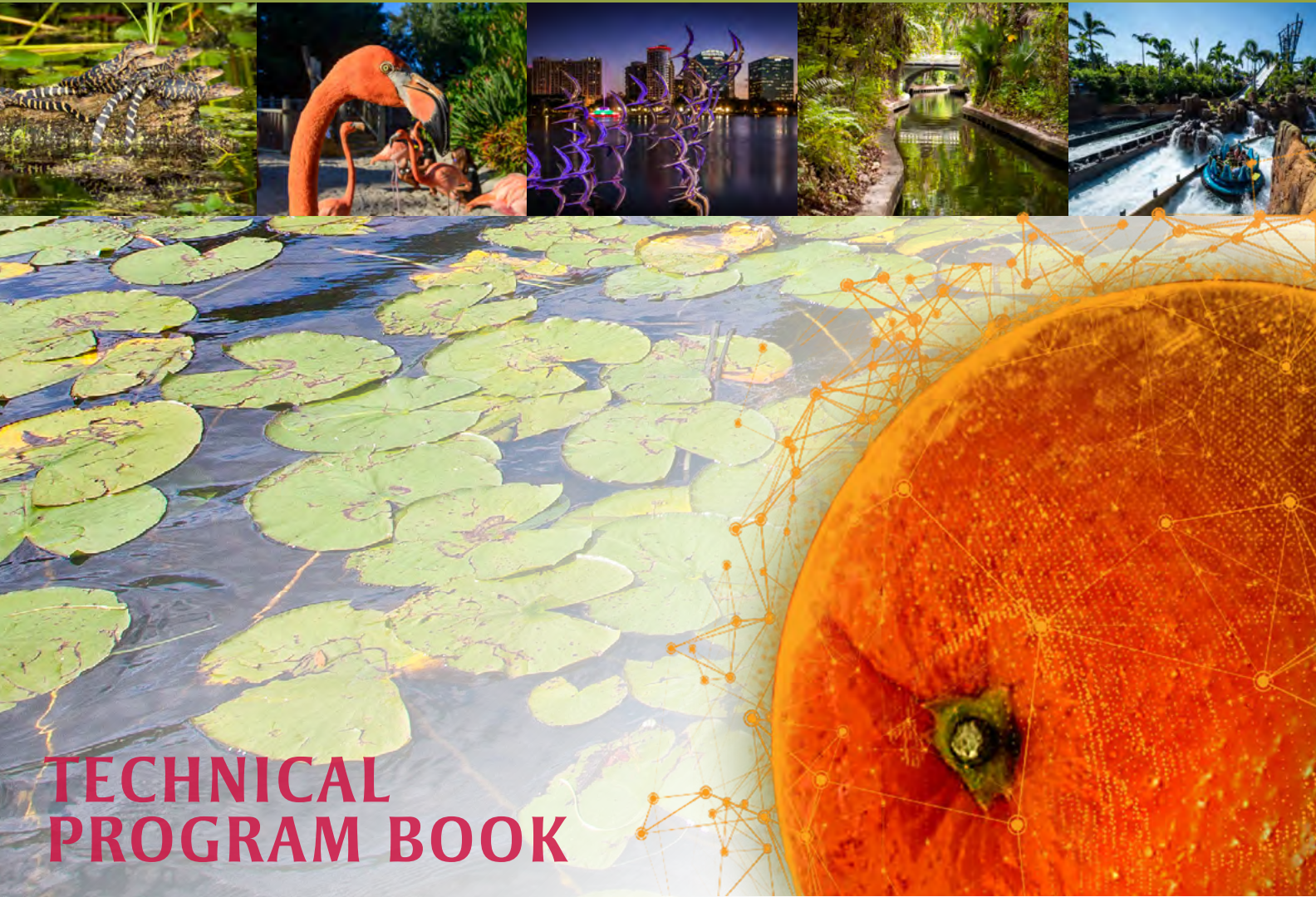


FIG Working Week 2023

28 May – 1 June, 2023, Orlando, Florida, USA

“Protecting Our World, Conquering New Frontiers”



TECHNICAL PROGRAM BOOK

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It is my pleasure to welcome you to FIG 2023 Working Week in Orlando, where an inspirational program awaits you.

FIG recognises that a sustainable agenda for planet and people is a universal agenda. And, if we are to achieve economic, social and technological progress, it is an imperative that this occurs in harmony with nature. Our 2023 FIG Working Week in Orlando has a clear focus that aims to highlight the key role that the surveying professionals, from the land, built and natural environments and geospatial sector, have to undertake to make this sustainable development agenda happen.

At this very start of the FIG four-year term, NSPS, our local organisers have chosen an excellent theme that is aligned to the FIG vision to serve People, Planet and working in Partnership for societal benefit. The theme is strategically aligned with the United Nations 2030 Sustainable Agenda as articulated in the Sustainable Development Goals (SDGs).

Sustainability and our professional practices are the hall mark of this year's deliberations. Climate is now the foundation of sustainability and underpins everything we do in our professional work. As our world and climate changes around us, we aspire to leverage our knowledge base and tools for measuring, monitoring, and forecasting how to improve the outlook for our future generations.

Our conference program includes a great variety of discussant platforms that reflect our collective FIG vision. The three plenary sessions expand upon: How we protect our planet; What are the survey professionals new frontiers in space and technology and; Why and How we take action to tackle some of the Global Challenges.

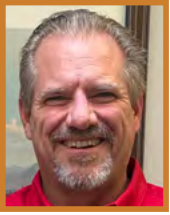
The technical program intend to inspire the surveying professionals and really innovative session formats designed including roundtable discussions, scientific pre-events, technical presentations and also a cinema of pre-recorded presentations. In addition exciting social events provides opportunities for relaxation and networking.

For the full experience of a FIG Working Week the FIG partnership special sessions are worth a look. This includes the dedicated SIDS sessions, the presentations of drones, the partnership themes covering climate relationship to land, blue economy, woman's land rights and of course the activities hosted by FIG platinum partners. A special symposium for the National Survey Geodetic day has also been scheduled. Above all, the program seeks to expand our presence through technology, experience, collaboration, and good will for a better tomorrow.

I am so pleased that the organisers have done their very best to arrange a memorable event. On behalf of FIG Council and office, for all of you and especially for our newcomers, I extend to you a warm welcome to our FIG family and FIG Working Week.

Diane A Dumashie

FIG President



Dear Colleagues,

On behalf of the 15,000+ members of the National Society of Professional Surveyors (NSPS), we are delighted to host our fellow surveying and geospatial professionals and technicians for the FIG Working Week 2023 in beautiful Orlando, Florida.

For more than 40 years, NSPS has been the voice of the professional surveying community in the United States (and Territories). Through its affiliation agreements with the respective state surveying societies, NSPS has a strong constituency base through which it communicates directly with lawmakers, agencies, and regulators at both the national and state levels. NSPS monitors and comments on legislation, regulation, and policies that have potential impact on the activities of its members and their clients and collaborates with a multitude of other organizations within the geospatial community on issues of mutual interest.

From monitoring legislation nationwide affecting licensing and regulations to championing educational and technical programs, NSPS is the surveyor's voice for providing representation at all levels of governmental oversight and public/private regulations. Our governance consists of practicing professionals and certified technicians working in both public and private industry. Our advocacy efforts



Dear Colleagues,

I am honored to welcome you to Orlando, Florida to FIG Working Week 2023.

We have a wonderful programme of important and timely technical sessions centered around the theme of the working week: Protecting Our World – Conquering New Frontiers. All ten FIG Commissions have put together a fantastic technical programme that will have something of interest for each of you.

The future of our profession, Young Surveyors will also be a key focus of the working week beginning with the FIG Young Sur-

veyors Americas Conference on Saturday-Sunday, 27–28 May, and continuing through the conference week.

include a continual oversight of legislative actions by our Government Affairs Committee (GAC) while our other professional standards committees keep our livelihood on top of education, licensing, and technical regulations. By partnering with groups and agencies such as the National Council of Examiners for Engineering and Surveying (NCEES), Accreditation Board for Engineering and Technology (ABET), and the American Land Title Association (ALTA), we keep the professional surveyor and the profession informed to further promote surveying and towards our duty to protect the public.

In furtherance of the goal of providing to its members the tools they need to properly perform their duties, NSPS maintains excellent working relationships with a number of federal agencies, such as the Bureau of Land Management, National Geodetic Survey, and U.S. Geological Survey. We also have representation on FEMA's Technical Mapping Advisory Council (TMAC) and participation in the review and updating of government agency sponsored programs related to geospatial activities.

Overall, NSPS strives to advance the sciences and disciplines within the profession, and to establish and further common interests, objectives, and political efforts to help bind the surveying and geospatial profession into a unified body in the United States.

Timothy W. Burch, PLS

NSPS Executive Director, FIG Commission 1 – Chair

veyors Americas Conference on Saturday-Sunday, 27–28 May, and continuing through the conference week.

It has been 21 years since FIG has held its annual conference in the Americas, the last time being the very successful FIG Congress 2002 in Washington, DC. Definitely time to bring FIG back to the Americas!

Orlando is a perfect venue for FIG Working Week 2023. It is the world's largest venue for meetings and conferences, hosting over 11,000 events every year attracting over 30 million participants with many advantages including a world class airport with new international terminal, world famous theme parks, wonderful weather, and many other opportunities for learning and relaxing.

Hosting this prestigious event will provide the opportunity for more U.S. surveyors to engage and network with their peers from around the globe.

Being in Florida we also have the advantage of key support from its state surveying society – the Florida Surveying and Mapping Society (FSMS). Through FSMS we can provide CEU/PDH (Continuing Education Units/Professional Development Hours) for attending and participating in the technical programme.

An FIG Member Association since 1959, when the American Congress on Surveying & Mapping (ACSM) joined FIG, NSPS is now the FIG Member Association after its merger with ACSM in 2012.



Welcome to the Magic World of FIG
From all of us to all of you

A warm welcome to all. To you who come locally from Orlando or Florida; from the host country USA; from other parts of the Americas; and from other continents. Welcome to Florida.

We are now in Orlando, a city that is famous for the magic Disney World which has a big impact on the city and region. Surveyors have had significant impact on the creation of Disney World, too, which you will hear more about in the Opening Ceremony, and take a stroll through the “Surveying Walt Disney World” section in the exhibition. Walt Disney himself was a true hard-worker who got quite much of his inspiration from travelling – within the US and around the world. Travelling is an inspiration, and that is one of the reasons why FIG is keen to bring you to the FIG Working Week in person.

We are thrilled that you have decided to be here in Orlando. Nowadays it is easy to stay at home; while that would be better for the carbon footprint, the question is whether it would be good for you? For your inspiration? Being together does something magic – the magic of meeting others from all over the world, the magic of exploring a new area, the magic of learning together with others and expanding horizons.

FIG and NSPS would like to thank **CONFERENCE MANAGERS** for their time, effort and dedication to making this Working Week a success.

We are also pleased to provide an exhibition full of international vendors showcasing their latest technology with many able to give live demonstrations of UAV, LIDAR, and GNSS technology in dedicated outdoor demonstration area.

Welcome to the United States, Florida, and Orlando!

John Hohol

Co-Conference Director, FIG Working Week 2023

But this Working Week is not all about Disney... Although it might be tempting to find some time to visit one of the Disney theme parks, stay on, because we are offering a magic program for you, too.

Please dig into this program book to get inspiration for the coming days. Visit our exhibitors and take a tour through the “University Hall”, the connect+reflect area and come by our new feature this year, the “FIG Cinema”.

In FIG, the term “surveyor” is interpreted in its broadest sense including professionals who measure, position, map, locate, appraise and value, estimate and cost, plan, construct, develop and manage the land, the seas and any man-made structures. The power of FIG and the Working Week is to bring together all these different professionals under the same roof – in sessions, fora, meetings, informal networking – to enhance the role of the surveyor on society.

And this is why you are here in Orlando, Florida now... So may I wish you some useful, efficient and above all magic days.

Let the magic begin...

Louise Friis-Hansen

FIG Director and Co-Conference Director



International Federation of Surveyors (FIG)

The International Federation of Surveyors is an international, non-government organisation whose purpose is to support international collaboration for the progress of surveying in all fields and applications.

FIG is the premier international organization 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. It provides an in-

ternational forum for discussion and development aiming to promote professional practice and standards.

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 organization (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.



National Society of Professional Surveyors (NSPS)

We are the voice of the professional surveying community in the United States of America and its territories. Through its affiliation agreements with the respective state surveying societies, NSPS has a strong constituency base through which it communicates directly with lawmakers, agencies & regulators at both the national and state level. NSPS monitors and comments on legislation, regulation, & policies that have potential impact on the activities of its members and their clients, and collaborates with a multitude of other organizations within the geospatial community on issues of mutual interest.

NSPS participates and is a member of key geospatial associations and groups including the International Federation of Surveyors (FIG), Pan American Association of Surveying and Topography Professionals (APPAT), Council On Federal Procurement of Architectural and Engineering Services (COFPAES), Coalition of Geospatial Organizations (COGO), International Ethics Coalition (IEC), and International Property Measurement Standards Coalition (IPMS).

NSPS also manages key geospatial certification programs including Certified Survey Technician, Hydrographer Certification, Certified Federal Surveyor, and Certified Floodplain Surveyor.



The local organizers from Florida together with the steering committee group members Diane Dumashie, John Hohol, Tim Burch and Louise Friis-Hansen.

Conference Steering Committee

- Dr. **Diane Dumashie**, President, FIG
- Mr. **John Hohol**, Co-Conference Director, NSPS
- Mr. **Tim Burch**, Executive Director, NSPS
- Ms. **Trish Milburn**, NSPS
- Mr. **Mikael Lilje**, Vice President, FIG
- Ms. **Louise Friis-Hansen**, Co-Conference Director, FIG

Local Organizing Committee

- Mr. **John Hohol**, Head of Local Organizing Committee
- Mr. **Tim Burch**
- Ms. **Trish Milburn**
- Mr. **Richard Allen**
- Mr. **William "Bill" Muscatello Jr.**
- Mr. **Lou Campanile Jr.**
- Mr. **Howard Ehmke**
- Ms. **Rebecca Porter**
- Ms. **Samantha Hobbs**
- Mr. **William "Bill" Rowe**
- Ms. **Jennifer Triana**

FIG Office

- Ms. **Louise Friis-Hansen**, FIG Director
- Ms. **Claudia Stormoen**, FIG Event and Support Manager
- Ms. **Maria Bargholz**, FIG Finances and Administration

**The Theme for FIG Working Week 2023 is:
Protecting our World, Conquering New Frontiers**

The theme is intended to inspire surveying and geospatial professionals in land management, land survey and land administration and to seek to expand our presence through technology, experience, collaboration, and good will for a better tomorrow. As our world and climate changes around us, we aspire to leverage our knowledge base and tools for measuring, monitoring, and forecasting how to improve the outlook for our future generations. The theme is strategically aligned with the United Nations 2030 Sustainable agenda as articulated in the sustainable Development Goals (SDG).

The conference theme draws upon the FIG vision to serve People, Planet and working in Partnership for societal benefit. This will be reflected in the three plenary sessions that will be setting the scene for each of the three conference days.



Disney surveyor Matt Sheridan surveying the Magic Kingdom's Main Street and Cinderella Castle.

Your source for geospatial news, developments, and technology

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- **Connect globally** with a vibrant community of diverse industry professionals
- **Amplify your voice** by sharing your research, case studies, industry vision and technology



Join us

“ GIM is keeping me “in the ring” with the ever-emerging technologies. ”

“ Your efforts in keeping us informed about the ever-evolving survey industry are truly appreciated. ”

“ Best geospatial magazine out there in terms of quality of content. ”

Conference Web Site and Technical Program

- Conference web site: fig.net/fig2023
- fig.net/fig2023/technical_program.htm and FIG Conference Web App

Wireless Internet

WiFi is available at the conference center:
 Network Name: Bonnet Creek_Meeting
 Password: FIGww23.

Conference Web App



The free conference web app allows you to quickly get the latest information about the program, speakers and participants. To access the app (all devices and platforms), visit www.fig.net/app.

Some of the FIG 2023 app features include:

- Technical program with PDFs
- List of speakers and participants
- Creation of personal conference program
- Exhibitor profiles & booth locations

See instructions at fig.net/fig2023/app.htm.

Social Media

FIG at LinkedIn:

<https://www.linkedin.com/groups/2669121/>

FIG at Twitter:

https://twitter.com/FIG_NEWS

FIG at Facebook:

<https://www.facebook.com/internationalfederationofsurveyors>

FIG YouTube Channel:

<https://www.youtube.com/channel/UCnILnXagUY5Y2f8Hy-yaw2Q>

#FIG2023 #FIGWorkingWeek

Registration and Conference Services

The FIG Registration desk is located in the North Foyer of Hilton Bonnet Creek. Any changes to the schedule will be posted in the conference web app.

Opening hours: Friday, May 26: 1–6pm; Saturday, May 27: 7am–5pm; Sunday, May 28 – Wednesday, May 31: 7am–6pm, Thursday, June 1: 8am–12pm.

Speakers Preparation Room

The speakers' preparation desk is located in the Manatee Room. You are required to bring your PowerPoint presentation to the staff at the desk for upload as early as possible and at the latest two hours before your sessions begins. There will be technicians waiting to assist you. You are required to have your presentation on an USB Memory Stick or External Portable Hard Drive, and the technician will download your presentation to the central system. You will help the technicians by having the session number of your presentation ready so that we can make sure that your presentation will be sent to the correct session room.

Opening hours: Sat 27 – Sun 28 May 8am–5pm, Mon 29 – Wed 31 May 8am–5:30pm, Thu 1 June 8–10am.

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/Sponsor pass: includes admission to all technical sessions and exhibition, lunches, coffee breaks with refreshments on the three conference days, Welcome Reception, Opening Ceremony, 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 and the Opening Ceremony.

Accompanying Person: Opening Ceremony, Welcome Reception, and lunch on the three conference days 29–31 May.

Bag and Certificates

Each full delegate will receive a conference bag. Certificates of attendance and presentation will be sent by email after the conference. Certified Educational Credits and certificates please see page 30.

Refreshment and Lunches

Complimentary coffee and tea will be served during the morning and afternoon breaks at coffee stations in the exhibition areas. Lunch on Monday, Tuesday and Wednesday will be served in the Bonnet Creek Ballroom.

Time	Sat 27 May	Sun 28 May	Exhibition			Thu 1 June	Time			
			Mon 11am-6pm Mon 29 May	Tue 11am-6pm Tue 30 May	Wed 11am-6pm Wed 31 May					
7am	Registration 7am-5pm	Registration 7am-6pm	Registration 7am-6pm	Registration 7am-6pm	Registration 7am-6pm	Registration 8am-12pm	7am			
8am			Newcomers Session				8am			
9am	1ST YOUNG SURVEYORS AMERICAS MEETING	General Assembly Day 1	1ST YOUNG SURVEYORS AMERICAS... REFERENCE FRAMES IN PRACTICE	MULTI-SENSOR-SYSTEMS...	Plenary Session 1	Plenary Session 2	Plenary Session 3			
10am								General Assembly Day 2	10am	
11am					Break / Exhib. Opens	Break	Break		11am	
12pm					Technical Sessions	Technical Sessions	Technical Sessions		12pm	
1pm					REFERENCE FRAMES IN PRACTICE MULTI-SENSOR-SYSTEMS WORKSHOP				Lunch	Lunch
2pm									2pm	
3pm						Technical Sessions	Technical Sessions	Technical Sessions		3pm
4pm					Break	Break	Break	NSPS PAC Cornhole Event	4pm	
5pm		Opening Ceremony			Technical Sessions	Commission Meetings	Technical Sessions		5pm	
6pm		Welcome Reception							6pm	
7pm									7pm	
8pm							FIG Working Week Dinner at Mango's Tropical Cafe		8pm	
9pm					Informal Get-Together / Free evening	Commission Dinners / Free evening				9pm
10pm										10pm
11pm								FRIDAY: Golf Outing	11pm	



The Working Week will take place at Signia by Hilton Orlando Bonnet Creek / Waldorf Astoria Orlando.

The venue lies within the Bonnet Creek nature preserve and is surrounded by Walt Disney World® Resort.

Signia by Hilton Orlando Bonnet Creek / Waldorf Astoria Orlando

14100 Bonnet Creek Resort Lane

Orlando, FL 32821, USA

<https://hiltonbonnetcreek.com/>

<https://www.waldorfastoriaorlando.com/>

There are twelve restaurants located within the Hilton Signia Bonnet Creek and Waldorf Astoria grounds. By simply showing your attendee badge, FIG Working Week attendees can receive 10% off breakfast from Harvest Bistro, located inside the Signia or Oscars located inside the Waldorf Astoria. Attendees will also receive a 10% discount on coffee at MUSE, located inside the Signia. Please note these discounts are only valid over conference dates.

Located in Waldorf Astoria

- Bull & Bear – open for dinner, operating out of Oscar’s Brasserie
- Oscar’s Brasserie – open for breakfast
- Peacock Alley – open all day (breakfast, lunch, dinner)
- Aquamarine – open for lunch and dinner



- Clubhouse Grill – open for lunch
 - Sir Harry’s Lounge – open seasonally
- Located in Hilton Signia Bonnet Creek**
- La Luce – open for dinner (closed on Wednesday)
 - Zeta Asia – open for dinner
 - Harvest Bistro – open all day (breakfast, lunch, dinner)
 - Beech – open all day (breakfast, lunch, dinner)
 - Myth Bar – open for dinner
 - Muse Coffee Bar – open 24/7



Lobby Level

Bonnet Creek Ballroom (left side)	General Assembly 1 & 2, Opening Ceremony, Plenary Sessions, NGS Day
Bonnet Creek Ballroom (right side; center foyer overflow)	Lunches
Registration Desk	Sat 27 May 7am–5pm; Sun 28 to Wed 31 May 7am–6pm Thu 1 June 8am–12pm
Floridian Ballroom / Exhibition	Monday to Wednesday 11am–6pm

Lower Level (Sessions)

Citrus + Collier + Columbia	Palm	Technical Sessions
Flagler + Gilchrist	Taylor	
Hamilton + Indian River	Madison	
Nassau	Vesey	
Orange	Carnegie + Broadway	
Sarasota	Sponsor Room (ESRI)	
Union	Sponsor Room (Trimble)	
Jade + Lexington	FIG Cinema	

Special Rooms

Bradford	FIG President’s Room
Brevard	FIG Meeting Room
Broward	NSPS/ Local Organizing Committee
Alachua	FIG Office
Baker	Meeting Room
Bay	Media Room
De Soto	Meeting Room De Soto
Manatee	Speakers’ Preparation Room Open Sat 27–Sun 28 May 8am–5pm, Mon–Wed 29–31 May 8am–5:30pm, Thu 1 June 8–10am



Sunday 28 May 2023 at 4:30–6pm
Bonnet Creek Ballroom

Signia by Hilton Orlando Bonnet Creek / Waldorf Astoria Orlando

Master of Ceremony: **Timothy Burch**, NSPS Executive Director

The Opening Ceremony will provide a spectacular introduction to the FIG Working Week, its theme, and its unique location – a festive start of the week.

You will be warmly welcomed by FIG, the national host National Society of Professional Surveyors NSPS, the local host in Florida, the Florida Surveying and Mapping Society, the City of Orlando, University of Florida and by “Native Insights”.

Keynote Presentations



FIG President Diane Dumashie
SERVING SOCIETY, BENEFITTING PEOPLE
AND THE PLANET: TACKLING THE GLOBAL
CHALLENGES

Diane will present the FIG’s agenda for the period 2023 to 2026, which is underpinned by the need for a sustainable profession that delivers services in a sustainable manner and address the global sustainable development agenda and to act now to address the climate agenda.

As a global professional body, FIG will need to ensure that it remains relevant and maintains an influential voice at all levels to serve society, benefitting people and the planet at the same time as making sure no-one is left behind. As professionals in the land, built and natural environments, we will need to step up to ensure we remain relevant and demonstrate our resolve. This means we will all need to demonstrate:

- Clarity and collaboration – a listening and action approach
- Purpose and reliability – a visible approach
- Action and courage – working together to deliver



Beverly Hart Jones, PSM
SURVEYING “PROJECT X”

The Boundary Survey for a secret land acquisition that became Walt Disney World

Beverly tells the story of her father. Beverly’s father was asked to prepare a survey of 12,450 acres that must be completed within six weeks. This is the story behind that survey and the additional tracts and parcels that became the 27,443 acres (11,106 ha) that we know today as Walt Disney World. It will cover a little bit of local history and the technology of the day that was used to establish the boundary lines in the woods and swamps of Central Florida almost sixty years ago and led to what, at the time, was the largest private construction project in the United States.

Beverly received her Florida Surveying and Mapping license in 1993. She is a fourth-generation Land Surveyor in Central Florida and has worked on many municipal, commercial, and residential projects. She currently leads the Subdivision Platting team at Johnston’s Surveying, Inc. in Kissimmee, Florida.

Immediately following the Opening Ceremony the Welcome Reception will be held at Signature Island.

Plenary Session 1 – Protecting our World

Climate preparedness using our knowledge base and tools for sustainable land management

Monday 29 May 9–11am, Signia by Hilton Orlando Bonnet Creek / Waldorf Astoria Orlando

The first plenary session will focus on Protecting our World, in which especially the relationship between climate change and sustainable development will be on the agenda. The climate focus is now the foundation of sustainability and underpins everything we do in our professional work. Unpacked by key note speakers they will relate this to land and the role surveyor's can lead in land management, land administration and geospatial context that enables us to understand how we can take urgent action on climate change, so that it can support the needs of the present and future generations.



The Global Land Outlook and Protecting Our Planet

Clarissa Augustinus, UNCCD
Co-coordinator and co-editor of
United Nations Convention to Combat
Desertification and FIG Ambassador

Clarissa holds a Ph.d in Social Anthropology from Rhodes University (South Africa) and has for many years been working for UN-Habitat. Clarissa was Founder and Lead on the Global Land Tool Network, GLTN.

Global land trends and future scenarios and the role of surveyors in protecting our planet.



Securing Land Tenure to Protect People and the Planet

Victoria Stanley
Senior Land Administration Specialist
World Bank

She has worked in more than 25 countries across Africa, Eastern Europe, Central Asia, and Latin America and across a wide range of issues including land reform, land administration, land governance and land policy. Victoria's current focus of work is on women's land rights and gender inclusion across urban and land issues.

How securing land tenure and land rights is critical not only for responding to and addressing the climate crisis but also for ensuring social cohesion and reducing conflict – in other words how our work as land professionals can protect both the planet and people.



Mapping a Sustainable Future in this New Era of Understanding

Brent Jones, Esri

Brent Jones oversees Esri's worldwide strategic planning, thought leadership, and marketing activities for land records, cadastre, surveying, and land administration

We are not on the same planet that we were born into. We are permanently in times of great change. We can no longer use traditional isolated methodologies or organizational approaches. Collectively, can forge a path towards a more sustainable and equitable world.

There will be Interpret Spanish interpretation for the Plenary Sessions. For instructions, see page 30.

Plenary Session 2 – Conquering New Frontiers

Our perspectives across outer space, across technology and across generations

Tuesday 30 May 9–11am, Signia by Hilton Orlando Bonnet Creek / Waldorf Astoria Orlando

The second plenary session has Conquering New Frontiers as the main topic. Mankind has forever embarked on progressing through and finding new frontiers. Our professional members throughout the generations are no different- we were all the future at one time. Interpretations of the new frontiers from our key note speakers are considering smarter working in digital transformation and impact of geospatial infrastructure, space research and development. In addition, hearing perspectives from our young surveyors in relation to what this means them, and what it means to be at the forefront of the current generational frontier as well as upcoming generations yet to choose surveying as their profession.



