase after providing Initial Operational Services to worldwide users since 2016. In this session, representatives of the European Commission will bring news about the status of the Galileo system, its future developments as well as about scientific initiatives for the monitoring and prediction of ionospheric disturbances. In addition, information on the Galileo's footprint in Asia will come from representative of the NAVIS Centre in Hanoi, which hosts the Galileo Demo Centre. This Demo Centre aims to be a permanent showcase of European GNSS technology in Asia. Some of the companies currently hosted in the Centre will present their most innovative solutions and research outcomes in the second part of this session.

**Claudio Cesaroni, Vincenzo Romano and Luca Spogli** (Italy): Countering Ionospheric Effects on EGNSS at Low-Latitude (10164)

**Patrick Henkel** (Germany): Precise Position Determination and Generation of Top-Actual Maps with ANavS Multi-Sensor RTK Module (10165)

**Mark Dumville, Michael Pattinson and William Roberts** (United Kingdom): Emerging Applications Exploiting GNSS Receiver Networks (10166)

**Pavlina Nikolova** (Belgium): Galileo: Status and Perspectives (10208)

**Joaquim Fortuny-Guasch** (Italy): Galileo New Service for High Accuracy Applications (10209)

**STRENGTHENING  
DEMOCRATIC SPACES  
TO BALANCE SOCIETAL  
PRIORITIES IN SPATIAL  
PLANNING****WEDNESDAY, 24 APRIL 14:00–15:30****VENUE:** 205ABC ("LX KOREA ROOM"), NCC  
**CHAIR:** DR. LOUISA JANSEN, FAO, ITALY  
**RAPPOREUR:** MS. MARIJE LOUWMA,  
CHAIR FIG COMMISSION 8, NETHERLANDS

**Jointly hosted by FIG and FAO**  
FAO has added a new publication on spatial planning and tenure to their series of technical guides. Spatial planning and tenure are highly intertwined. The core ideas to strengthen democratic space of rights holders will be discussed drawing on the VGGT's and based on grounded practice.

**STRENGTHENING  
PARTNERSHIPS IN LAND  
GOVERNANCE IN THE ASIA  
PACIFIC REGION****WEDNESDAY, 24 APRIL 14:00–15:30****VENUE:** 249BC ("SOUTH ROOM"), NCC  
**CHAIR:** DR. ORHAN ERCAN, FIG VICE  
PRESIDENT, TURKEY  
**RAPPOREUR:** GLTN SECRETARIA

**Jointly hosted by FIG, UN-Habitat/GLTN, LX Korea, CLSPI, FIG Asia Pacific Capacity Development Network, Vietnam Association of Geodesy, Cartography and Remote Sensing, UN-GGIM**

In 2013, various partners initiated the Asia-Pacific Regional Land Tenure Initiative (RLTI) with the objectives of setting up a multi-stakeholder on land governance and tenure issues in the region, furthering knowledge and discussion on regional entry points for land tenure interventions, stimulating discussions on capacity development and learning exchanges and increasing engagement by partners at regional land discourse. Since then, the 'loose' Network has become the driving force in maximizing cooperation, exchanges, synergies on land governance and tenure in the region.

**Objectives:**

- To sensitize land professionals on the land governance and land tenure challenges and opportunities in the region.
- To share information on existing projects and initiatives in the region.
- To identify opportunities for regional collaboration and partnership.

**TS04A\_1: INTERNATIONAL  
BOUNDARIES****WEDNESDAY, 24 APRIL 14:00–14:45****VENUE:** 210BC ("TRIMBLE ROOM"), NCC  
**COMMISSION:** 1  
**CHAIR:** MS. WINNIE SHIU, CHAIR FIG  
COMMISSION 1, HONG KONG SAR, CHINA  
**RAPPOREUR:**  
MS. ROBYN MCCUTCHEON, AUSTRALIA**Maxim Shoshany and Haim**

**Srebro** (Israel):  
Center of Valley versus Thalweg:  
Revisiting The Israel – Jordan  
Aravah Boundary Dispute (9930)

**Haim Srebro** (Israel):  
River Boundaries: the Influence of  
Changes in the Jordan and Yar-  
muk Rivers on the International  
and Cadastral Boundaries (Part  
2) (9945)

**Gordon Johnston** (United King-  
dom):  
International Standards for Hydro-  
graphic Surveyors and Nautical  
Cartographers (10012)

**TS04A\_2: PROFESSIONAL  
ETHICS AND STANDARDS –  
PART 1****WEDNESDAY, 24 APRIL 14:45–15:30****VENUE:** 210BC ("TRIMBLE ROOM"), NCC  
**COMMISSION:** 1  
**CHAIR:** MS. WINNIE SHIU, CHAIR FIG  
COMMISSION 1, HONG KONG SAR, CHINA  
**RAPPOREUR:**  
MS. ROBYN MCCUTCHEON, AUSTRALIA

**Tchad Sharon Jatau, Ruya Fadason and Christiana Paul** (Nigeria):  
Professional Ethics in the Built  
Environment and its Impact on  
Client Behavior (9851)

**Leonie Newnham** (Australia):  
Ways to Build Workplace In-  
novation in a Victorian Land  
Management Organization by  
Understanding Its Relationship to  
Organization Culture. (10115)

**Gary Strong and Alan Muse** (United Kingdom):  
The Need for International Fire  
Safety Standards and why the UN  
is Supporting this (9766)

**TS04B: ENHANCING  
SURVEYING ACADEMIC  
NETWORKS****WEDNESDAY, 24 APRIL 14:00–15:30****VENUE:** 210A ("ARCGIS ROOM"), NCC  
**COMMISSION:** 2  
**CHAIR:** DR. MILO Todorovski,  
NETHERLANDS  
**RAPPOREUR:** MR. MARINUS DE  
BAKKER, NETHERLANDS

**Rob Sarib, David Mitchell, Mohsen Kalantari** (Australia) and  
**Dimo Todorovski** (Netherlands):  
Opportunities for Fostering Devel-  
opment of Academic Networks in  
Asia and the Pacific Through the  
FIG Asia Pacific Capacity Develop-  
ment Network (10147)

**Dimo Todorovski** (Netherlands),  
**Rodolfo Salazar, Ginella Jacome**  
(Ecuador) and **Christiaan Lemmen** (Netherlands):  
Establishment of Latin America  
Land Administration Network  
(LALAN) (10145)

**Agnes Mwasumbi and Felician Komu** (Tanzania):  
The Role of the Eastern Africa  
Land Administration Network  
(EALAN) in Promoting Land Ad-  
ministration Education in Eastern  
Africa (10148)

**Uchendu Eugene Chigbu**  
(Germany) and **Sait Siraj** (United  
Kingdom):  
The Global Land Tool Network:  
The Role of the International  
Training and Research Cluster in  
the Strategy 2018-2030 (10149)

**Jennifer Whittal** (South Africa):  
An Academic Network for Africa  
(10146)

**MEMBER ASSOCIATION,  
REGIONAL BODIES AND  
REGIONAL NETWORKS  
FORUM 2****WEDNESDAY, 24 APRIL 14:00–15:30****VENUE:** 252A ("RIPRO ROOM"), NCC  
**CHAIR:** THE FORUM WILL BE CHAIRED BY  
REPRESENTATIVES FROM ALL PARTNERS

...continuation

**TS04C: THE LAND SURVEYORS ROLE IN THE ERA OF CROWD-SOURCING AND VGI, PRESENTATION OF THE NEW FIG PUBLICATION NO. 73**

**WEDNESDAY, 24 APRIL 14:00–15:30**

**VENUE:** 207ABC ("FIG FOUNDATION ROOM"), NCC

**COMMISSION:** 3

**CHAIR:** PROF. **ABBAS RAJABIFARD**, AUSTRALIA

**RAPPORTEUR:** PROF. **HARTMUT MÜLLER**, CHAIR FIG COMMISSION 3, GERMANY

**Yerach Doytsher** (Israel): Crowdsourcing vs. Wisdom of the Crowd: The Implementation in the Geo-Science Domain (10190)

**Chryssy Potsiou** and **Charalabos Ioannidis** (Greece): Why Crowdsourcing in Surveying (10191)

**Hartmut Müller** (Germany): Integration of Authoritative Geospatial Information and Crowdsourced Volunteered Geographic Information (10192)

**Charalabos Ioannidis** and **Chryssy Potsiou** (Greece): 2D and 3D Crowdsourced Cadastral Surveys – Looking Ahead (10193)

**Enrico Rispoli** (Italy): Search Path Towards the Era of Crowdsourcing and Big Data Management (10194)

**TS04D: RUSSIAN SESSION – MODERN GEOSPATIAL CHALLENGES 2**

**WEDNESDAY, 24 APRIL 14:00–15:30**

**VENUE:** 252BC ("GEO-PLUS ROOM"), NCC

**CHAIR:** MR. **FEDOR SHKUROV**,

RUSSIAN FEDERATION

Продолжение русскоязычной сессии

**Vladimir Tikhonov** and **Marina Petrushina** (Russia): Cadastral Engineers of Russia and their Professional Associations (10201)

**Andrei Filipenka** and **Maryna Litreyeva** (Belarus): Geospatial Data in the State Information Resources of the Land Cadastre (10202)

**Sergey Volkov** and **Vasily Nilipovskiy** (Russia): Land Management Education in the Russian Federation: Current Status and Prospects (10203)

**Nadezhda Rudnitskaya** and **Sergey Zabagonsky** (Belarus): Current State of Geodetic Infrastructure in the Republic of Belarus and Prospects of its Development (10204)

**Alexander Karpik**, **Igor Musikhin** and **Leonid Lipatnikov** (Russia): Education. Russia's Answer to Big Challenges (10205)

**TS04G: FIT-FOR-PURPOSE LAND ADMINISTRATION – EXPERIENCES IN PRACTICE**

**WEDNESDAY, 24 APRIL 14:00–15:30**

**VENUE:** 309A ("MAKE YOUR MARK. ROOM"), NCC

**CHAIR:** DR. **DANIEL STEUDLER**, FIG HONORARY MEMBER, SWITZERLAND & MRS. **ANNE-PIERRE GIRARDIN**, FRANCE

**Danilo Antonio** (Kenya): Fit-For-Purpose Land Administration; Guiding Principles for Country Level Implementation (10178)

**Bernd Eversmann** (Finland): The Role of the "Fit-for-Purpose" Approach in the REILA Land Administration Project in Ethiopia (10180)

**Uma Shankar Panday**, **Janak Raj Joshi**, **Raja Ram Chhatkuli** (Nepal), **Stig Enemark** (Denmark) and **Danilo Antonio** (Philippines): Development of Fit-For-Purpose Land Administration Country Strategy: Experience from Nepal (UN-HABITAT GLTN) (10049)

**Kees de Zeeuw**, **Paula Dijkstra**, **Christiaan Lemmen**, **Eva-Maria Unger** (Austria), **Mathilde Molendijk**, **Ernst-Peter Oosterbroek** and **Christelle van den Berg** (Netherlands): Bridging the Security of Tenure Gap: Fit-For-Purpose Initiatives (10181)

