



XXVII FIG Congress

11-15 SEPTEMBER 2022 WARSAW POLAND

"Volunteering for the Future –
Geospatial Excellence for a Better Living"



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Dear Colleagues,

You started reading the program book of the FIG Congress 2022. Together with the local organizers from the Polish Association of Surveyors (AGP), FIG welcomes you to the XXVII FIG International Congress in Warsaw (Poland).

Each FIG Congress is a big event. The General Assembly will elect not only the next president, but also two new vice presidents and will confirm the ten commission chairs for the next term of office. In this program book you find all the information about our events, plenary and technical sessions over the next 5 days. This is probably what you expect while reading this introduction.

I would like to draw your attention to the special circumstances of this FIG Congress in the year 2022. First of all, we the organizers are very happy that after COVID19 we are finally able to meet in person again.

On behalf of the entire FIG, I would like to thank our friends and partners from the Polish Association of Surveyors for their willingness and strength in organizing this Congress. 14 months ago, AGP offered to prepare together with the FIG Office this Congress. Normally a local organizing team has a preparation time of almost four years.

In addition to this difficulty came seven months ago the Russian invasion of Ukraine, which is a direct neighbour to Poland. Since then Poland offers a lot of humanitarian support to the refugees which are currently staying in huge numbers in Poland and in the capital Warsaw. During the preparatory meetings with our Polish friends we never felt a sceptical or pessimistic view on the situation. It is the contradiction: There was never a doubt in bringing the preparations to a positive end. Thanks for this. This is really extraordinary and outstanding!

I wish us all a wonderful Congress with inspiring presentations, exciting discoveries in Warsaw, and good new contacts with colleagues and friends from all over the world.

Prof. Dr. Rudolf Staiger
President, International Federation of Surveyors (FIG)



Dear Colleagues,

The Association of Polish Surveyors (SGP) is proudly honoured to host the XXVII FIG International Congress in Warsaw. This significant and prestigious event for surveyors takes place for the first time in Poland, although the 7th FIG Convention in 1942 was to be held in Warsaw. Unfortunately, World War II thwarted these plans, and after exactly 80 years, we got another chance to organise this event. The more we are honoured that we were allowed to organise the Congress and present Polish achievements to colleagues from around the world. We sincerely believe that hosting this prestigious event will broaden the horizons of the Polish local science and professional surveyors, entailing opportunities for development and international cooperation.

The Association of Polish Surveyors joined FIG in 1926, and since then, our members have been operating in the Federation. SGP is a non-governmental scientific and technical organisation with over 100 years of tradition. We are the largest surveying organisation in Poland, gathering surveyors representing all areas of professional activity, and Poland is probably the country with the largest number of surveyors per capita. We have a solid surveying heritage and a reasonable basis for developing our profession.



Dear Colleagues,

Organising a congress is a huge project and a great challenge. We had to prepare a Congress within one year, which should stop a run of bad luck of not being able to have direct meetings for two years. Throughout this time, we have been afraid of many scenarios: further illnesses and mutations of the covid virus, low level of vaccination in the world, as well as events that we did not expect: cheated migrants sent to the border of the EU by the Belarusian regime destabilising the situation in my country, and the shameful Russian invasion on independent Ukraine. All these factors filled us with fear that our meeting might not succeed. We tried to respond appropriately and diplomatically to all of them and support colleagues in need.

Warsaw is undoubtedly one of the most exciting cities in the world. Please take the opportunity to see it. The list of highlights attracting the attention of conference participants also involves the tradition and legends of churches, castles, palaces, factories and warehouses. Off-the-wall street theatres, open-air jazz events, parks where picnic breakfasts taste the most delicious and mysterious nooks of Polish cities, and even residents enthusiastically participate in the urban games. Warsaw is also a city of the best universities in Poland, including the largest classical university in Poland, the University of Warsaw and the largest technical university, the Warsaw University of Technology. Warsaw is the second city in Europe in the number of students (235,000); on a European scale, more people study only in Paris. Many famous people were born in Warsaw, like Maria Skłodowska-Curie, the first female recipient of the Nobel Prize; Frédéric Chopin, composer; Casimir Pulaski, a hero of the American Revolutionary War, Robert Lewandowski, footballer and Iga Świątek, tennis player.