NASA – Exploration for our Future

Russell Romanella
NASA United States National Aeronautics
and Space Administration

Mr. Romanella had over 30 years of NASA experience. He had many leadership positions at the Kennedy Space Center during his career including Director of the International Space Station and Spacecraft Processing, Associate Director for Engineering and Technical, and most recently, prior to his retirement, Director of Safety and Mission Assurance.

Russell Romanella explores the current Human and Robotic Exploration Missions within NASA. He explores NASA's exploration of the solar system and beyond including Mars, Saturn, the asteroid belt, and NASA's plan to return to the Moon and on to Mars.



Is the New Frontier AI, Digital Twins, and the Metaverse?

Bryn Fosburgh; Trimble
Senior Vice President, Advisor to the CEO

Since 1994, Bryn has been involved and led Trimble's Geospatial, Construction, Transportation and Logistics (T&L), and Agriculture Sectors.

Is the new frontier AI, Digital Twins, and the Metaverse and do these capabilities form the Holodeck of the future for Geospatial professionals or are they simply a set of tools no different than GNSS, optical instrumentation, or EDMs from our past. It is our profession that needs to decide which reality – real or imagined – these tools provide.



Smarter Working in Digital Transformation – A Perspective of the Younger Generation

Mr Mickey Ng Nok Hang, Young Surveyors

Mickey is a Geospatial Surveyor currently working in Hong Kong with near 10 years of working experience on geospatial data management.

Through a combination of technological innovation and new ways of thinking, Mickey has adopted a different and more profound approach in the widespread of aerial, land and engineering survey projects.

Where will the industry be in 5-10 years and how can Young Surveyors prepare to respond to the changes and demand in the future? These are some of the questions Mickey will elaborate over.



Inspirational talk by GET KIDS INTO SURVEY

Plenary Session 3 – Tackling the Global Challenges Surveyors and their skill set in action

Wednesday 31 May 9–11am, Signia by Hilton Orlando Bonnet Creek / Waldorf Astoria Orlando

The third and final plenary session will elaborate on the overall action orientated theme for this current term of leadership Tackling the Global Challenges. Surveyors have much to contribute in society and to highlight, advocate and above all act to ensure change that builds on a sustainability agenda. The session includes an introduction to the new Reference Frame system/Datum which is leading up to a special National Geodetic Survey Track (NGS).



The Modernized U.S. National Spatial Reference System – Aligning National Geospatial Data to the Globe

Juliana Blackwell, Director,
National Geodetic Survey, NOAA

Juliana oversees the management and delivery of the National Spatial Reference System, the nation's consistent coordinate system for latitude, longitude, height, gravity measurements and shoreline.

The Theme for this Working Week is “Protecting Our World, Conquering New Frontiers.” To achieve this, geospatial data from many different sources must be interoperable and defined within a modern, accurate, inclusive reference frame.



Land Administration and Land Management Role In Tackling Disaster Management / Sea Level Rise with a Special Focus on Sustainability of Island States (SIDS)

Simone Lloyd GISP, Principal Director,
National Spatial Data Management Branch
Jamaica

Simone is an internationally certified geospatial professional (GISP), project manager, educator and trainer with a wealth of over 15 years' experience contributing to the development of Jamaica's geospatial landscape.



Thought Leadership: Challenges in Cities, Transportation and Reality Modeling Contribution to Land Management

Dustin Parkman, Vice President,
Bentley Systems

Dustin has held several senior product and business development positions throughout his career and has specialized in developing products and solutions that service the infrastructure industry.

Bentley's vision is influenced by the unprecedented transformation that will have to happen in the next few years to achieve sustainable development goals and future-proof the world's infrastructure.



Thought Leadership: Is our Wider Community Taking ESG on Board

Andrew Hurley, Global Commercial Manager
(U.S./Canada/ANZ), Leica Geosystems

With more than 30 years of experience in Geomatics, Andrew is responsible for driving and developing the company's business strategy and new business models across all product lines/ solutions and segments including total stations, GNSS and reality capture.

How do Environmental, Social, and Governance (ESG) and business trends improve value to society.

Category A – Platinum Level

	Bentley Systems www.bentley.com
	Environmental Systems Research Institute, Inc. (ESRI), www.esri.com
	Leica Geosystems AG www.leica.com
	Trimble Navigation Ltd www.trimble.com

Category C – Silver Level

	Carlson Software www.carlsonsw.com
	Topcon Europe Positioning b.v. www.topconpositioning.com

Category D – Bronze Level

	GIM International – Geomares Publishing www.gim-international.com
	GIS/Transport Ltd. www.gistransport.com
	RIPRO Corporation, Japan www.ripro.co.jp
	Supermap Software Co, Ltd. www.supermap.com
	TopoDOT www.topodot.com


Category E – Basic Level

	Beijing iSpatial Co., Ltd, PRC ispatical.com.cn
	Geoide Geosystems S.a. www.geoide.pt
	Geoweb S.p.A, www.geoweb.it/
	NEH Vietnam www.neh.vn

Category F – Regional Level

	Atlas Surveying www.atlas-surveying.com
	Construction Technological Services Private Limited – www.surveysrilanka.com
	GEO:connexion Ltd www.geoconnexion.com
	Georeference Engineering Consultants, Saudi Arabia, yas@geo.sa
	Geo-Tech Surveys Ltd, Ghana, Info@geotechsys.com
	ORBITS Engineering Firm www.orbitseng.com/

Category G – Other Sponsorship

	The Danish Society of Engineers, IDA https://english.ida.dk/
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A number of Technical Tours have been organized to complement the conference experience.

National Oceanic and Atmospheric Administration (NOAA) [10517]

Aircraft Operation Center, Lakeland, Florida

Tuesday 30 May 1-5pm

Wednesday 31 May 1-5pm

Meeting point: Hilton exit door near Hilton gift shop



The NOAA Aircraft Operations Center serves as the main base for NOAA's fleet of nine specialized environmental data-gathering aircraft, including the agency's three "hurricane hunter" planes. NOAA Corp officers use many tools familiar to surveyors including photogrammetry, LIDAR, and UAV technology.

Southeastern Surveying and Mapping Corporation (SSMC) [10518]

Orlando, Florida

Tuesday 30 May 1-5pm

Wednesday 31 May 1-5pm

Meeting point: Hilton exit door near Hilton gift shop



Founded in Orlando in 1972, Southeastern Surveying and Mapping Corporation (SSMC) is an independent, employee-owned surveying and mapping, subsurface utility engineering (SUE), and geographic information systems (GIS) firm serving the southeastern United States. It is the largest surveying and mapping company in Florida.

Orlando Wetlands Park [10519]

Christmas, Florida

Tuesday 30 May 1-5pm

Wednesday 31 May 1-5pm

Meeting point: Hilton exit door near Hilton gift shop



The Orlando Wetlands Park is a man-made wetland designed to provide advanced treatment for reclaimed water from the City of Orlando and other local cities. The Park is 1650 acres (668 hectares) in size and located in Christmas, Florida.

National Geodetic Survey's special NGS DAY

NOAA's National Geodetic Survey is hosting a full day's worth of presentations on Wednesday 31 May 2023. These sessions will provide updated information about the planned modernization of the National Spatial Reference System (NSRS), which provides official geodetic coordinates to define non-defense related U.S. government geospatial data assets. State, regional and tribal governments as well as academic and private industry that work with the U.S.

University of Florida Geomatics Department's 50th Anniversary

The Geomatics program at the University of Florida will mark its 50th year of existence in 2023. The program was started in fall of 1973 as the result of a strong promotion by the Florida Surveying and Mapping Society (then known as the Florida Society of Professional Land Surveyors) to set up a bachelor's degree program in Florida. While the degree title has changed over the years, UF Geomatics has flourished from its rather humble beginnings in 1973 to become a leading program for Geomatics education in the U.S.

Memorial Day Observation

Monday, May 29th 2:30pm – Signature Island

Join us for the time-honored tradition of Memorial Day and the celebration for those who gave their lives while in military service. The National Society of Professional Surveyors (NSPS) welcomes all Working Week participants to witness a short program featuring a military honor guard and proclamations by NSPS leadership.

Small Island Developing States (SIDS) Workshop

On Monday and Tuesday four sessions elaborate on the many distinct challenges that SIDS face in their pursuit of social and economic development and these challenges are compounded by the adverse impacts of climate change.



FIG Working Week is much more than technical sessions. In the program you will also find pre-events, special sessions with partners, administrative and organizational meetings, partner meetings, and forums.

Pre-Conference Events	Date	Time	Location
FIG Young Surveyors Conference	Saturday 27 May – Sunday 28 May	9am–5pm 8:30am–12pm	Citrus/Collier/Columbia
Reference Frames in Practice	Saturday 27 May – Sunday 28 May	1pm–6pm 8am–4pm	Orange
Multi-Sensor-Systems Workshop	Saturday 27 May – Sunday 28 May	1pm–6pm 9am–1pm	Palm
 APPAT – Pan American Association of Surveying and Topography Professionals Extraordinary Assembly	Saturday 27 May	9am–1pm	Taylor

FIG Sessions	Date	Time	Location
General Assembly – Day 1	Sunday 28 May	9am–3:30pm	Bonnet Creek Ballroom
General Assembly – Day 2	Thursday 1 June	10am–1pm	Bonnet Creek Ballroom
Newcomers Session – Introduction to the FIG Working Week	Monday 29 May	8–8:45am	Citrus/Collier/Columbia
Annual Meetings of FIG Commissions. Open for all interested. After the Annual Meetings each commission organizes a dinner (self paid).	Tuesday 30 May	4:30–6:00pm	Various

Task Force Sessions	Date	Time	Location
Reimagining the Climate Action Agenda for the Global Surveyor Community through FIG – FIG Task Force	Monday 29 May	11:30am–1pm	Hamilton/Indian River
FIG Task Force on Diversity and Inclusion in the Survey Profession	Tuesday 30 May	11:30am–1pm	Madison

FIG Network Sessions and Fora	Date	Time	Location
Member Association Forum (by invitation)	Monday 29 May	11:30am–1pm	Citrus/Collier/Columbia
Academic Member Forum	Monday 29 May	4:30–6pm	Palm
Director Generals Forum (Affiliate Members) including FIG Task Force on Geospatial Trends	Tuesday 30 May	11:30am–1pm	Citrus/Collier/Columbia
FIG Standards Network Meeting	Tuesday 30 May	2:30–4pm	Madison
FIG Africa Capacity Development Network Meeting	Wednesday 31 May	2:30–4pm	Flagler/Gilchrist
FIG Americas Capacity Development Network Meeting	Wednesday 31 May	2:30–4pm	Palm
FIG Asia/Pacific Capacity Development Network Meeting	Wednesday 31 May	7:45–8:45am	Nassau
Forum of Regional Bodies FoRB	Wednesday 31 May	11:30am–1pm	Baker
FIG Corporate Members Meeting	Wednesday 31 May	2:30–4pm	Brevard – FIG Meeting Room

Social Program

FIG Working Week wouldn't be anything without the interaction and networking of our participants. An excellent programme of social functions was put together for the Working Week that promises delegates and their partners a tantalizing taste of some of the great locations, cuisine and performance art of Orlando, Florida, USA. Join these events to get to know your fellow peers.

Event	Date	Time	Location	Details
Welcome Reception	Sunday 28 May	6–8pm	Signature Island Signia by Hilton Orlando Bonnet Creek/ Waldorf Astoria	All participants are invited
Informal bar meetings – of own initiative	Monday 29 May	–	–	–
Working Week Dinner: American Evening	Wednesday 31 May	7–10pm	Mango's Tropical Cafe Orlando 8126 International Drive, Orlando, FL 32819 Shuttle buses to and from the dinner venue – starting at 5:45pm and until 6:45pm and return starting at 9:30pm and the last bus at 10:30pm NOTE: It is possible to stay at the dinner venue. At 10:00pm it will open for other guests and at- tendees can stay and have fun.	Tickets: 145 USD *)
FIG Farewell Reception	Thursday 1 June	1–2:30pm	Golf Pavilion Signia by Hilton Orlando Bonnet Creek/ Waldorf Astoria Orlando	Hosted by FIG Working Week 2024, Accra, Ghana
NSPS PAC Cornhole Event	Thursday 1 June	4–5pm	Hilton Bonnet Creek / Waldorf Astoria Grounds	25 USD per player or 50 USD per 2 person team (Single players will be paired with other single players) *)
NSPS PAC and FIG Foundation Golf Outing	Friday 2 June	8am–	Waldorf Golf Course, Waldorf Astoria Orlando	75 USD 1 round of 9 or 100 USD 2 rounds of 9 *)

*) Based on space availability tickets may be available for purchase from the Registration Desk

Accompanying Persons Program

Accompanying persons are very welcome at the FIG Working Week. Included in the registration for accompanying persons is the Opening Ceremony and Welcome Reception, as well as lunches on 29–31 May.

Social Tours

Whether you are a theme park enthusiast, bird watcher, foodie, water sports fanatic, sun worshipper, arts patron, serious shopper or anything in between, you're always welcome in Orlando! The possibilities are endless. Visit Orlando offers free vacation planning services to help you plan the perfect trip to Orlando. Please visit: <https://www.visitorlando.com/plan>

Additionally the local organizers have secured special offerings from Walt Disney World for FIG Working Week attendees. For more information, please visit: <https://www.mydisneygroup.com/figww2023>

Other tours and sightseeing can be booked through viator.com – they offer various tour packages. We encourage all attendees to make their own arrangements, www.viator.com

Special offerings from VisitOrlando to FIG Working Week attendees: www.orlandomeeting.com/delegate/fig-working-week-2023/

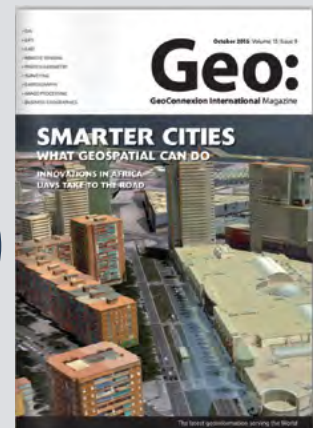


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Thank you to our sponsors and supporters, we really do appreciate you being part of the FIG Working Week!

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ESRI – The global leader in GIS software and location intelligence, helps customers unlock the full potential of data to improve operational and business results. Esri software is deployed in more than 350,000 organizations globally and in over 200,000 institutions in the Americas, Asia and the Pacific, Europe, Africa, and the Middle East, including Fortune 500 companies, government agencies, nonprofits, and universities. Esri has regional offices, international distributors, and partners providing local support in over 100 countries on six continents. Esri engineers the most innovative solutions for digital transformation, the Internet of Things (IoT), and advanced analytics. Visit us at esri.com.

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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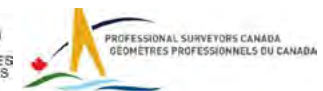


United Nations
Convention to Combat
Desertification

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SILVER SPONSORS

COMNAV TECHNOLOGY, LTD. – Established in 2012, ComNav Technology is dedicated to being an innovator and leader in high-precision GNSS technologies and applications. Until the end of 2022, ComNav Technology has sold its products and solutions to more than 120 countries with a total quantity of more than 500,000 units GNSS modules in over 10 different industries, including land survey, machine control, UAV, UGV, deformation monitoring, personnel positioning, precision agriculture, marine.

LEICA GEOSYSTEMS – Revolutionizing the world of measurement and survey for 200 years, Leica Geosystems, part of Hexagon, creates complete solutions for professionals across the planet. Known for premium products and innovative solution development, professionals in a diverse mix of industries, such as aerospace & defense, safety & security, construction, and manufacturing, trust us for all their geospatial needs. With precise and accurate instruments, sophisticated software, and trusted services, Leica Geosystems delivers value everyday to those shaping the future of our World.

BRONZE SPONSORS

- **BENTLEY** – Bentley Systems (Nasdaq: BSY) is the infrastructure engineering software company. We provide innovative software to advance the world's infrastructure – sustaining both the global economy and environment. Bentley Systems' 5,000 colleagues generate annual revenues of more than \$1 billion in 194 countries.
- **BERNTSEN** – We are Berntsen International, a 51-year-old company respected as a leader in the manufacture of survey and utility marking products. We have a deep bank of repeat customers, a range of high-quality marking products, and an unparalleled brand in the industry. We are successful, but not resting on our legacy.
- **CHC Navigation** – Founded in 2003, CHC Navigation creates innovative GNSS navigation and positioning solutions to make customers' work more efficient. CHCNAV products and solutions cover multiple industries such as geospatial, construction, agriculture and marine. With a presence across the globe, CHC Navigation is today recognized as one of the fastest growing companies in geomatics technologies.
- **MCKIM&CREED** – We are a leading geospatial firm specializing in cutting-edge mapping, remote sensing, and data analysis solutions. With a strong commitment to innovation

and excellence, we have been at the forefront of the geospatial industry, providing our clients with accurate, reliable, and actionable insights.

- **RIPRO** – RIPRO Corporation, Japan, has manufactured recycled plastic survey markers for 51 years. RIPRO has been recognized as the Guinness World Record holder for the most manufactured plastic survey markers in the world for 2021.
- **TOPODOT** – TopoDOT is a leading software development company located in Orlando, FL specializing in LiDAR and point cloud processing solutions. TopoDOT develops, sells and supports TopoDOT, a high performance MicroStation application for importing and extracting topography and models from point clouds, calibrated images and related data.
- **UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION (UNCCD)** – G20 leaders launched the G20 Global Land Initiative in 2020. Their ambition is to reduce degraded land by 50 per cent by 2040 by preventing, halting, and reversing land degradation on all terrestrial ecosystems: from forests and grasslands, to drylands, rangelands, croplands, peatlands, mangroves, soil, tundra, karst, and wetlands.

ESRI Hands-On Learning Lab



Room: Sarasota – ESRI Room

Mon, May 29 and Tue, May 30 9am-6pm, Wed, May 31 9am-12pm

Take a self-paced lesson at the Hands-On Learning Lab. The Hands-On Learning Lab is a dedicated space to take free lessons on a variety of GIS and ArcGIS topics. Each self-paced lesson takes about one hour to complete and includes conceptual information and step-by-step software exercises. We provide laptops and the ArcGIS software needed to complete each lesson. Esri instructors are available to assist with lesson selection and answer any questions you may have.

Trimble Room Trimble

If you would like to set up a special meeting with a Trimble representative, please visit their booth at the exhibition, or Trimble Room “Union”.

GNSS/GPS/LIDAR/UAV Demonstrations on Signature Island

Signature Island, located directly outside behind the hotel, is a 973m² (10,473 ft²) island with picturesque views of the resort’s waterways and golf course. With clear views of the sky, it provides an ideal venue for live demonstrations of the latest GPS/GNSS/UAV/LIDAR technology.

	Monday, May 29	Tuesday, May 30	Wednesday, May 31
11:30am–12:15pm	Trimble	Frontier Precision Unmanned	Trimble
12:30–1:15pm		GEODNET	RIEGL USA
1:30–2:15pm	Tersus GNSS	Trimble	
2:30–3:15pm	Leica Geosystems	CHC Navigation	ComNav Technology

Come to the FIG Booth for a Talk

	Monday, May 29	Tuesday, May 30	Wednesday, May 31
Morning break	FIG Office	FIG Commission 3 and 8	FIG Council
Lunch break	FIG Task Forces FIG Standards Network FIG Young Surveyors Network	FIG Regional Capacity Development Network – Africa – Americas – Asia/Pacific	FIG Commission 2 FIG Commission 9 FIG Commission 10
Afternoon break	FIG Commission 4 and 7	FIG Commission 5 and 6	–



An exhibition is running concurrently with the conference showcasing the latest and best in surveying and spatial products and services. The exhibition is located in the Floridian Ballroom and is open 11am – 6pm Monday – Wednesday. For up-to-date information about the exhibition, please visit fig.net/fig2023/exhibitors.htm or the Conference Web App.

216	217	316	317	416	417	516	517	614	617
214	215	314	315	414	415	514	515		615
210	307			411		510	609		
208	esri THE SCIENCE OF WHERE			409		508	Trimble		
206				407		506			
200	201	302	303	400	403	500	503	600	603
		300	301		401		501		601

UNIVERSITY ROW

Surveying Walt Disney World	200	 CHC Navigation	314	 Blue Marble Geographics	501
Media Corner	201	 Kompass BMS	315	 Javad GNSS	503
 Beijing PIESAT Information Technology Co., Ltd	206	 Leica Geosystems AG	400	 United Nations Convention to Combat Desertification (UNCCD)	506
 FIG	208	 Half Associates, Inc.	401	 Geo-Plus	510
 NSPS	210	 TopoDOT	403	 Jakarta	514
 FIG Working Week 2024 Accra	214	 Berntsen International, Inc.	407	 Seafloor Systems	515
 FIG Norway – Geoforum	215	 Ripro	409	 Frontier Precision Unmanned	517
 FIG Working Week 2025 Brisbane & FIG Congress 2026 Cape Town	216	 NCEES	411	 National Geodetic Survey – NOAA	600
 Bentley Systems Inc.	300	 GPI Geospatial, Inc.	414	 International Association of Assessing Officers	601
 McKim&Creed	301	 Tersus GNSS	415	 Trimble	609
 GeoMax Positioning	302	 Riegl USA	416	 Florida Surveying and Mapping Society	614
 Woolpert	303	 Geodnet	417	 ORBITS Engineering Firm	615
 Esri	307	 ComNav Technology Ltd.	500	 Connect+Reflect Lounge	617

EXHIBITORS

WELCOME TO UNIVERSITY ROW!

Want more information about educational curriculums specifically designed for producing the next generation of surveyors and geospatialists? Visit “UNIVERSITY ROW” to learn more about these programs. Located opposite the 600 series booths, this section of the exhibit hall is specifically designed to allow attendees an informal opportunity to see the schools participating in this year’s FIG Working Week.

While you are there, meet their educators, students, and alumni to learn more about their programs, partnerships with local and national companies, and why education is an important step to becoming a successful surveyor.



SCAN ME

CONNECT+REFLECT LOUNGE

A first of its kind FIG Working Week initiative, the Connect+Reflect zone is a safe space for conference attendees to seek individual support, share diverse stories and build the basis for a sustainable workforce.

Informal and interactive sessions will be hosted throughout the working week covering topics spanning mental health, podcasting, coaching, yoga and meditation, building your business, what is inclusion and building your brand. Scan the QR code or visit the zone to find out more.

- **Beijing PIESAT Information Technology Co., Ltd.** – PIESAT is focusing on its mission for advancing the research and application of satellite technologies (Remote sensing satellite and Navigation satellite).
- **Blue Marble Geographics** – Blue Marble Geographics® is a GIS and geodetic software development company offering cutting-edge yet affordable solutions, including Geographic Calculator® and Global Mapper®.
- **FIG Norway-GeoForum/TEKNA** – Norwegian members of FIG and candidate for FIG Working Week 2027. We invite you to our stand 215 to know more about destination Stavanger and Norway.
- **Florida Surveying and Mapping Society** – FSMS represents the surveying and mapping profession to aid and contribute to the standards of the profession for the benefit of the public and members. FSMS welcomes individuals from across all geospatial-related fields.
- **Frontier Precision Unmanned** has the latest innovations in drone aircraft and sensors to fit your job or application. We offer industry-leading to make sure you get the right product for the right UAS application.
- **GEODNET** – GEODNET is the world’s largest decentralized GNSS Reference Station Network. GEODNET’s reliable correction streams support the Agriculture, Construction and Survey communities.
- **GeoMax Positioning** – GeoMax manufactures and distributes a comprehensive portfolio of surveying solutions, including quality instruments and software. GeoMax introduced the world’s first Android-enabled software: X-PAD.

Geo-Plus – Geo-Plus is a software company that provides innovative and user-friendly solutions for land surveyors, civil engineers, and architects to optimize their projects and workflows with advanced geospatial tools.

GPI Geospatial, Inc. – GPI Geospatial, Inc. has been a premier provider of geospatial solutions for 50 years. We provide precision mapping, imagery, lidar, and surveying services for transportation, construction, energy, and government clientele.

Halff Associates, Inc. – Halff is an employee-owned, full-service engineering & architecture firm founded in 1950, headquartered in Richardson, Texas. Our passion is providing smarter solutions with a distinctly human touch for everyone we serve.

IAAO – IAAO is a global community of diverse mass appraisal professionals advancing fair and equitable property appraisal, assessment administration, and property tax policy through professional development, research, standards, and technical assistance.

Jakarta – Jakarta enables cities and utilities to optimize their asset and infrastructure management by offering an engineering-grade Digital Twin of their territory and an automated AI-driven asset inventory solution.

JAVAD GNSS – JAVAD GNSS, headquartered in San Jose, USA designs and manufactures products using multi-constellation, multi-frequency GNSS technology solutions for positioning, navigation, timing, survey, and aerospace industries.

Kompass BMS (Maps United Ltd) – Kompass BMS is a comprehensive software platform for geospatial surveying and engineering companies, designed to streamline operations from project proposals to invoicing.



Antero Aaltonen

National Geodetic Survey – NOAA – NOAA's National Geodetic Survey (NGS) provides the framework for all positioning activities in the Nation. The foundational elements of latitude, longitude, elevation, and shoreline information impact a wide range of important activities.

NCEES – NCEES is a nonprofit organization dedicated to advancing professional licensure for engineers and surveyors.

ORBITS Engineering Firm – An Engineering Firm based in Saudi Arabia focused in Geospatial business.

RIEGL USA – With more than 40 years of experience in the research, development and production of laser rangefinders, distance meters, and scanners, RIEGL delivers proven innovations in 3D.

Seafloor Systems – Seafloor Systems, Inc. offers complete survey solutions from hydrographers, for hydrographers. Our team of engineers and former surveyors realize the need for innovative tech out in the field.

Tersus GNSS – Tersus is a leading GNSS RTK solution provider. Our engineers have been pioneers in the design of GNSS products to support high-precision positioning applications.

Woolpert – Woolpert is the premier geospatial firm in the U.S. with an unmatched reputation for performance, quality, and service. We offer an integrated suite of geospatial services.