**Jürg Lüthy** and **Jürg Kaufmann** (Switzerland): A Critical Acclaim of the Fit for Purpose Publication (10182)

**Kwame Tenadu** (Ghana): A Legacy of Fit-for-Purpose (FFP) Land Administration, Ghana's Example (10228)

**TS04J: HISTORY SESSION**

**WEDNESDAY, 24 APRIL 14:00–15:30**

**VENUE:** 249A ("LEICA GEOSYSTEMS ROOM"), NCC

**CHAIR:** MR. **JOHN BROCK**, AUSTRALIA

**Daniel Thomas** and **Jennifer Whittal** (South Africa): Initial Explorations in Reconstructing the Original Beacons and Boundaries in the Constantia Valley in Cape Town (10033)

**Marina Nistotskaya** (Sweden), **Michelle D'Arcy** and **Robert Ellis** (Ireland): Mapping the State: Measuring Infrastructural Power Through Cadastral Records (9784)  
*This is a peer reviewed paper.*

**Nur Zurairah Abdul Halim**, **Zoher Nomanbhoy** and **Mohd Noor ISA** (Malaysia): The Development of National Atlas – Malaysia's Experience (9792)  
*This is a peer reviewed paper.*

**John Brock** (Australia): "STRATA" SMITH: The Surveyor Whose Map Changed the World! (9736)



Wednesday, 24 April 2019 16:00–17:30

**TS05A: PROFESSIONAL ETHICS AND STANDARDS – PART 2**

**WEDNESDAY, 24 APRIL 16:00–17:30**  
**VENUE:** 210BC ("TRIMBLE ROOM"), NCC  
**COMMISSION:** 1  
**CHAIR:** MR. NIGEL SELLARS, UNITED KINGDOM  
**RAPPORTEUR:** DR. LEONIE NEWNHAM, AUSTRALIA

**Gary Strong and Nigel Sellars** (United Kingdom): Raising the Importance of Ethics for the Surveying Profession (9759)

**Alexey Bukharov** (Russia): The Development of Standards and Ethical Challenges of Surveyors Associations in Russia (10031)

**Torben Juulsager** (Denmark): Danish Surveyors 250 Years in the Service of Society to Be a Profession – That's the Answer (10085)

**Nigel Sellars** (United Kingdom): Challenges for Surveying Professionals in the 21st Century – Ethics and the Importance of Stakeholder Engagement. (9911)

**TS05B: INNOVATION IN SURVEYING PEDAGOGY AND CURRICULUM**

**WEDNESDAY, 24 APRIL 16:00–17:30**  
**VENUE:** 210A ("ARCGIS ROOM"), NCC  
**COMMISSION:** 2  
**CHAIR:** ASSOC PROF. DAVID MITCHELL, CHAIR FIG COMMISSION 2, AUSTRALIA  
**RAPPORTEUR:** DR. ROHAN BENNETT, NETHERLANDS

**William Kelly** (United Kingdom): Innovative Pedagogy for Geospatial Lifelong Learning (9983)

**Marinus De Bakker** (Netherlands): Geo-Information Education in the Era of Big (GEO) Data (10025)

**Wahyuni Widigdo, Sukmo Pinuji and Sutaryono Sutaryono** (Indonesia): Curriculum Development for Land Policy and Management in the National Land College, Indonesia (10053)

**Minh Long Le** (Vietnam) and **Vasily Nilipovskiy** (Russia): Sustainable Rural Development and Land Registration in Vietnam (10207)

**TS05C: SPATIAL DATA INFRASTRUCTURE SDI**

**WEDNESDAY, 24 APRIL 16:00–17:30**  
**VENUE:** 207ABC ("FIG FOUNDATION ROOM"), NCC  
**COMMISSION:** 3  
**CHAIR:** PROF. KEVIN MCDOWGALL, AUSTRALIA  
**RAPPORTEUR:** MR. CEMAL KIVILCIM, TURKEY

**Rizwan Bulbul** (Austria), **Muhammad Sheraz Ahsan** (Pakistan) and **Johum Fatimah Mirza** (USA): Towards National SDI in Pakistan: The Challenges (9815)  
*This is a peer reviewed paper.*

**Brent Jones** (USA): Why You Need to Modernize to Stay Relevant (9856)

**Sergei Shavrov, Olga Batura, Miroslav Kobasa and Kirill Slabodich** (Belarus): Legislation to Support the Digital Transformation of Land Governance and Land Administration (9859)

**Miodrag Roić** (Croatia): Land Administration Data to Support Development and Research (9891)

**Luc Desbiens** (Canada) and **Hai Ngo – Trung** (Vietnam): Land Information Management at the Local Government Level in Vietnam (9925)

**TS05D: MARINE GEO-SPATIAL AND SURVEYING TECHNIQUES**

**WEDNESDAY, 24 APRIL 16:00–17:30**  
**VENUE:** 252BC ("GEO-PLUS ROOM"), NCC  
**COMMISSION:** 4  
**CHAIR:** MR. SIMON IRONSIDE, NEW ZEALAND  
**RAPPORTEUR:** MS. JAKOVLJEVIC GORDANA, BOSNIA AND HERZEGOVINA

**Muhammad Hafiz Mohd Yatim, Abdullah Hisam Omar and Nazirah Mohamad Abdullah Mirza** (Malaysia): Institutional Analysis: The Policy Formation Tool for Marine Spatial Planning (10126)

**Trinh Thi Phin and Dinh Thi Bao Hoa** (Vietnam): Determine the Vulnerability of Surface Water Resources in the Rach Gia City, Kien Giang Province Using GIS (9956)

**Kari Strande** (Norway): Comprehensive Databases for Seabed Environment (10074)

**Pham Can and Nguyen Ngoc Lau** (Vietnam): Research on Application of RTPPP for the Hydrographic Surveying in Vietnam (9909)

**Nazirah Mohamad Abdullah, Abdullah Hisam Omar and Muhammad Hafiz Mohd Yatim** (Malaysia): Extending the Paradigm of Marine Space Stakeholder Governance to the Marine Spatial Planning (10128)

**Auwal Garba Abubakar** (Nigeria), **Mohd Razali Mahmud, Kelvin Kang Wee Tang and Noor Safaruddin Kamaruddin** (Malaysia): Theoretical Process on forces attenuating the equilibrium Tide: An Overview (10121)

**Mohd Hilmi Abdullah, Mohd Noor Isa, Hanafiah Hassan, Najhan Md Said, Ismail Harun, Mohd Zaid Abdullah, Mohammad Azmi Mohd Zin, Shaharuddin Musa, Md Rudi Ismail, Mohd Nazam Sulaiman and Khairulnizam M.Idris** (Malaysia): The Establishment of Hydrography and Marine Technology Programme (UTM HYDRO III) for Malaysian Professional Land Surveyors (10125)

**TS05E: GNSS TECHNIQUES AND APPLICATIONS**

**WEDNESDAY, 24 APRIL 16:00–17:30**  
**VENUE:** 309B ("ESRI ROOM"), NCC  
**COMMISSION:** 5  
**CHAIR:** DR. SUELYNN CHOY, AUSTRALIA  
**RAPPORTEUR:** DR. RYAN KEENAN, AUSTRALIA

**Adria Rovira-Garcia, Jose Miguel Juan, Jaume Sanz, Guillermo González-Casado and Escudero Royo Miguel** (Spain): The NAVSCIN Project: Towards High-Accuracy Navigation under Scintillation (9928)

**Basara Miyahara, Satoshi Kawamoto, Satoshi Abe and Hiroshi Munekane** (Japan): Development of Real-Time PPP Processing System of Japan and Its Evaluation by Comparison with Real-Time RTK System, Regard (9872)

**Robert Suya** (Malawi): Ionospheric-Constrained PPP using Triple-GNSS Constellations (9769)  
*This is a peer reviewed paper.*

**Paul Oluyori, Matthew Ono and Sylvester Eteje** (Nigeria): Comparison of OPUS, CSRS-PPP and magicGNSS Online Post-Processing Software of DGPS Observations for Geometric Geoid Modelling in FCT, Abuja (10009)

**Daniel Gillins, Jacob Heck, Galen Scott, Kevin Jordan and Ryan Hippenstiel** (USA): Accuracy of GNSS Observations from Three Real-Time Networks in Maryland, USA (10077)

**David Mulindwa** (Uganda): Comparison of the Effect of High-Latitude and Equatorial Ionospheric Scintillation on GPS Signals During the Maximum of Solar Cycle 24 (9998)

**Wim de Wilde, Jean-Marie Sleewaegen** (Belgium) and **Ryan Keenan** (Australia): Efficient Jammer Detection and Classification Using GNSS Receivers on a Highway Overhead Structure (9959)

**FIG COMMISSIONS ANNUAL MEETINGS**

**WEDNESDAY, 24 APRIL 17:30–18:30**  
**VENUE:** VARIOUS

The FIG Commissions are responsible for pursuing FIG's professional and technical objectives and are the backbone of the professional work in FIG.

The Commission meetings are open for everyone who are interested in the work. After the meeting each commission hosts a dinner.

Join the meetings in following rooms:

- Commission 1: Professional Standards and Practice in **TRIMBLE ROOM (210bc)**
- Commission 2: Professional Education in **ArcGIS ROOM (210a)**
- Commission 3: Spatial Information Management in **FIG FOUNDATION ROOM (207abc)**
- Commission 4: Hydrography in **GEO-PLUS ROOM (252bc)**
- Commission 5: Positioning and Measurement in **ESRI ROOM (309b)**
- Commission 6: Engineering Surveys in **RIPRO ROOM (252a)**
- Commission 7: Cadastre and Land Management in **Make Your Mark. Room (309a)**
- Commission 8: Spatial Planning and Development in **LX KOREA ROOM (205abc)**
- Commission 9: Valuation and the Management of Real Estate in **SOUTH ROOM (249bc)**
- Commission 10: Construction Economics and Management in **LEICA GEOSYSTEMS ROOM (249a)**

**TS05F: ENGINEERING SURVEYS – DEVELOPING OUR METHODS**

**WEDNESDAY, 24 APRIL 16:00–17:30**  
**VENUE:** 252A (“RIPRO ROOM”), NCC  
**COMMISSION:** 6  
**CHAIR:** MR. NGUYEN NGOC BANG, VIETNAM  
**RAPPORTEUR:** MS. CORINNA HARMENING, AUSTRIA

**Andrea Biasion** (Switzerland), **Gregory Walsh** (USA), **Bernd Walser** and **Thomas Moerwald** (Switzerland):  
 A new approach to the Terrestrial Laser Scanner workflow: the RTC360 solution (9968)

**Edi Meier, Inma Gutiérrez, Marco Baumann, Max Bosshard** and **Rainer Heeb** (Switzerland):  
 Detection of Service Pipes and the Risk of Collapsing Sinkholes at the Lake of Constance in Switzerland Using Ground Penetrating Radar (GPR) (10010)

**Jonathan Li** (Canada):  
 3D Mapping in GNSS-denied Environments Using a Low-cost LiDAR Backpack (10093)

**Joël van Cranenbroeck** (Belgium):  
 Thyssenkrupp Test Tower GNSS Monitoring Safety System (9747)

**Njike Chigbu, Maduabughichi Okezie, Donald Ikenna Arungwa** and **Chima.o. Ogba** (Nigeria):  
 Comparative Analysis of Google Earth Derived Elevation with in-situ Total Station Method for Engineering Constructions (10129)