Welcome to Warsaw. We are sure that this important scientific and social event for our profession, as well as Polish culture, cuisine and hospitality, will give you great pleasure and satisfaction with your stay and will make you happy to come back here in the future.

Janusz Walo

President, Association of Polish Surveyors, SGP

Today, we have the opportunity to meet and show the world that we are one community of surveyors who can cooperate and that our participation in the economy is essential. We prove once again that surveyors are part of every investment process, we are involved in sustainable development goals measurements, and geospatial data specialists are directly or indirectly involved in most of the decisions made in the world. All this makes us very visible among other engineers.

I wish you fruitful discussions in sessions on very diverse geospatial topics. I also wish you a wonderful stay in charming Warsaw – the city with a fascinating history, modern architecture, visitor-friendly infrastructure, and a rich offer of cultural events.

Krzysztof Bakula

Co-Congress Director, Association of Polish Surveyors



Your precious time for reflection – Welcome to Warsaw

Three years have gone since the last FIG conference; and what three years. We managed to transform the FIG Working Week 2020 into 26 thematical articles and 2021 into an “e-Working Week”. We proved that it is doable. It worked. And it was a success. The post survey of the e-Working Week 2021 showed that 100% of the respondents would recommend the FIG Working Week. So why do we not continue online? This could give many more a chance to attend who are not in the fortunate position to be able to travel. Well, yes we could, but we will not! Although, this Congress will take place in a sort of hybrid version. It seems that the new buzzword is “hybrid” – everything can be hybrid these days. But does that mean that hybrid is good?

When we started organising this congress – one year ago – we did not know how the situation would develop and for that reason we wanted to include in the planning some online elements. It was good that we did so, because still, not everyone can travel. It was however also clear that our main focus should be on the on-site part of the congress. Why?

These past years have shown how much personal contact means. The possibility to network, to meet, to talk, to laugh, to look at each other in full person, to read each others body language. Now and then this is needed. And we believe that this is the right thing for the FIG Congress. This one meeting a year (at least) ought be a person-to-person meeting. The rest of the year, online meetings make so much sense and can be very efficient, especially because, now we know each other a little better. The online meetings are precious because they can save time, save money, save in carbon foot print...

There is another reason why attending in person is so special; something we may not have realised and appreciated earlier – however out of a bad situation always comes positive learning. Being onsite gives you the privilege of being You; time for immersion – precious time for reflection that you do not have at home in front of your screen with emails popping in, family to attend to, work to be done, deadlines to be met, and then a conference running in the background on the screen. No; being on site in real time is a privilege that we should appreciate and care for. And now we are here in Warsaw – physically, and we should also be here mentally to absorb new knowledge, learn, meet, talk, observe, laugh, enjoy...

A very big thanks to the super engaged, competent and dedicated local organising committee. They jumped right into this one year ago with courage and spirit, despite uncertainty, despite the short preparation time! Thank you for the wonderful and very special cooperation – it was short... but very sweet!

Welcome FIG Congress 2022 – welcome to Warsaw

Louise Friis-Hansen

FIG Director and Co-Congress Director

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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 inter-

national 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.



Stowarzyszenie Geodetów Polskich (SGP) – Association of Polish Surveyors

The first surveyor’s organization was established at the Polish territory in 1916 under the name “The Union of Surveyors”. The name of association was transformed to the “Union of Polish Surveying Associations” (1925), “Union of Licensed Surveyors” (1926), “Surveyor’s Union of Republic of Poland” (1945) and “Association of Polish Surveyors”, SGP 1953. Professional Organization of Polish Surveyors joined International Federation of Surveyors in

1926. Polish surveyors hosted the FIG Permanent Committee Meetings three times in 1932 in Warsaw, in 1959 in Kraków and in 1985 in Katowice. Association of Polish Surveyors organized under FIG frames “The 1st International Cadastral Congress” in 1998 in Warsaw. Polish colleagues chaired FIG Technical Commissions.