Monday, 29 May

	Citrus/Collier/Columbia	Flagler/Gilchrist	Hamilton/Indian River	Nassau	Orange
Morning	Newcomers Session 8:00–8:45			SIDS MEETING 8:00–8:50	
09:00–11:00	📢 PLENARY SESSION 1: PROTECTING OUR WORLD – Bonnet Creek Ballroom [10511]				
11:00–11:30	Morning Break – Exhibit Hall				
11:30–13:00	TS01A: FIG Member Association Forum	TS01B: FIG Corporate Member Session – ESRI	TS01C: Reimagining the Climate Action Agenda for the Global Surveyor Community through FIG – C: TF on Climate [10548]	TS01D: SIDS – Introductions of Global and Regional Supporting Partners – Session 1 [10533]	TS01E: History Session [10540]
13:00–14:30	Lunch Break – Center Foyer/Lunch Area				
14:30–16:00	TS02A: FIG Mentoring Program – C: YSN	TS02B: Enhancing Women’s Access (to Land and Surveying) – 1 – C: 1, 7 & TF on SDG [10528]	TS02C: FIG/GLTN Working Together on Land and Climate [10549] – C: GLTN	TS02D: AVM, Digital Twins and BIM for Increasing Transparency on Real Estate Markets – C: 9 & 10 [10608]	TS02E: Blue Surveying – CLGE Seville Declaration – the Planet is Thirsty for Concrete Actions – C: 3, 4 & CLGE [10541]
16:00–16:30	Afternoon Break – Exhibit Hall				
16:30–18:00	TS03A: Future of the Young Surveyors Network	TS03B: Enhancing Women’s Access (to Land and Surveying) – 2 – C: 1, 7 & TF on SDG [10529]	TS03C: Opportunities and Challenges for Climate Change Adaptive Strategies – C: 8 & YSN [10550]	TS03D: SIDS – Top Concerns of the Caribbean SIDS – Session 3 [10535]	TS03E: Valuation of Unregistered Land Manual – C: 9 & GLTN [10542]

Tuesday, 30 May

Morning				SIDS MEETING 8:00–8:50	
09:00–11:00	📢 PLENARY SESSION 2: CONQUERING NEW FRONTIERS – Bonnet Creek Ballroom [10512]				
11:00–11:30	Morning Break – Exhibit Hall				
11:30–13:00	TS04A: FIG Director Generals Forum	TS04B: FIG Corporate Member Session - Trimble	TS04C: Legal Regulations for Valuation and Transparency on the Real Estate Market in Countries and States – C: 7 & 9 [10551]	TS04D: SIDS – Summary Session and Development of Draft Declaration – Session 4	TS04E: Hydrographic Applications in Blooming the Blue Economy & Marine Administration – C: 4 [10544]
13:00–14:30	Lunch Break – Center Foyer/Lunch Area				
14:30–16:00	TS05A: Evaluation of Land Administration Systems – C: 7 [10524]	TS05B: Rural-Urban Linkages – C: 8 [10530]	TS05C: Examples of Transparent Real Estate Markets through Good Data Availability – C: 9 [10552]	TS05D: Digital Technologies in Construction – C: 10 [10536]	TS05E: Conquering New Frontiers of Hydrography – C: 4 [10543]
16:00–16:30	Afternoon Break – Exhibit Hall				
16:30–18:00	FIG Commission 7 Annual Meeting	FIG Comm. 8 Annual Meeting	FIG Comm. 9 Annual Meeting	FIG Comm. 10 Annual Meeting	FIG Comm. 4 Annual Meeting

Wednesday, 31 May

Morning	FIG FOUNDATION MEETING (Bradford) 7:00–8:50			FIG Asia/Pacific Capacity Development Network – Meeting 7:45–8:45	
09:00–11:00	📢 PLENARY SESSION 3: TACKLING THE GLOBAL CHALLENGES – Bonnet Creek Ballroom [10513]				
11:00–11:30	Morning Break – Exhibit Hall				
11:30–13:00	TS07A: Designing FFP Land Tenure Recordation Tools: VCSP In-Country Deployment in Sierra Leone – C: YSN & VCSP [10593]	TS07B: Spatial Planning and Socio-Economic Influences – C: 8 & 9 [10531]	TS07C: Finding the Price of Land – a Case of Registration and Good Data – C: 3 & 9 [10609]	TS07D: Sustainable Construction in the Built Environment – C: 10 [10537]	TS07E: Modern Parcel Management for Surveyors (ESRI) [10539]
11:30–13:00	NGS Day: Practical Implications of National Spatial Reference System (NSRS) Modernization – Changing Survey Methodology – Bonnet Creek Ballroom [10514]				
13:00–14:30	Lunch Break – Center Foyer/Lunch Area				
14:30–16:00	TS08A: Land Tenure Reform System for Mars – C: YSN & VCSP [10594]	TS08B: FIG Africa Capacity Development Network – Meeting	TS08C: Rural Development and Land Markets – C: 8 & 9 [10554]	TS08D: Cost Information Management – C: 10 & Standard Network [10538]	TS08E: Blended Learning: Good Practices and Lessons Learned – C: 2 [10561]
14:30–16:00	NGS Day: Update on the NOAA CORS Network and Opus – Bonnet Creek Ballroom [10515]				
16:00–16:30	Afternoon Break – Exhibit Hall				
16:30–18:00	FIG Presidents Meeting	TS09B: Spatial Planning Instruments for Land Governance: Conception and Implementation Strategies – C: 8 [10532]	TS09C: Real Estate Markets: Times to Change – What Can Make Markets Transparent? – C: 9 [10555]	TS09D: Cybersecurity, Data Quality and Openness in Land Administration – C: 7 [10547]	TS09E: Alternative Teaching Methodologies, Activate Students in the Classroom – C: 2 [10562]
16:30–18:00	NGS Day: Case Studies of Surveys NGS Does Now and How They Will Change – Bonnet Creek Ballroom [10516]				

Monday, 29 May					
Palm	Taylor	Madison	Vesey	Broadway/Carnegie	
					Morning
					09:00–11:00
					11:00–11:30
TS01F: Surveying by Drones – Session 1: Theory, Practice, and Standards – C: 5, 6 & Standards Network [10556]	TS01G: Dynamic Datums and Working with Resultant Data (for both Surveyors and Geospatial Experts) – C: 5 [10563]	TS01H: French Session 1 [10545]	TS01I: Framework for Effective Land Administration (FELA) – C: 7 & UN-GGIM EG-LAM [10520]	TS01J: Open Data Initiatives and Perspectives in SIM – C: 3 [10589]	11:30–13:00
					13:00–14:30
TS02F: Surveying by Drones – Session 2: Panel Discussion – C: 5, 6 & Standards Network [10557]	TS02G: Combining Positioning and Sensing Systems – C: 5 & 6 [10564]		TS02I: 3d Land Administration – C: 3, 7, ISO & OGC [10521]	TS02J: SIDS – Top Concerns of the Caribbean SIDS – Session 2 [10534]	14:30–16:00
					16:00–16:30
TS03F: FIG Academic Forum	TS03G: Novel Low-Cost Positioning Sensor Systems and their Applications – C: 5 [10565]	TS03H: FIG Corporate Member Session – Leica Geosystems	TS03I: Future of LADM – C: 3 & 7 [10522]	TS03J: Advances in GeoAI – C: 3 [10590]	16:30–18:00
Tuesday, 30 May					
					Morning
					09:00–11:00
					11:00–11:30
TS04F: Legal, Policy and Reform Issues in Land Administration – C: 7 [10558]	TS04G: GNSS Reference Stations and Networks – C: 5 [10566]	TS04H: Diversity and Inclusion in the Surveying Profession – C: TF on Diversity/Inclusion	TS04I: Fit-For-Purpose Land Administration: Making it Happen – C: 7 [10523]	TS04J: Technological Advances in Spatial Data Handling – C: 3 [10591]	11:30–13:00
					13:00–14:30
TS05F: Innovations in Surveying Education – C: 2 [10559]	TS05G: Building Capacity in Geodetic Competency – C: 5 [10567]	TS05H: Professional Standards – C: 1 [10582]	TS05I: Applications of Lidar in Engineering Geodesy – C: 6 [10587]	TS05J: GIS for Sustainable (Geo-)spatial Planning – C: 3 & 8 [10592]	14:30–16:00
					16:00–16:30
FIG Comm. 2 Annual Meeting	FIG Comm. 5 Annual Meeting	FIG Comm. 1 Annual Meeting	FIG Comm. 6 Annual Meeting	FIG Comm. 3 Annual Meeting	16:30–18:00
Wednesday, 31 May					
					Morning
					09:00–11:00
					11:00–11:30
TS07F: Spanish Session – 1 [10579]	TS07G: Land Administration Education – C: 2, 7 & GLTN [10568]	TS07H: The Land Administration and Management in Ghana: Emerging Trends [10610]	TS07I: FIG Corporate Member Session – Bentley Systems	TS07J: AI and Remote Sensing for Land Administration – C: 7 [10525]	11:30–13:00
Regional Bodies Meeting (Baker)					11:30–13:00
					13:00–14:30
TS08F: FIG Americas Capacity Development Network – Meeting	TS08G: The Future of the Cadastral Surveyor – C: 7 [10569]	TS08H: FIG Standards Network Meeting – C: Standards Network	TS08I: Spatial Revitalisation Through Urban-Rural Land Linkages: Principles and Practices – C: 8, NUST, HSF, GLTN [10611]	TS08J: Land Administration Digitalisation – C: 7 [10526]	14:30–16:00
FIG Corporate Members Meeting (Brevard – FIG Meeting Room)					14:30–16:00
					16:00–16:30
TS09F: Spanish Session – 2 [10580]	TS09G: Comparing Cadastres – C: 7 [10570]	TS09H: Future of Surveying – C: 1 [10586]	TS09I: Assessment and Control of Critical Civil Infrastructure – C: 6 [10588]	TS09J: Digital Transformation in Land Management – C: 7 & 8 [10527]	16:30–18:00
					16:30–18:00

FIG Working Week 2023 Opportunities for Continuing Education Units of Professional Development Hours (PDHs*)

Workshops, seminars, technical tours, and paper presentations during FIG Working Week 2023 will qualify for Continuing Education Units of Professional Development Hours (CEU/PDH) as authorized by the Florida Board of Professional Surveyors and Mappers (the Florida's Surveying and Mapping licensing entity) through Florida Surveying and Mapping Society's (FSMS) Florida Continuing Education provider status – **Provider No. CE11.**

*1 PDHs are educational units used to fulfil continuing education requirements for licensure or certification

Interprenet will provide simultaneous instantaneous interpretation remotely over the Internet using mobile phone application. They will provide Spanish interpretation for the Plenary Sessions.

The QR code will take you directly to the App. To access use the unique token FIGww2023. You can download the app through App Store (iOS or Android) and then it will automatically open the respective token

Interprenet es un proveedor global de servicios lingüísticos que ofrece interpretación simultánea y al instante a través del internet utilizando su aplicación exclusiva para teléfonos móviles. Proporcionarán interpretación en español para las Sesiones Plenarias.

El código QR que se muestra llevará a la audiencia directamente a la aplicación y accederá al token único que se seleccionó para este evento FIGww2023, o si no tienen la aplicación instalada, primero serán dirigidos a la App Store (iOS o Android) donde pueden descargarla primero y luego abrirá automáticamente el token respectivo



User Guide for Interprefy Smartphone App

1. Connect to the WiFi network.
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5. Elija su idioma y disfrute de la interpretación e directo.

FIG's Technical Work is led by Commissions, Networks and the Conference LOC:

Commission 1	Professional Standards and Practice – Mr. Timothy Burch , USA
Commission 2	Professional Education – Dr. Dimo Todorovski , Netherlands
Commission 3	Spatial Information Management – Dr. Sagi Dalyot , Israel
Commission 4	Hydrography – Dr. M.D .Eranda K. Gunathilaka , Sri Lanka
Commission 5	Positioning and Measurement – Dr. Ryan Keenan , Australia
Commission 6	Engineering Surveys – Prof. Dr. Werner Lienhart , Austria
Commission 7	Cadastre and Land Management – Dr. Rohan Bennett , Australia
Commission 8	Spatial Planning and Development – Dr. Kwabena Obeng Asiana , Ghana
Commission 9	Valuation and the Management of Real Estate – Mr. Peter Ache , Germany
Commission 10	Construction Economics and Management – Ms. Mercy Iortyer , Nigeria
Young Surveyors Network	Ferah Pirlanta Köksal , Turkey

The Scientific Committee of the Peer Review Papers

Chief Editor: Prof. **Volker Schwieger**, Germany

Members:

Timothy Burch, United States

Dimo Todorovski, Netherlands

Hartmut Müller, Germany

Eranda K. Gunathilaka, Sri Lanka

Ryan Keenan, Australia

Werner Lienhart, Austria

Rohan Bennett, Australia

Marije Louwsma, Netherlands

Heidi Falkenbach, Finland

Friday, 26 May 2023

FIG COUNCIL MEETING

FRIDAY, 26 MAY 09:00–17:00

VENUE: BRADFORD – FIG PRESIDENT'S ROOM, HILTON/WALDORF

CHAIR: DR. **DIANE DUMASHIE**, FIG PRESIDENT, UNITED KINGDOM

- By invitation only

Saturday, 27 May 2023

APPAT GENERAL ASSEMBLY

SATURDAY, 27 MAY 09:00–13:00

VENUE: TAYLOR, HILTON/WALDORF

APPAT promotes the different disciplines of surveying and stimulates research in all disciplines of surveying. APPAT consists of 25 member organizations from 15 countries throughout the Americas and Spain. <https://colegiotopografoscr.com/appat/index.html>

- By invitation only

ACCO MEETING

SATURDAY, 27 MAY 09:00–17:00

VENUE: BREVARD – FIG MEETING ROOM, HILTON/WALDORF

CHAIR: MR. **MIKAEL LILJE**, FIG VICE PRESIDENT, SWEDEN

RAPPORTEUR: MS. **LOUISE FRIIS-HANSEN**, FIG DIRECTOR, DENMARK

- By invitation only

Saturday, 27 May 2023



1ST FIG YOUNG SURVEYORS AMERICAS MEETING

SATURDAY, 27 MAY 09:00–18:00

VENUE: CITRUS/COLLIER/COLUMBIA, HILTON/WALDORF

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

Opening Ceremony

Welcome by

- **Diane Dumashie** – FIG President
- **Timothy Burch** – NSPS Executive Director
- **John Hohol** – FIG Foundation President
- **Shirley Chapunza** and **Jacob Heck** – FIG Young Surveyors Network

VCSP: Volunteer Community Surveyor Program

What is GIS – **Brent Jones**, Esri (10605)

Wrap-up Day 1

Dinner/ Social Event – Splitsville – Bowling and American Fare

Leveraging Technology to Move Beyond Boundaries (10603)

- Sustainability, **Craig Hill**, Leica Geosystems
- Leveraging Technology, **Bryn Fosburgh**, Trimble Inc.
- Mapping the Plastic, **Simon Ironside**, Chair FIG Working Group 4.3

Updates from Regional Networks

Diversity, Equity and Inclusion (10604)

Six different cultural backgrounds but one passion in common: Survey. Join these Young Surveyors on their path of becoming professionals, their work and personal experiences, boundaries & challenges they have encountered, and how they managed to overcome them and where it got them to be.

Charity Event (Sponsored by Trimble)

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SCIENTIFIC WORKSHOP ON UNCERTAINTY AND QUALITY OF MULTI-SENSOR SYSTEMS

SATURDAY, 27 MAY 13:00–18:00

VENUE: PALM, HILTON/WALDORF

COMMISSION: 5 & 6

CHAIR: PROF. **VOLKER SCHWIEGER**, GERMANY

SESSION 1: QUALITY OF TERRESTRIAL LASERSCANNING

CHAIR: PROF. DR. **WERNER LIENHART**, CHAIR FIG COMMISSION 6, AUSTRIA

Corinna Harmening and Ramon Butzer (Germany):

Quality Investigations of Different Modelling Approaches for Laser Scanning Point Clouds Representing Natural Surfaces (12112)

Jens-André Paffenholz, Yu Lan and Alexander Dorndorf (Germany):

Direct Geo-Referencing of 3d Point

Clouds in a Multi-Sensor System Approach (12256)

Jan Hartmann, Ingo Neumann and Hamza Alkhatib (Germany):

Improving Terrestrial Laser Scanning Accuracy: Modeling Distance Uncertainties with Machine Learning Techniques (12254)

SESSION 2: QUALITY MODELS AND UNCERTAINTY OF MONITORING SENSORS

CHAIR: PROF. **CORINNA HARMENING**, GERMANY

Li Zhang, Laura Balangé and Volker Schwieger (Germany):

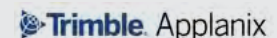
Geometric Quality Assurance with the Research Cluster IntCDC (12021)

Werner Lienhart (Austria): Uncertainty Assessment of High Frequent Strain Measurements (12250)

Annette Scheider, Eike Barnefske and Harald Sternberg (Germany):

FOS-Based Monitoring of Underwater Port Structures (12160)

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TECHNICAL SEMINAR ON REFERENCE FRAMES IN PRACTISE

SATURDAY, 27 MAY 13:00–18:00

VENUE: ORANGE, HILTON/WALDORF

CHAIR: MR. **RYAN KEENAN**, AUSTRALIA

RAPPORTEUR: DR. **KEVIN AHLGREN**, UNITED STATES

Welcome and Opening Remarks

- Dr. **Ryan Keenan** (Chair, FIG Commission 5)
- Mr. **Tim Burch** (Executive Director, National Society of Professional Surveyors)

Session 1: International Geodesy Initiatives

- 1) ICG at UN Ms. **Sharafat Gadimova**, United Nations Office for Outer Space Affairs
- 2) UN-GGIM Subcommittee on Geodesy and Education, Training, and Capacity Building Working Group

Dr. **Daniel R. Roman**, Chair for WG on Education, Training and Capacity Building

- 3) The International GNSS Service and International Association of Geodesy: Serving Surveyors Ms. **Allison Craddock**, IGS Bureau Director

Session 2: Introduction to Geodetic Reference Frames

- 4) Introduction to Geodetic Reference Frame Theory Dr. **Chris Pearson**, University of Otago, New Zealand
- 5) Introduction to Vertical Reference Frames Dr. **Kevin Ahlgren**, National Geodetic Survey, USA

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Sunday, 28 May 2023

TECHNICAL SEMINAR ON REFERENCE FRAMES IN PRACTISE

SUNDAY, 28 MAY 08:00–15:00
VENUE: ORANGE, HILTON/WALDORF

Session 3: IGS and OGC

- 6) Open Geospatial Consortium (OGC) Standards
 Mr. **Roger Lott**, EPSG, USA; Mr. **Keith Ryden**, ESRI, USA; and Mr. **Chris Crook**, LINZ, New Zealand
- 7) Ginan – Open Source Analysis Centre Software from Geoscience Australia
 Dr. **Eldar Rubinov**, FrontierSI, AustraliZ

Session 4: Case Studies I

- 8) One Pacific, One Map
 Mr. **Andrick Lal**, South Pacific Communities, Fiji
- 9) United States: Development of a modernized NSRS in the U.S.
 Dr. **Michael Dennis**, National Geodetic Survey, USA

Session 5: Case Studies II

- 10) Taiwan
 Prof. **Peter Tain-Yuan Shih**, National Yang Ming Chiao Tung University, Taiwan
- 11) Uruguay
 Ms. **Daniela Cuentas Lujan**
- 12) The Philippines: NAMRIA challenges in PGD2020
 Ms. **Hennesey Marohom**, NAMRIA
- 13) Exploring the Lunar Reference Frame
 Mr. **Joshua Critchley-Marrows**, University of Sydney, Australia

Panel Discussion

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1ST FIG YOUNG SURVEYORS AMERICAS MEETING

SUNDAY, 28 MAY 08:30–12:00
VENUE: CITRUS/COLLIER/COLUMBIA, HILTON/WALDORF
CHAIR: DR. **JACOB HECK**, UNITED STATES

Developing and Engaging with the Next Generation (10606)

The key to maintaining sustainability within the geospatial industry lies in the engagement and making opportunities for the next generation. In this session we will listen to and engage with industry professionals who are going above and beyond to not only provide career growth but are also marketing the profession to new people.

Future of the Young Surveyors Network

This session provides an open discussion on how the FIG Young Surveyors Network and its affiliate members will continue to grow and keep the geospatial industry relevant.

Closing and wrap-up

After two long days of discussion, we will look back on what we learned and see what we can do to move forward together.

SCIENTIFIC WORKSHOP ON UNCERTAINTY AND QUALITY OF MULTI-SENSOR SYSTEMS

SUNDAY, 28 MAY 09:00–13:00
VENUE: PALM, HILTON/WALDORF
CHAIR: PROF. **VOLKER SCHWIEGER**, GERMANY

SESSION 3: MULTI-SENSOR-SYSTEMS FOR KINEMATIC POSITIONING
SESSION CHAIR: DR. **LI ZHANG**, GERMANY

Lukas Klatt, Niklas-Maximilian Schild and Harald Sternberg (Germany):
 Senses for Submarines: Concepts for Optical- and Acoustic-Based Odometry and SLAM for Underwater Navigation (12148)

Sören Vogel and Frederic Hake (Germany):
 Development of GPS Time-Based Reference Trajectories for Quality Assessment of Multi-Sensor Systems (12253)

Mohamed Mostafa (Canada):
 High-Definition Mapping for Autonomous Driving using Integrated Sensors – Part I (12191)

SESSION 4: UNCERTAINTY OF KINEMATIC POSITIONING AND MAPPING
SESSION CHAIR: DR.-ING. **ANNETTE SCHEIDER**, GERMANY

Mohamed Mostafa (Canada):
 High-Definition Mapping for Autonomous Driving using Integrated Sensors Part II (12270)

Dominik Ernst, Sören Vogel, Hamza Alkhatib and Ingo Neumann (Germany):
 Uncertainty Evaluation for a Kinematic LiDAR-Based Multi-Sensor System (12255)

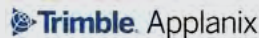
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Sunday, 28 May

FIG GENERAL ASSEMBLY – DAY 1

SUNDAY, 28 MAY 09:00–15:30
VENUE: BONNET CREEK BALLROOM, HILTON/WALDORF
CHAIR: DR. **DIANE DUMASHIE**, FIG PRESIDENT, UNITED KINGDOM
RAPPORTEUR: MS. **LOUISE FRIIS-HANSEN**, FIG DIRECTOR, DENMARK

FIG General Assembly will be held on 28 May and 1 June in Orlando, USA at Signia by Hilton Orlando Bonnet Creek / Waldorf Astoria Orlando Convention Center. At the General Assembly the Council Work Plan will be presented by President Diane Dumashie. All Commission and network work plans will also be presented.

- For all FIG members
- Open for observers

OPENING CEREMONY

SUNDAY, 28 MAY 16:30–18:00
VENUE: BONNET CREEK BALLROOM, HILTON/WALDORF

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

During the opening all attendees will be met by the national and local culture and welcome addresses by our host from the US and locally from Florida.

Keynote presentations:

- **Diane Dumashie**, FIG President Serving Society, Benefitting People And The Planet: Tackling the Global Challenges
- **Beverly Hart Jones**, PSM Surveying “Project X”: The Boundary Survey for a Secret Land Acquisition that Became Walt Disney World

WELCOME RECEPTION

SUNDAY, 28 MAY 18:00–20:00
VENUE: SIGNATURE ISLAND, HILTON/WALDORF

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 Orlando.

NEW! The FIG Cinema is designed to serve as a unique and engaging space for conference attendees. Through the power of storytelling, this Cinema aims to inspire and empower people to envision a better future for people and planet. The FIG Cinema room will be a space that fosters an environment that looks at the world we currently live in and help to create ideas and visions and sparks our collective imagination for a better future. It offers a one-of-a-kind opportunity for conference attendees to sit back, relax and be inspired by the incredible work of their peers.

MONDAY, 29 MAY	TUESDAY, 30 MAY	WEDNESDAY, 31 MAY
<p>11:00–13:00: PRESENTATIONS BY PEERS...</p> <p>We are in the midst of a new digital and technological era, in which the land surveyor is transforming its profession and activities to provide more complex and timely services and information about Earth and its processes. From climate change to green spaces, these presentations will lead you through current trends and cutting-edge approaches in which spatial data and information are used for various applications that aim to support our communities and environment. Sit back, relax and be inspired by the incredible work of your peers.</p>	<p>11:00–12:25: PRESENTATIONS BY PEERS...</p> <p>Sit back, relax, and let the stories of dedication, passion, and impact unfold before your eyes.</p> <p>12:25–13:00: ESRI PRESENTS: A Comprehensive Geospatial System. Presented by JACK DANGER-MOND, Esri Founder.</p> <p>Take a tour of ArcGIS and its powerful capabilities for developing rich content, conducting spatial analysis, collecting data in the field, and sharing across an organization.</p>	<p>11:00–11:30: TRIMBLE PRESENTS: An Introduction to Trimble Applinix Solutions for Mobile Mapping and Aerial Survey</p> <p>11:30–12:45: THE FOUNDATION OF GEOMATICS</p> <p>Let's dig in and explore geodesy, the discipline dealing with the measurement and representation of the earth.</p> <p>12:45–13:00: BENTLEY SYSTEMS PRESENTS: Bentley Advancing Infrastructure</p>

13:00–15:30: SURVEYING SUPERSTAR MOVIE MINI-MARATHON [★ FOR DETAILED PROGRAM, SEE PAGE 37]
Cinematic Superstar Surveying Spectacular!!!

Come and marvel at this amazing World Premiere compilation of over 50 movies, TV shows and TV commercials masterly webbed together by Surveying Movie Mogul **JOHN BROCK**, who has collected his eclectic mix of Hollywood style productions featuring all-things surveying.

<p>15:30–15:50: LEICA GEOSYSTEMS PRESENTS: Florence as it was: A Digital Reconstruction of a Medieval City</p> <p>15:50–16:00: DISNEY COMPILATION</p> <p>16:00–16:30: PRESENTATIONS BY PEERS...</p> <p>Join us to learn how Positioning and Measurement techniques and technologies continue to support humanity and its developments between the ground and the stars. From the fundamentals of coordinates and survey markers, learning about how our senses help us in geospatial activities, considering how metadata and time affect them, to the latest techniques in measuring the land and surveying using the stars. We'll even learn about plans for positioning and mapping on the Moon!</p>	<p>15:30–16:30: THE NEXT FOUR YEARS...</p> <p>Today, we have the privilege of introducing you to the visionary chairs of the ten commissions and networks, as they take center stage to present their work plans for the next four years.</p> <p>In this immersive cinematic experience, we invite you to delve into the heart of FIG, as we explore its direction and future trajectory. Where is FIG heading?</p>	<p>15:30–16:30: PRESENTATIONS BY PEERS...</p> <p>Join another FIG cinematic journey. We'll cover stories about digital transformation, 3D land administration, integrated cadastral surveys, and application of the international LADM standard. We'll look at the role of land administration and management in pro poor settlement, urban build-up, and national land policies. Things wrap up with a focus on technical aspects of asset, network, and property surveying.</p>
<p>16:30–18:00: PROTECTING OUR WORLD</p> <p>Ladies and gentlemen, good afternoon and welcome to this eagerly awaited replay of the captivating keynote session Protecting our World that unfolded this morning. For those of you who may have missed the earlier presentation, fear not, for you are about to embark on an extraordinary journey of knowledge, insight, and inspiration.</p>	<p>16:30–18:00: CONQUERING NEW FRONTIERS</p> <p>Whether you were preoccupied this morning or simply desire to relive the magic, now is the time to savor the unparalleled experience of this remarkable keynote session. Prepare to be captivated, inspired, and enlightened as we present to you the replay of the morning's plenary session.</p>	<p>16:30–18:00: TACKLING THE GLOBAL CHALLENGES</p> <p>The stage is set, and the spotlight is ready to illuminate the brilliance that awaits. From the comfort of your seats, please enjoy the plenary session Tackling the Global Challenges featuring JULIANA P. BLACKWELL, SIMONE LLOYD, DUSTIN PARKMAN and ANDREW HURLEY.</p>

PRESENTATION BY PEERS

Take a break and join us in this cinematic experience that highlights the incredible work of our colleagues.