**TS05G: RISK AND DISASTER MANAGEMENT**

**WEDNESDAY, 24 APRIL 16:00–17:30**  
**VENUE:** 309A (“MAKE YOUR MARK. ROOM”), NCC  
**COMMISSION:** 7 AND 8  
**CHAIR:** PROF. SYED ZAFAR ABBAS, PAKISTAN  
**RAPPORTEUR:** MS. NUR ZURAIRAH ABDUL HALIM, MALAYSIA

**Abbas Rajabifard** (Australia):  
 Strategic Pathways Towards Disaster Resilience- Leveraging National Land and Geospatial Systems (10211)

**Eva-Maria Unger** (Netherlands), **Raja Ram Chhatkuli** (Nepal), **Danilo Antonio** (Kenya), **Paula Dijkstra** and **Christiaan Lemmen** (Netherlands):  
 Creating Resilience to Natural Disasters Through FFP Land Administration – an Application in Nepal (10037)

**Mohd Rodzi Salleh, Suzanna Razali Chan, Zalina Sungip, Syahfrilhaidi Abdul Rahman** and **Mohd Afzaini Mamat Nawi** (Malaysia):  
 Improving Search and Rescue Services for Malaysia Offshore Oil & Gas Operation Area (10173)

**Marija Juric** (Sweden):  
 Lantmäteriet’s Role in the Fight Against Forest Fires During the Summer of 2018 (9932)

**Mulyadi Mulyadi, David Mitchell** and **Donald Grant** (Australia):  
 Grassroots Perceptions of Land Administration to support Disaster Risk Reduction in Hazard-Prone Informal Settlements in Jakarta Province, Indonesia: Lessons for Land Policy (9811)  
*This is a peer reviewed paper.*

**TS05H: LAND GOVERNANCE AND IMPLEMENTATION STRATEGIES**

**WEDNESDAY, 24 APRIL 16:00–17:30**  
**VENUE:** 205ABC (“LX KOREA ROOM”), NCC  
**COMMISSION:** 8  
**CHAIR:** PROF. ERWIN VAN DER KRABBen, NETHERLANDS  
**RAPPORTEUR:** PHD. WIOLETA KRUPOWICZ, POLAND

**Walter Timo de Vries** (Germany), **Henrikus Johannes (Rik) Wouters** (Netherlands) and **Kalle Antero Konttinen** (Finland):  
 An Analysis of Long-Term Experiences with Land Consolidation Projects and Programs in Europe (9781)  
*This is a peer reviewed paper.*

**Kwabena Asiana** (Netherlands), **Rohan Bennett** (Australia), **Jaap Zevenbergen** and **Andre Da Silva Mano** (Netherlands):  
 Responsible Consolidation of Customary Lands: A Framework for Land Reallocation (9867)

**Thi Thanh Mai Duong** (Vietnam), **D. Ary A. Samsura** and **Erwin van der Krabben** (Netherlands):  
 Land for Tourism Accommodation Development – a New Driver for Large-Scale Land Acquisition in Vietnam (9947)

**Fahria Masum, Karl Spindler** and **Michael Klautz** (Germany):  
 Roadmap to a Coordinated Master Plan: Rural Revitalization in Sichuan Province in China (10005)

**Xuefei Huang, Cifang Wu** and **Rong Liao** (China, PR):  
 The Institutional Conditions for the Evolution and Innovation of the Land Consolidation Model in China (10107)

**Thu Do, Huan Nguyen, Tuan Tran, Hung Vu** and **Cuong Doan** (Vietnam):  
 Evaluating the Current Ecological Adaptability and Future Trends of Agricultural Land Use Systems for Spatial Orientation of Land Use Planning in Quoc Oai District, Hanoi. (10069)

**TS05I: LAND VALUE AND COMPULSORY ACQUISITION**

**WEDNESDAY, 24 APRIL 16:00–17:30**  
**VENUE:** 249BC (“SOUTH ROOM”), NCC  
**CHAIR:** MR. STEVEN NYSTROM, UNITED STATES  
**RAPPORTEUR:** ASSOC. PROF. DR. PHAM VAN CU, VIETNAM

**Thuy Le, Tuan Pham** and **Binh Tran** (Vietnam):  
 Application of Space Syntax and GIS in Assessment of Accessibility Factors Affecting Urban Residential Land Values (a Case Study in Trung Hoa – Nhan Chinh Area, Hanoi City) (9830)  
*This is a peer reviewed paper.*

**Felix Ajibade** and **Anthonia Adedirin** (Nigeria):  
 Appraisal of security Level within Nigeria Residential Real Estates Neighbourhood. (9864)

**Sang Hoon Park, Hyeong Sun Kim** and **Jung Sun Kim** (Republic of Korea):  
 A Comparison of Characteristics of the Residential Real Estate Market Using Capitalization Ratio: Focusing on Seoul City and Hanoi City (9883)

**Rahmat Aris Pratomo, D. Ary Samsura** and **Erwin van der Krabben** (Netherlands):  
 The Impact of Spatial Transformation of Large-Scale Land Development on Property Rights: Some Cases from New Town Development in Indonesia (10098)

**Sander Lenferink** (Netherlands):  
 Integrating Negotiations on Investments in Housing and Mobility: Geo-Based Gaming to Stimulate Land Use Transport Integration (10120)

**TS05J: IMPROVING COST MANAGEMENT**

**WEDNESDAY, 24 APRIL 16:00–17:30**  
**VENUE:** 249A (“LEICA GEOSYSTEMS ROOM”), NCC  
**COMMISSION:** 10  
**CHAIR:** MR. ALAN MUSE, CHAIR FIG COMMISSION 10, UNITED KINGDOM  
**RAPPORTEUR:** MS. MERCY IYORTYER, NIGERIA

**Chan KH** (Hong Kong SAR, China):  
 Enhancing Smarter Life from Mitigating Maintenance Injury (9773)

**Sihle Gogela, Ayodeji Oke** and **Clinton Aigbavboa** (South Africa):  
 Influences of Project Cost Estimation in South African Construction Industry (9844)

**Alan Muse** (United Kingdom) and **Mercy Iyortyer** (Nigeria):  
 Improving Construction Cost Prediction Through Standards and Technology (9786)

**Ganiyu Amuda-Yusuf** and **Ranti Taibat Adebisi** (Nigeria):  
 5-Dimensional BIM and the Challenges of Adopting Measurement Standards (10013)

**Jhon Escorcía Hernández, Ricardo Camacho Castilla** (Colombia) and **Jaime Wills Sanín** (United Kingdom):  
 Historical Analysis of Road Infrastructure Accessibility in Colombia (9952)

**Jim Mason** (United Kingdom):  
 Power Indicators in International Construction Law (9767)

**FIG COMMISSION DINNERS**

**WEDNESDAY, 24 APRIL 19:00–23:00**  
**VENUE:** VARIOUS

Thursday, 25 April

Thursday, 25 April 2019 11:00–12:30

### PLENARY SESSION3: A SMARTER LIFE AND ENVIRONMENTAL RESILIENCE THROUGH INITIATIVES

**THURSDAY, 25 APRIL 09:00–10:30**  
**VENUE:** 318 ("SURVEYOR'S ROOM"), NCC  
**CHAIR:** DR. **DIANE DUMASHIE**, FIG VICE  
PRESIDENT, UNITED KINGDOM

**Khamarrul Azahari Razak**,  
Senior Lecturer, Research Fellow  
(Malaysia):  
Geo-led Horizon Scanning Pro-  
gramme for Disaster Risk Reduc-  
tion (DRR): A New Insight into  
2030 Global Vision (10218)

**Ulla Kronborg**, Danish Agency  
for Data Supply and Efficiency  
(Denmark):  
Sharing is Everything (10219)

**Network FIG Young Surveyors**  
(USA):  
Everyone's Contribution Counts  
(10220)

### TS06A: WOMEN IN SURVEYING

**THURSDAY, 25 APRIL 11:00–12:30**  
**VENUE:** 210BC ("TRIMBLE ROOM"), NCC  
**COMMISSION:** 1  
**CHAIR:** MS. **ROBYN MCCUTCHEON**,  
AUSTRALIA  
**RAPporteur:** DR. **LEONIE NEWNHAM**,  
AUSTRALIA

The session will discuss the oppor-  
tunities and land rights of women  
land surveyors today and tomor-  
row. After the presenters have set  
the scene, a roundtable discussion  
will follow on:

- To discuss the action items,  
which include promoting wom-  
en in surveying, addressing  
hidden bias towards women  
in surveying, tackling the lack  
of gender diversity, and how  
best to promote women in the  
surveying industry; and
- To discuss individual challenges  
and case studies in each country  
represented

**Monika Przybilla** (Germany):  
Women in Surveying – Today and  
Tomorrow (10064)

**Anne Girardin** (France), **Emem  
Isang** (Nigeria) and **Madaleine  
Weber** (USA):  
Opportunities for Female Land  
Surveyors in Emerging Economies  
(9981)

### TS06B: PROFESSIONAL DEVELOPMENT EXPERIENCES AND PATHWAYS

**THURSDAY, 25 APRIL 11:00–12:30**  
**VENUE:** 210A ("ARCGIS ROOM"), NCC  
**COMMISSION:** 2  
**CHAIR:** ASSOC. PROF. **DONALD GRANT**,  
AUSTRALIA  
**RAPporteur:** MR. **WILLIAM KELLY**,  
UNITED KINGDOM

**Leiv Bjarte Mjøs** and **Arve Leiknes**  
(Norway):  
The Struggle for a Land Surveying  
Profession (10072)

**Narelle Underwood** and **Lisa  
Powell** (Australia):  
Challenging the Status Quo: Inno-  
vate or Detonate (9913)

**Malavie Don Eranda Kanchana  
Gunathilaka**, **Indika Prasanna**  
(Sri Lanka), **Dulani Halvitigala** and  
**Sara Wilkinson** (Australia):  
Shaping the Strategic Direction  
of the Surveying Profession in Sri  
Lanka (9971)

**James Kavanagh** and **Sellers  
Nigel** (United Kingdom):  
Land & Resources Professional  
Qualification Pathway – Core Com-  
petencies for Global Land Profes-  
sionals (9997)

**Lisette Mey** (Netherlands),  
**Laura Meggiolaro** (Italy), **Paul  
van Asperen**, **Rik Wouters**  
(Netherlands) and **Stacey Zammit**  
(Canada):  
Taking the Data Revolution to the  
Next Level: Effective and Inclusive  
Methods of Communicating Spatial  
Data (10104)

### TS06C: 3D CADASTRE

**THURSDAY, 25 APRIL 11:00–12:30**  
**VENUE:** 207ABC ("FIG FOUNDATION  
ROOM"), NCC  
**COMMISSION:** 3 AND 7  
**CHAIR:** PROF. **YERACH DOYTSHER**,  
ISRAEL  
**RAPporteur:** PROF. **PETER VAN  
OOSTEROM**, NETHERLANDS

**Yasemin Kuleyin** (Turkey):  
Smart Cadaster 360° (9831)

**Hiroyuki Hasegawa** (Japan),  
**Leng Heng Kim** and **Samnang  
Kim** (Cambodia):  
4D-IMADAS with 3D Mapping of  
Kyoto-Angkor (Khmer) Capitals  
(9908)