Association of Polish Surveyors, SGP, acts as a voluntary organization of individuals being professional surveyors due to the diploma certifying education in land surveying. Legal basis of SGP results from Polish Parliament Law on Associations.



Congress Steering Committee

- Dr. Prof. **Rudolf Staiger**, President, FIG
- Prof. **Janusz Walo**, President, SGP
- Dr. **Krzysztof Bakuła**, Co-Congress Director, SGP
- Dr. **Ludmiła Pietrzak**, Member, SGP
- Ms. **Louise Friis-Hansen**, Co-Congress Director, FIG

Local Organising Committee

Dr. **Krzysztof Bakuła**, Head of Local Organising Committee

Members:

- | | |
|---------------------------------------|---------------------------------------|
| Dr. Agnieszka Cieniala | Dr. Monika Balawejder |
| Dr. Artur Warchoł | Dr. Tomasz Lipecki |
| Dr. Krzysztof Karsznia | Mr. Tomasz Malinowski |
| Dr. Ludmiła Pietrzak | Prof. Violetta Sokoła-Szewiola |
| Dr. Magdalena Pilarska-Mazurek | Dr. Wioleta Krupowicz |

FIG Office

- Ms. **Louise Friis-Hansen**, FIG Director and Co-Congress Director
- Ms. **Claudia Stormoen Pedersen**, FIG Event and Support Manager
- Ms. **Maria Bargholz**, FIG Finances and Administration
- Ms. **Evelien Hertz-van Gelder**, FIG Assisting Event and Support Manager



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DONE FAST, DONE RIGHT

Registration and Conference Services

The FIG Registration desk is on the ground floor of DoubleTree by Hilton Hotel & Conference Centre Warsaw, on the left side of the main entrance. Any changes to the schedule will be posted in the conference web app.

Opening hours: 10–14 September 8:00–17:30 and 15 September 10:00–14:00.

Speakers Preparation Room

The speakers' preparation desk is located on the first floor in the Mulberry room. You are required to bring your PowerPoint presentation to the staff for upload earliest possible and the latest two hours before your sessions begins. 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. Please notice that there are no computers available for elaboration on your presentation.

Opening hours: Sunday 11 September 8:30–17:30, Mon-Wed 12–14 September 8:00–17:30.

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: Welcome Reception, Opening Ceremony and a half-day social tour of own choice.

Bag and Certificates

Each full delegate will receive a conference bag, unless they have opted not to at the registration. Certificates of attendance and presentation will be sent by email after the conference.

Refreshment and Lunches

Complimentary refreshments will be served during the morning and afternoon breaks at coffee stations in the exhibition areas. Lunch will be served in the restaurants.

Conference Web Site and Technical Programme

- Conference web site: fig.net/fig2022
- fig.net/fig2022/technical_program.htm and FIG Conference Web App

Wireless Internet

Wireless Internet is available at DoubleTree by Hilton. Wifi name: Hilton-Guest, no password.

Conference Web App



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

Some of the FIG 2022 app features include:

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

See instructions at fig.net/fig2022/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/UCn1LnXagUY5Y2f8Hy-yaw2Q>

The theme for **FIG Congress 2022** is “**Volunteering for the Future – Geospatial Excellence for a Better Living**”. This overall theme is addressing two aspects. The first part “Volunteering for the future” is the overall motto for the current term of Office from 2019 to 2022.

It reflects the urgent need for volunteers and volunteers’ work. And this need is not only specific for a federation like FIG. During the last decades, it became more and more difficult to convince people to do volunteered work for example for the local football club, the quire or a professional organisation like FIG. It reflects the urgent need for volunteers and volunteers’ work and the understanding for and impact on the tasks that are undertaken by International Professional Organisations like FIG.