MONDAY 11:00-13:00

11811	Ahuchaogu Udo Emmanuel et al. (Nigeria)	GIS and Remote Sensing Based Assessment of Hydro-Geomorphological Parameters of Lower Niger Basing in Nigeria
11881	Hoang Ha (Viet Nam)	Monitoring the Displacement of the Ba River Fault Zone of Vietnam Using GNSS Technology
11949	Ogba Chima et al. (Nigeria)	Analyzing Flash Flood Risk in a Section of Ntawogba Creek, Port Harcourt City, Rivers State
11979	Pepple Godwill Tamunobiekiri et al. (Nigeria)	Map Revision of Small Scaled Topographic Sheet 303 Abakaliki South-West (SW), Nigeria
12028	Sackey Jemima et al. (Ghana)	Enhancing Port Reputation Through an Improved Environmental Governance: a Case Study of the Takoradi Port Infrastructure Expansion Project
12043	Davoli Enrico (Italy)	Be a Surveyor in Emergency Conditions Shipwreck Costa Concordia - Emilia Romagna Earthquake
12082	Olutosin Olunloyo et al. (Nigeria)	Urban Green Spaces and Park Development in Ibadan Metropolis, Nigeria: Implication and Lessons for Surveying Profession
12103	Nadeeka Tharuka et al. (Sri Lanka)	Assessing Role of Climate and Land Use/land Cover on Flood Risk Using a Fusion of Ground Surveys and Remotely Sensed Imagery – the Case of Pinga Oya in Sri Lanka
12137	Neelamsetti Lakshmi KantaKumar et al. (India)	Pluvial Flooding Hazard Vulnerability Assessment in an Urban Environment: a Case Study of Margao, Goa
12140	Leksono Ayubella Anggraini et al. (Indonesia)	“GEOLOKA”: Urban Heat Island Participatory Mapping Using Dynamic Web-GIS for Urban Strategic Planning (Study Case: Cirebon City, Indonesia)
12171	Chryssy Potsiou, Charalabos Ioannidis, Thanos Vlastos, Sofia Soile, Konstantinos Apostolopoulos, Argyro-Maria Boutsis and Maria Gkeli (Greece)	A Geospatial Integrated Tool for Historic Walking Trails in the Holy Site of Meteora, Greece
12178	Chtouki Hassan (Morocco)	Suburbanization of Casablanca: Emergence and Actors of the Informal Industrial Fabric.
12184	Adeniran Oluwole et al. (Nigeria)	Nexus of Geospatial Problems, Emerging Geospatial Technologies, Applications and Sustainable Survey Practice in Nigeria
12219	Samuel Oluwasegun Temitope Oluwasegun Temitope et al. (Nigeria)	Geospatial Analysis of Land Use/land Cover Impact on Soil Heat Influx
12257	Wijaya Tofan R. et al. (Indonesia)	Reclamation/Rehabilitation of the Former Sea Tin Mine of PT TIMAH TBK
11982	Nguyen Viet-Hung et al. (Viet Nam)	Urban Transportation Policies for Governing Hanoi City

MONDAY 15:30-16:30

12059	Hyeon Seok Jeon (Republic of Korea)	Geospatial Information Linkage of Five Senses
12248	Okada Kengo (Japan)	Importance of the Survey Marker
12046	Knight Sam (USA)	The Need for Time Standards in Geospatial Metadata
12070	Paunescu Cornel et al. (Romania)	Considerations Regarding Romania’s Leveling Network
12044	Dennis Michael (USA)	The Future Is Here: Introducing the State Plane Coordinate System of 2022
11941	Al-Manasir Khalil et al. (United Arab Emirates)	ARABREF - A Vision for its Design and Implementation
12222	Hummel Philipp (USA)	Accurate Global Georeference
12064	Critchley-Marrows Joshua (Australia)	An Exploration of the Lunar Reference Frame

TUESDAY 11:00-12:25

11927	Blicavs Michelle (Australia)	Finding, Creating and Educating the Next Generation of Surveyors
11943	Anyakora Angela Omamuyowwi et al. (Nigeria)	Developing Leadership Skills in Young Surveyors - the Young Surveyors African Network - West African Young Surveyors (WYSAN) Team
11968	Mensah-Boafo Eva et al. (Ghana)	Web Application for Field Accident Reporting: a Case Study of Land Surveyors in Ghana
11999	Ayani Raudlah et al. (Indonesia)	A Comparison of Deep Learning Methodology for Predicting Palm Oil Trees
12017	Rajaure Nirmala (Nepal)	Understanding Biodiversity Conservation: Buffer Zone Resources and Land Use Change in Argayuli VDC of Chitwan National Park, Nepal.
12022	Budhathoki Niki (Nepal)	Integrated Development of Bagmati Civilization, Nepal
12030	Chigbu Njike et al. (Nigeria)	Exploring the Potentials of Geospatial Technologies in Food Security Challenges of Eastern-Nigeria Through Education
12052	Adenaiya Olumide et al. (Nigeria)	Influences Contractors Tendering on Building Project in Nigeria
12056	Radovanovic Robert (Canada)	Development of Sustainability Professionals from a Geomatics Context : Experiences at the University of Calgary
12154	Adams Alison et al. (USA)	Assessing Barriers to Pursuing a Degree in Geomatics Technology among Geomatics Students at the University of Florida
12244	Ola-Ade Esther Oluwafolakemi et al. (Nigeria)	Benefits & Challenges of 5D BIM Adoption: Perception of Quantity Surveyors
11977	Botsyo Sebastian Senyo et al. (Ghana)	Bathymetric Mapping to Support Ecological Restoration and Management of the Korle Lagoon

WEDNESDAY 15:30-16:30

12039	Beck Anthony et al. (United Kingdom)	Land Registration and the Trusted Intermediary: Considerations on the Practicality of Moving to Self-Service Transactions
12139	Andritsou Dimitra et al. (Greece)	Investigating the Merging of BIM and Land Use Geospatial Data with 2D Cadastral Information. A Case Study for a Municipality in Greece.
12117	Mulyadi Mulyadi et al. (Indonesia)	Digital Elevation Model for 3D Cadastre Visualization in WebGIS Bhumih: Jakarta case study
12107	Gupta Debanjana et al. (India)	Critical Assessment on the Implementation of LADM as per ISO 19152:2012 in Indian Scenario – Existing System, Challenges and Possible Implementation Strategies
12087	Hutabarat Indra Roharatua et al. (Indonesia)	Integrated Parcel Boundary Survey and Mapping: a Pilot Project to Improve Spatial Data and to Accelerate Complete Systematic Land Registration (ptsl)
11951	Kwesi Edward A. A. et al. (Ghana)	Mapping of Land Subsidence Vulnerability: Case Study at the Tarkwa-Prestea Mining Areas of Ghana
11919	Ahey Michael Dela (Netherlands)	Challenges of Land Administration in Ghana: a Review of the Ghana National Land Policy
11809	Oli Punya (Nepal)	Transmission Line Survey in Nepal
11802	Pepple Godwill et al. (Nigeria)	Varying Geometry Area Determination of Selected Sites in Rivers State University, Port Harcourt, Nigeria.
11932	Viet-Hung Nguyen et al. (Viet Nam)	Industrial Zones Development in Hanoi Towards 2030’s Sustainable Development Goals

★ **13.00-13.35: SUPERSTAR SURVEYING: HOLLYWOOD STYLE!** – Over 35 movies and TV shows with even commercials featuring surveying and A-list movie icons playing surveyors



13.35-14.05: HOLLYWOOD MOVIE SURVEYORS – THE R- RATED VERSION – More top celebrities line up to play surveyors while some come to gruesomely grisly ends while others engage in other behind the blinds activities to give this pot pourri of mensors a justifiable adults-only rating.



14.05-14.25: FILM SURVEYORS REACH THE TOP! – Just when you thought that it couldn't get any better, you are treated to an Oscar winning movie in which legendary character actor, Daniel Day Lewis wins an Academy award for his role as an oil surveyor in the very violent production "There Will Be Blood!"



14.25-15.30: THE ROAD TO OBSESSION! – To put a memorable finale onto this unbelievable marathon of movie measurers you will find out what motivated John Brock to embark on his more than 35 year ongoing quest to obtain all of the Hollywood films and TV series which include surveying in their plots, so be delighted to see Smurfette in The Smurfs and an episode of the cult comedy classic "Get Smart" weave in quirky surveying content into their plots.

Monday, 29 May Morning

NEWCOMERS SESSION

MONDAY, 29 MAY 08:00–08:45
VENUE: CITRUS/COLLIER/COLUMBIA, HILTON/WALDORF
CHAIR: MR. MIKAEL LILJE, FIG VICE PRESIDENT, SWEDEN
RAPPOORTEUR: MS. CLAUDIA STORMOEN, FIG EVENT MANAGER

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 session 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!

SIDS MORNING MEETING

MONDAY, 29 MAY 08:00–08:50
VENUE: NASSAU, HILTON/WALDORF
CHAIR: DR. DANIEL ROMAN, UNITED STATES

Small Island Developing States(SIDS) Workshop

Serving Society for the benefit of people and planet; Facing the global challenges in Small Island Developing States: The Role of Land Professionals

- Welcome address, **Amanda Allred**, NSPS President
- Welcome address: the Global Role of FIG, **Diane Dumashie**, FIG President

PLENARY SESSION 1:
PROTECTING OUR WORLD
[10511] 

MONDAY, 29 MAY 09:00–11:00
VENUE: BONNET CREEK BALLROOM, HILTON/WALDORF

This first plenary session will have the relationship between climate change and sustainable development on the agenda. The climate focus is now the foundation of sustainability and underpins everything we do in our professional work. Unpacked by key note speakers they will relate this to land and the role surveyor's can lead in land management, land administration and geospatial context that enables us to understand how we can take urgent action on climate change, so that it can support the needs of the present and future generations.

Clarissa Augustinus (Ireland): The Global Land Outlook and Protecting Our Plane (12300)

Victoria Stanley (USA): How Does the World Bank See Land as Integral to Addressing Climate Change (12301)

Brent Jones (USA): Mapping a Sustainable Future in This New Era of Understanding (12302)

Monday, 29 May 2023 11:30–13:00

TS01A: FIG MEMBER
ASSOCIATION FORUM

MONDAY, 29 MAY 11:30–13:00
VENUE: CITRUS/COLLIER/COLUMBIA, HILTON/WALDORF
CHAIR: MR. TIMOTHY BURCH, CHAIR FIG COMMISSION 1, UNITED STATES
RAPPOORTEUR: MS. PAULA DIJKSTRA, CHAIR TF ON SGD, NETHERLANDS

FIG Member Association Presidents and representatives are invited to this Forum to discuss issues of relevance and importance to member associations, to network and to exchange.

TS01B: FIG CORPORATE
MEMBER SESSION – ESRI

MONDAY, 29 MAY 11:30–13:00
VENUE: FLAGLER/GILCHRIST, HILTON/WALDORF
CHAIR: MR. BRENT JONES, UNITED STATES

Enterprise Land Administration Systems: Off-the-Shelf GIS Technology for Mapping and Cadastral Systems

With ongoing security risks, unpredictable revenue models, increasing technical debt, and costly support of highly customized bespoke systems, land administration authorities are increasingly turning to sustainable solutions. ArcGIS is a complete, secure, interoperable, open, purpose-built geospatial platform for cadastral and mapping operations that enables you to improve efficiency, manage data integrity, and share data across your organization. Attend and learn from land administration experts on how ArcGIS can improve your organization.

Presenters:

- **Nick Land**
- **Kees De Zeeuw**
- **Linda Foster**
- **Tim Fella**
- **Mark Cygan**
- **Brent Jones**

TS01C: REIMAGINING THE
CLIMATE ACTION AGENDA
FOR THE GLOBAL SURVEYOR
COMMUNITY THROUGH FIG
[10548]

MONDAY, 29 MAY 11:30–13:00
VENUE: HAMILTON/INDIAN RIVER, HILTON/WALDORF
COMMISSION: TF ON CLIMATE
CHAIR: DR. CLARISSA AUGUSTINUS, IRELAND
RAPPOORTEUR: MS. ROSHNI SHARMA, AUSTRALIA

Combat climate change and its impacts! Continue the discussion of the keynote session and turn your inspiration into action. We need your energy and ideas to move forward and to provide leadership. Be the change & join us!

Program:

- Introduction and opening remark by **Diane Dumashie**, FIG President
- Presentation of the Task Force and its Communication Strategy by **Roshni Sharma**, Member of the Task Force
- Panel discussion on key climate-related surveying issues
Panelists:
Simon Ironside, New Zealand
David Elegbede, Nigeria (YSN)
Ronald Ssendendo, Uganda (SDG TF)
- Discussion lead by **Roshni Sharma**
- Moving Forward

TS01D: SIDS –
INTRODUCTIONS OF
GLOBAL AND REGIONAL
SUPPORTING PARTNERS –
SESSION 1 [10533]

MONDAY, 29 MAY 11:30–13:00
VENUE: NASSAU, HILTON/WALDORF
CHAIR: DR. DANIEL ROMAN, UNITED STATES

Small Island Developing States(SIDS) Workshop
 Serving Society for the benefit of people and planet; Facing the global challenges in Small Island Developing States: The Role of Land Professionals

- FIG regional and sub-regional capacity development, **Rob Sarib**, FIG CDN
- FIG and Pacific SIDS support, **Andrick Lal**, PGSC
- UN-GGIM-Americas Regional Committee, **John Nyberg**, Vice-President
- CARIGEO Initiative, **Simone Lloyd**, CARIGEO
- Disaster Relief Support for the Caribbean, TBD St. Maarten, WG on Disasters
- UN-GGIM-Americas Academic Network, **Rosario Casanova**, President
- Geodetic Reference Frame for the Americas, **Dana Caccamise II**, SIRGAS US Rep.

ESRI HANDS-ON LEARNING LAB

MONDAY, 29 MAY 09:00–13:00
VENUE: SARASOTA – ESRI ROOM, HILTON/WALDORF



TS01E: HISTORY SESSION [10540]

MONDAY, 29 MAY 11:30–13:00
VENUE: ORANGE, HILTON/WALDORF
CHAIR: MR. JOHN BROCK, AUSTRALIA

Crazy about history? Don't miss this event – An afternoon of History, where the FIG Permanent Institution of History of Surveying will highlight the achievements of surveyors, the evolution of knowledge and methodology of measuring, as well as the development of surveying instrumentation.

John Brock (Australia):
 Surveyors of Arabia (12098)

Joe Knetsch (USA):
 Surveying of Florida (12294)

Leikny Gammelmo (Norway):
 Mapping Norway for 250 Years – Maps Give Power (11933)

TS01F: SURVEYING BY DRONES – SESSION 1: THEORY, PRACTICE, AND STANDARDS [10556]

MONDAY, 29 MAY 11:30–13:00
VENUE: PALM, HILTON/WALDORF
COMMISSION: 5, 6 & STANDARDS NETWORK
CHAIR: DR. MOHAMED MOSTAFA, TRIMBLE APPLANIX, CANADA
RAPPORTEUR: MR. RYAN KEENAN, CHAIR FIG COMMISSION 5, AUSTRALIA

Mohamed Mostafa (Canada):
 FIG Standards for Surveying by Drones (12185)

Tian Zhao and Ayman Habib (USA):
 Unified Multi-sensor Advanced Triangulation (UMSAT) for System Calibration and Trajectory Enhancement of Imaging and Ranging Sensors Onboard Mobile Mapping Systems (12226)

David Martin (France):
 Possible Ways to FIG Standards for Surveying by Drones (12299)

TS01G: DYNAMIC DATUMS AND WORKING WITH RESULTANT DATA – FOR BOTH SURVEYORS AND GEOSPATIAL EXPERTS [10563]

MONDAY, 29 MAY 11:30–13:00
VENUE: TAYLOR, HILTON/WALDORF
COMMISSION: 5
CHAIR: DR. CHRIS PEARSON, NEW ZEALAND
RAPPORTEUR: DR. KEVIN AHLGREN, UNITED STATES

Bernard Kumi-Boateng and Joseph Edem Vigbedor (Ghana):
 Assessing the Integration of Total Least Squares and Radial Basis Function Neural Network for Coordinate Transformation (11905)

Brian Donahue, Catherine Robin and Michael Craymer (Canada):
 Reference System Modernization in Canada (12000)

Mohammed Aljafar (Saudi Arabia):
 Coordinates Trajectory Models: Basics and Implementation (11884)
This is a peer reviewed paper.

Davey Edwards and Ibraheem Ali (USA):
 Southeast Texas Subsidence Adjustment Project (12029)

Ryan Hippenstiel, John May, Jacob Heck (USA), Michael Craymer and Rachel van Herpt (Canada):
 The 2022 GNSS Survey for a New International Great Lakes Datum: Overcoming Challenges with International Planning and Digital Tools (12007)

Christopher Pearson (New Zealand) and **Sebastien Vielliard** (France):
 Plans to Support Modernized CSRS and NSRS Datums in Trimble Software (11920)

TS01H: FRENCH SESSION 1 [10545]

MONDAY, 29 MAY 11:30–13:00
VENUE: MADISON, HILTON/WALDORF
CHAIR: MR. MARC VANDERSCHUEREN, BELGIUM

This session is in French to permit an active participation for the non-English speaking members of FGF (Federation of the French Speaking Surveyors) and give the possibility to the FIG members to dialogue in French.

Bertin Mwanambuka Mafine (Democratic Republic of Congo):
 Le bornage et la délimitation des terres des communautés locales en RDC. (12145)

Marc Vanderschueren (Belgium):
 Etat de la situation «2023» de la FGF au sein de ses «pays membres» Perspectives pour le futur. (12155)

Bernard Flaceliere (France):
 Mistakes to Be Avoided in Positioning (12258)

TS01I: FRAMEWORK FOR EFFECTIVE LAND ADMINISTRATION (FELA) [10520]

MONDAY, 29 MAY 11:30–13:00
VENUE: VESEY, HILTON/WALDORF
COMMISSION: 7 & UN-GGIM EG-LAM
CHAIR: MR. VICTOR KHOO, SINGAPORE
RAPPORTEUR: MR. KEAN HUAT SOON, SINGAPORE

Kean Huat Soon and Victor Khoo (Singapore):
 Implementing the Framework for Effective Land Administration (FELA): New Workplan and Developments (12061)

Mikael Lilje (Sweden):
 The UN-GGIM Integrated Geospatial Information Framework and the status of the High-Level Group of the IGIF (11937)

Jean-Philippe Lestang (France):
 Improved Land Management, a Key Factor for a Stable and Protective Social Economic Development (12041)

Charisse Griffith-Charles (Trinidad And Tobago):
 Land Registration for Conquering New SDG Frontiers (12099)

Brandon Tourtelotte, Katie Pickett (USA) and **Kees de Zeeuw** (Netherlands):
 FELA-based Geospatial Knowledge Infrastructure (12127)

Eva-Maria Unger, Rohan Bennett (Netherlands), **Mahamat Abdoulaye Malloum** (Chad), **Christelle van den Berg** (Netherlands), **Claudia Stöcker** (Germany), **Kaspar Kundert** (Rwanda), **Dina Naguib** (Egypt), **Markus Koper** (Germany), **Divyani Kohli** and **Mila Koeva** (Netherlands):
 Fit-For-Purpose Land Administration and the Framework for Effective Land Administration in Chad (12242)

TS01J: OPEN DATA INITIATIVES AND PERSPECTIVES IN SIM [10589]

MONDAY, 29 MAY 11:30–13:00
VENUE: BROADWAY/CARNEGIE, HILTON/WALDORF
COMMISSION: 3
CHAIR: PROF. YERACH DOYTSHER, ISRAEL
RAPPORTEUR: PROF. PIETRO GRIMALDI, ITALY

Franz Okyere (Ghana), **Thea Minnich** and **Ansgar Brunn** (Germany):
 Analyses of Implementation Data from a Low-Cost Ambulance Service in Ghana (11912)

Dony Erwan, Albertus Yogo and Sheilla Ramadhani (Indonesia):
 Web Geoportals 'BHUMI' for Easy Access to Land Information and Community Participation-Based Mapping (12011)

Lopang Maphale, Kabelo Mokwena, Bagadzi Michael Manisa, Mooketsi Segobye and Keleboga kaizer Moreri (Botswana):
 A Strategy for Virtually Sharing of Geographic Information by Botswana National Mapping Agency (12060)

Lorenz Jenni (Switzerland), **Moisés Poyatos** (Spain), **Jan Schulz** (Germany) and **Ronald Ssengendo** (Uganda):
 Data Governance Strategy in Lesotho Based on Integrated Geospatial Information Framework (IGIF) (12177)

Halima Alnaqbi (United Arab Emirates):
 The Status of Implementation of an Integrated Geospatial Data Management Framework in Dubai (12204)

Jennifer Triana (USA):
 Data Quality Considerations that Allow Automated Modeling of UAS Point Clouds. (12233)

Mon 29 Afternoon Monday, 29 May 2023 14:30–16:00

MEMORIAL DAY OBSERVATION

MONDAY, 29 MAY 14:30–15:00
 VENUE: SIGNATURE ISLAND, HILTON/WALDORF

Join us for the time-honored tradition of Memorial Day and the celebration for those who gave their lives while in military service. The National Society of Professional Surveyors (NSPS) welcomes all Working Week participants to witness a short program featuring a military honor guard and proclamations by NSPS leadership.

Memorial Day honors America's military men and women who lost their lives in service to their country.

The holiday is observed on the last Monday of May, a time of year when weather is turning warmer, and schools and universities are adjourning for summer break. To Americans, Memorial Day weekend marks the unofficial beginning of summer. But at its heart, Memorial Day, originally called Decoration Day, is a day when Americans reflect on the sacrifice of those who have given their lives in military service.

TS02A: FIG MENTORING PROGRAM

MONDAY, 29 MAY 14:30–16:00
 VENUE: CITRUS/COLLIER/COLUMBIA, HILTON/WALDORF
 COMMISSION: YSN
 CHAIR: MS. ROSHNI SHARMA, AUSTRALIA
 RAPPORTEUR: MR. DAVID ELEGBEDE & MS. ANGELA ANYAKORA, NIGERIA

The session will give an update on the status of the FIG Mentoring Program drawing from the key learnings on the outcome of the Pilot and the planned future trajectory. It will also include an interactive segment of rotational 5 minute one on one mentoring sessions of the session's participants.

- Program:**
- 15 min Introduction of the session and status of the FIG Mentoring Program
 - 15 min Key learnings from the Pilot
 - 30 min Interactive segment of “mentee” and “mentor” pairings (rotational)
 - 15 min Group discussion with everyone sharing their mentee and mentor experiences.
 - 15 min Future of the Program

TS02B: ENHANCING WOMEN’S ACCESS (TO LAND AND SURVEYING) – 1 [10528]

MONDAY, 29 MAY 14:30–16:00
 VENUE: FLAGLER/GILCHRIST, HILTON/WALDORF
 COMMISSION: 1, 7 & TF ON SDG
 CHAIR: MS. KATE FAIRLIE, AUSTRALIA
 RAPPORTEUR: MS. CLAIRE BUXTON, NEW ZEALAND

Marisa Balas (Mozambique), **Christiaan Lemmen** (Netherlands), **Rosana Albuquerque** (Portugal) and **Eva-Maria Unger** (Austria): Promoting Women’s Land Rights in SubSaharan Africa: Potential Mitigation Measures to Gender Inequality in Land Access and Land Tenure Security A Literature Review (12221)

Monica Lengoiboni (Netherlands), **Dora Dadey** (Ghana), **Wytse Chamberlain-van der Werf**, **Ajay Bailey** and **Jaap Zevenbergen** (Netherlands): A Review of Long-Term Impacts of Land Registration on Women’s Land Rights (11984)

Basirata Abudu-Akindali and **Jemmima Adi Agyekum** (Ghana): Women in Cadastral Surveying -Its Challenges and Prospects In Ghana (11887)

Jimmy Alani, **Godfrey Toko**, **Ibrahim Magesemo**, **Richard Oput** and **Joseph Mivule** (Uganda): Securing Gender Sensitive Systems for Land Surveys and Registration in Uganda (12126)

Jonathan Zinzi Ayitey, **Mustapha Okyere** and **Frank Gyamfi Yeboah** (Ghana): Understanding the Effects of Commoditization of Land on the Indigenes’ Land Tenure Security in Peri-Urban Ghana. (11862)

Raja Ram Chhatkuli (Nepal), **Danilo Antonio**, **Hellen Ndungu** (Kenya), **Ranjita Kattel**, **Jagat Deuja** (Nepal) and **John Gitau** (Kenya): Securing Land Rights of the Landless and Urban Poor from Policy to Practice: The Case of Kankai Municipality, Nepal (12015)

TS02C: LAND AND CLIMATE [10549]

MONDAY, 29 MAY 14:30–16:00
 VENUE: HAMILTON/INDIAN RIVER, HILTON/WALDORF
 COMMISSION: GLTN
 CHAIR: MS. ROSHNI SHARMA, AUSTRALIA

The purpose of the session is to engage with professionals and gain their further thinking on Land and Climate for this GLTN activity.

FIG has a long history of developing land tools within the GLTN context. How can these experiences and tools be adapted to engage with the land and climate agenda?

What land tools do FIG members need to advance their climate engagement and work?

How can FIG professionals contribute within the context of GLTN on the land and climate agenda?