**Rod Thompson** (Australia), **Peter  
van Oosterom** (Netherlands) and  
**Sudarshan Karki** (Australia):  
Towards an Implementable Data  
Scheme for 4D/5D Cadastre  
Including Bi-Temporal Support  
(10039)

**Anna Shnaidman**, **Peter van  
Oosterom**, **Alias Abdul Rahman**  
(Malaysia), **Sudarshan Karki**  
(Australia), **Chrit Lemmen** and  
**Hendrik Ploeger** (Netherlands):  
Analysis of the Third FIG 3D Cadas-  
tres Questionnaire: Status in 2018  
and Expectations for 2022 (10080)

**Peter van Oosterom**, **Marian  
de Vries** (Netherlands), **Bar-  
bara Cemellini** (Italy) and **Rod  
Thompson** (Australia):  
Results of the Public Usability  
Testing of a Web-Based 3D Cadas-  
tral Visualization System (10082)

### TS06D: REMOTE SENSING FOR HYDROGRAPHY

**THURSDAY, 25 APRIL 11:00–12:30**  
**VENUE:** 252BC ("GEO-PLUS ROOM"), NCC  
**COMMISSION:** 4  
**CHAIR:** DR. **ABDULLAH HISAM OMAR**,  
MALAYSIA  
**RAPporteur:** DR. **MDEK  
GUNAATHILAKA**, SRI LANKA

**Najhan Md Said** and **Rozaimi Che  
Hasan** (Malaysia):  
Multi-Layer Optimisation Tech-  
nique (M-Lot) for Shallow Water  
Hydrographic Survey Mapping  
Using Satellite-Derived Bathyme-  
try Application (10123)

**Yen Phan Quoc** and **Hoai Dao  
Khanh** (Vietnam):  
Evaluates the Possibility of Shal-  
low Water Bathymetry Mapping  
Using Optical Satellite Imagery  
(9772)

*This is a peer reviewed paper.*

**Md Hifney Hj Abd Rahman**  
(Brunei Darussalam):  
The Potential of Using Satellite  
Altimetry for Sea Level Study in  
Brunei (9788)

**Hong Phuong Trinh**, **Thi Thanh  
Thuy Hoang** and **Thi Minh An Ngo**  
(Vietnam):

Using Remote Sensing Technology  
to Detect the Shoreline Change  
Caused by Mining Activities: Case  
Study of Thach Khe Iron Mine,  
Thanh Ha District, Ha Tinh Prov-  
ince, Vietnam (9839)

*This is a peer reviewed paper.*

**Kelvin Kang Wee Tang**, **Mohd  
Razali Mahmud** (Malaysia),  
**Alhaji Hussaini** and **Auwal Garba  
Abubakar** (Nigeria):  
An Aid in Determining the Ter-  
ritorial Sea Baseline for Marine  
Cadastre using Satellite-Derived  
Bathymetry (10122)

### PLATINUM MEMBER SESSION – LEICA GEOSYSTEMS: HARNESSING DIGITAL TRANSFORMATION THROUGH REALITY CAPTURE FOR SMART CHANGE

**THURSDAY, 25 APRIL 11:00–12:30**  
**VENUE:** 249A ("LEICA GEOSYSTEMS ROOM"), NCC  
**CHAIR:** MR. **STUART WOODS**, LEICA GEOSYSTEMS

Digitisation is fundamental to the growth of smart cities. Cadastral mapping is the basis smart city planning and smarter expansion and movement is enabled by digitalisation of rail infrastructure. We can better predict climate change induced natural disasters using ground-based digital reality capture that provides a smarter understanding of flood plains. It's time for the construction projects to benefit from access to automated 3D data capture technology, that is more affordable, productive, and designed for use by all on site. With Leica Geosystems' reality capture solutions that deliver innovative 3D workflows from terrestrial scanning, UAVs or mobile mapping, surveyors can benefit from new applications to grow their business and increase efficiencies in the field and office. We are enabling digital transformation for surveying professionals around the world, however, wherever, and whenever they work.

#### Presenters:

- Mr. **Stuart Woods**, Vice President, Survey Solutions, Mobile Mapping
- Mr. **Andrea Biasion**, Application Engineer

**Leica**  
Geosystems



**TS06E: SPECIAL SESSION ON THE SUSTAINABLE DEVELOPMENT GOALS & FIG**

**THURSDAY, 25 APRIL 11:00–12:30**

**VENUE:** 309B ("ESRI ROOM"), NCC

**CHAIR:** MS. PAULA DIJKSTRA, NETHERLANDS

**RAPPORTEUR:** MR. RILEY SMITH, NETHERLANDS AND MS. SIMONE EMENS, NETHERLANDS

The Sustainable Development Goals (SDGs) and related land indicators will re-shape and influence our profession profoundly in the decade to come. It is considered to be of crucial importance that FIG member organisations and surveyors are aware and prepared on how their (daily) work contributes to the achievement of the SDGs and vice versa. During the session you will learn about the Sustainable Development Goals (SDGs) and the indicators that are related to the surveying profession. Together we will discuss the relevance of SDGs and the indicators for the FIG, the commissions and you as member.

**TS06F: FRENCH SESSION – STRUCTURES «GÉOMÈTRES» ET DÉONTOLOGIE/ETHIQUE**

**THURSDAY, 25 APRIL 11:00–12:30**

**VENUE:** 252A ("RIPRO ROOM"), NCC

**CHAIR:** MR. MARC VANDERSCHUEREN, BELGIUM

**RAPPORTEUR:** MS. GODELIVE PHANZU VANGU, CONGO, DR

**Marc Vanderschueren** (France): La Fédération des Géomètres Francophones (FGF): états des lieux au 1.1.2019 et ...perspectives... (10158)

**Maurice Barbieri** (Switzerland): The Impact of New Technologies on Professional Ethics (10161)

**Jean-Yves Pirlot** (Belgium): Ethics, from Theory to Practice (10156)

**Yousfi Khalid** (Morocco): Le code des devoirs professionnels de l' ONIGT (10153)

**TS06G: LAND CHALLENGES IN LATIN AMERICA**

**THURSDAY, 25 APRIL 11:00–12:30**

**VENUE:** 309A ("MAKE YOUR MARK ROOM"), NCC

**COMMISSION:** 7

**CHAIR:** MR. DANIEL PAEZ, CHAIR FIG COMMISSION 7, COLOMBIA

**RAPPORTEUR:** MR. IAN ROSE, UNITED STATES

**Lina Maria González** (Colombia), **Abbas Rajabifard** (Australia), **Daniel Paez** (Colombia), **Soheil Sabri** (Australia) and **Ricardo Camacho** (Colombia):

A Proposed Methodology to Assess Disaster Risk within a Land Use Cover Change Model, Contributing to SDGs – Case Study: Bogota, Colombia (9861)

**Luciana Bernardes Vasquez** (Brazil), **Jaap Zevenbergen, Dimo Todorovski** (Netherlands) and **Bastiaan Philip Reydon** (Brazil): Modelling the Complex Land Administration in Brazil (9903)

**Andrés Guarín and Tatiana Santos** (Colombia): Articulation of the Plan of Social Ordering of Rural Property with the Multipurpose Cadaster (10016)

**Rudiney Pereira and Juliana Marchesan** (Brazil): Spatial Analysis of Forest Fragmentation Using Language R (10092)

**Daniel Paez** (Colombia): Marriage of Opposites: Strategies for Public and Private Sectors Working Together in Land Tenure Reform Projects that Support SDG (10138)

**TS06H: SMART CITIES – EMERGING TOOLS AND APPLICATIONS**

**THURSDAY, 25 APRIL 11:00–12:30**

**VENUE:** 205ABC ("LX KOREA ROOM"), NCC

**COMMISSION:** 8

**CHAIR:** MR. MARINUS DE BAKKER, NETHERLANDS

**RAPPORTEUR:** DR. EUGENE CHIGBU, GERMANY

**Kimberley Worthy** (Australia) and **John Kedar** (United Kingdom): Cities of the Future – Where is the Actionable Geospatial Information? (9889)

**Xinxin Zhou, Changbin Wu, LinWang Yuan, Zhaoyuan Yu and Chendi Hu** (China, PR): A Comprehensive Accessibility Evaluation Model for Temporal Public Facilities of Urban Residential Areas Based on Internet Map (9879)

**Hung V. Nguyen** (Vietnam): Evaluating the Environmental Impact of the Hoankiem Lake with Focus on Urban Development Planning by Using a DPSIR Framework. (9841)  
*This is a peer reviewed paper.*

**Jimmy Chou** (Chinese Taipei): Interoperability and Deep Learning for Smart City Implementation and Disaster Monitoring Application (10163)

**Muhammad Mansur Kabir** (Nigeria): Nigeria Smart City Initiatives (NSCI): the Geospatial Perspectives (9946)

**TS06I: DEVELOPING CAPACITY FOR GEODETIC INFRASTRUCTURE AND SYSTEMS I**

**THURSDAY, 25 APRIL 11:00–12:30**

**VENUE:** 249BC ("SOUTH ROOM"), NCC

**CHAIR:** MS. ALLISON CRADDOCK, UNITED STATES AND MR. BASARA MIYAHARA, JAPAN

**RAPPORTEUR:** MR. ROB SARIB, AUSTRALIA

Jointly hosted by FIG Asia Pacific Capacity Development Network (AP CDN), UN Global Geospatial Information Management for Asia and the Pacific Working Group 1 (UN-GGIM-AP WG1), UN Sub Committee on Geodesy Education Training and Capacity Building (UN SCoG ETCB)

**Rob Sarib** (Australia): Building Survey and Geospatial Capacity in Asia and the Pacific Region (10183)

**Mikael Lilje** (Sweden) and **Allison Craddock** (USA): UNGGIM Subcommittee on Geodesy and its Working Group on Education, Training and Capacity Building (10185)

**Allison Craddock** (USA): Proposed Capacity Building Applications for the UN GGIM-World Bank Integrated Geospatial Information Framework (10186)

**Basara Miyahara** (Japan): Work and Plan of UN-GGIM-AP Working Group on Geodetic Reference Frame (10187)

**OPEN GATHERING OF THE UNGGIM ACADEMIC NETWORK**

**THURSDAY, 25 APRIL, 12:30–13:15**

**CHAIR:** PROF. ABBAS RAJABIFARD, AUSTRALIA

**VENUE:** 309A ("MAKE YOUR MARK")

**SECRETARY:** MR. DANIEL PAEZ, CHAIR FIG COMMISSION 7, COLOMBIA

Join us for an informal conversation to learn about current activities and opportunities for involvement with the UNGGIM Academic Network, an advisory body directly involved key geospatial developments at the United Nations that works in cooperation with FIG. Everyone welcome and professors, lecturers, students, researchers and other members of the academic community are particularly invited.

Thursday, 25 April 2019 14:00–15:30

**SOCIAL TENURE DOMAIN MODEL – DEVELOPMENT AND APPLICATION AT COUNTRY LEVEL****THURSDAY, 25 APRIL 14:00–15:30**  
**VENUE:** 210A ("ARCGIS ROOM"), NCC**Jointly hosted by FIG Young Surveyors Network and UN-Habitat GLTN**

The Session will involve key champions of STDM presenting conceptual and technical features of STDM tool, overview of its application at country level, sharing of practical and training experiences, sharing next steps and way forward, feedback and open discussions.