The second aspect is underlining the significant change in our profession. Decades ago, the standard product of a land surveyor was a topographic map or a cadastral plan. Typically, this product was only partly accessible and often reserved for military and state administration purposes only. This has changed radically. Today geo-information and all related products are seen in a much broader context and as public goods and beneficial for the well-being and betterment of the entire society. In addition to this, we can observe that the current geo-data-products are gaining in quality and are becoming more and more available free of charge for the user.

The Overall Topics

Surveyor 4.0: Future Applications for Cadaster, Environmental Questions, Engineering and Mining

The expression “Surveyor” is here used as a generic term comprising all occupations and professions in conjunction with Geospatial data.

Among others are land surveyors, quantity surveyors, construction surveyors, cadastral surveyors, mining surveyors, photogrammetrists, topographers, cartographers, hydrographers, valuers, geo-informaticians, land and town planners. The technologists say that we are at the beginning or even in the middle of the 4th industrial revolution. And our profession is of course

affected or in a positive wording profiting from these latest developments like Internet of Things (IoT) or Artificial Intelligence (AI). The numbering “4.0” wants to remind us here of this strong connection between the technical advancements in general and our geospatial activities. Surveyors have always been strongly associated with the most modern ways of presenting data, so they fit perfectly into the IoT and AI. Development of sensors lead us to more detailed and accurate measurements providing Surveyor innovative tools and methods. Automation in workflow that we deal every day allow us to work more effective and be competitive. Are we able to use this potential in connection with other fields of science and engineering to continue to stay on the top of technology?

Our Profession in and after Covid Times

COVID-19 changed the global live radically on at all levels. It changed our personal and private life, but also our professional customs and activities.

The pandemic created new limitations but at the same time it offered also new opportunities.

It would be wonderful to share during the Congress the new experiences and approaches related to digitalization, automation in professional work, teamwork, customer relations and document certification.

Each crisis brings new opportunities...

Open Data and Open Access: Are These the Bullet Points of the Future Roadmap?

Open Data and Open Access are promoted by industry and politics not only in our professional field.

What are the aspects, consequences, benefits and disadvantages of this approach? On the other hand, the verification of data in repositories is fundamental for sharing reliable data for making decisions.

Does authoritative data in repositories compete to open access? Should they be Open Access. How we should deal with crowdsourcing being the opportunity to involve society in geospatial data collection and how it can be useful for surveyors.

Surveying Competence for Other Disciplines

Today we do not only measure and “deliver” a map as the final product. Together with other disciplines new geospatial products which are often of a multi-purpose-use are designed and developed according to the specific needs of the potential users.

What is our role in improving not only the methods of sharing geodata, but also in specialized obtaining them in terms of other disciplines?

How to convince our partners from other disciplines that despite progress and automation of measurement techniques with tools and methods available for everyone, they still should need surveyor?



Unlock Your Positioning Mobility



Eyr
GNSS Receiver



Freyja
GNSS Receiver



SLT2
Total Station



SLT10
Total Station



TR7 Pro
GNSS Receiver

Time	Sat 10 Sept.	Exhibition				Thu 15 Sept.	
		Sun 18:00–21:00 Sun 11 Sept.	Mon 11:00–18:00 Mon 12 Sept.	Tue 11:00–18:00 Tue 13 Sept.	Wed 11:00–18:00 Wed 14 Sept.		
07:00	Registration 8:00–17:30	Registration 8:00–17:30	Registration 8:00–17:30	Registration 8:00–17:30	Registration 8:00–17:30	Registration 10:00–14:00	
08:00			Newcomers Session				
09:00	7TH YOUNG SURVEYORS CONFERENCE REFERENCE FRAMES IN PRACTICE MINING SURVEYING WORKSHOP SURVEYING AND BIM CLASSROOM ARCGIS PARCEL FABRIC – ESRI MULTI-SENSOR-SYSTEMS WORKSHOP		Keynote Sessions 1 & 2	Technical Sessions	Keynote Sessions 5 & 6	Coffee / Tea	
10:00						Coffee / Tea	Coffee / Tea
11:00			Technical Sessions	Technical Sessions	Technical Sessions		
12:00			Lunch Commission Meetings	Lunch Commission Meetings	Lunch Commission Meetings		
13:00			General Assembly Session 2	Technical Sessions	Debate Sessions	Technical Sessions	Farewell Reception
14:00				Coffee / Tea	Coffee / Tea	Coffee / Tea	
15:00			Opening Ceremony	Technical Sessions	Keynote Sessions 3 & 4	Technical Sessions	
16:00							
17:00							
18:00			Opening of Exhibition				
19:00		Welcome Reception / Cultural Evening					
20:00							
21:00			Informal Lobby Bar Get-Together / Free evening	FIG Congress Dinner at Warsaw University of Technology	Commission Dinners / Free evening		
22:00							
23:00							