- **John Gitau**, GLTN – GLTN overview
- **David Mitchell**, FIG – Land and Climate
- **Eugene Chigbu**, NUST –Urban and Rural Linkages and Climate
- Open discussion

TS02D: AVM, DIGITAL TWINS AND BIM FOR INCREASING TRANSPARENCY ON REAL ESTATE MARKETS [10608]

MONDAY, 29 MAY 14:30–16:00
 VENUE: NASSAU, HILTON/WALDORF
 COMMISSION: 9 & 10
 CHAIR: MS. MERCY IYORTYER, CHAIR FIG COMMISSION 10, NIGERIA
 RAPPORTEUR: MR. STEVEN NYSTROM, UNITED STATES

Wafu Luasi Nabutola (Kenya): The Role of Building Surveyors in Construction & Maintenance Value Chain in Light of Misadventure of COVID-19 (11942)

Christina Mauer and **Schlachter Maximilian** (Germany): The Potential of AVM and AI – Opportunities and Risks for Appraisers (12081)

Luke Jorgensen and **Joshua Jorgensen** (USA): Using Machine Learning to Create High Performance Models for AVM Without Linearity Constraints (12092)

Vassena Giorgio Paolo Maria (Italy): Indoor MMS and Digital Twin to Get the Spatial Data of a Large Real Estate Asset (12176)



Wikimedia Commons, PD

ESRI HANDS-ON LEARNING LAB

MONDAY, 29 MAY 13:00–16:00
 VENUE: SARASOTA – ESRI ROOM , HILTON/WALDORF

TS02E: BLUE SURVEYING – CLGE SEVILLE DECLARATION – THE PLANET IS THIRSTY FOR CONCRETE ACTIONS [10541]

MONDAY, 29 MAY 14:30–16:00
VENUE: ORANGE, HILTON/WALDORF
COMMISSION: 3, 4 & CLGE
CHAIR: DR. **ENRICO RISPOLI**, ITALY
RAPPORTEUR: MR. **JEAN-YVES PIRLOT**, BELGIUM

Vladimir Krupa (Croatia), **Enrico Rispoli** (Italy) and **Jean-Yves Pirlot** (Belgium): BLUE SURVEYING – CLGE Seville Declaration – The Planet is Thirsty for Concrete Action – Introduction (12289)

Enrico Rispoli and **Maria Grazia Scorza** (Italy): “BLUE SURVEYING” and the Environmental Goals of Sustainable Development (12287)

Simon Ironside (New Zealand): Mapping Plastic using UAV Multi-spectral Images (12309)

Johnston Gordon (United Kingdom): “Blue Surveying – Hydrography, ESG and the Blue Circular Economy” (12288)

Qin Yan, Chun Dong and **Ai-Hua Cao** (China, PR): Coordinated Development of Economic Growth and Vegetation Cover in the Yangtze River Economic Belt, China (12292)

Denis Hains (Canada), **Rafael Ponce** (USA), **Karen Cove** (Canada), **Maria Emanuela Mihailov** (Romania) and **Victoria Obura** (Kenya): Hydrospectral, the Blue Geospatial+! (12212)

Romanus Ayadiuno and **Dominic Ndulue** (Nigeria): Marine Ecosystem Management: the Role of Geospatial Experts from Southern Nigeria’s Perspective (11922)

Kwaku Nyarko-Dokyi, Michael Nyoagbe and **Maxwell Akosah-Kusi** (Ghana): The Ghana Water Company Transformation Journey (12290)

TS02F: SURVEYING BY DRONES – SESSION 2: PANEL DISCUSSION [10557]

MONDAY, 29 MAY 14:30–16:00
VENUE: PALM, HILTON/WALDORF
COMMISSION: 5, 6 & STANDARDS NETWORK
CHAIR: DR. **MOHAMED MOSTAFA**, TRIMBLE APPLANIX, CANADA
RAPPORTEUR: MR. **DAVID MARTIN**, CHAIR FIG STANDARD NETWORK, FRANCE

- Dr. **M. Mostafa**, Trimble Applanix, Canada. FIG Standards for Surveying by Drones: An Introduction (5 min)
- Dr. **A. Habib**, Professor, Purdue University, USA. Surveying by Drones: The Academic Perspective (15 min)
- Ms. **My-Linh Truong**, ULS Division Manager, RIEGL USA, Taking Flight with RIEGL LiDAR (15 min)
- Dr. **Tristan Allouis**, CTO, YellowScan, France (15 min)
- Panel Discussion including the audience (40 min)

TS02G: COMBINING POSITIONING AND SENSING SYSTEMS [10564]

MONDAY, 29 MAY 14:30–16:00
VENUE: TAYLOR, HILTON/WALDORF
COMMISSION: 5 & 6
CHAIR: DR. **WERNER LIENHART**, CHAIR FIG COMMISSION 6, AUSTRIA
RAPPORTEUR: DR. **RYAN KEENAN**, CHAIR FIG COMMISSION 5, AUSTRALIA

Joseph Hutton, Nilesh Gopaul, Jau-Hsiung Wang, Mohamed Mostafa and **Anna Jarvis** (Canada): Optimizing the Accuracy and Efficiency of Mobile Mapping and Surveying using the Latest GNSS Constellations and Frequencies and LiDAR Adjustment Technology (11947)

Russell Hall (USA): “Guiding the Course” Using Mobile Mapping and TopoDOT to Help Build a Formula 1 Track (12232)

Lidija Špiranec (Switzerland): Protecting Railway Transport: Advancements in Autonomous and Automated Geodetic Deformation Monitoring (11908)

Puttipol Dumrongchai, Chawis Srimanee, Boonyarit Keawaram, Thanatepol Boonprakob and **Teeradon Thongkam** (Thailand): Development of Landslide Monitoring System by Real-Time Kinematic Survey: Experimentation and Application in Mae Moh Mine, Thailand (11973)

Iwan Hermawan, Idwan Suhendra, Ragil Wahyu Tasyrifin Karim, Darmawan Eka Wicaksono and **Halim Wiranata** (Indonesia): Evaluation of Precision and Accuracy of Mobile Mapping System (MMS) Leica Pegasus Two Ultimate for Road Monitoring (12158)

Ralf Becker, Benjamin Eberhardt, Christoph Effkemann, Thomas Gattung, Issa Hansen, Louis Makiello, Enrico Neumann, Juan Ramirez, Raimund Schwermann, Julian Teege and **Jörg Blankenbach** (Germany): RiverCloud – A Multi-sensor UAV/USV Tandem System for High Resolution Data Acquisition of Water Bodies (11874)
This is a peer reviewed paper.

Pratikshya Regmi, Michael Starek and **Jacob Beryhill** (USA): Overview of the Uncrewed Aircraft System (UAS) Campus Survey Project at Texas A&M University-Corpus Christi (12196)

TS02I: 3D LAND ADMINISTRATION [10521]

MONDAY, 29 MAY 14:30–16:00
VENUE: VESEY, HILTON/WALDORF
COMMISSION: 3, 7. ISO & OGC
CHAIR: PROF. **PETER VAN OOSTEROM**, NETHERLANDS
RAPPORTEUR: MSC. **EFTYCHIA KALOGIANNI**, GREECE

Dimitra Andritsou, Sofia Soile and **Chryssy Potsiou** (Greece): Investigating the Merging of BIM and Land Use Geospatial Data with 2D Cadastral Information. A Case Study for a Municipality in Greece. (12139)

Eftychia Kalogianni, Peter van Oosterom, Christiaan Lemmen, Hendrik Ploeger (Netherlands) and **Rod Thompson** (Australia): 3D Land Administration: Current Status (2022) and Expectation for the Near Future (2026) (12246)

Matthew Woodlief (USA): Technical Considerations for Implementing 3D Cadastre (12004)

Matjaz Grilc (Slovenia), **Nicolas Smith** (France), **Vladimir Krupa** (Croatia) and **Jean-Yves Pirlot** (Belgium): Condominium as Seen by Surveyors a Compendium of National Approaches on Condominium Surveying and Their Best Practices (12119)

Jing Sun and **Jenny Paulsson** (Sweden): Towards 3D Cadastral Level of Detail (12035)

Shan-Ju Yang and **Jung-Hong Hong** (Chinese Taipei): A Multi-Level Space Unit Framework for 3d Buildings to Facilitate the Development of Digital Twin (11960)

Shen Ying, Meng Wang, Chengpeng Li, Wenting Zhang, Ye Wang, Yong Zhan and **Yu Zhang** (China, PR): 3D Cadastral Practice in Different Cities in China (12217)

TS02J: SIDS – TOP CONCERNS OF THE CARIBBEAN SIDS – SESSION 2 [10534]

MONDAY, 29 MAY 14:30–16:00
VENUE: BROADWAY/CARNEGIE, HILTON/WALDORF
CHAIR: MR. **ROB SARIB**, AUSTRALIA

Small Island Developing States(SIDS) Workshop Serving Society for the benefit of people and planet; Facing the global challenges in Small Island Developing States: The Role of Land Professionals

- UN-GGIM Americas Private Networks, **Valrie Grant**, Private Networks
- GIS Support to the Caribbean, **Tim Fella**, ESRI
- U.N SDG’s, **Paula Dijkstra**, Task Force on FIG and the SDGs
- Summary of questionnaire responses, **Steven Nystrom**, FIG Commission 9
- Short presentations expressing top five concerns (5–10 minutes each)
- Presentations include: **Ruth L. Trujillo-Rodriguez**, professional surveyor, Puerto Rico; **Darren Kelly**, Chief Surveyor, Cayman Islands Government Lands & Survey Department; **Wayneworth Hamilton**, Director of Surveys, Turks and Caicos Islands
- Discussion

TS03A: THE FUTURE OF YOUNG SURVEYORS NETWORK

MONDAY, 29 MAY 16:30–18:00
VENUE: CITRUS/COLLIER/COLUMBIA, HILTON/WALDORF
CHAIR: MS. SHIRLEY CHAPUNZA, ZIMBABWE
RAPPORTEUR: MR. ZIFCEAC IAROSLAV, ROMANIA

The session will give an update on the YSN plans and activities from across the globe. It will also include an interactive segment of group discussions of the young surveyor's role in serving the community for people and planet.

The group discussion will invoke conversation in mentoring and climate sensitive professional development, partnerships and young surveyors' engagement in FIG commissions and Task Forces as well as promotion of inclusion, diversity and equity within the network and profession at large.



ESRI HANDS-ON LEARNING LAB

MONDAY, 29 MAY 16:00–18:00
VENUE: SARASOTA – ESRI ROOM , HILTON/WALDORF

TS03B: ENHANCING WOMEN'S ACCESS (TO LAND AND SURVEYING) – 2 [10529]

MONDAY, 29 MAY 16:30–18:00
VENUE: FLAGLER/GILCHRIST, HILTON/WALDORF
COMMISSION: 1, 7 & TF ON SDG
CHAIR: MS. KATE FAIRLIE, AUSTRALIA
RAPPORTEUR: MS. CLAIRE BUXTON, NEW ZEALAND

FIG's Commission 7 Working Group on Women's Land Rights has developed a preliminary project plan to revisit and build on FIG Publication 24, to clearly document and articulate the role and responsibilities of surveyors in promoting and mainstreaming women's land rights in practice and to grow FIG's contributions to the Stand for Her Land (SH4L) initiative, in particular supporting FIG members to support SH4L activities on the ground.

This session commences with a brief introduction to the WG and the aims and intent of the session. This is followed by a panel drawn from representatives from multilaterals and development partners, NGOs and the private sector. Two key questions are asked of the panel:

- What are your experiences of successes and barriers to achieving women's land rights, especially in the 'Americas' region?
- How best can FIG and surveyors impact the WLR space, including through linkages with S4HL?

The final half hour of the session will be devoted to an 'inputs session' (rather than a Q+A) – meaning that opportunity will be provided to the audience to provide input into the Working Group workplan, to guide the direction that FIG might take and to ultimately volunteer for a role in the Working Group. Attendees are particularly asked to consider the role of surveyors – both individuals and representative bodies – in achieving women's land rights.

TS03C: OPPORTUNITIES AND CHALLENGES FOR CLIMATE CHANGE ADAPTIVE STRATEGIES [10550]

MONDAY, 29 MAY 16:30–18:00
VENUE: HAMILTON/INDIAN RIVER, HILTON/WALDORF
COMMISSION: 8 & YSN
CHAIR: MR. CHARLES ATAKORA, GERMANY
RAPPORTEUR: ADAMU BALA, NIGERIA

Obianinulu Oduwegwu, David Elegbede and Priscilla Vambe (Nigeria): Flooding in Nigeria: Surveying Approach to Mitigating The Risk and Disaster. (11829)

Inma Gutierrez and Edi Meier (Switzerland): GRIMONIT (Groundriskmonitor) Fully Automatic and Remote-Controllable Deformation Early Warning System for Difficult Measurement Conditions (11868)
This is a peer reviewed paper.

Tien-Yin Chou, Chen-Yang Lee, Hsiao-Yuan Yin, Yi-Chia Lin and Mei-Ling Yeh (Chinese Taipei): The Disaster Management of Large Scale Landslide: A Case Study of Debris Flow Early Responding Systems (12016)

Rumbidzai Chivizhe, Juliana Useya and Reason Mlambo (Zimbabwe): Damage and Loss Assessment Due to Tropical Cyclone Idai's Flooding Events in Chimanimani District, Zimbabwe (12031)

TS03D: SIDS – TOP CONCERNS OF THE CARIBBEAN SIDS – SESSION 3 [10535]

MONDAY, 29 MAY 16:30–18:00
VENUE: NASSAU, HILTON/WALDORF
CHAIR: DR. DANIEL ROMAN, UNITED STATES

Small Island Developing States(SIDS) Workshop
 Serving Society for the benefit of people and planet; Facing the global challenges in Small Island Developing States: The Role of Land Professionals

- Short presentations expressing top five concerns (5–10 minutes each) continued
- Presentations include: **Trich Lactor-Polius** (President) St. Lucia Association of Surveyors
- Charisse Griffith-Charles**, University of the West Indies
- Discussion

TS03E: VALUATION OF UNREGISTERED LAND MANUAL [10542]

MONDAY, 29 MAY 16:30–18:00
VENUE: ORANGE, HILTON/WALDORF
COMMISSION: 9 & GLTN
CHAIR: DR. MICHAEL MCDERMOTT, AUSTRALIA
RAPPORTEUR: MR. JAMES KAVANAGH, UNITED KINGDOM

The ground-breaking "Valuation of Unregistered Land—A Practice Manual is gaining significant momentum and recognition in the land sector, especially in the land acquisition/compensation sector. The manual has started an important conversation on the recognition of non-market values and their relevant to tribal and communally held land and has been presented at several recent conferences to audiences outside of our (FIG) usual remit. This session will seek to explore recent work by the expert group on:

- The evolution of non-market value
- Ensuring fairness in unregistered and customary land acquisition (IAIA)
- Recent case studies from Indonesia, Ghana, Uganda, Nepal and Sri Lanka
- The principle of equivalence
- Livelihood restoration, monetary compensation for acquired land and regulatory frameworks
- The future – update from UN GLTN

TS03G: NOVEL LOW-COST POSITIONING SENSOR SYSTEMS AND THEIR APPLICATIONS [10565]

MONDAY, 29 MAY 16:30–18:00
VENUE: TAYLOR, HILTON/WALDORF
COMMISSION: 5
CHAIR: DR. LI ZHANG, GERMANY
RAPPORTEUR: MR. DAVID MULINDWA, UGANDA

Maurice Barbieri (Switzerland): GISCAD-OV : Galileo High Accuracy Service : a Contribution of Surveyors to GNSS (12293)

David Mulindwa, Ronald Ssengendo and Arthur Andrew Kumbu (Uganda): Adoption of Low-Cost Gns Unit and Raspberry Pi 4 for CORS Network in Africa: a Viable Solution for Reliable and Accurate Positioning (12149)

Johnson Oguntuase, Uchenna Nwankwo and Stephan Howden (USA): Affordable GNSS PPP Results as Constraints for Pressure Time Series Offshore (11890)
This is a peer reviewed paper.

Rui Fernandes (Portugal): EPOS-GNSS – Improving the Access to GNSS data and Products from CORS Stations in Europe (12183)

TS03F: FIG ACADEMIC MEMBER FORUM

MONDAY, 29 MAY 16:30–18:00
VENUE: PALM, HILTON/WALDORF
CHAIR: MR. KWAME TENADU, FIG VICE PRESIDENT, GHANA

The FIG Academic Members Forum is the platform where the Academic Members of FIG and other academics gather to discuss about academic responsibilities and prepare actions.

Monday, 29 May 2023 16:30–18:00

TS03H: FIG CORPORATE MEMBER SESSION – LEICA GEOSYSTEMS

MONDAY, 29 MAY 16:30–18:00

VENUE: MADISON, HILTON/WALDORF
CHAIR: DR. CRAIG HILL, SWITZERLAND

Making the World a Better and Safer Place, Step by Step, with Leica Geosystems

The wide-ranging solutions Leica Geosystems, part of Hexagon, provides are created with sustainability as a priority. We deliver scalable innovations across a vast array of industries. Step by step, our solutions help customers to optimise the use of raw materials and components, improve energy efficiency and productivity, extend product life, and predict and prevent harm.

This presentation will provide insights into the many areas Leica Geosystems helps customers move progressively towards sustainability, including a special focus on how deformation monitoring protects people and the environment to make the world a safer place.

Presenters:

- Dr. Craig Hill, VP Marketing & Services, Leica Geosystems AG, Heerbrugg, Switzerland
- Dr. Lidija Špiranec, Senior Product Engineer, Leica Geosystems AG, Heerbrugg Switzerland



TS03I: FUTURE OF LADM [10522]

MONDAY, 29 MAY 16:30–18:00

VENUE: VESEY, HILTON/WALDORF

COMMISSION: 3 & 7

CHAIR: PROF. PETER VAN OOSTEROM, NETHERLANDS

RAPPORTEUR: MR. MULYADI MULYADI, INDONESIA

Christiaan Lemmen, Peter van Oosterom, Abdullah Kara (Netherlands), **Eftychia Kalogianni** (Greece), **Abdullah Alattas** (Saudi Arabia) and **Agung Indrajit** (Indonesia):

Overview of Developments of Edition II of the Land Administration Domain Model (12245)

Eftychia Kalogianni, Edward Verbree, Peter van Oosterom (Netherlands), **Ivars Neudiens** (Latvia) and **Roberto Capua** (Italy):

Galileo High Accuracy Services Support Through ISO 19162 Ladm Edition II (12251)

Golgi Alvarez, Leidy Bernal Vargas and **Jonathan Albarracin** (Colombia):

Interaction of Land Objects from LADM Models to Improve Citizen Services (12084)

Kambugu William (Uganda) and **Juan Pablo Soliz** (USA): Securing Community Land Rights Using a Simplified Land Community Data Model (SLCDM): a Uganda Case Study (12100)

Solomon Njogu, John Gitau (Kenya) and **Danilo Antonio** (Philippines):

The Social Tenure Domain Model Framework: Lessons and Opportunities from a Decade of Experiences in the Country Applications (12165)

TS03J: ADVANCES IN GEOAI [10590]

MONDAY, 29 MAY 16:30–18:00

VENUE: BROADWAY/CARNEGIE, HILTON/WALDORF

COMMISSION: 3

CHAIR: DR. SAGI DALYOT, CHAIR FIG COMMISSION 3, ISRAEL

RAPPORTEUR: DR. ANNA SHNAIDMAN, ISRAEL

Markus Schaffert and **Michael Müller** (Germany):

Combining GIS with Fuzzy Logic and Scenario Planning to Deal with Demographic Change. A Case Study on Medical Supply in Rural Germany (11925)

Hassan Musa, Samuel Sule Garba, Ibrahim Kurfi Ahmed and **Yakubu Yazeed** (Nigeria): Leveraging Deep Learning to Improve UAV Image Matching for On-Demand Mapping (12079)

Darion Mahadeo and **Raid Al-Tahir** (Trinidad And Tobago): Artificial Intelligence Techniques for Extracting Impervious Surface Areas from Satellite Imagery (12090)

Michael Nyoagbe, John Ayer, Lily Lisa Yevugah and **Yaw Mensah Asare** (Ghana): Flood Prediction Using Machine Learning and GIS as an Early Warning System (12205)

Hartmut Mueller (Germany): Some Considerations on the Potential Impact of Artificial Intelligence for Surveyors' Work (12213)

Monday, 29 May 2023 19:00–20:30

INFORMAL DRINKS AND MINGLING – CONVERSATIONS FOR SURVEYORS ABOUT CLIMATE

MONDAY, 29 MAY 19:00–20:30

VENUE: VENUE TO BE ANNOUNCED AT THE TS01C SESSION



Tuesday, 30 May Morning

FIG FOUNDATION MEETING

TUESDAY, 30 MAY 07:00–08:50
VENUE: BRADFORD – FIG MEETING ROOM, HILTON/WALDORF
CHAIR: MR. JOHN HOHOL, FIG FOUNDATION PRESIDENT, UNITED STATES

- By Invitation only

SIDS MORNING MEETING

TUESDAY, 30 MAY 08:00–08:50
VENUE: NASSAU, HILTON/WALDORF
CHAIR: DR. DANIEL ROMAN, UNITED STATES

Small Island Developing States(SIDS) Workshop
 Serving Society for the benefit of people and planet; Facing the global challenges in Small Island Developing States: The Role of Land Professionals

Follow-ups, discussion and any further presentations on Top Concerns

PLENARY SESSION 2:
CONQUERING NEW FRONTIERS [10512]

TUESDAY, 30 MAY 09:00–11:00
VENUE: BONNET CREEK BALLROOM, HILTON/WALDORF

Mankind has forever embarked on progressing through and finding new frontiers. Our professional members throughout the generations are no different- we were all the future at one time. Interpretations of the new frontiers from our key note speakers are considering smarter working in digital transformation and impact of geospatial infrastructure, space research and development. In addition, hearing perspectives from our young surveyors in relation to what this means them, and what it means to be at the forefront of the current generational frontier as well as upcoming generations yet to choose surveying as their profession.

Russell Romanella (USA):
 Asa – Exploration for Our Future (12303)

Bryn Fosburgh (USA):
 Is the New Frontier Ai, Digital Twins, and the Metaverse? (12304)

Mickey Ng Nok Hang (Hong Kong SAR, China):
 Smarter Working in Digital Transformation (12305)

Inspirational talk by
GET KIDS INTO SURVEY

Tuesday, 30 May 2023 11:30–13:00

TS04A: FIG DIRECTOR GENERALS FORUM

TUESDAY, 30 MAY 11:30–13:00
VENUE: CITRUS/COLLIER/ COLUMBIA, HILTON/WALDORF
CHAIR: DR. DANIEL STEUDLER, FIG VICE PRESIDENT, SWITZERLAND
RAPPORTEUR: PROF. ABBAS RAJABIFARD, CHAIR FIG TASK FORCE ON GEOSPATIAL TRENDS, AUSTRALIA

The annual FIG Director Generals Forum brings together Chief Executives or Director Generals of national (or provincial) agencies and FIG Affiliate Members that have responsibility over mapping, cadastre, valuation, planning and development, land administration and management from around the world. The Forum allows peer-to-peer engagement to address the present challenges and opportunities, including the responsibility of national agencies to stay relevant and effective.

This year's Director Generals Forum will be contested by the new FIG-Task Force on "The Role of FIG in International Trends and Future Geospatial Information Ecosystem". Members of the Task Force will provide background information, followed by a moderated panel discussion, which aims to seek opinions and input from the attending Director Generals

SPECIAL MEETING ON PHASE 4 [10581]

TUESDAY, 30 MAY 11:30–13:00
VENUE: BAKER, HILTON/WALDORF
COMMISSION: GLTN

TS04B: FIG CORPORATE MEMBER SESSION – TRIMBLE

TUESDAY, 30 MAY 11:30–13:00
VENUE: FLAGLER/GILCHRIST, HILTON/WALDORF

Enabling Geospatial Professionals to Conquer New Frontiers
 Speakers: **Stephanie Michaud** and **Anna Jarvis**

As a market leader and technology innovator in the geospatial industry, Trimble Inc realizes it takes more than just a cool new product to transform the way the world works and create lasting change. It takes investment in the people who are leading and driving that change, and supporting the way they want to work with entirely new disruptive solutions.

Democratization of positioning solutions has been a persistent goal within the Trimble Survey and Mapping sector, especially for addressing Land Administration needs of mapping cadastre and people's relationship to the land, all while maintaining data integrity and quality. Over the past year, several localized pilots have been launched in select markets worldwide (India, Brazil, and South Africa) to test the validity of a low cost, software based GNSS solution, paired with attribute rich survey software. In this session, we are excited to share the results and lessons learned while deploying these pilots.

As the cost of commercially available imaging sensors (LiDARs, cameras, etc.) continues to decrease, so has the cost of mobile mapping systems that use them, meaning there is more geospatial data available than ever which can be harnessed to make faster, safer, and greener decisions. Applications range from real-time detection of foreign objects on runways (FOD), high accuracy mapping for telecommunication companies planning locations for new fiber-optic cables, or contributing to real-time efficiency in a railyard. Accuracy of the geospatial data and its collection efficiency are of utmost importance, and without the proper tools challenges can arise, especially in dense urban environments. The hardware and software solutions from Trimble Applanix provide the highest accuracy positioning and orientation measurements for mobile georeferencing in all environments, whether mapping from an aircraft, a UAV, land vehicle, or a ship.

Join the Trimble and Applanix teams as we share the many ways in which we are protecting our world, while simultaneously striving to enable geospatial professionals to conquer new frontiers.

TS04C: LEGAL REGULATIONS FOR VALUATION AND TRANSPARENCY ON THE REAL ESTATE MARKET IN COUNTRIES AND STATES [10551]

TUESDAY, 30 MAY 11:30–13:00
VENUE: HAMILTON/INDIAN RIVER, HILTON/WALDORF
COMMISSION: 7 & 9
CHAIR: DIPL.-ING. PETER ACHE, CHAIR FIG COMMISSION 9, GERMANY
RAPPORTEUR: MR. LUC HERMANS, NETHERLANDS

Kahilu Kajimo-Shakantu and Allen Dzuda (South Africa):

Challenges of Private Capital Investments in the Former Transkei Area in South Africa: Effects of Property Laws on Real Estate Development (12190)

Wolfgang Glunz (Germany):
 IPMS: All Buildings – a Tool to Compare Building Areas and Property Values (11894)

Felicjan Komu and Evelynne Mugasha (Tanzania):
 Legal Regulations for Valuation and Transparency in the Real Estate Market in Tanzania (12124)

Nino Raymond Alvina (USA):
 Making Property Valuation and Taxation Work Better: a Brief Review of Policy and Program Interventions in the Philippines (12197)

Kevin Barthel (USA):
 Land-Based Revenues to Support Improved Services and Increased Land Productivity (12273)

ESRI HANDS-ON LEARNING LAB

TUESDAY, 30 MAY 09:00–13:00
VENUE: SARASOTA – ESRI ROOM, HILTON/WALDORF

TS04D: SIDS – SUMMARY SESSION AND DEVELOPMENT OF DRAFT DECLARATION – SESSION 4

TUESDAY, 30 MAY 11:30–13:00
VENUE: NASSAU, HILTON/WALDORF
CHAIR: DR. DANIEL ROMAN, UNITED STATES

Small Island Developing States(SIDS) Workshop

Serving Society for the benefit of people and planet; Facing the global challenges in Small Island Developing States: The Role of Land Professionals

- Summary of Top Concerns and Draft Declaration, **Steven Nystrom**
- Discussion led by **Rob Sarib and Andrick Lal**
- Next Steps, **Daniel Roman and James Kavanaugh**
- Closing remarks by **Daniel Roman**

TS04E: HYDROGRAPHIC APPLICATIONS IN BLOOMING THE BLUE ECONOMY & MARINE ADMINISTRATION [10544]

TUESDAY, 30 MAY 11:30–13:00
VENUE: ORANGE, HILTON/WALDORF
COMMISSION: 4
CHAIR: PROF. MOHD RAZALI MAHMUD, MALAYSIA
RAPPOREUR: MR. GEOFF LAWES, AUSTRALIA

Oladunni Opatoyinbo, Ifeanyi Onuigbo, Ahmed Musa and Yusuf Opaluwa (Nigeria): Derivation of Seawater Depth from Atmospheric Pressure in the Near-Shore Zone of Barrier-Lagoon Complex, Lagos State, Nigeria (12077)

Dhono Nugroho, Ardhan Zulkhy Rokhmany, Audita Widya Astuti and Bily Silaen (Indonesia): Hydrographic Survey in Basic Design Stage of Immersed Tunnel Planning for the New Capital City of Indonesia (12156)

Muhammad Algaamdi (Saudi Arabia): Coastline Length Effects on Area Calculation (12214)

TS04F: LEGAL, POLICY AND REFORM ISSUES IN LAND ADMINISTRATION [10558]

TUESDAY, 30 MAY 11:30–13:00
VENUE: PALM, HILTON/WALDORF
COMMISSION: 7
CHAIR: DR. JAAP ZEVENBERGEN, NETHERLANDS
RAPPOREUR: MS. SHEILLA AYU RAMADHANI, INDONESIA

Elena Busch (Norway) and **Maria Ovdii** (Moldova): Norwegian Support to Geospatial Sector in the Republic of Moldova: Sixteen Years of Capacity Development (11914)

Teimuraz Gabriadze and Elene Grigolia (Georgia): Land Registration Reform in Georgia – Innovative Solutions and Approaches (12027)

Eric Yeboah, James Dadson, Jones Ofori-Boadu and Benjamin Arthur (Ghana): Reforming Land Administration Through Market-Oriented Interventions- Mapping out Emerging Lessons from Ghana's Journey Towards Private Sector Participation (11995)

Hellen Ndongu, John Gitau (Kenya), **Lunalyn Cagan** (Philippines) and **Danilo Antonio** (Kenya): Land Tenure Security Innovations in the Philippines – the Case of 'Good Enough Land Governance' in Muntinlupa City (12036)

TS04G: GNSS REFERENCE STATIONS AND NETWORKS [10566]

TUESDAY, 30 MAY 11:30–13:00
VENUE: TAYLOR, HILTON/WALDORF
COMMISSION: 5
CHAIR: DR. RYAN KEENAN, CHAIR FIG COMMISSION 5, AUSTRALIA
RAPPOREUR: DR. ELДАР RUBINOV, AUSTRALIA

Saad Al-Qahtani, Abdulwasiu Salawu, Abdullah Al-Qahtani and Abdullah Al-Thawwad (Saudi Arabia): Establishment of KSA-CORS Network, Its Performance and Future Plans (12208)

Milan Horemuz, Amin Alizadeh-Khameneh, Johan Vium Andersson and Sara Wahlund (Sweden): Geometry of Reference Stations in Network RTK (11870)
This is a peer reviewed paper.