**Objectives:**

- Introduce participants to the basic concepts of STDM;
- Provide technical updates on STDM development including key features;
- Share country experiences on STDM application of the tools;
- Discuss different roles of key partners and proposed strategies for support; and
- Explore next steps and way forward.

**FIG TASK FORCE ON GOVERNANCE****THURSDAY, 25 APRIL 14:00–15:30**  
**VENUE:** 210BC ("TRIMBLE ROOM"), NCC  
**CHAIR:** DR. **DIANE DUMASHIE**, FIG VICE PRESIDENT, UNITED KINGDOM

The first session open to all FIG Members (Associations, Corporates, Affiliates and Academics); your first opportunity to input into our work on the review of FIG Governance. Our deliberations and conversation with you will be determined by a participatory engagement road map with you over the next 2 years. Do attend to hear, participate and input.

**TS07C: NATIONAL SPATIAL DATA INFRASTRUCTURE NSDI****THURSDAY, 25 APRIL 14:00–15:30**  
**VENUE:** 207ABC ("FIG FOUNDATION ROOM"), NCC  
**COMMISSION:** 3  
**CHAIR:** DR. **ENRICO RISPOLI**, ITALY  
**RAPPOREUR:** DR. **MARKUS SEIFERT**, GERMANY

**Bach Giang Tran** (Vietnam): Building, Developing and Managing the National Geospatial Data Infrastructure in Vietnam (9980)

**Dorus Kruse and Jasper Roes** (Netherlands): How to Increase the Usage of an NSDI from 1 Billion Hits to 10 Billion Hits in 5 Years (9989)

**Daniel Casalprim** (Spain), **Fabián Mejía** (Colombia), **Moisés Poyatos** (Spain), **Alejandro Tellez** and **Jose Antonio Pinzon** (Colombia): Extended Models from the Colombian LADM Profile as Support of Land Use Planning – Land Administration SDI (10023)

**Matt Myers** (United Kingdom) and **Solomoni Nata** (Fiji): ITLTB – Fiji's Customary Land Custodian: a Case Study of Managing Nearly 90% of the Country's Land (10045)

**Borko Draskovic** (Serbia), **Tončovska Rумыana** (Italy) and **Vucetic Darko** (Serbia): Integration of Crowdsourcing and Digital Platform of National Spatial Data Infrastructure for Efficient Decision Making (10091)

**TS07D: ISS – APPLICATIONS USING EARTH OBSERVATIONS AND REMOTE SENSING****THURSDAY, 25 APRIL 14:00–15:30**  
**VENUE:** 252BC ("GEO-PLUS ROOM"), NCC  
**CHAIR:** PROF. DR. **JIXIAN ZHANG**, FIG VICE PRESIDENT, CHINA PR  
**RAPPOREUR:** ASSOC. PROF. DR. **QUANG MINH NGUYEN**, VIETNAM

This is an ISS – Inspirational Short Session presenting on applications using airborne or even satellite platforms. The presentations are discussing both applications concerning land cover and water body changes. The presentations are short, sharp and specific, hence maximize information and idea gathering. Following the inspiring presentations there will be a lively discussion.

**Vu Anh Tuan, Le Thi Thu Hang and Nguyen Hong Quang** (Vietnam): Monitoring Urban Surface Water Bodies Changes Using MNDWI Estimated From Pan-sharpened Optical Satellite Images (9771)

**Artur Janowski, Malgorzata Renigier and Marek Walacik** (Poland): Modern Geospatial Technologies in Infrastructure Information Uncertainty Decrease (9918)

**Do Thi Hoai and Le Minh Hang** (Vietnam): Monitoring Land-Cover Changes Using Multi-Temporal Sentinel-1 Data in U Minh Thuong National Park (9779)  
*This is a peer reviewed paper.*

**Christine Atuhaire** (Uganda): Assessing The Impact Of Urbanisation On Human-Wildlife Conflict In Areas Around Queen Elizabeth National Park-Uganda Using Remote Sensing Techniques (9935)

**Dung Nguyen Mai, Chuyen Tran Trung, Anh Le Hong, Xuan Nguyen Trung and Huong Tran Mai** (Vietnam): CNN Based Method for Semantic Segmentation of VNREDSatt-1 Satellite Image (10052)

**Hong Hanh Tran, Bach Viet Pham and Sy Cuong Ngo** (Vietnam): Remote Sensing and GIS for Mapping and Monitoring Land Cover/land-Use Changes in the Phu Tan District of the Ca Mau Province, Lower Mekong Delta (10063)

**Nurul Ain Wahida Mohd Radzali, Helmi Zulhaidi Mohd Shafri, Badronnisa Yusuf and Balqis Mohamed Rehan** (Malaysia): Identification of Rainfall Variation at Urban Area for Rooftop Rainwater Harvesting Adoption (10040)

**TS07E: MULTI-SENSOR POSITIONING****THURSDAY, 25 APRIL 14:00–15:30**  
**VENUE:** 309B ("ESRI ROOM"), NCC  
**COMMISSION:** 5  
**CHAIR:** DR. **DAN GILLINS**, UNITED STATES  
**RAPPOREUR:** PROF. **GUENTHER RETSCHER**, AUSTRIA

**Volker Schwieger, Otto Lerke and Gabriel Kerekes** (Germany): Image-Based Target Detection and Tracking Using Image-Assisted Robotic Total Stations (9887)

**Allison Kealy** (Austria), **Guenther Retscher** (Austria), **Jelena Gabela, Yan Li** (Australia), **Salil Goel** (India), **Toth Charles, Andrea Masiero** (Italy), **Wioleta Błaszczyk-Bąk** (Poland), **Vassilis Gikas, Harris Perakis** (Greece), **Zoltan Koppanyi and Dorota Grejner-Brzezinska** (USA): A Benchmarking Measurement Campaign in GNSS-denied/Challenged Indoor/Outdoor and Transitional Environments (9837)  
*This is a peer reviewed paper.*

**Giuseppina Vacca and Giannina Sanna** (Italy): Terrestrial Laser Scanner and Close Range Photogrammetry point clouds accuracy assessment for the structure deformations monitoring (10113)

**Li Zhang, Jinyue Wang, Martin Wachsmuth, Marko Gasparac, Roland Trauter and Volker Schwieger** (Germany): Role of Digital Maps in Road Transport Security (9995)

**TS07F: FRENCH SESSION – BONNES PRATIQUES : ÉVOLUTIONS****THURSDAY, 25 APRIL 14:00–15:30**  
**VENUE:** 252A ("RIPRO ROOM"), NCC  
**CHAIR:** DR. **LEOPOLD DEGBEGNON**, BENIN  
**RAPPOREUR:** MR. **BERNARD FLACELIERE**, FRANCE

**Anne Girardin** (France) and **Emem Isang** (Nigeria): Formation de femmes géomètres et para-géomètres (10223)

**Jean-François Dalbin** (France): Dematerialization of demarcation minutes and electronic signature for land security (10152)

**Christine Maltais** (Canada): Choosing the Accuracy According to the Main Objective: the Example of the Cadastre of Quebec (10151)

**Godelive Phanzy Bitaka** (Democratic Republic of Congo): La Place de l'éthique Professionnelle dans l'administration (10157)

**Hassan Chtouki** (Morocco): Périurbanisation Industrielle de La Couronne Ouest de Casablanca : Processus de Recomposition d'un Espace Polarisé (10006)

**TS07G: EXAMPLES OF LAND ADMINISTRATION IN AFRICA**

**THURSDAY, 25 APRIL 14:00–15:30**

**VENUE:** 309A ("MAKE YOUR MARK. ROOM"), NCC

**COMMISSION:** 7

**CHAIR:** DR. **MARISA BALAS**,

MOZAMBIQUE

**RAPPORTEUR:** MR. **KWABENA ASIAMA**, NETHERLANDS

**Habtemicael Weldegiorgis**

(Eritrea): Enforcement of Mandatory Cadastral Registration in Eritrea (9753)  
*This is a peer reviewed paper.*

**Solomon Njogu** (Kenya), **Lobo Ngumba**, **Serge Kakule** (Democratic Republic of Congo) and **Danilo Antonio** (Philippines): Flexible Land Information System as Driver For Change, Peace and Development: The Case of Post Conflict DRC (UN-HABITAT GLTN) (9999)

**John Gitau**, **Hellen Ndungu**, **Danilo Antonio** and **Oumar Sylla** (Kenya): Experiences in the Application of Participatory Land Information Tools for Improving Tenure Security in Developing Countries (UN-HABITAT GLTN) (10042)

**Thomas Dabiri** (Nigeria): Closing up the Gap: Five Year Plan for Cadastral Data Management in Delta State of Nigeria (10088)

**Hans-Gerd Becker** (Uganda): A Fit-for-Purpose Approach to Register Customary Land Rights in Uganda (10221)

**TS07H: MAPPING, MONITORING AND PLANNING SPATIAL DEVELOPMENTS**

**THURSDAY, 25 APRIL 14:00–15:30**

**VENUE:** 205ABC ("LX KOREA ROOM"), NCC

**COMMISSION:** 8

**CHAIR:** MR. **KWAME TENADU**, GHANA

**RAPPORTEUR:** MS. **MARIJE LOUWSMA**, CHAIR FIG COMMISSION 8, NETHERLANDS

**Divyani Kohli** and **Mila Koeva** (Netherlands): Identification and Characterization of Informal Settlements Using Satellite Images in Support of Land Administration (9967)

**Wioleta Krupowicz** (Poland), **Adrianna Czarnecka** and **Magdalena Grus** (Netherlands): Possibilities of Implementing Crowdsourcing Initiatives in Rural Development Programmes in Poland (9922)

**Yuntai Zhao** and **Rong Rosy Liao** (China, PR): Newly-Established Spatial Planning System in China (10108)

**Louie Robert Posadas**, **Lunalyn Cagan** (Philippines), **Danilo Antonio** and **John Gitau** (Kenya): Responsive and Evidence-Based Community-Driven Mapping as a Catalyst of Change Towards Disaster-Resilient Communities: a Case of Muntinlupa City, Philippines a Case of Muntinlupa City, Philippines (UN-HABITAT GLTN) (10046)

**TS07I: DEVELOPING CAPACITY FOR GEODETIC INFRASTRUCTURE AND SYSTEMS II**

**THURSDAY, 25 APRIL 14:00–15:30**

**VENUE:** 249BC ("SOUTH ROOM"), NCC

**CHAIR:** MS. **ALLISON CRADDOCK**, UNITED STATES, MR. **BASARA MIYAHARA**, JAPAN

**RAPPORTEUR:** MR. **ROB SARIB**, AUSTRALIA

**Jointly hosted by FIG Asia Pacific Capacity Development Network (AP CDN), UN Global Geospatial Information Management for Asia and the Pacific Working Group 1 (UN-GGIM-AP WG1), UN Sub Committee on Geodesy Education Training and Capacity Building (UN SCoG ETCB)** The sessions will provide participants with:

- Country or national reports from the Asia Pacific region on the status of geodetic infrastructure and systems, their major challenges and capacity development initiatives.
  - Reports from the UN GGIM AP WG1, UN SCoG ETCB and FIG AP CDN on their workings and activities; including perspectives on building geodetic capacity
  - A practical perspective on the principles and implementation of the UN Integrated Geospatial Information Framework.
  - Case Studies on how collaboration, strategic / operational planning, and political will has assisted geodetic infrastructure and capability development
- The sessions will conclude with the opportunity to have open discussions amongst presenters and delegates on the development of a roadmap for the way forward.