DoubleTree by Hilton Hotel & Conference Centre Warsaw

The FIG Congress 2022 will be held at the DoubleTree by Hilton Hotel & Conference Centre Warsaw, located 10 km from the National Stadium 11 km from Łazienki Park and 14 km from Old Town Market Place.

DoubleTree by Hilton Hotel & Conference Centre Warsaw
 Skalnicowa 21, 04-797 Warsaw
<https://www.hilton.com/en/hotels/wawccdi-doubletree-hotel-and-conference-centre-warsaw/>

Ground Floor

Ballroom	General Assembly 2 & 3, Opening Ceremony, Keynote Sessions
Ballroom “Trimble” and Ballroom “Esri”	Technical Sessions
Registration Desk	See opening hours below
Exhibition	Sunday 18:00–21:00 Monday to Wednesday 11:00–18:00

Registration Desk

The FIG Registration Desk is open as follows:
 Saturday to Wednesday 08:00–17:30
 Thursday 15 September 10:00–14:00



First Floor (Sessions)

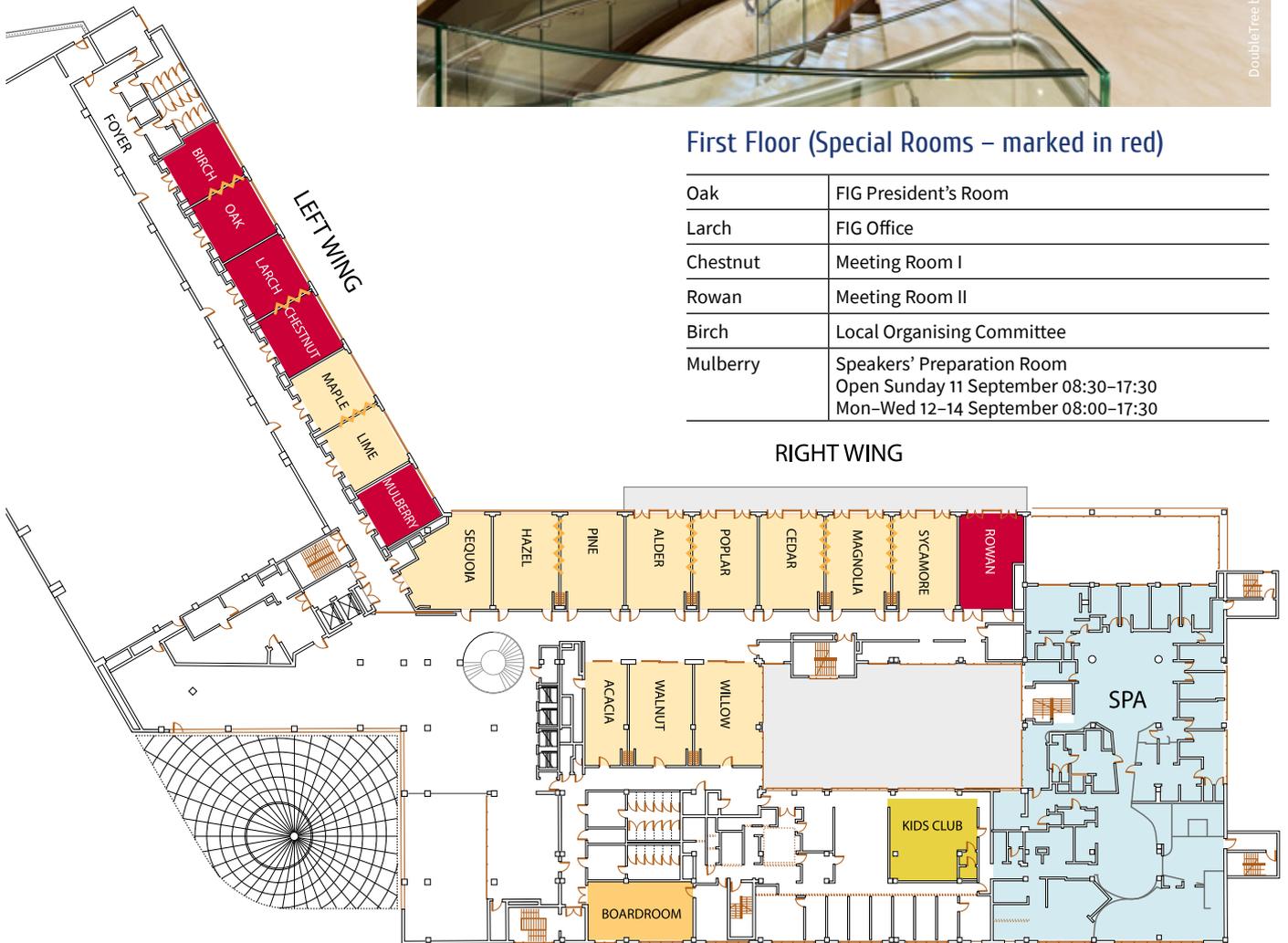
Walnut + Acacia	Technical Sessions
Willow	
Lime + Maple	
Sycamore + Magnolia + Cedar	
Poplar + Alder	
Pine + Hazel	Sponsor Presentations
Sequoia	