Peter T.Y. Shih (Chinese Taipei): A Performance Analysis of Real Time Kinematic GNSS Services in Taiwan (11990)

Asmamaw Yehun, Tsegaye Gogie (Ethiopia), **Addisu Erkihun** (Luxembourg) and **Martin Vermeer** (Finland): Estimation of Precipitable Water Vapour Using Ground-based GPS and Radio Occultation over Ethiopian Regions (11828)

John Galetzka, Ira Sellars, Francine Coloma, Lijuan Sun and Don Haw (USA): The NOAA CORS Network (NCN): a Brief History and Current Status (12101)

Luis Elneser, Xiaohua Wen (Australia), **Garrett Seepersad** (Canada), **Mike Horton** and **Yudan Yi** (USA): Can Co-Location and Community CORS Add Value to GNSS Data? (12063)

Sorin Nistor and Valeria-Ersilia Oniga (Romania): Evaluation of GALILEO Data for High Precision Determination (12247)

TS04H: DIVERSITY AND INCLUSION IN THE SURVEYING PROFESSION

TUESDAY, 30 MAY 11:30–13:00
VENUE: MADISON, HILTON/WALDORF
COMMISSION: TF ON DIVERSITY/INCLUSION
CHAIR: MR. STEPHEN DJABA, CHAIR TF ON DIVERSITY & INCLUSION, GHANA

Malinowski Tomasz (Poland): Success in Life (12229)

TS04I: FIT-FOR-PURPOSE LAND ADMINISTRATION: MAKING IT HAPPEN [10523]

TUESDAY, 30 MAY 11:30–13:00
VENUE: VESEY, HILTON/WALDORF
COMMISSION: 7
CHAIR: MS. PAULA DIJKSTRA, NETHERLANDS
RAPPOREUR: MR. MARIO SIUKUTA, NAMIBIA

Wambayi Wabwire (Kenya), **Coughenour Amy** and **Kemper Rudo** (USA): Empowering Communities in the Global South with Geospatial Technology for Sustainable Development (12173)

Claudia Stöcker, Auriol Degbello, Gergely Vassanyi (Germany) and **Kaspar Kundert** (Rwanda): Community-Based Mapping with Smartlandmaps: Versatile, Simple and Inclusive (12116)

Leiv Bjarte Mjøs and Helge Nysæter (Norway): Finding Property Boundaries by Use of Low-Cost Technology and Free Public Data (12161)

Helge Nysæter and Arve Leiknes (Norway): Fit-For-Purpose Boundary Mapping with Low-Cost Gns Receivers and Opensource Software (12024)

Ibrahim Magemeso, Godfrey Toko, Richard Oput, Jimmy Alani and Johnson Mukaga (Uganda): Registration of Customary Certificates of Ownership Using Accurate Data in Uganda (12131)

Israel Taiwo, Sunday Oladejo and David Elegbede (Nigeria): Limitations of Fit-For-Purpose Land Administration Implementations in Africa (12186)

Abdul Khaliq Bujang (Brunei Darussalam): Land Survey Methodology Research Project 'Fit for Purpose' for Brunei Darussalam (12252)

TS04J: TECHNOLOGICAL ADVANCES IN SPATIAL DATA HANDLING [10591]

TUESDAY, 30 MAY 11:30–13:00
VENUE: BROADWAY/CARNEGIE, HILTON/WALDORF
COMMISSION: 3
CHAIR: PROF. HARTMUT MÜLLER, GERMANY
RAPPOREUR: DR. SAGI DALYOT, CHAIR FIG COMMISSION 3, ISRAEL

Ho Sin-Yi (Chinese Taipei): Temporal Modelling Consideration for Geospatial Data to Support Time-Aware Operations (11938)

Alvaro Ortiz and Luz Angela Rocha (Colombia): Spatial Clustering for Generation of Routes Adjusted to the Vehicle Fleet in Spatial Databases (11992)

Anna Shnaidman, Or Aleksandrowicz, Dariel Renn-Pony, Medad Hozo and Moshe Yaniv (Israel): Geo Data-Based Policymaking: National Tree Canopy Cover Example (12002)

Jean Abdoulaye Morand, Gabriel Jaffrain, Christophe Sannier, Jean Louis Weber and Jean Philippe Lestang (France): From Land Use & Land Cover Data to the First Ecosystem Natural Capital Accounting Experimentation in the Republic of Guinea (12050)

Naa Dedei Tagoe (Ghana), **Francesco Holecz** (Switzerland) and **Alexander Ayettey** (Ghana): An Early Warning Earth Observation System to Detect and Map Forest Disturbances (12215)

Tuesday Tours

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) [10517]**TUESDAY, 30 MAY 13:00–18:00**

The NOAA Aircraft Operations Center serves as the main base for NOAA's fleet of nine specialized environmental data-gathering aircraft, including the agency's three "hurricane hunter" planes. NOAA Corp officers use many tools familiar to surveyors including photogrammetry, LIDAR, and UAV technology.

- Ticket required

SOUTHEASTERN SURVEYING AND MAPPING CORPORATION (SSMC) [10518]**TUESDAY, 30 MAY 13:00–18:00**

Founded in Orlando in 1972, Southeastern Surveying and Mapping Corporation (SSMC) is an independent, employee-owned surveying and mapping, subsurface utility engineering (SUE), and geographic information systems (GIS) firm serving the southeastern United States. It is the largest surveying and mapping company in Florida.

- Ticket required

ORLANDO WETLANDS PARK [10519]**TUESDAY, 30 MAY 13:00–18:00**

The Orlando Wetlands Park is a man-made wetland designed to provide advanced treatment for reclaimed water from the City of Orlando and other local cities. The Park is 1650 acres (668 hectares) in size and located in Christmas, Florida.

- Ticket required

ESRI HANDS-ON LEARNING LAB**TUESDAY, 30 MAY 13:00–16:00****VENUE:** SARASOTA – ESRI ROOM, HILTON/WALDORF

Tuesday, 30 May 2023 14:30–16:00

TS05A: EVALUATION OF LAND ADMINISTRATION SYSTEMS [10524]**TUESDAY, 30 MAY 14:30–16:00****VENUE:** CITRUS/COLLIER/COLUMBIA, HILTON/WALDORF**COMMISSION:** 7**CHAIR:** DR. **ROHAN BENNETT**, CHAIR FIG COMMISSION 7, AUSTRALIA
RAPPORTEUR: MS. **CARMEN FEMENIA RIBERA**, SPAIN

Charl-Thom Bayer (Denmark), **Wambayi Wabwire** (Kenya), **Laura Meggiolaro** (Italy) and **Marzatico Francesca** (New Zealand):

Re-Imaging Comparative Land Administration Data for the Next Decade (12133)

Michael Barry (Canada) and **Rosalie Kingwill** (South Africa): Land Titling Suitability Classification Theory (11966)

Jaap Zevenbergen and **Guus van Westen** (Netherlands): Land Tenure Security as the Holy Grail – Do Mapping and Registration Bring What Is Often Assumed? (12020)

Ken Lyons (Australia): Simulation Models to Test Improvement Proposals in Land Administration Before Investing [Special reference to Developing Countries] (11911)

Tony Burns, Kate Fairlie (Australia), **Neil Pullar** (New Zealand), **Stevan Dobrilovic** and **Jill Pike** (USA): New Assessment Tool for Identifying Appropriate Technology Investments in Land Administration Records and Transaction Systems (12274)

Fatemeh Jahani Chehrehbargh, Abbas Rajabifard, Behnam Atazadeh (Australia) and **Daniel Steudler** (Switzerland): Performance Evaluation of Land Administration Systems – Implications of Global Initiatives (11921)

TS05B: RURAL-URBAN LINKAGES [10530]**TUESDAY, 30 MAY 14:30–16:00****VENUE:** FLAGLER/GILCHRIST, HILTON/WALDORF**COMMISSION:** 8**CHAIR:** MR. **KWAME TENADU**, FIG VICE PRESIDENT, GHANA

Magdalena Grus, Erwin Folmer and **Alexandra Rowland** (Netherlands): The First Results of User Experience Experiment with Accessing Geospatial Information in the Kadaster Knowledge Graph with Augmented Reality (12034)

Raymond Peter Lubwama (Uganda): Impact of Mining Induced Urbanisation on Land Cover in Gold Mining Areas in Uganda: a Case Study of Gold Mines Mawero Parish, Busia District (12162)

Mitchelle Chao Mwanguo and **Collins Mwangi** (Kenya): Use of Geographic Information Systems (GIS) to Assess Literacy in Rural Communities in Kenya (12181)

TS05C: EXAMPLES OF TRANSPARENT REAL ESTATE MARKETS THROUGH GOOD DATA AVAILABILITY [10552]**TUESDAY, 30 MAY 14:30–16:00****VENUE:** HAMILTON/INDIAN RIVER, HILTON/WALDORF**COMMISSION:** 9**CHAIR:** DR. **CHRISTINA MAUER**, GERMANY
RAPPORTEUR: MR. **WOLFGANG GLUNZ**, GERMANY

Luc Hermans, Ruud Kathmann and **Marco Kuijper** (Netherlands): Transparency Through the Use of International Standards (11946)

Eva Katharina Neubrand, Sabine Georgi, Michael Hellwig and **Peter Ache** (Germany): Taxonomy of Commercial Real Estate – Structuring the Substantive Submarket of Commercially Used Real Estate in Germany for the Purpose of Market Observation and Valuation (12118)

Frank Harleman and **Marion Plegt** (Netherlands): Making the Housing Market Transparent with Land Registry Data: the Role of Buy-To-Let in the Dutch Housing Market (12037)

TS05D: DIGITAL TECHNOLOGIES IN CONSTRUCTION [10536]**TUESDAY, 30 MAY 14:30–16:00****VENUE:** NASSAU, HILTON/WALDORF
COMMISSION: 10**CHAIR:** PROF. **CHRISTIAN CLEMEN**, GERMANY
RAPPORTEUR: DR. **ROBERT KADEN**, GERMANY

Sebastian Schilling and **Christian Clemen** (Germany): Terraintwin – Microservice Architecture for the Integration of Geodata (GIS) and Building Models (BIM) Using Link Models (11873)
This is a peer reviewed paper.

Christoph Blut, Tristan Kinnen, Felix Schellong, Dirk Heidermann, Guenter Bleimann-Gather and **Joerg Blankenbach** (Germany): X-Reality for Intuitive BIM-Based As-Built Documentation (11918)

Alojz Kopacik, Jan Erdelyi and **Richard Honti** (Slovakia): Point Cloud and BIM-based Quality Check of Building Structures (11983)

Michael Koterba (USA): MJ4D, An Agile and Platform Agnostic Digital Twin (12053)

Felix Gruner, Enrico Romanschek, Daniel Wunjaz and **Christian Clemen** (Germany): Scan Vs. BIM: Patch-Based Construction Progress Monitoring Using BIM and 3D Laser Scanning (ProgressPatch) (12203)

Vincent Agie de Selsaten (Belgium): The Application of Robotics in Construction (12243)

TS05E: CONQUERING NEW FRONTIERS OF HYDROGRAPHY [10543]**TUESDAY, 30 MAY 14:30–16:00****VENUE:** ORANGE, HILTON/WALDORF
COMMISSION: 4**CHAIR:** DR. **MALAVIVE DON ERANDA KANCHANA GUNATHILAKA**, CHAIR FIG COMMISSION 4, SRI LANKA
RAPPORTEUR: MR. **GORDON JOHNSTON**, UNITED KINGDOM

Maroale Martha (Mimi) Chauke and **Heimann Clinton** (South Africa): Towards Identifying Fundamental Datasets and Associated Data Custodians for the Marine and Coastal Sphere in South Africa – an Integrated Geospatial Information Framework Approach. (12067)

Caleb Oluwadare and **Emmanuel Sanyaolu** (Nigeria): Cost-Efficient Bathymetric Mapping Using Sentinel Data (11888)
This is a peer reviewed paper.

Daniel Roman (USA) and **John Crowley** (Canada): Dynamic Heights for the International Great Lakes Datum of 2020 (11980)

Prosper Basommi Laari (Ghana): Prediction of Piezometric Water Level Using Artificial Neural Network Optimized with Particle Swarm Optimization (12023)

Mohd Razali Mahmud and **Kelvin Kang Wee Tang** (Malaysia): Challenges of Nearshore Bathymetric Mapping Using Satellite Derived Bathymetry in Malaysia (12045)

Niklas-Maximilian Schild, Lukas Klatt and **Markus Kraft** (Germany): Subsea Pipeline Tracking Using a Forward-Looking Imaging Sonar for Autonomous Underwater Vehicle (12121)

TS05F: INNOVATIONS IN SURVEYING EDUCATION [10559]

TUESDAY, 30 MAY 14:30–16:00

VENUE: PALM, HILTON/WALDORF

COMMISSION: 2

CHAIR: PROF. ROSARIO CASANOVA, URUGUAY

RAPPORTEUR: DR. BOLKAS DIMITRIOS, UNITED STATES

Yanli Zhang, Daniel Unger and Matthew McBroom (USA): Visual Traverse: an Open Source Python Program for Traverse Computation (11840)

Ifeanyi Okezie (Nigeria): Innovation in Surveying Education: a Tale from Two Regions (11843)

Dimitrios Bolkas, Matthew O'Banion, Jeffrey Chiampi and Jordan Laughlin (USA): Collaborative Virtual Reality for Surveying Education (11844) *This is a peer reviewed paper.*

Emmanuel Stefanakis (Canada): Enhancing Geomatics Engineering Education with Software Engineering Attributes (11954)

Rosario Casanova (Uruguay): Professional Education in Ethics? (11965)

Ugonna Nkwunonwo, Elijah Ebinne and Ndukwe Chiemelu (Nigeria): Exploring Professional Rejuvenation for Land Surveying Theory and Praxis from a Critical Management Perspective (11981)

Pietro Grimaldi (Italy): International Training Summer School by Coifa (12086)

Georgia Giannopoulou and Monika Przybilla (Germany): Mentoring Measures as Promoter of Career Planning in the Surveying World with a Special Focus on DVW in Germany (12179)

Peta Cox and Fairlie Kate (Australia): Use of AI in Education and the Surveying Profession (12192)

TS05G: BUILDING CAPACITY IN GEODETIC COMPETENCY [10567]

TUESDAY, 30 MAY 14:30–16:00

VENUE: TAYLOR, HILTON/WALDORF

COMMISSION: 5

CHAIR: MR. MIKAEL LILJE, FIG VICE PRESIDENT, SWEDEN

Rudolf Staiger (Germany): The Validation of Geodetic Measurements (11929)

Masaki Murakami (Japan): Study on Modernizing the General Standard of Operation Specifications for Public Surveys (12009)

Nicholas Hazelton (USA) and Yitong Wu (China, PR): The Future of Ground Marks for Geomatics: Stability and Utility (12088)

James Kavanagh and Pearson Chris (United Kingdom): RICS – GNSS – Guidelines for the Use of Gns in Land Surveying and Mapping 3rd Ed – an Operational Best Practice Standard (12048)

Yitong Wu (China, PR) and Nicholas Hazelton (USA): Evolving Computational and Data Collection Needs in Geomatics: Field Requirements and Capabilities. (12089)

Ryan Keenan (Australia), Allison Craddock (USA), Mikael Lilje (Sweden), Rob Sarib (Australia) and Demian Gomez (USA): A Global Survey of Reference Frame Competency in terms of Education, Training and Capacity Building (ETCB): Results, Analysis and Update (12230)

Xiaopeng Li, Kevin Ahlgren, Yan Ming Wang, Jordan Krcmaric and Ryan Hardy (USA): An Entire Spectrum Modernization of the Geoid Model – from data collection to modeling and customer services (12006)

TS05H: PROFESSIONAL STANDARDS [10582]

TUESDAY, 30 MAY 14:30–16:00

VENUE: MADISON, HILTON/WALDORF

COMMISSION: 1

CHAIR: MR. TIMOTHY BURCH, CHAIR FIG COMMISSION 1, UNITED STATES
RAPPORTEUR: MR. CRAIG AMEY, UNITED STATES

Nigel Sellars (United Kingdom): The Case for Consistent Property Measurement Standards – the Dawn of a New Era (12096)

TS05I: APPLICATIONS OF LIDAR IN ENGINEERING GEODESY [10587]

TUESDAY, 30 MAY 14:30–16:00

VENUE: VESEY, HILTON/WALDORF

COMMISSION: 6

CHAIR: PROF. CORINNA HARMENING, GERMANY

Junwei Hoang (China, PR): Application of Laser Scanner Based on SLAM Technology in Urban 3d Digitization (12078)

Rob Kundrick (USA): Scan-to-BIM of the UCF Rosen Center: Combing NavVis SLAM Data with TopoDOT Feature Extraction Tools (12271)

Jean Paul Hernandez (USA): Latest Developments in Pavement Condition Analysis using Mobile LIDAR (12234)

Jens-André Paffenholz, Corinna Harmening, Mathias Martin and Norbert Meyer (Germany): Derivation of Displacements of Soil Layer Compositions Induced by Means of Wheel Overruns Using Laser Scanning Point Clouds (12188)

Coleen Johnson and Scott Jones (USA): The Use of Remote Sensing Technologies to Perform Tree Surveys (12147)

Benjamin Erickson (USA): Review of International Standard ISO 17123-4:2012 for Electro-Optical Distance Meters (12001)

Audrey Alajouanine and Khalil Masmoudi (France): Implementation and Optimization of a Complete Process of Collection, Classification and Exploitation of LIDAR Data (11826)

Nabila Rahmawati, Yudo Prasetyo, Firman Hadi, Elisya Febriana and Joy Arsyad Natabraja (Indonesia): Augmented Reality Application Using 3D Model of TLS (Terrestrial Laser Scanner) (Case Study: Plaosan Lor Temple, Klaten Regency) (11997)

TS05J: GIS FOR SUSTAINABLE (GEO-) SPATIAL PLANNING [10592]

TUESDAY, 30 MAY 14:30–16:00

VENUE: BROADWAY/CARNEGIE, HILTON/WALDORF

COMMISSION: 3 & 8

CHAIR: GEOM. CROMWELL MANALOTO, ITALY
RAPPORTEUR: MR. MARKUS SCHAFFERT, GERMANY

Leonard Anyan-Darko and Priscilla Djaba (Ghana): Analysing the Aftermath of the Weija Dam Spillage Using Geographic Information Systems (11807)

Tingneyuc Sekac (Papua New Guinea), Jana Sujoy Kumar (India), Nosare Maika and Sammy Aiau (Papua New Guinea): Geospatial Technology for Hydro-power Site Selection and Rural Electrification Supply-Demand Analysis – A Case Study in the Yabem/Mape Rural of Finschhafen District, Papua New Guinea (11822) *This is a peer reviewed paper.*

Mirian Nzoputachi Marshall, Njike Chigbu, Raphael Ike Ndukwu, Samuel Ogwo Ukangwa and Maduabughichi Divine Okezie (Nigeria): Urban Land-Use Change Detection Using Multi-Temporal Satellite Imageries: a Case Study of Isuikwuato Local Government Area in Abia State. (11893) *This is a peer reviewed paper.*

Leonardo Franchi (Italy): Real-Time Mapping of the Waterways Network (11978)

Nander Yang (China, PR): GIS Spatial Analysis Based Solutions for the Electricity Industry (11993)

Priscilla Djaba and Stephen Djaba (Ghana): A Geo-Spatial Approach to Resolving Illegal Mining Activities in Ghana (12157)

Godfred Owusu Amoako (Ghana): Impact of Surface Mining on Food Security in Amansie West and South Districts of Ghana (12195)

Tuesday, 30 May 2023 16:30–18:00

ANNUAL FIG COMMISSION MEETINGS

The FIG Commissions are responsible for pursuing FIG's 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.

FIG COMMISSION 1 – PROFESSIONAL STANDARDS AND PRACTICE

TUESDAY, 30 MAY 16:30–18:00
VENUE: MADISON, HILTON/WALDORF
COMMISSION: 1
CHAIR: MR. **TIMOTHY BURCH**, CHAIR FIG COMMISSION 1, UNITED STATES

Working Groups:
 WG 1 – International Ethics Standards
 WG 2 – Women in Surveying
 WG 3 – International Boundary Settlement and Demarcation

FIG COMMISSION 2 – PROFESSIONAL EDUCATION

TUESDAY, 30 MAY 16:30–18:00
VENUE: PALM, HILTON/WALDORF
COMMISSION: 2
CHAIR: DR. **DIMO TODOROVSKI**, CHAIR FIG COMMISSION 2, NETHERLANDS

Working groups:
 WG 1 – Developing and strengthening academic networks
 WG 2 – Innovation in Curriculum development implementation
 WG 3 – Young surveyors in Education – Learning styles in surveying education
 WG 4 – Land Administration Education

FIG COMMISSION 3 – SPATIAL INFORMATION MANAGEMENT

TUESDAY, 30 MAY 16:30–18:00
VENUE: BROADWAY/CARNEGIE, HILTON/WALDORF
COMMISSION: 3
CHAIR: DR. **SAGI DALYOT**, CHAIR FIG COMMISSION 3, ISRAEL

Working Groups:
 WG 1 – Geospatial data: professionalism, technology, and services
 WG 2 – Urban challenges in developing countries
 WG 3 – GIS for sustainable (geo-) spatial planning
 WG 4 – LADM and 3D LA
 WG 5 – Geospatial next

FIG COMMISSION 4 – HYDROGRAPHY

TUESDAY, 30 MAY 16:30–18:00
VENUE: ORANGE, HILTON/WALDORF
COMMISSION: 4
CHAIR: DR. **MALAVIGE DON ERANDA KANCHANA GUNATHILAKA**, CHAIR FIG COMMISSION 4, SRI LANKA

Working Groups:
 WG 1 – Hydrographic Standards and Guidelines
 WG 2 – Sustainable Oceans and Hydrography
 WG 3 – Mapping the Plastic

FIG COMMISSION 5 – POSITIONING AND MEASUREMENT

TUESDAY, 30 MAY 16:30–18:00
VENUE: TAYLOR, HILTON/WALDORF
COMMISSION: 5
CHAIR: DR. **RYAN KEENAN**, CHAIR FIG COMMISSION 5, AUSTRALIA

Working Groups:
 WG 1 – Standards, Quality Assurance and Calibration
 WG 2 – 3D Reference Frames
 WG 3 – Vertical Reference Frames
 WG 4 – GNSS
 WG 5 – Multi-Sensor Systems
 WG 6 – Cost-Effective Positioning

FIG COMMISSION 6 – ENGINEERING SURVEYS

TUESDAY, 30 MAY 16:30–18:00
VENUE: VESEY, HILTON/WALDORF
COMMISSION: 6
CHAIR: PROF. DR. **WERNER LIENHART**, CHAIR FIG COMMISSION 6, AUSTRIA

Working Groups:
 WG 1 – Deformation Monitoring and Analysis
 WG 2 – Dynamic Structural Monitoring
 WG 3 – Applications of AR and VR in Engineering Geodesy
 WG 4 – Engineering Surveying Outreach

FIG COMMISSION 7 – LAND MANAGEMENT AND CADASTRE

TUESDAY, 30 MAY 16:30–18:00
VENUE: CITRUS/COLLIER/COLUMBIA, HILTON/WALDORF
COMMISSION: 7
CHAIR: DR. **ROHAN BENNETT**, CHAIR FIG COMMISSION 7, AUSTRALIA

Working Groups:
 WG 7.1 – Framework for Effective Land Administration (FELA)
 WG 7.2 – Fit for Purpose Land Administration (FFPLA)
 WG 7.3 – 3D and LADM (3D/LADM)
 WG 7.4 – Artificial Intelligence 4 Land Administration (AI4LA)
 WG 7.5 – Women's Access to Land and S4HL
 WG 7.6 – Integrated Land Management
 WG 7.7 – Education in Land Administration
 WG 7.8 – Comparative Land Administration

Rohan Bennett (Australia): Renewing, Reimagining, and Recommitting Land Management and Cadastre for Global and Local Relevance (11991)

FIG COMMISSION 8 – SPATIAL PLANNING AND DEVELOPMENT

TUESDAY, 30 MAY 16:30–18:00
VENUE: FLAGLER/GILCHRIST, HILTON/WALDORF
COMMISSION: 8
CHAIR: DR. **KWABENA OBENG ASIAMA**, CHAIR FIG COMMISSION 8, GHANA

Working Groups:
 WG 1 – Urban-rural land linkages
 WG 2 – Unregistered Land and large-scale acquisition/compensation
 WG 3 – Spatial Planning Instruments and Climate Change
 WG 4 – Digital Transformation for Land Management and Spatial Governance
 WG 5 – Spatial Plan and Valuation Information in LADM Context

ESRI HANDS-ON LEARNING LAB

TUESDAY, 30 MAY 16:00–18:00
VENUE: SARASOTA – ESRI ROOM, HILTON/WALDORF

Tue 30 Evening

FIG COMMISSION DINNERS

TUESDAY, 30 MAY 19:00–23:00
VENUE: VARIOUS

To be decided by each commission.

Everyone is welcome, please contact the commission chair.



FIG President Diane Dumashie together with the Commission and Network Chairs.

FIG COMMISSION 9 – VALUATION AND THE MANAGEMENT OF REAL ESTATE

TUESDAY, 30 MAY 16:30–18:00
VENUE: HAMILTON/INDIAN RIVER, HILTON/WALDORF
COMMISSION: 9
CHAIR: MR. **PETER R. ACHE**, CHAIR FIG COMMISSION 9, GERMANY

Working Groups:
 WG 1 – Definition of Transparency on Real Estate Markets
 WG 2 – Best practice Cases on Transparent Real estate Markets
 WG 3 – Automated Valuation Modelling (AVM) with machine learning and artificial intelligence

FIG COMMISSION 10 – CONSTRUCTION ECONOMICS AND MANAGEMENT

TUESDAY, 30 MAY 16:30–18:00
VENUE: NASSAU, HILTON/WALDORF
COMMISSION: 10
CHAIR: MS. **MERCY IYORTYER**, CHAIR FIG COMMISSION 10, NIGERIA

Working Groups:
 WG 1 – Digital Technologies in Construction
 WG 2 – Sustainable Developments in the Built Environment
 WG 3 – Cost Information Management
 WG 4 – Commercial /Project Management

Christian Clemen (Germany): Current Standardization Efforts to Achieve BIM and GIS Interoperability (12201)

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Our unique, seven-course training program was developed for licensed surveyors looking to gain the knowledge and skills necessary for providing cadastral services on federal trust lands.