**Presenters:**

- Mr. **Bayantumen Purevdorj** (Mongolia): Mongolia's Geodetic Infrastructure, Challenges and Plans for Future
- Mr. **Viliami Folau** (Tonga): Tonga's Geodetic Infrastructure, Systems and Capabilities – The Road to Modernization
- Mr. **Andrick Lal** (Fiji): Geodetic Capacity in the Pacific – SPC and PGSC Partnership Desk Perspective
- Mr. **Asakaia Tabua** (Fiji): Fiji's Geodetic Infrastructure, Systems and Capabilities
- Mr. **Arif Aditiya** (Indonesia): The Improvement Status of the Indonesian Geodetic Reference Frames

**TS07J: EUROPE AND NEW TRENDS IN LAND ADMINISTRATION**

**THURSDAY, 25 APRIL 14:00–15:30**

**VENUE:** 249A ("LEICA GEO-SYSTEMS ROOM"), NCC

**COMMISSION:** 7

**CHAIR:** MR. **TORBEN**

**JUULSAGER**, DENMARK  
**RAPPORTEUR:** MR. **DARKO VUCETIC**, SERBIA

**Mauno Pyykönen** and **Heikki Lind** (Finland): Quality Improvement of the Cadastral Index Map (9902)

**Ludmiła Pietrzak** and **Paweł Hanus** (Poland): Protection of Agricultural Lands in Poland (9907)

**Søren Brandt Pedersen** (Denmark): Land-Related Tasks and Possibilities Related to Implementation of the Sustainable Development Goals (9982)

**Gyula Iván** (Hungary): Let us Speak about the Future of Developed Cadastres (10102)

**Helén Elisabeth Elvestad** and **Per Kåre Sky** (Norway): From Rural to Urban Land Consolidation – an Analysis of Recent Urban Cases Treated in the Norwegian Land Consolidation Court (10116)

**Helén Elisabeth Elvestad** (Norway): Negative Covenants in Densification Projects – Cadastral Challenges (10117)

**FIG PRESIDENTS MEETING – HOW CAN THE MEMBER ASSOCIATIONS INFLUENCE FIG AND OUR EVENTS?**

**THURSDAY, 25 APRIL 15:30–18:00**

**VENUE:** 210BC ("TRIMBLE ROOM"), NCC

**CHAIR:** PROF. DR. **RUDOLF STAIGER**, FIGS PRESIDENT, GERMANY

This year the presidents meeting will be different from the previous ones. It will be held the day before the 2nd General Assembly and Council wants to work together with the presidents of the member associations on a specific topic. "How can the member associations influence FIG and our events?". Your input and your ideas are appreciated.

This event is convened by the FIG President and is reserved for Presidents or Heads of delegation of Member Associations (or their representatives)

- By invitation only



**MASTER CLASS: LEARNING SESSION ON THE USE OF TECHNOLOGY**

**THURSDAY, 25 APRIL 16:00–17:30**  
**VENUE:** 207ABC (“FIG FOUNDATION ROOM”), NCC  
**CHAIR:** MS. MARIA PAOLA RIZZO, ITALY

**Jointly hosted by FIG and FAO Objective:**

– The learning session will focus on the master class: Open Tenure system to record customary tenure and field data collection in different contexts.

**Expected Outcome:**

– Participants have enhanced understanding of available technologies via familiarization with the solutions presented in the master class.

- By invitation only

**TS08E: COST-EFFECTIVE POSITIONING**

**THURSDAY, 25 APRIL 16:00–17:30**  
**VENUE:** 309B (“ESRI ROOM”), NCC  
**COMMISSION:** 5  
**CHAIR:** DR. LEONID LIPATNIKOV, RUSSIAN FEDERATION  
**RAPPORTEUR:** DR. LI ZHANG, GERMANY

**Joël van Cranenbroeck** (Belgium) and **Chris Rizos** (Australia): The “uberization” of the GNSS Positioning Infrastructure (10136)

**Guenther Retscher** and **Alexander Leb** (Austria): Influence of the RSSI Scan Duration of Smartphones in Kinematic Wi-Fi Fingerprinting (9743)  
*This is a peer reviewed paper.*

**Nguyen Lau** (Vietnam): Experimental Processing of 1 Second Measurements of GNSS Low Cost Single Frequency Receiver by Using Different Software Packages (9825)

**Hugo Sobreira, Bruno Bougard** (Belgium), **David Calle, Julian Barrios** (Spain) and **Ryan Keenan** (Australia): SBAS Australian-NZ Testbed – Exploring New Services (9958)

**Warakan Supinajaroen** (Thailand) and **Bastiaan Van Loenen** (Netherlands): Selection of the Elements for a Continuously Operating Reference Station (CORS) Ecosystem Conceptual Model (10044)

**TS08F: FRENCH SESSION – NOUVELLES TECHNOLOGIES**

**THURSDAY, 25 APRIL 16:00–17:30**  
**VENUE:** 252A (“RIPRO ROOM”), NCC  
**CHAIR:** MR. JEAN-FRANCOIS DALBIN, FRANCE  
**RAPPORTEUR:** MS. CHRYSTINE MALTAIS, CANADA

**Léopold Degbegnon** (Benin): Analyse de la dynamique spatio-temporelle de l’occupation du sol et problèmes fonciers dans la commune d’Ifangni (10222)

**Benoit Tambwe** (Democratic Republic of Congo): Systeme D’information Foncière Basé Sur Le Modele De Fonctionnement Des Administrations Foncières De La République Démocratique Du Congo” (10224)

**Mustapha Kahhak** (Morocco): Dématérialisation des services de la conservation foncière et du cadastre au Maroc (10225)

**Pham Van Cu, Thi Dieu Dinh, Manh Hung Nguyen, Thi The Doan, Ngo Tra Le and Dao Nguyen Lam** (Vietnam): Cartographie des rizières dans le delta du fleuve Rouge basée sur les données multi-temporelles Sentinel -1A du Vietnam Datacube. Cas de la province Thái Binh (10150)

**Bernard Flaceliere** (France): Positionnement GNSS précis par smartphone (10154)

**Valere LAWSON** (France): The Smart City Concept and the Challenges of “Living Together” in an Increasingly Dense and Vertical Globalized Urban Future (10159)

**Françoise Duquenne** (France): La gestion de l’information géospatiale à l’échelle mondiale (GGIM) (10155)

**TS08G: EMERGING LAND ADMINISTRATION TRENDS IN ASIA**

**THURSDAY, 25 APRIL 16:00–17:30**  
**VENUE:** 309A (“MAKE YOUR MARK, ROOM”), NCC  
**COMMISSION:** 7  
**CHAIR:** MR. BONG BAE JANG, KOREA, REPUBLIC OF  
**RAPPORTEUR:** DR. LE THI MINH PHUONG, VIETNAM

**Stefan Wei and Adin Li** (China, PR): Mobile Mapping System Used in Cadastral Surveying (9904)

**Zhongguo Xu** (China, PR): Application of LADM for Rural Homestead Administration in China (9924)

**Yuefei Zhuo** (China, PR): An LADM-based Profile for Farmland Tripartite Entitlement System in China (9948)

**Raja Ram Chhatkuli, Suresh Dhakal** (Nepal), **Danilo Antonio (Kenya) and Shristee Singh Shrestha** (Nepal): Statutory Versus Locally Existing Land Tenure Typology: a Dilemma for Good Land Governance in Nepal (UN-HABITAT GLTN) (10021)

**Busch Elena, Onsrud Helge** (Norway) and **Almaz Abdiev** (Kyrgyzstan): Norwegian Support to Land Sector in Kyrgyzstan – Preparing Geographic Information for Statistics and Sustainable Development Goals (10170)

**Mehmet Alkan and Zeynel Abidin Polat** (Turkey): Design and Determine the LADM Infrastructure for Turkey Country Profile (10179)

**TS08H: ADAPTIVE STRATEGIES FOR CLIMATE CHANGE**

**THURSDAY, 25 APRIL 16:00–17:30**  
**VENUE:** 205ABC (“LX KOREA ROOM”), NCC  
**COMMISSION:** 8  
**CHAIR:** DR. MICHAEL KLAUS, CHINA  
**RAPPORTEUR:** DR. ADRIANNA CZARNECKA, POLAND

**Fahria Masum and Michael Klaus** (Germany): Challenges and Strategies for Adapting Climate Change in Rural Development (9910)

**Annekia Brand, Aksel Ersoy and Ellen Van Bueren** (Netherlands): Mapping with the Tap Open: The Key Importance of Land Management for Urban Flood Resilience in Houston (Texas) and Accra (Ghana) (10054)

**Amos Iloabuchi Ugwuoti, Emmanuel Onah and Oliver Ojinnaka** (Nigeria): Improving Enugu Urban Water Sourcing and Distribution Using Geospatial Technologies (10137)

**Hong Quang Nguyen, Thi Van Hue Le, Claire Quinn, Rachael Carrie, Thi Thanh Nga Pham, Lindsay Stringer** (United Kingdom) and **Van Tan Dao** (Vietnam): Spatial Planning Influences Mangrove Forest Development in Kim Son District of Ninh Binh Province (9862)

**Nyncke Emmens and Marije Louwsma** (Netherlands): How a Broadened View on Land Readjustment Can Help Dealing with Future Spatial Challenges (10086)

**Vu Phan-Hien and Anh Nguyen-Tuan** (Vietnam): Crop Water Requirements (9915)



## Thursday, 25 April 2019 16:00–17:30

### TS08I: VALUATION FRONTIERS

**THURSDAY, 25 APRIL 16:00–17:30**

**VENUE:** 249BC ("SOUTH ROOM"), NCC

**COMMISSION:** 9

**CHAIR:** MR. STEVEN NYSTROM, UNITED STATES

**RAPPORTEUR:** DR. PHAM MINH HAI, VIETNAM

**Pauliina Krigsholm, Kaisa Ridanpää and Kirsikka Riekkinen** (Finland):

Blockchain as a Technological Solution in Land Administration – What Are Current Barriers to Implementation? (9829)  
*This is a peer reviewed paper.*

**Ayodeji Oke, Clinton Aigbavboa and Taniele Cane** (South Africa):  
Review of Factors Influencing Socially Cohesive Smart Societies in South Africa (9845)  
*This is a peer reviewed paper.*

**Timothy Fella and Katherine Smyth** (USA):

Leveraging Location-Enabled Street Photos and Machine Learning to Automate Large-Scale Data Collection in Support of Property Valuation (9857)

**Peter Ache** (Germany):

Nationwide Real Estate market Transparency Prevents a Bubble – From Local Real Expertise to Statewide market Knowledge – (9866)

**Winrich Voss and Keno Bakker** (Germany):

Geospatial Information to Support Real Estate Valuation (9991)

**Abdullah Kara** (Turkey), **Ruud Kathmann, Peter van Oosterom, Christiaan Lemmen** (Netherlands) and **Ümit Işıkdag** (Turkey):  
Towards the Netherlands LADM Valuation Information Model Country Profile (10066)

### TS08J: TEN YEARS OF LAW ON GEOINFORMATION IN SWITZERLAND – TRENDS, CHALLENGES AND IMPACT

**THURSDAY, 25 APRIL 16:00–17:30**

**VENUE:** 249A ("LEICA GEOSYSTEMS ROOM"), NCC

**COMMISSION:** 7

**CHAIR:** MRS. GERDA SCHEENACH, AUSTRIA

**Daniel Steudler** (Switzerland):  
10 Years of "Law on Geoinformation" in Switzerland – The International Context (9929)

**Christian Kaul** (Switzerland):  
10 Years of "Law on Geoinformation" in Switzerland – Current Situation and Outlook (9938)

**Jürg Lüthy** (Switzerland):  
10 Years of "Law on Geoinformation" in Switzerland – Core Features of a Successful National Spatial Data Infrastructure (9939)

**Helena Åström Boss** (Switzerland):

10 Years of "Law on Geoinformation" in Switzerland – A Federative Organisation Requires Clear Rules and Responsibilities (9942)

## Thursday, 25 April

### GALA DINNER

**THURSDAY, 25 APRIL 19:30–23:00**

**VENUE:** LUC THUY RESTAURANT

The Gala dinner will take place at Luc Thuy Restaurant. Luc Thuy is a luxurious oriental style restaurant, located on the banks of Hoan Kiem – undoubtedly one of the most beautiful locations in Hanoi. Luc Thuy is well-known to locals and international diners not only for its stunning, delicious traditional and modern Vietnamese Cuisine, but also for its elegant and cozy space filled with natural light and a breeze from Hoan Kiem Lake. An unforgettable Vietnamese dinner featured by music and show awaits the guests. It will be the best way to enjoy a night in Hanoi.