Double Tree by Hilton Hotel / Conference Centre Warsaw

First Floor (Special Rooms – marked in red)

Oak	FIG President's Room
Larch	FIG Office
Chestnut	Meeting Room I
Rowan	Meeting Room II
Birch	Local Organising Committee
Mulberry	Speakers' Preparation Room Open Sunday 11 September 08:30-17:30 Mon-Wed 12-14 September 08:00-17:30



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Sunday 11 September 2022 at 16:30–18:00 DoubleTree by Hilton Warsaw, Ballroom

Masters of Ceremony: **Krzysztof Bakuła** and **Louise Friis-Hansen**, Co-congress Directors

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

The Opening includes key addresses by representatives of the ministry responsible for geodesy and cartography, Surveyor General, representation of municipality and voivodeship. FIG President Rudolf Staiger who will end his 4 years term in 2022 will be main key-note speaker.

At the end of the Opening Ceremony the exhibition will be opened and the Welcome Reception will take place in the exhibition.

Welcome Addresses

There will be welcome addresses by:

- Mr. **Piotr Uściński**, Ministry of Economic Development and Technology
- Ms. **Alicja Kulka**, Surveyor General, Head Office of Geodesy and Cartography
- Mr. **Adam Struzik**, Marshal's Office of the Mazowieckie Voivodeship in Warsaw
- Dr. **Rafał Trzaskowski**, Warsaw president (Mayor of Warsaw)

- Prof. **Janusz Walo**, President of Polish Association of Surveyors, SGP
- Dr. **Krzysztof Bakuła**, Local Co-Congress Director

Keynote Speaker



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





Six keynote sessions in three blocks will be the highlight of the technical programme of the Congress. These high-level presentations and panel discussions cover topics within the overall theme "Volunteering for the future – Geospatial excellence for a better living". There will be three blocks of keynote sessions – one each day during the conference days.