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Wednesday 31 Morning

**PLENARY SESSION 3:
TACKLING THE GLOBAL CHALLENGES
[10513]**


WEDNESDAY, 31 MAY 09:00–11:00
VENUE: BONNET CREEK BALLROOM,
 HILTON/WALDORF

Surveyors have much to contribute in society and to highlight, advocate and above all act to ensure change that builds on a sustainability agenda. In this plenary our key note speakers will elaborate further on selected challenges that is at the forefront of thinking and highlighted in some of the FIG commission working groups. Driven by the need for sustainable development and fit for the future, this includes: an introduction to the new Reference Frame system/Datum that is being introduced in the US and which is leading up to a special National Geodetic Survey Day/Track (NGS); Disaster responsiveness highlighting the sustainability of island states given the challenges that the Small Islands are facing (which will also be a special topic in the technical sessions); and technological sustainable applications for the development of urban areas.

Juliana Blackwell (USA):
 The Modernized U.s. National Spatial Reference System – Aligning National Geospatial Data to the Globe (12306)

Simone M. Lloyd:
 Land Administration and Land Management Role in Tackling Disaster Management / Sea Level Rise – with a special focus on Sustainability of Island States (SIDS) (12310)

Dustin Parkman (USA):
 Challenges in Cities, Transportation and Reality Modeling Contribution to Land Management (12307)

Andrew Hurley (USA):
 Is Our Wider Community Taking ESG on Board? (12308)

**ASIA & THE PACIFIC CAPACITY DEVELOPMENT NETWORK –
MORNING MEETING**

WEDNESDAY, 31 MAY 07:45–08:45
VENUE: NASSAU, HILTON/WALDORF
CHAIR: MR. **ROB SARIB**, CHAIR ASIA/THE PACIFIC NETWORK, AUSTRALIA

This is an open meeting for participants who are interested in the capacity and capability development, and would like to discover, as well as share, information on related FIG activities in the Asia and the Pacific region. It is also an opportunity to have a chat about the work plans of the FIG Asia Pacific Capacity Development Network (AP CDN) and also meet like minded individuals from affiliated organisations.

ESRI HANDS-ON LEARNING LAB

WEDNESDAY, 31 MAY 09:00–12:00
VENUE: SARASOTA – ESRI ROOM, HILTON/
 WALDORF

Wednesday, 31 May 2023 11:30–13:00

**TS07A: DESIGNING
FFP LAND TENURE
RECORDATION TOOLS: VCSP
IN-COUNTRY DEPLOYMENT
IN SIERRA LEONE [10593]**

WEDNESDAY, 31 MAY 11:30–13:00
VENUE: CITRUS/COLLIER/COLUMBIA,
 HILTON/WALDORF
COMMISSION: YSN & VCSP
CHAIR: MR. **DAVID ELEGBEDE**, NIGERIA
MODERATORS: **CLAUDIA STOECKER**,
 SmartLandMaps, **MARKUS KOPER**,
 Trimble Land Administration & **ANGELA
 ANYAKORA**, NIGERIA

As a first for the FIG YSN Volunteer Community Surveyor Program, an in-Country deployment with land administration experts (Trimble and SmartLandMaps) was held in engagement with a Sierra Leonean community to assist the Sierra Leone Government in its land reform policies and helping the Young Surveyors to build capacity through the appropriate technology. Come to learn more in an engaging and inspiring session. Guiding Questions for Discussions:

How can different means of land tenure recordation be meaningfully applied and complemented to create fit-for-purpose solutions for different areas in Sierra Leone?

What is needed to create capacity, especially among young surveyors and para-surveyors, to assist in the documentation and registration of land tenure data?

**TS07B: SPATIAL PLANNING
AND SOCIO-ECONOMIC
INFLUENCES [10531]**

WEDNESDAY, 31 MAY 11:30–13:00
VENUE: FLAGLER/GILCHRIST, HILTON/
 WALDORF
COMMISSION: 8 & 9
CHAIR: DR. **EUGENE CHIGBU**, NAMIBIA
RAPPOREUR: MS. **ANA JULIA
 HERRERA GONZALEZ**, COSTA RICA

**Tochukwu Blessed Enyinna and
 Oduwegwu Obianinulu (Nigeria):**
 Employing Cost Modelling Tools in
 Land Management and Develop-
 ment (11805)

**Oluwabenga Orimogunje and
 Benjamin Adeleke (Nigeria):**
 Forces Engendering Land Use
 Dynamics in Abeokuta Metropolis,
 Southwestern Nigeria: The GIS
 Perspective (11815)
This is a peer reviewed paper.

**Bernard Kumi-Boateng and
 Irene Asante Sakyi (Ghana):**
 Where Are the Poor? A GIS-Multi-
 dimensional Non-Monetary
 Poverty Index Approach for Ghana
 (11906)

**Dony Erwan Brilianto, Wahyu
 Sari Sabekti, Ayu Nadiariyani
 and Slamet Riswanto**
 (Indonesia):
 Spatial and Land Thematic Map in
 the Relocation Project of Indone-
 sia's National Capital City (12012)

**Dony Erwan Brilianto, Hendro
 Prastowo, Vito Haga Mursa,
 Valentina Ingradiarini and
 Rendra Ady Wijaya (Indonesia):**
 The Acceleration of Agrarian
 Reform Through the Provision of
 Lands Redistribution Object from
 the Released Forest Area Using
 Land and Spatial Thematic Map
 (12014)

Torben Juulsager (Denmark):
 Transformation of Rural Areas into
 Sustainable Energy Landscapes
 (12138)

**Cromwell Manaloto, Luca Dal
 Buono and Daniele Brancato**
 (Italy):
 Geometra 2030: Challenges and
 Insights in Spatial Planning for the
 Italian Surveyors (12172)

**TS07C: FINDING THE
PRICE OF LAND –
A CASE OF
REGISTRATION AND
GOOD DATA [10609]**

**WEDNESDAY, 31 MAY 11:30–
 13:00**
VENUE: HAMILTON/INDIAN
 RIVER, HILTON/WALDORF
COMMISSION: 3 & 9
CHAIR: DR. **ENRICO RISPOLI**,
 ITALY
RAPPOREUR: DR. **FELICIAN
 KOMU**, TANZANIA, UNITED
 REPUBLIC OF

Jean-Yves Bourguignon
 (France):
 Prospective Property Val-
 uations in the Context of
 Sustainable Environmental
 Development for Future
 Generations and Energy
 Renovation of Real Estate
 (11891)

Markus Seifert (Germany):
 Semantic Web & Linked
 Data – Geodata connect
 yourself! (11974)

Vahid Khatami (Denmark):
 Open Data on Geospatial
 Information for Urban
 Planning (12275)

**James Kavanagh and Ben
 Elder (United Kingdom):**
 Valuation and Compulsory
 Acquisition of Unregistered
 and Customary Land: How
 to Ensure Fairness? (11944)

**REGIONAL BODIES
MEETING**

**WEDNESDAY, 31 MAY 11:30–
 13:00**
VENUE: BAKER, HILTON/
 WALDORF

- By invitation only

**TS07D: SUSTAINABLE
CONSTRUCTION IN THE
BUILT ENVIRONMENT
[10537]**

**WEDNESDAY, 31 MAY 11:30–
 13:00**
VENUE: NASSAU, HILTON/
 WALDORF
COMMISSION: 10
CHAIR: MR. **JÖRG BLANKENBACH**,
 GERMANY
RAPPOREUR: DR. **GABRIEL
 NANI**, GHANA

**Olufisayo Adedokun,
 Temitope Egbelakin**
 (Australia) and **Olusola
 Festus Akinradewo**
 (Nigeria):
 Analysis of Risk Triggers in
 Public Tertiary Education
 Building Projects (11816)
This is a peer reviewed paper.

**Chille Humphrey Anyawata
 and Abduganiyu Adebayo
 Oke (Nigeria):**
 Effects of Non-Adoption of
 Contract Auditing on Con-
 struction Project Delivery in
 Port Harcourt, Rivers State
 (11899)

Diana Ahiaku (Ghana):
 The Effect of Infrastructural
 Development on Urban
 Growth: a Case Study of
 Pokuase Interchange, Ghana
 (12042)

**Fosu Brempong and Paa
 Kwasi Akuffo – Ensaw**
 (Ghana):
 Drone Technology, a Game
 Changer in Construction Pro-
 ject Communication During
 COVID-19 Pandemic – a Case
 Study at Asanko Gold Mine
 – Tetrem Full Resettlement
 Project, Ghana. (12095)

Frank Friesecke (Germany):
 Policy Actions for Affordable
 Housing in Germany (12134)

Ted Knaak (USA):
 Integrating Geospatial Oper-
 ations into Next Generation
 Design Processes (12235)

Michael Cook (USA):
 New Efficient Solutions
 for Distribution Powerline
 Extraction and Utility Pole
 Survey (12236)

TS07E: MODERN PARCEL MANAGEMENT FOR SURVEYORS (ESRI) [10539]

WEDNESDAY, 31 MAY 11:30–13:00
VENUE: ORANGE, HILTON/WALDORF
CHAIR: MR. **TIM HODSON**, UNITED STATES

ArcGIS Parcel Fabric for Modern Cadastral Operations

With increasing uses of parcel data, accuracy and completeness are critical. There is a demand for a parcel management and cadastral system capable of improving efficiency, managing data integrity, and sharing data across your organization and with the public. Come learn how the ArcGIS Parcel Fabric delivers a survey-based solution incorporating high-accuracy data, storing survey record information, and maintaining parcel history. Fully scalable from a few hundred parcels on a single workstation to hundreds of thousands in an enterprise, it will accommodate. Finally, a parcel system built by surveyors for surveyors.

TS07H: THE LAND ADMINISTRATION AND MANAGEMENT IN GHANA: EMERGING TRENDS [10610]

WEDNESDAY, 31 MAY 11:30–13:00
VENUE: MADISON, HILTON/WALDORF

TS07F: SPANISH SESSION – 1 [10579]

WEDNESDAY, 31 MAY 11:30–13:00
VENUE: PALM, HILTON/WALDORF
CHAIR: PROF. **ROSARIO CASANOVA**, URUGUAY

Carmen Femenia Ribera, Gaspar Mora-Navarro and Inmaculada Marques-Perez (Spain):

The Situation of the Academy in Land Administration in Spain and Iberoamerican (11930)

Daniela Cuentas Lujan (Uruguay):

Incidence of a Public Work on Land Value (12146)

Ana Julia Herrera (Costa Rica) and **Marshall Rosenberg** (USA): La Comunicación No Violenta (CNV) como Herramienta para la Enseñanza, Aprendizaje y Desarrollo de las Habilidades Blandas en la Ingeniería (12216)

Angelica Leon (Colombia): Implementation of Three-Dimensional Geological Models in Photogrammetric Projects (12220)

Rodolfo Méndez-Baillo and Rosario Casanova (Uruguay): Influence of Altimetric Errors in the Determination of Hydraulic Parameters for Structure Sizing, Case of Study in Uruguay (11883)

TS07I: FIG CORPORATE MEMBER SESSION – BENTLEY SYSTEMS

WEDNESDAY, 31 MAY 11:30–13:00
VENUE: VESEY, HILTON/WALDORF

- Creating 4D Surveys
Pascal Cloutier
- Managing 4D Survey & big Reality Data
Glen Franklin
- Digital Twins and AI derived from 4D Surveys
Scott Becher and **Gen Taurand**
- Q&A



TS07G: LAND ADMINISTRATION EDUCATION [10568]

WEDNESDAY, 31 MAY 11:30–13:00
VENUE: TAYLOR, HILTON/WALDORF
COMMISSION: 2, 7 & GLTN
CHAIR: DR. **DIMO TODOROVSKI**, CHAIR FIG COMMISSION 2, NETHERLANDS
RAPPOREUR: PROF. **FERNANDEZ-GOMEZ WILMAR**, COLOMBIA

Dimo Todorovski, Bastiaan Reydon (Netherlands), **Rodolfo Salazar, Ginella Jacome** (Ecuador), **Gabriel Pansani** (Brazil), **Femenia Carmen** (Spain), **Wilmar Fernandez** (Colombia) and **Rocha Luz Angela**:

Latin America Land Administration Network – LAIAN; Current Status and Planned New Activities (11819)

Maria Amalia Florez Huertas and Luis Molina (Colombia): Flexible and Innovative Learning Pathways in the Context of Land Administration in Colombia: Microcredentials and Macrocredentials (12008)

Jang Chan Woo (Republic of Korea):

An Educational Cadastral Surveying Simulator Applying a Metaverse Platform (12058)

Wilmar Fernandez-Gomez, Luz Angela Rocha-Salamanca, Alvaro Ortiz-Davila, Cesar Rojas-Jimenez (Colombia) and **Rolf de By** (Netherlands):

A Research Agenda on Geoinformation Sciences Towards Responsible Land Administration in Colombia (11882)

This is a peer reviewed paper.

TS07J: AI AND REMOTE SENSING FOR LAND ADMINISTRATION [10525]

WEDNESDAY, 31 MAY 11:30–13:00
VENUE: BROADWAY/CARNEGIE, HILTON/WALDORF
COMMISSION: 7
CHAIR: DR. **KIRSIKKA RIEKKINEN**, FINLAND
RAPPOREUR: MS. **LINDA FOSTER**, UNITED STATES

Kees de Zeeuw (Netherlands) and **Brent Jones** (USA): Decision Support for the Practical Implementation of Land Administration Systems (12125)

Sheilla Ayu Ramadhani, Rahmat Sidik, Fitriyani Hasibuan and Hias Hardika Prabajati (Indonesia): Assessing the Quality of Photo Imageries from UAVs for Cadastral Purposes in Indonesia (12065)

Andy Kodua Bofo and Matthew Osei Junior (Ghana): Utilizing UAV Techniques to Investigate the Dynamics of Encroachment on The Right-Of-Way for The N8 Highway in Peri-Urban Ghana (12193)

Jeroen Grift (Netherlands), **Claudio Persello** (Italy) and **Mila Koeva** (Bulgaria): Cadastral Boundary Delineation using Deep Learning and Remote Sensing Imagery: State of the Art and Future Developments (12013)

Tareq Hasosah (Saudi Arabia): Geospatial and A.I. Technologies for Cadastral Mapping and Land Registration (11800)

Ali El Hussein (USA): Hybrid Pre-Vectorization Approaches to Produce Accurate, Precise Maps to Scale up Boundary Demarcation for Property Rights Delivery: Case Study in Zambia's Systematic Land Titling Project (11967)

TS07K: PRACTICAL IMPLICATIONS OF NATIONAL SPATIAL REFERENCE SYSTEM (NSRS) MODERNIZATION – CHANGING SURVEY METHODOLOGY [10514]

WEDNESDAY, 31 MAY 11:30–13:00
VENUE: BONNET CREEK BALLROOM, HILTON/WALDORF
CHAIR: MR. **JEFF JALBRZIKOWSKI**, UNITED STATES
RAPPOREUR: MR. **BEN ERICKSON**, UNITED STATES

National Geodetic Survey's Special NGS DAY – OPEN FOR EVERYONE

- Practical impacts of the modernized NSRS
- Canada's implementation of the modernized frames
- Changes Afoot: State Plane 2022 and Retirement of the U.S. Survey Foot
- Preparing for the Modernization of the NSRS

Dru Smith (USA): Practical Impacts of the Modernized NSRS (12286)

Brian Donahue (Canada): Reference System Modernization in Canada (12298)

Michael Dennis (USA): Changes Afoot: State Plane 2022 and Retirement of the U.S. Survey Foot (12295)

Lynda Bell and Christine Gallagher (USA): Preparing for the Modernization of the NSRS (12282)

Wednesday Tours

Wednesday, 31 May 2023 14:30–16:00

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) [10517]**WEDNESDAY, 31 MAY 13:00–18:00**

The NOAA Aircraft Operations Center serves as the main base for NOAA's fleet of nine specialized environmental data-gathering aircraft, including the agency's three "hurricane hunter" planes. NOAA Corp officers use many tools familiar to surveyors including photogrammetry, LIDAR, and UAV technology.

- Ticket required

SOUTHEASTERN SURVEYING AND MAPPING CORPORATION (SSMC) [10518]**WEDNESDAY, 31 MAY 13:00–18:00**

Founded in Orlando in 1972, Southeastern Surveying and Mapping Corporation (SSMC) is an independent, employee-owned surveying and mapping, subsurface utility engineering (SUE), and geographic information systems (GIS) firm serving the southeastern United States. It is the largest surveying and mapping company in Florida.

- Ticket required

ORLANDO WETLANDS PARK [10519]**WEDNESDAY, 31 MAY 13:00–18:00**

The Orlando Wetlands Park is a man-made wetland designed to provide advanced treatment for reclaimed water from the City of Orlando and other local cities. The Park is 1650 acres (668 hectares) in size and located in Christmas, Florida.

- Ticket required

TS08A: LAND TENURE REFORM SYSTEM FOR MARS [10594]**WEDNESDAY, 31 MAY 14:30–16:00**
VENUE: CITRUS/COLLIER/COLUMBIA, HILTON/WALDORF**COMMISSION:** YSN & VCSP
CHAIR: MS. **ROSHNI SHARMA**, AUSTRALIA**RAPPORTEUR:** MR. **OPEOLUWA AKINRADEWO**, SOUTH AFRICA**VCSP/YSN E-Volunteering Competition****Program:**

- Introduction by Chair
- Overview of the VCSP
- Overview of the 'Creating a Land Tenure Reform System for Mars' event by the VCSP – goals, methods, scenario
- Outcomes of the event: Selection of video submissions from participating groups
- Interactive audience discussion:
- How do similar scenarios play out on Earth?
- Why is it important to explore these themes in the face of climate change, COVID-19 and a changing society in 2023?
- What is the role of surveyors in protecting the planet?

FIG CORPORATE MEMBERS MEETING**WEDNESDAY, 31 MAY 14:30–16:00**
VENUE: BREVARD, HILTON/WALDORF**CHAIR:** DR. **DIANE DUMASHIE**, FIG PRESIDENT, UNITED KINGDOM

- By invitation only

TS08B: FIG AFRICA CAPACITY DEVELOPMENT NETWORK – MEETING**WEDNESDAY, 31 MAY 14:30–16:00**
VENUE: FLAGLER/GILCHRIST, HILTON/WALDORF**CHAIR:** MR. **MOHAMMED MAMMAN KABIR**, CHAIR ARN, NIGERIA

The International Federation of Surveyors-Africa Regional Network (FIG-ARN) is a Regional Capacity Development Network of the FIG that is saddled with the responsibility of developing the capacity of African surveyors. It works to raise the visibility and profile of its members and to articulate the interest of Africa within the overall vision and mission of FIG. In line with the theme of the 2023 Working Week, the FIG-ARN session will outline the critical roles African surveyors should play in protecting Africa and conquering new frontiers in the content. No doubt Africa needs protection the most. Africa, the second largest continent in the world with a population of more than 1.3 billion people remains most challenging, least mapped and least charted. The session will therefore unbundle opportunities offered in the FIG-ARN 2023-2026 Work plan in our collective drive towards Protecting Our World, Conquering New Frontiers.

Agenda:

- Opening and Self Introduction
- FIG-ARN Thematic Briefing
- Introduction of FIG-ARN Work Plan 2023-2026
- Deliberations and Observations
- General Matters Relevant to FIG-ARN
- Closing

TS08C: RURAL DEVELOPMENT AND LAND MARKETS [10554]**WEDNESDAY, 31 MAY 14:30–16:00**
VENUE: HAMILTON/INDIAN RIVER, HILTON/WALDORF**COMMISSION:** 8 & 9
CHAIR: MR. **JAMES KAVANAGH**, UNITED KINGDOM**RAPPORTEUR:** MR. **CHARLES ATAKORA**, GERMANY**Lalu Ahmad Farhan, Imam Buchori and Bambang Edhi Leksono (Indonesia):**

Development of an Environmentally Friendly Tourism City in the Protected Forest of Lombok Using Integrated Geospatial Analysis. (11940)

Helén Elvestad (Norway): Distribution of Net Added Value from Rezoning – a Challenging Measure in the Norwegian Land Consolidation Act (11972)

Kwabena Obeng Asiamah and Seth Opuni Asiamah (Ghana): Tinkering with Resettlement from Large-Scale Land Acquisition on Customary Lands – Lessons from Compulsory Acquisition and Deprivation of Land Use in Ghana (12187)

TS08D: COST INFORMATION MANAGEMENT [10538]**WEDNESDAY, 31 MAY 14:30–16:00**
VENUE: NASSAU, HILTON/WALDORF
COMMISSION: 10 & STANDARD NETWORK
CHAIR: MR. **GABRIEL NANI**, GHANA
RAPPORTEUR: DR. **JAN ERDELYI**, SLOVAKIA

Gabriel Nani (Ghana): Smart Contract Tools for Addressing the Menace of Payment Challenges to Contractors on Construction Projects (12019)

Olalekan Omojokun (Nigeria): Digital Twin Examined, with the Role of Construction Economics and Management in Construction/cost Effectiveness. (12231)

Esther Oluwafolakemi Ola-Ade, Modupe Oluwaseyi Ajayi and Adetayo Onososen (Nigeria): Benefits & Challenges of 5D BIM Adoption: Perception of Quantity Surveyors (12244)

Anil Sawhney (USA) and Mercy Iyortyer (Nigeria): Decarbonizing the Built Environment: Importance of Data, International Standards and Surveyors (12277)

TS08E: BLENDED LEARNING: GOOD PRACTICES AND LESSONS LEARNED [10561]**WEDNESDAY, 31 MAY 14:30–16:00****VENUE:** ORANGE, HILTON/WALDORF**COMMISSION:** 2
CHAIR: MR. **MARINUS DE BAKKER**, NETHERLANDS**RAPPORTEUR:** MR. **MATTHEW WHOMSLEY**, UNITED KINGDOM

Charles A. Nettleman III (USA): Are You Being Served?: How The Quality of Online CEU Courses Are Eroded Professional Surveyor Education (11839)

Marinus de Bakker (Netherlands): Changes in Geo-Information Education, Looking Back and Forward (11861)

Agustyarsah Agustyarsah, Mulyadi Mulyadi, Kariyono Kariyono, Christiana Agustina Yessy, Muzqafa Reagy and Yuniarti Wiwiek (Indonesia): Integrated Cadastre Mapping Training through Blended Learning Method as part of Corporate University Initiative: Challenge and Opportunity in Ministry of Agrarian Affairs and Spatial Planning/National Land Agency Indonesia (11985)

Daniel Martin, Erika Little and Jeff Jalbrzikowski (USA): OPUS-Projects for Managers Training: Transitioning from Mandatory Instructor-Led to Online, Self-Paced (12005)

Eugen Niculae and Alain Chenux (Ireland): Past, Present and Future of the Land (geo) Surveying Education at Technological University Dublin (12049)

Matthew Whomsley (United Kingdom): Enhancement of Blended Learning Materials and Methodologies to Promote Inclusivity (12071)

TS08F: FIG AMERICAS CAPACITY DEVELOPMENT NETWORK – MEETING

WEDNESDAY, 31 MAY 14:30–16:00
VENUE: PALM, HILTON/WALDORF
CHAIR: MR. KWAME TENADU, FIG VICE PRESIDENT, GHANA
RAPPORTEUR: PROF. ROSARIO CASANOVA, URUGUAY

This session is an initial meeting for those interested in capacity development in the Americas covering all regions in North, Central and South America as well as the Caribbean. This open meeting of the Americas Capacity Development Network (Americas CDN) will discuss the supporting activities of the FIG, other global and regional partner organizations, and provide a forum to voice the concerns of countries throughout the Americas. This will be the first of many such meetings to facilitate a regional effort, while recognizing the need for more focused efforts in subregional areas such as the Caribbean.

TS08G: THE FUTURE OF THE CADASTRAL SURVEYOR [10569]

WEDNESDAY, 31 MAY 14:30–16:00
VENUE: TAYLOR, HILTON/WALDORF
COMMISSION: 7
CHAIR: MR. MICHAEL BARRY, CANADA
RAPPORTEUR: MR. INDRA ROHARATUA HUTABARAT, INDONESIA

Jeff Jalbrzikowski (USA): Where Have All the U.S. Government Surveyors (and Other Geospatial Professionals) Gone? (12175)

Vladimir Krupa (Croatia), Jean-Yves Pirlot (Belgium) and Florian Lebourdais (France): The European Geodetic Surveyors' Act – an Introduction to a New ID for Geodetic Surveyors in Europe and in the World (12115)

Michelle Blicavs (Australia): Determining the Future Demand, Supply and Skills Gap for Surveying and Geospatial Professionals in Australia: 2022–2032 (11926)

Bertrand Mercier and Etienne Aveline (France): Surveyor : Guarantor of a Sustainable Living Environment (11866)

TS08H: FIG STANDARDS NETWORK MEETING

WEDNESDAY, 31 MAY 14:30–16:00
VENUE: MADISON, HILTON/WALDORF
COMMISSION: STANDARDS NETWORK
CHAIR: DR. DAVID MARTIN, FRANCE

The meeting will start with a general presentation of the status of activities in the Standards Network, and will cover the main areas:

- ISO/TC 211 Geographic Information/Geomatics,
- ISO 19152,
- ISO/TC 172 SC6 Survey Instrument Standards
- International Property Measurement Standards Coalition IPMS,
- International Construction Measurement Standards (ICMS),
- Standards in Hydrography,
- If possible also Blockchain
- IPMS
- LADM Edition II
- TLS Calibration and 17123-9

TS08I: SPATIAL REVITALISATION THROUGH URBAN-RURAL LAND LINKAGES: PRINCIPLES AND PRACTICES [10611]

WEDNESDAY, 31 MAY 14:30–16:00
VENUE: VESEY, HILTON/WALDORF
COMMISSION: 8, NUST, HSF, GLTN
CHAIR: PROF. UCHENDU EUGENE CHIGBU, NUST/GLTN
RAPPORTEUR: DR. OLUIBUKUN AJAYI, NUST

The politics of land tenure and imbalance in spatial planning and development have left rural and urban areas to be developed in unequal ways. Spatially, we have a world in which we are socioeconomically divided into thriving urban areas, semi-thriving peri-urban areas, and declining rural areas. To achieve a world in which everyone enjoys secure land rights in inclusive living spaces and improved livelihoods, understanding the current state of urban-rural land governance is essential.

This special session will help identify and highlight ideas necessary for grasping spatial development problems from an urban-rural land linkages perspective. Of particular interest is that it will establish a post-Congress initiative for mapping a strategy for a revitalising rural areas as spatial units that are linked to urban and peri-urban areas for balanced or interdependent development.