## Friday, 26 April

### FIG GENERAL ASSEMBLY – PART 2

**FRIDAY, 26 APRIL 09:00–12:30**

**VENUE:** 318 ("SURVEYOR'S ROOM"), NCC

**CHAIR:** PROF. DR. RUDOLF STAIGER, FIG PRESIDENT, GERMANY

### FAREWELL RECEPTION, HOSTED BY FIG WORKING WEEK 2020

**FRIDAY, 26 APRIL 12:30–14:30**

**VENUE:** 3RD FLOOR, ROOM 313

Delegates are invited to farewell the FIG Working Week 2019 and its host city in an informal environment. Join us as we toast to a successful event and at the same time have a taste of FIG Working Week 2020 in Amsterdam, the Netherlands.

- All participants are invited
- Hosted by FIG Working Week 2020, Amsterdam, the Netherlands





## Leica RTC360 3D Reality Capture Solution

The Leica RTC360 3D laser scanner is highly portable, highly automated, intuitive and designed for maximum productivity. This laser scanning solution efficiently combines a high-performance scanner with a mobile-device app to capture and automatically register scans in real time and industry-leading post-processing office software to register scans seamlessly to complete your entire workflow.

## Leica GS18 T World's fastest GNSS RTK rover

Introducing the world's fastest and easiest-to-use GNSS RTK rover, the Leica GS18 T. Now you can measure any point faster and easier without the need to hold the pole vertical. This latest innovation combines GNSS and inertial measurement unit (IMU) being the first true tilt compensation solution that is immune to magnetic disturbances and is calibration-free. Save up to 20 percent over conventional surveying practices, measure where others can't, faster than ever before and forget the bubble.




**HxGN  
LIVE**

LV, NV  
11-14  
**June  
2019**

[HxGNLIVE.com](http://HxGNLIVE.com)



Leica Geosystems AG  
[leica-geosystems.com](http://leica-geosystems.com)



- when it has to be **right**







## THE FIG FOUNDATION

The FIG Foundation is an independent body under the International Federation of Surveyors and has been established for the purpose of raising funds to finance surveying education development projects and supporting young surveyors in order to build a sustainable future.

The FIG Foundation will build a sustainable future by:

- grants and scholarships to projects, for instance to develop curricula for surveying education, training and capacity building, especially in developing countries;
- encouraging research into all disciplines of surveying and to disseminate the results of that research;
- promoting high standards of education and training for surveyors and to facilitate continuing professional development;
- educating people in the disciplines of surveying, particularly in developing countries and countries in transition;

- promoting the use of distance learning, networking, eLearning and knowledge management if surveying education and continuing professional development;
- promoting the exchange of surveying personnel for greater understanding of all facets of the profession of surveying;
- supporting by seed funding conferences, meetings of young surveyors and similar events in co-operation with international agencies such as the United Nations.

### Donations to the FIG Foundation

By attending the FIG Working Week you support the FIG Foundation with 10 EUR. Your participation in the Vietnamese Cultural Performance also supports the Foundation. If you would like to give an extra donation contact the FIG Office in room 257ab on the 2nd floor.

More information at [www.fig.net/foundation](http://www.fig.net/foundation).

3<sup>rd</sup> FIG Young Surveyors Asia Pacific Meeting
Special Event

# Charity Dance



Monday 22<sup>nd</sup> April 16:30 Vietnam National Convention Center (NCC)

*Beneficiaries:*




*Organized by:*



*Proudly sponsored by:*



Hanoi is sometimes dubbed the “Paris of the East” for its French influences. With its tree-fringed boulevards, more than two dozen lakes and thousands of French colonial-era buildings, Hanoi is a popular tourist destination.

## SIGHTSEEING



**1** You'll hear about the Old Quarter's “36 streets” which evolved to reflect the different guilds that called the area home: each guild concentrated their business along an individual street, and the streets' names reflected the business of the guilds that lived there. Located in the Old Quarter, Hoan Kiem Lake is where people gather in Hanoi to rest, eat lunch, play, or simply take a walk around the perimeter of the lake.



**2** Built as a temple to Confucius in 1070, the Temple of Literature was centered more on academia than religion. A place of study for the wealthy, The Temple of Literature was Vietnam's first national university, and many monuments remain on the grounds dedicated to the scholars who graduated here.



**3** The Hoa Lo Prison Museum, also known as Maison Centrale, played a significant role in the French colonial expansion of Vietnam. Many of Vietnam's political prisoners were tortured and killed here. Afterward, during the Vietnam War, the North Vietnamese used it to imprison American soldiers.

### Old Quarter & Hoan Kiem Lake

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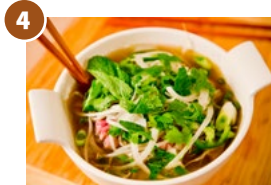
### Temple of Literature

Built as a temple to Confucius in 1070, the Temple of Literature was centered more on academia than religion. A place of study for the wealthy, The Temple of Literature was Vietnam's first national university, and many monuments remain on the grounds dedicated to the scholars who graduated here.

### Hoa Lo Prison Museum

The Hoa Lo Prison Museum, also known as Maison Centrale, played a significant role in the French colonial expansion of Vietnam. Many of Vietnam's political prisoners were tortured and killed here. Afterward, during the Vietnam War, the North Vietnamese used it to imprison American soldiers.

## VIETNAMESE SPECIALTIES IN HANOI



**4** Pho is the must-try dish in Vietnam. It is a staple breakfast food, but no matter the time of day, you will find restaurants and street vendors serving the dish and many a contented soul crouching over a bowl and slurping the soup. Pho originated in Hanoi, so where better to try this dish than Vietnam?

*Phở Thìn, address: 13, Lo Duc*



**5** Bún chả is one of the best Hanoi food specialties not to be missed. The dish consists of grilled pork strips and balls or chả served over a bed of rice vermicelli noodles or bún. It typically comes with a plate of fresh Vietnamese herbs and a bowl of dipping sauce. Pickled vegetables, like cabbage, carrots, onion or green papaya served with additional meatballs on the side.

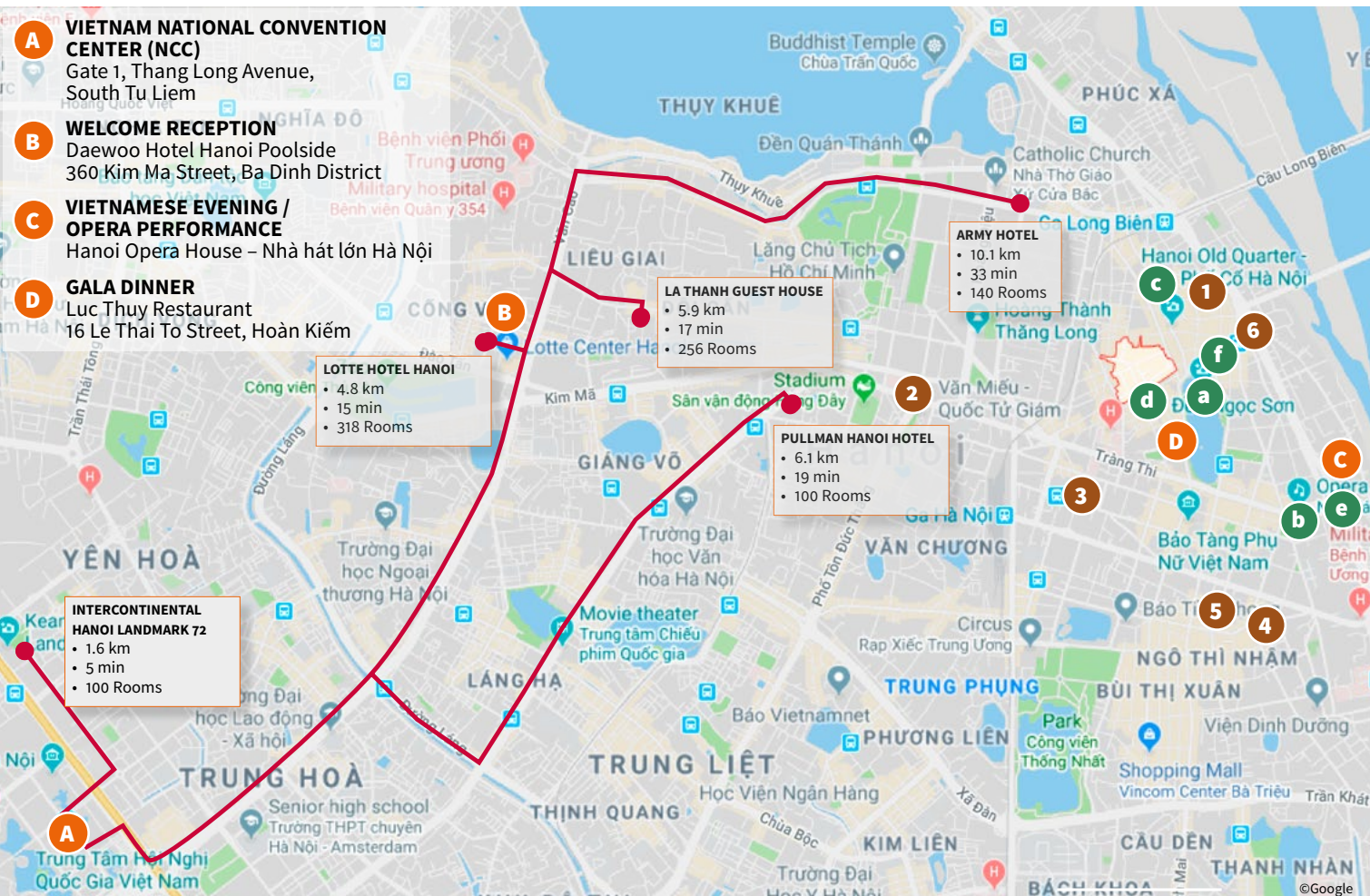
*Bún Chả Hương Liên – Already popular, this restaurant gained worldwide acclaim when President Obama and Anthony Bourdain ate Bún chả together. Address: 24, Le Van Huu.*



**6** Vietnamese egg coffee is brewed in a drip filter, before adding the thoroughly-whisked mixture of the yolk and other ingredients. After all the components are mixed together, the cup is put in a bowl of hot water to help the coffee maintain the necessary temperature when it's served.