TS08J: LAND ADMINISTRATION DIGITALISATION [10526]

WEDNESDAY, 31 MAY 14:30–16:00
VENUE: BROADWAY/CARNEGIE, HILTON/WALDORF
COMMISSION: 7
CHAIR: DR. CHRISTIAN THELLUFSEN, DENMARK
RAPPORTEUR: DR. CHARISSE GRIFFITH-CHARLES, TRINIDAD AND TOBAGO

Arve Leiknes and Leiv Bjarte Mjøs (Norway): Methods for Improving Cadastral Map in Norway (12153)

Narelle Underwood and Adrian White (Australia): Transitioning from Paper to Digital Survey Plans in NSW Australia (12102)

Muhammad Irfan, Idin Yunindra Ibnu Parasu (Indonesia) and Ketut Ary Sucaya (Indonesia): Digital Transformation in Indonesia Land Services (12062)

Hussein Jattani and Sammy Musyoka (Kenya): A Prototype Land Information System: Case Study of New Taveta Town in Kenya (12040)

Elene Grigolia and Teimuraz Gabriadze (Georgia): Digitalization of Systematic Land Registration Process in Georgia (12025)

Anselm Haanen, Jeff Needham (New Zealand), Roger Fraser and Murray Dolling (Australia): No More Survey Plans! Towards Fully Digital Cadastral Survey Datasets (11989)

Felix Enyimah Toffah (Italy) and Tina Dzigbordi Wemegah (Ghana): WebGIS Application for Cadastral Surveys (11970)

Tim Hodson (USA): Using the ArcGIS Parcel Fabric to Maintain the Authoritative “system of Record” of Land in the United States. (11948)

Florian Lebourdais (France): GEODEMAT – Distribution of Digitized Cadastral Documentation to Citizens: an Example of a Win-Win Public-Private Partnership for the Benefit of the Citizen (11831)

TS08K: UPDATE ON THE NOAA CORS NETWORK AND OPUS [10515]

WEDNESDAY, 31 MAY 14:30–16:00
VENUE: BONNET CREEK BALLROOM, HILTON/WALDORF
CHAIR: MR. RYAN HIPPENSTIEL, UNITED STATES
RAPPORTEUR: DR. DAN GILLINS, UNITED STATES

National Geodetic Survey's special NGS DAY – OPEN FOR EVERYONE

- The NOAA CORS Network (NCN) Services
- Updating OPUS-S to Support Multi-GNSS
- OPUS-Projects 5: Supporting RTK for Establishment of Geodetic Control
- OPUS-Projects for Manager's Training – Transitioning from Instructor-led to Online, Self-paced instruction
- Augmenting Data exchange formats for OPUS of the future

John Galetzka and Ira Sellars (USA): The NOAA CORS Network (NCN) Services (12283)

Nick Forfinski-Sarkozi (USA), Dan Gillins and Andria Bilich (USA): Updating OPUS-S to Support Multi-GNSS (12284)

Daniel Gillins, Nick Forfinski-Sarkozi, Ira Sellars and Weibing Wang (USA): OPUS-Projects 5: Supporting RTK Measurements for Establishment of Geodetic Control (12280)

Daniel Martin, Erika Little and Jeff Jalbrzikowski (USA): OPUS-Projects for Managers Training – Transitioning From Mandatory Instructor-led to online, Self-Paced. (12281)

Ryan A. Hardy (USA): Augmenting Data Exchange Formats for OPUS of the Future (12296)

Wednesday, 31 May 2023 16:30–18:00

TS09B: SPATIAL PLANNING INSTRUMENTS FOR LAND GOVERNANCE: CONCEPTION AND IMPLEMENTATION STRATEGIES [10532]

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: FLAGLER/GILCHRIST, HILTON/WALDORF
COMMISSION: 8
CHAIR: DR. KWABENA OBENG ASIAMA, CHAIR FIG COMMISSION 8, GHANA
RAPORTEUR: MS. SHIRLEY CHAPUNZA, ZIMBABWE

Fairlie Kate (Australia) and **Francesca Marzatico** (New Zealand):
 Land Administration for Climate Change in Practice: Developing a Research Agenda (11846)

Daniel Janonius Lowgren (Sweden):
 Key Biotopes, Registration and Disputes in the Swedish Forest (11939)

Augustus Aturinde, Raymond Peter Lubwama and Ejulu Wilson (Uganda):
 Spatial Legal Identity Through the Spatially Enabled Addressing System. a Case for Informal Settlements (12003)

Steven Nystrom (USA), **Chryssy Potsiou** (Greece) and **Rik Wourters** (Netherlands):
 Implementing Projects for Building Back Better and the Continuum Towards Land Degradation Neutrality (12130)

Ayubella Anggraini Leksono, Bambang Edhi Leksono and Yuliana Susilowati (Indonesia):
 Analysis of the Impact of Rebanda Priority Areas on Phenomenon of Landuse Changes in Indramayu Regency (12144)

TS09A: FIG PRESIDENTS MEETING

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: CITRUS/COLLIER/COLUMBIA, HILTON/WALDORF
CHAIR: DR. DIANE DUMASHIE, FIG PRESIDENT, UNITED KINGDOM

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

TS09C: REAL ESTATE MARKETS: TIMES TO CHANGE – WHAT CAN MAKE MARKETS TRANSPARENT? [10555]

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: HAMILTON/INDIAN RIVER, HILTON/WALDORF
COMMISSION: 9
CHAIR: MR. PETER R. ACHE, CHAIR FIG COMMISSION 9, GERMANY
RAPORTEUR: MR. LUC HERMANS, NETHERLANDS

Joshua Jorgensen (12092)
Felician Komu (12124)
Raymond Alvina Nino (12197)
Eva Katharina Neubrand (12118)
James Kavenagh (11944)

- Guiding Questions for discussions:
- Why legal regulations are necessary?
- What should be the key points of regulation?
- Are voluntary standards sufficient?
- What could a “competition” for more transparency look like?

TS09D: CYBERSECURITY, DATA QUALITY AND OPENNESS IN LAND ADMINISTRATION [10547]

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: NASSAU, HILTON/WALDORF
COMMISSION: 7
CHAIR: PROF. LEIV BJARTE MJØS, NORWAY
RAPORTEUR: MR. ARVE LEIKNES, NORWAY

Dennis Ushiña (Ecuador) and **Dimo Todorovski** (North Macedonia):
 Assessment of Transparency and Open Data in Land Administration in Ecuador (12132)

Miodrag Ročić (Croatia):
 Consistency of Data in Cadastral Systems (11996)

Jimmy Alani, Godfrey Toko, Lenin Victor Oonyu, Richard Oput and Joseph Mivule (Uganda):
 Privacy and Security Issues in Access Control for Land Information Systems Towards Cloud Storage (12135)

Joseph Rajul and Dimo Todorovski (Netherlands):
 Assessing Transparency and Accountability of Land Governance in Kenya (11909)

Dionysia – Georgia Perperidou (Greece):
 Inconsistencies Amongst Urban Plans and Cadastral Data of Hellenic Cadastre (12142)

Mário Balão and Cristina Catita (Portugal):
 Integration of Open Source Software in the Topographic Production Chain (12066)

Mahmoud Solomon (Liberia), **Frank Pichel** (USA) and **Christopher Byren** (Liberia):
 Monrovia: from 1995 Block Mapping Survey to 2023 Digital Cadastre. (12174)

TS09E: ALTERNATIVE TEACHING METHODOLOGIES, ACTIVATE STUDENTS IN THE CLASSROOM [10562]

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: ORANGE, HILTON/WALDORF
COMMISSION: 2
CHAIR: MS. RESHMA SHRESTHA, NEPAL
RAPORTEUR: MR. PAUL KENNY, AUSTRALIA

Kevin Musungu and Kehinde Babalola (South Africa):
 Using Kolb’s Experiential Learning Theory to Assess Work Integrated Learning (WIL) in Geomatics (11897)

Valentin Fahrer, Valentin Großmann, Clara Váth, Adrian Weng and Joshua T. Wolf (Germany):
 Analyzing the Motivation and Expectations of the Next Generation of Geodesy Students in German-Speaking Countries (11958)

Paul Kenny (Australia):
 Education – Why Is It Important? (11962)

Derek Spalton, Giacomo Anderson and Richard Self (United Kingdom):
 Development of Survey Control and Problem Based Learning in Heritage Tunnels, North Derbyshire, UK (12152)

Sara Gepponi, Filippo Vircollo, Caterina Ferrari and Elena Paiola (Italy):
 GeoCubix: Learning by Play (12167)

Reshma Shrestha and Ganesh Prasad Bhatta (Nepal):
 Evaluating the Impact of Surveying Education by Applying Integrated Framework of Blooms Taxonomy with CIPP Model: a Case of Bachelors in Geomatics Engineering at Kathmandu University (12168)

TS09F: SPANISH SESSION – 2 [10580]

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: PALM, HILTON/WALDORF
CHAIR: PROF. ROSARIO CASANOVA, URUGUAY
RAPORTEUR: DR. DANIEL ROMAN, UNITED STATES

La FIG apoya el papel de una profesión próspera y sostenible de agrimensores a través de organizaciones miembros nacionales en todo el mundo. Muchas de estas sociedades profesionales existen a lo largo de las Américas, pero no hay tantas en las naciones hispanas. Si bien muchos países hispanos cuentan con profesionales de esta disciplina, estos no forman parte de sociedades organizadas.

Esta sesión se llevará a cabo en español y se enfocará en cuáles son los principales desafíos de nuestra comunidad hispana. Discutiremos sobre sus principales desafíos y fortalezas y compartiremos experiencias sobre posibles alternativas para abordar estas preocupaciones. Para ello, discutiremos la visión y misión de la FIG, así como contaremos con reflexiones de enfoques locales a partir de la experiencia de asociaciones profesionales nacionales.

TS09G: COMPARING CADASTRES [10570]

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: TAYLOR, HILTON/WALDORF
COMMISSION: 7
CHAIR: MR. JUSTUS WAMBAYI, KENYA
RAPPORTEUR: DR. EVA-MARIA UNGER, AUSTRIA

Daniel Roberge, Jean Gagnon and Christian Lord (Canada): Comparative Analysis of Land Tenure Systems in Canada (12055)

Ashim Babu Shrestha, Shambhu Gyawali and Sumitra Shrestha (Nepal): Land Administration System in Nepal (12141)

Habtemicael Weldegiorgis (Eritrea): Recent Developments of Cadastral Activities in Eritrea (11953)

Karolina Itäinen, Pauliina Krigsholm and Kirsikka Riekkinen (Finland): Towards Enhanced Evaluation and Comparison of Mature Cadastral Systems (12111)

Refi Rizqi Ramadian, Sheilla Ayu Ramadhani, I Gde Witha Arsana, Agus Wahyudi Kushendratno and Virgo Ereasta Jaya (Indonesia): Cadastral Base-Map Management in Indonesia (12068)



FIG FOUNDATION PH.D. SCHOLARSHIP RECIPIENT

Kehinde Babalola, Simon Hull and Jennifer Whittal (South Africa): Land Administration Systems and their Legal Frameworks Reform for Nigeria (11851)

This is a peer reviewed paper.

Ludmila Pietrzak, Pawel Hanus and Andrzej Hopfer (Poland): Relations Between Registered Parcel, Boundary Section and Boundary Point, Using the Example of Poland (11952)

TS09H: FUTURE OF SURVEYING [10586]

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: MADISON, HILTON/WALDORF
COMMISSION: 1
CHAIR: MR. TIMOTHY BURCH, CHAIR FIG COMMISSION 1, UNITED STATES
RAPPORTEUR: MR. CRAIG AMEY, UNITED STATES

Bertrand Mercier (France): Surveyor: a Profession Facing the Challenges of Society (11865)

David Oluwakunmilola Adetunji-Alao (Nigeria): The Aging Profession/Renewal of the Profession (and Also the Profession Itself) – Make the Profession Younger. (11895)

Stephen Djaba and Daniel Owusu Ansah (Ghana): The Future of Land Surveying in Ghana – “igniting the Interest in Land Surveying as a Profession in Our Kids and Young Pupils as They Choose Their Career Path” (11903)

Rose Mwaura (Kenya): The Role of Surveying Professionals in a Dynamic World; a Perspective of Kenya (11975)

Joseph Omotosho Oluborode and Paul Kehinde Oluborode (Nigeria): Principles and Strategies for Surveyors to Operate as Business Professionals (12069)

TS09I: ASSESSMENT AND CONTROL OF CRITICAL CIVIL INFRASTRUCTURE [10588]

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: VESEY, HILTON/WALDORF
COMMISSION: 6
CHAIR: DR. DIMITRIOS BOLKAS, UNITED STATES

Benoit Fredericque (France) and **Glen Franklin** (USA): Enabling Infrastructure Digital Twin with 4D Surveying and Reality Modeling (12272)

Krzysztof Bakuta, Paulina Zachar, Radostaw Palak, Mateusz Buda, Maksymilian Foltyn and Konrad Sosnowicz (Poland): The Possibility of Using AI Tools to the Inventory of Technical and Transportation Infrastructure Using Uav Data (12259)

Marietta Ayisi and Paa Kwesi Akuffo Ensaw (Ghana): Survey Construction of Tailings Storage Facility, Current Trends and Future Projections (12202)

Andrea De Seixas, Luiz Filipe Campos Do Canto, Welisson José Dos Santos and Priscilla Helienay Oliveira Do Nascimento Pestana (Brazil): Investigation of the Control and Monitoring of Onshore Wind Structures, Buildings, Built And/or Natural Soils with the Employment of Geodetic Measurement (11959)

Stephen Djaba and Ebenezer Owusu Dapaah (Ghana): Improving Volume Reconciliation Using Drone Technology in the Open Pit Mining Industry in Ghana – a Case Study (11902)

Mohsen Arjmand, Michael Olsen, Jaehoon Jung, Lassiter H. Andrew and Melika Jafari (USA): Conceptual Design of Advanced Construction Progress Monitoring with Terrestrial and Robotic Laser Scanning Systems (12199)

Mehran Dizbadi (Germany), **Behrooz Arastoo** (Iran), **Charles Toth** (USA) and **Ansgar Brunn** (Germany): Automatic Extraction of Buildings Boundaries Using Satellite Imagery with High Spatial Resolution and Deep Learning Methods (11998)

Madaubughichi Divine Okezie, Njike Chigbu, Chioma Christiana Gabriel and Clinton Chimgozirim Chigbu (Nigeria): Topographic Model Analysis as a Tool for Sustainable Land Inventory and Management (11964)

TS09J: DIGITAL TRANSFORMATION IN LAND MANAGEMENT [10527]

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: BROADWAY/CARNEGIE, HILTON/WALDORF
COMMISSION: 7 & 8
CHAIR: DR. WALTER DIMO DE VRIES, GERMANY
RAPPORTEUR: MSC. CLAUDIA STÖCKER, NETHERLANDS

Golgi Alvarez and Oscar Gil Rojas (Colombia): Beyond the Land Administration System. Let’s Talk about Land Management! (12083)

Linda Foster (USA): Today’s Technology Enables Multi-purpose Cadastre (12093)

Ana Milena Prada, Rosa Ladino and Andrés Guarín (Colombia): Environmental Information as a Fundamental Axis of the Rights, Restrictions and Responsibilities of the Land Administration System in Colombia (12150)

Bertrand Mercier and Blandine Ganivet (France): Géofoncier : a G.I.S Website Application for Protecting Land Management (11867)

Abulleif Majed M, Dalbough Fahad and Mohd Zuhairi Abd Latef (Saudi Arabia): Securing Surface Rights for Oil and Gas Field Development Using State-of-the-Art GIS Technology (11836)

Angel Collado, Fernando Buchón-Moragues and David Hernández-López (Spain): GeoAI4Land in Spain: Justification, Feasibility and First Steps. (11986)

Adamu Bala and Zia-Ul-Haq Tukur Bello (Nigeria): Generating Automated Land Use Taxes in Kano State, Nigeria Using Cadastral Records and Geospatial Information System (11976)

Angela Kesiena Etuonovbe Etuonovbe and Francis I. Okeke (Nigeria): Towards the Development of Land Information Management for Sustainable Development in Delta State, Nigeria (11803)
This is a peer reviewed paper.

TS09K: CASE STUDIES OF SURVEYS NGS DOES NOW AND HOW THEY WILL CHANGE [10516]

WEDNESDAY, 31 MAY 16:30–18:00
VENUE: BONNET CREEK BALLROOM, HILTON/WALDORF
CHAIR: DR. DAN GILLINS, UNITED STATES
RAPPORTEUR: MR. RYAN HIPPENSTIEL, UNITED STATES

National Geodetic Survey’s special NGS DAY – OPEN FOR EVERYONE

- Implementing NGS OPUS Projects’ GVX feature to align RTK vectors to the NSRS to establish Geodetic Control for FirstNet Indoor Mapping.
- IGLD: A case study for leveraging digital tools to enhance QA/QC on large scale static GNSS observation campaigns
- Geodetic Leveling in the Modernized NSRS
- NGS Field Operations: Modernizing in Many Ways
- Closing Remarks by Director of National Geodetic Survey

Kevin Jordan and Benjamin Gavin (USA): Implementing NGS OPUS Projects’ GVX feature to align RTK vectors to the NSRS to establish Geodetic Control for FirstNet Indoor Mapping (12278)

John May (USA): IGLD: a Case Study for Leveraging Digital Tools to Enhance QA/QC on Large Scale Static GnsS Observation Campaigns (12279)

Benjamin Erickson (USA): Geodetic Leveling in the Modernized NSRS (12297)

Ryan Hippenstiel (USA): NGS Field Operations: Modernizing in Many Ways (12285)

Wed, 31 May Evening

**FIG WORKING WEEK DINNER:
AMERICAN EVENING**

WEDNESDAY, 31 MAY 19:30–23:00
VENUE: MANGO'S TROPICAL CAFE

Please join us at Mango's Tropical Café for dinner and a show. FIG Working Week attendees will have exclusive access to the venue. Please join us for cocktails and light hors d'oeuvres, followed by a three-course dinner.

While you are enjoying your cocktails, we encourage you to walk around the venue and discover the largest collection of Haitian art in the world; each piece of art tells a story and has a purpose. All of the art around the venue, including the art that covers the bars, was hand selected by Mango's owner David Wallack. Each piece of art tells a story and has a purpose.

During dinner, plan to be entertained by a full 90-minute show featuring a 9-piece band, DJ, and performances by some names known worldwide: Michael Jackson, Jennifer Lopez, and many more!

SHUTTLE BUSES start from Hilton at 5:45pm and the last bus leaves at 6:45pm.

Return – the first bus starts at 9:30pm and the last leaves at 10:30pm.

The buses leave when they are full.



Thursday, 1 June 2023

FIG GENERAL ASSEMBLY – DAY 2

THURSDAY, 1 JUNE 10:00–13:00
VENUE: BONNET CREEK BALLROOM,
HILTON/WALDORF
CHAIR: DR. DIANE DUMASHIE, FIG PRESIDENT,
UNITED KINGDOM
RAPPORTEUR: MS. LOUISE FRIIS-HANSEN,
FIG DIRECTOR, DENMARK

Results of the elections; wrap up from the Working Week, upcoming conferences; Closing ceremony.

FAREWELL RECEPTION

THURSDAY, 1 JUNE 13:00–14:30
VENUE: GOLF PAVILION, HILTON/WALDORF

Delegates are invited to this farewell to the FIG Working Week 2023 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 2024 in Accra, Ghana. The reception is hosted by the FIG Working Week 2024.



CORNHOLE EVENT

THURSDAY, 1 JUNE 16:00–
VENUE: HILTON/WALDORF GROUNDS
SEE: 25 USD PER PLAYER OR 50 USD PER 2-PERSON TEAM (SINGLE PLAYERS WILL BE PAIRED WITH OTHER SINGLE PLAYERS)

Cornhole or Corn Toss is similar to horseshoes except you use wooden boxes called cornhole platforms and corn bags instead of horseshoes and metal stakes. Contestants take turns pitching their corn bags at the cornhole platform until a contestant reaches the score of 21 points. A corn bag in the hole scores 3 points, while one on the platform scores 1 point.

Friday, 2 June 2023

GOLF OUTING

FRIDAY, 2 JUNE – TEE TIMES START AT 08:00
VENUE: WALDORF GOLF COURSE,
WALDORF ASTORIA ORLANDO
SEE: 75 USD 1 ROUND OF 9 OR
100 USD 2 ROUNDS OF 9
CLUB RENTAL: 60 USD SPECIFY LEFT OR RIGHT

Visually stunning and immensely playable, the golf course is enhanced by natural elements like majestic cypress trees lining the fairways and features a five-tee system to accommodate golfers of every caliber.



THE FIG
FOUNDATION

Building a Sustainable Future

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 Working Week Dinner also supports the Foundation. If you would like to give an extra donation contact the registration or use this QR code. More information at fig.net/figfoundation.



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INFORMATION FOR VISITORS TO THE USA

Getting to and from the Conference Venues

A complimentary shuttle is provided from the hotel to Disney Springs. Please inquire at the front desk for shuttle schedule.

Emergency Services

For emergencies, please dial 22 from any house phone. The hotel loss prevention team will then call the appropriate authorities.

Sales Tax

Many countries have a Value Added Tax (VAT) already included in the price. In the USA there is not a VAT. However, many states (including Florida) have a sales tax which is shown as a separate amount from the price.

In some states individual counties and cities add an additional percentage to the state sales tax.

For example, the FIG Working Week 2023 venue is located in Orlando which is in Orange County, Florida. The Florida sales tax is 6%. Orange County sales tax is 0.5%, the Orlando sales tax is 0.0%. Therefore, the total sales tax for Orlando is 6.5%.

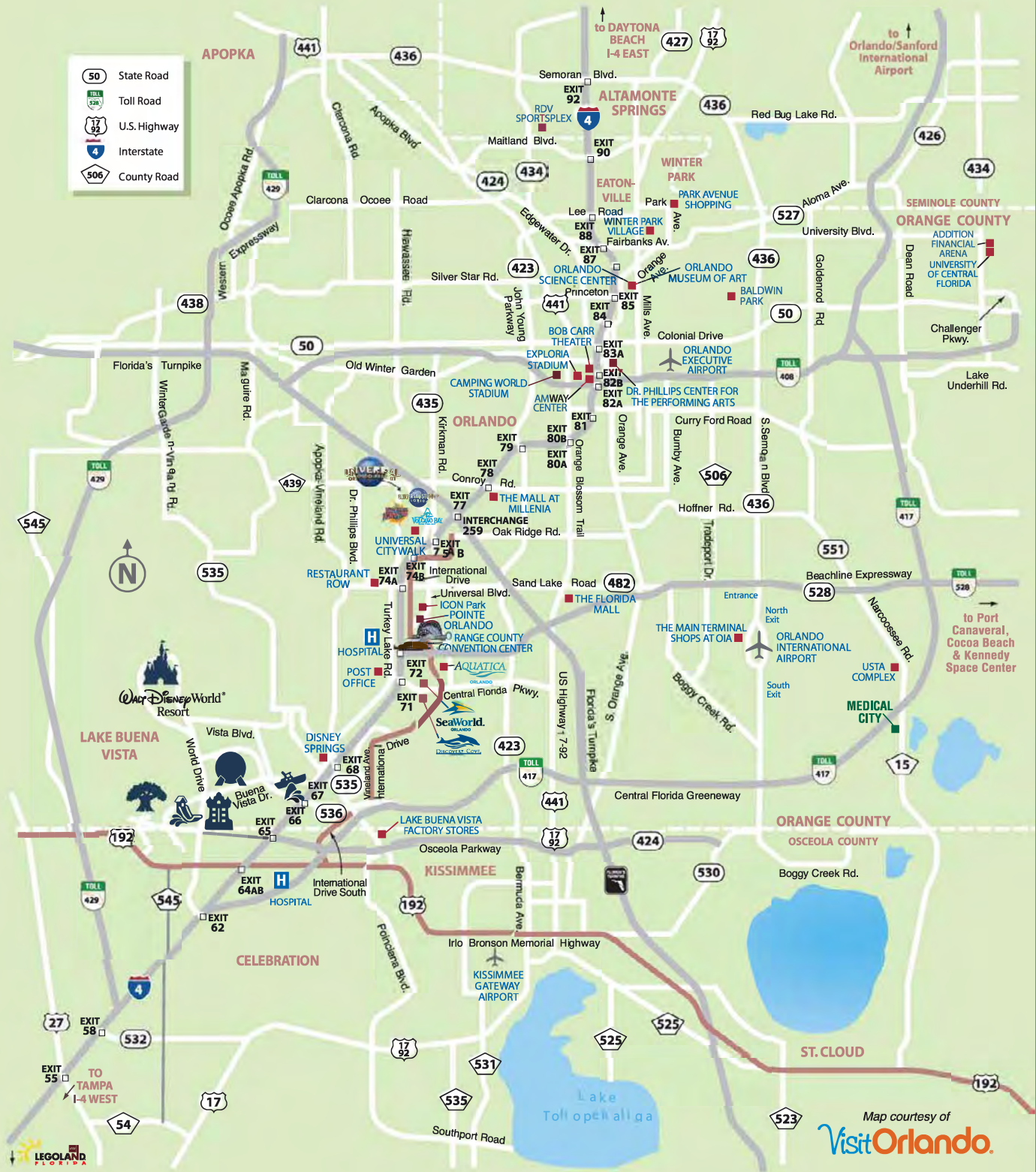
This sales tax is collected for most items (hotel accommodations, restaurants, rental cars, taxi service, etc. while groceries, prescription medicine, and gasoline are all tax-exempt in Florida).

Tipping (Gratuities)

In many countries tipping is not a common practice or just a minor roundup of the total charge. In the USA tipping (paying gratuities) is a common practice for some services.

Examples include \$1–2 per bag for skycaps, bellhops, doormen, and parking valets if they handle bags, \$2-5 per night for housekeeper, Doormen who merely open doors are not tipped, unless they call a cab or provide another service. Parking valets are paid upon pick-up \$3-5, depending upon how much effort is required to retrieve a vehicle. For waiters at sit-down restaurants, bartenders, barbers/hairdressers, taxi and Uber drivers, the tip should be calculated as a percentage of your total bill as follows: 10% usually means you aren't totally happy, 15% usually means all was acceptable, 20% for excellent, over 20% for outstanding. 15–20 percent is considered standard in most communities.

- State Road
- Toll Road
- U.S. Highway
- Interstate
- County Road



Map courtesy of
VisitOrlando.

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FIG Young Surveyors Charity Event

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Let's gather and have some
fun playing the
classic game of

BINGO!

Saturday
27 May
2-3pm

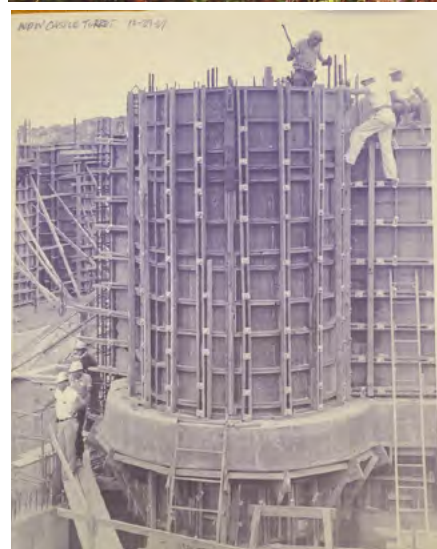


Citrus/Collier/Columbia Room

The proceeds from the Charity event will go to the FIG YSN's Volunteer Community Surveyor Program, VCSP, and the FIG Foundation.



Open for all



Surveying in the Everglades with Airboat: Brandon Barnes and Bobby Hicks (SSMC – Southeastern Surveying and Mapping Corporation).

Surveying in rough terrain: Mark Klaers (SSMC – Southeastern Surveying and Mapping Corporation).

Walt Disney World Magic Kingdom: Construction of Cinderella Castle turrets (19 October 1969).

Walt Disney World Magic Kingdom: Re-construction of new Fantasyland 2011 in front of Pinocchio's Village Haus.

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FORTHCOMING MAJOR FIG EVENTS



FIG Working Week 2024

Accra, Ghana | MAY, 2024

BUILDING RESILIENT ENVIRONMENT:
SURVEYORS INNOVATION FIT FOR FUTURE



fig.net/fig2024



FIG Working Week 2025

Brisbane, Australia | 1-5 June

COLLABORATION, INNOVATION AND RESILIENCE:
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FIG XXVIII Congress 2026

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The South
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FIG Working Week 2028

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