*Giảng – opening Hours: 7:00–22:30, address: 39 (lane), Nguyen Huu Huan, Hoan Kiem*





## OTHERS

### Shop Hanoi's night market

The night market in Hanoi is only open on Friday, Saturday, and Sunday nights. You usually can often get better deals. It's a more pleasant shopping experience in general. Plus, there's food – loads of choices cooked fresh right in front of you while you shop.

### Water puppet theatre

The ancient art form of water puppetry has a long association with Hanoi and there are several theatres where guests can en-



Hoan Kiem Lake and Ngoc Son Temple



Hanoi Opera House



Dong Xuan Market



(St. Joseph's Cathedral (Nha Tho Lon Ha Noi))



National Museum of Vietnamese History



Long Water Puppet Theatre



joy this uniquely Vietnamese take on Asia's puppet tradition.

*Opening hours: daily 15:00, 16:10, 17:20, 18:30 & 20:00, address: 57B, Dinh Tien Hoang Street, Hoan Kiem District, Hanoi*

### Ho Chi Minh Mausoleum

Ho Chi Minh has left an indelible mark on Vietnamese history and he is revered in Hanoi as the country's greatest leader. This is more than a tourist attraction, it is a part of living history and a visit here stays long in the memory.

*Opening Hours: Tuesday–Thursday 7:30–10:30, Saturday & Sunday 7:30–11:00, address: 8 Hung Vuong, Dien Bien, Ba Dinh, Hanoi*

### Cha Cá Lã Vong



Chả Cá is one of the unique specialties of the Hanoi people. It even has a street named after it – Cha Ca street. Hanoians even have a saying that ... “someone should try this once in their

life before leaving this world.”

*Opening Hours: Daily from 11:00 to 14:00 and 17:00 to 21:00, address: 14 Chả Cá, Hanoi*

### Other popular attractions in Hanoi

- Imperial Citadel of Thang Long
- The Perfume Pagoda
- Ngoc Son temple
- Dong Xuan Market

## GENERAL INFORMATION ABOUT HANOI

### HANOI – CULTURAL SYMBOL

Hanoi, the capital of Vietnam is a more than thousand-year-old city with a rich past, and steadily inching towards becoming an important modern-day city. The city is expected to grow rapidly in 2019 and simultaneously preserve traditional cultural values. Hanoi displays many local as well as Chinese influences due to its

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proximity to Southern China. It was once the capital of the French and Indochina colonial territory, and thus, its architecture, as well as culture, reflects French influences as well.

Come along and explore all that Hanoi has to offer from diverse events and good vibes to experiencing the beautiful historical places that is always close by.

## SHUTTLEBUS: GETTING TO AND FROM THE CONFERENCE VENUES

Please see timetables of the shuttlebuses on page 58.

## HANOI TRANSPORTATION

Air travelers flying into Hanoi will need to go through Noi Bai International Airport about 40 minutes' drive from the Hanoi city center.

It also could be easy because there are many kinds of transportation to choose based on your budget.

Already at the airport FIG Working Week volunteers welcome you, and can guide you which transport to use to your hotel. This service is available from Friday, 19 April to Tuesday 23, April from 8–17. Look after the volunteers in red shirts with the FIG logo.

**Taxi.** Working meters cost about VND10,000 to VND15,000 for the first two kilometers, then about VND8,000 per succeeding kilometer.

*Taxi Mai Linh, tel. 024 3972 5888 | Taxi Nội Bài, tel. 024 3886 8888 | Taxi Thanh Nga, tel. 024 3821 5215 | Taxi Airport, tel. 024 3886 6666*

**Grab bike and taxi.** Grab is an app like Uber, but it offers more options, such as Grab motorbike rides. You only need a Vietnamese SIM card with Internet access and fortunately it is very cheap (around VND100,000 – 3 USD). iOS: (available) | Android: (available)

**Motorcycle Taxis (Xe Om).** Travelling via motorcycle taxis is a quick and inexpensive way of getting around in Hanoi. 2 km should be about 20,000–30,000 dong.

**Renting a scooter.** Renting a scooter may be an option if you want a little more flexibility to your travel around Hanoi. Many guesthouses or hotels can get their guests a motorbike to rent for about \$5 per day.

*Van Chinh, tel. 098 959 55 33 | 38 Hàng Buồm, tel. 094 106 23 09 |*

*96 Yên Hoa, tel. 091 888 99 81 | 112 Nguyễn Văn Cừ, tel. 094 246 76 74*

## TOUR THE CITY

Sightseeing tours around Hanoi is an opportunity for all of you with a better insight into ancient and nowadays of Hanoi, friendly and hospitable but also very dynamic and modern. You will get to experience many different emotions, respect, admiration, but sometimes the deposition because of the resilience of the Hanoi people. There is also an opportunity to see the daily life, how they use and transport controls, how they work and activities, all of which are explained clearly and supported by our staff.



**Shuttlebus Schedule****Hotel: Army****Address: No. 1A Nguyen Tri Phuong, Ba Dinh, Hanoi****Route: Army – Daewoo – NCC**

Date	Time	Route
22 April	08:00	Army – Daewoo
	08:30	Daewoo – NCC
	11:00	NCC – Army – Daewoo – Army
	14:00	Army – Daewoo
	14:30	Daewoo – NCC
23 April	17:30	NCC – Daewoo – Army Hotel
	08:00	Army – Daewoo
	08:30	Daewoo – NCC
	11:00	NCC – Daewoo – Army
	14:00	Army – Daewoo
24 April	14:30	Daewoo – NCC
	17:30	NCC – Daewoo – Army
	08:00	Army – Daewoo
	08:30	Daewoo – NCC
	11:00	NCC – Daewoo – Army
25 April	14:00	Army – Daewoo
	14:30	Daewoo – NCC
	17:30	NCC – Daewoo – Army
	08:00	Army – Daewoo
	08:30	Daewoo – NCC
26 April	11:00	NCC – Daewoo – Army
	14:00	Army – Daewoo
	14:30	Daewoo – NCC
	17:30	NCC – Daewoo – Army

**Shuttlebus for Welcome Reception – April 22, 2019****Venue: Daewoo Hotel****Address: 360 Kim ma – Ba Dinh – Hanoi**

Time	Route Army – Daewoo
18:30	Army – Daewoo
21:30	Daewoo – Army
<b>Route Intercontinental Landmark 72 – NCC – Daewoo</b>	
18:00	Intercontinental Landmark 72 – NCC
18:30	NCC – Daewoo
21:30	Daewoo – NCC – Intercontinental Landmark 72
<b>Route Pullman – Daewoo</b>	
18:45	Pullman – Daewoo
21:30	Daewoo – Pullman

**Shuttlebus Schedule****Hotel: Pullman****Address: No. 40 Cat Linh, Dong Da, Hanoi****Route: Pullman – NCC**

Date	Time	Route
22 April	08:00	Pullman – NCC
	11:00	NCC – Pullman
	14:00	Pullman – NCC
	17:30	NCC – Pullman
23 April	08:00	Pullman – NCC
	11:00	NCC – Pullman
	14:00	Pullman – NCC
	17:30	NCC – Pullman

**Shuttlebus for Cultural Evening – April 23, 2019****Venue: Hanoi Opera House****Address: No.1 Trang Tien Street, Hoan Kiem, Hanoi****SHOW 1****Route 1 Army – Hilton Opera**

18:00 Army Hotel – Hilton Opera

20:30 Hanoi Opera House – Army

**Route 2 Intercontinental Landmark 72 – NCC – Daewoo – Hilton Opera**

18:00 Intercontinental Landmark 72 – NCC

18:15 NCC – Daewoo

18:30 Daewoo – Hilton Opera

20:30 Hanoi Opera House – Daewoo – NCC – Intercontinental Landmark 72

**Route 3 Pullman – Hilton Opera**

18:00 Pullman – Hilton Opera

20:30 Hanoi Opera House – Pullman

**SHOW 2****Route 1 Army – Hilton Opera**

20:00 Army – Hilton Opera

22:30 Hanoi Opera House – Army

**Route 2 Intercontinental Landmark 72 – NCC – Daewoo – Hilton Opera**

19:30 Intercontinental Landmark 72 – NCC

19:45 NCC – Daewoo

20:00 Daewoo Hotel – Hilton Opera

22:30 Hanoi Opera House – Daewoo – NCC – Intercontinental Landmark 72

**Route 3 Pullman – Hilton Opera**

20:00 Pullman – Hilton Opera

22:30 Hanoi Opera House – Pullman

**Shuttlebus Schedule****Hotel: Intercontinental Landmark 72****Address: Pham Hung St., Me Tri, Cau Giay, Hanoi****Route: Intercontinental Landmark 72 – NCC**

Date	Time	Route
22 April	08:00	Intercontinental Landmark 72 – NCC
	08:15	Intercontinental Landmark 72 – NCC
	11:00	NCC – Intercontinental Landmark 72
	14:00	Intercontinental Landmark 72 – NCC
	17:30	NCC – Intercontinental Landmark 72
23 April	08:00	Intercontinental Landmark 72 – NCC
	08:15	Intercontinental Landmark 72 – NCC
	11:00	NCC – Intercontinental Landmark 72
	14:00	Intercontinental Landmark 72 – NCC
24 April	17:30	NCC – Intercontinental Landmark 72
	08:00	Intercontinental Landmark 72 – NCC
	08:15	Intercontinental Landmark 72 – NCC
	11:00	NCC – Intercontinental Landmark 72
25 April	14:00	Intercontinental Landmark 72 – NCC
	17:30	NCC – Intercontinental Landmark 72
	08:00	Intercontinental Landmark 72 – NCC
	08:15	Intercontinental Landmark 72 – NCC
26 April	14:00	NCC – Intercontinental Landmark 72
	08:00	Intercontinental Landmark 72 – NCC
	08:15	Intercontinental Landmark 72 – NCC
	14:00	NCC – Intercontinental Landmark 72

**Shuttlebus for Gala Dinner – April 25, 2019****Venue: Luc Thuy Restaurant****Address: No. 16 Le Thai To St., Hoan Kiem, Hanoi****Route Army – Luc Thuy Restaurant**

18:45 Army Hotel – Luc Thuy

22:30 Luc Thuy – Army Hotel

**Route Intercontinental Landmark 72 – NCC – Daewoo – Luc Thuy**

18:15 Intercontinental Landmark 72 – NCC

18:30 NCC – Daewoo

18:45 Daewoo – Luc Thuy

22:30 Luc Thuy – Daewoo – NCC – Intercontinental Landmark 72

**Route Pullman – Luc Thuy**

18:30 Pullman – Luc Thuy

22:30 Luc Thuy – Pullman



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Published by the International Federation of Surveyors

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