Keynote Session 1 – Geospatial Excellence for a Better Living – Digitalisation and Modern Surveying and Cadastre in a Post-Covid19 Era

Monday 12 September 9:00–10:00, DoubleTree by Hilton Warsaw, Ballroom “Trimble”

The keynote session will set the scene of the Congress. Even though at the onset of the pandemic, many surveying, geodetic and land administration organizations were already quite far in the digitalisation of data and processes, the last two years was speeding up this transformation.

In this keynote session the speakers will take the audience through their undertakings and experiences during these past years, how the transformation has been handled, and what learnings can be drawn from this.



The Activities of GUGIK During the Pandemic

Ms. Ewa Surma

Director of the Strategy, International Cooperation and Public Information Department of Head Office of Geodesy and Cartography (GUGIK), Poland



Better living after Covid – The Surveyor Point of View

Prof. Paweł Hanus

Professor in the Department of Integrated Geodesy and Cartography at the AGH University of Science and Technology, Poland



Digital Transformation and the Role of Land Administrations – FAO, FIG and UNECE/WPLA Joint Publications

Ms. Romyana Tonchovska

Senior Land Administration-Information Technology Officer of the Food and Agriculture Organization of the UN (FAO), Italy



The keynote will be chaired by:

Prof. Abbas Rajabifard

Director of Centre for SDIs and Land Administration at the University of Melbourne, Australia

Keynote Session 2 – Urban Rural Partnership

Monday 12 September 10:00–11:00, DoubleTree by Hilton Warsaw, Ballroom “Trimble”

Urban Rural Partnership is more urgent than ever in the light of an ongoing or even increasing urban rural divide in developed as well as in developing countries. Central elements are the need for comprehensive land policies, reflecting a priority on spatial and economic integration, and the importance of considering governance, infrastructure and local capacity. Join our two distinguished keynote speakers through the urban rural land linkages.



Urban Rural Partnership – It's a Matter of Territorial Justice!

Prof. Holger Magel

FIG Honorary President and TUM Emeritus of Excellence



The keynote will be chaired by:

Dr. Orhan Ercan

Former FIG Vice President (2017–2021), Türkiye



The GLTN Approach to Urban Rural Partnership

Mr. Robert Lewis-Lettington

Chief of the Land, Housing and Shelter Section at UN-Habitat

Keynote Session 3 – Land Governance in support of the 2030 Global Agenda

Tuesday 13 September 16:00–17:00 DoubleTree by Hilton Warsaw, Ballroom “Trimble”

The global sense of urgency and the pressure on land have showed an increase of the relevance of surveying and geo-information towards the achievement of the SDG's. Land governance is about the policies, processes and institutions by which land, property and natural resources are managed. Therefore, land governance plays a key role in achieving the SDGs where more than half of the goals are directly land related. In this regard, the global surveying profession holds an important position as the custodians of the people to land relationship. This session will unfold the concept of responsible land governance and the importance of including all land, people and land rights at a countrywide scale. Further, the session will align the concepts with the 2030 Agenda for Sustainable Development and how FIG supports the SDGs. The agenda provides us a roadmap towards a more sustainable world. Providing leadership as FIG, as professional and as a citizen on the SDGs will be of great added value. This session sets the scene how you can actively contribute to volunteering for the future for our profession, society and our planet at the same time.



Understanding the Role of Responsible Land Governance and Secure Land Rights in Support of the 2030 Global Agenda

Prof. Stig Enemark

FIG Honorary President and Professor Emeritus of Land management at Aalborg University, Denmark



Panelist

Dr. Kwabena Asiana

PhD in Land Administration
from the University of Twente, Netherlands
Chair FIG Young Surveyors Network



Taking Action to Transform Our World into a More Sustainable Environment

Ms. Paula Dijkstra

Director a.i. of Kadaster International and
Chair Task Force on FIG and the Sustainable
Development Goals, Netherlands



The keynote will be chaired by:

Dr. Rohan Bennett

Associate Professor and
Incoming of FIG Commission 7, Australia

Keynote Session 4 – How the Land Profession Skills May Thrive in the Post 2020 Pandemic World – Insights from Across the Generations: Geography, Governance and Volunteering

Tuesday 13 September 17:00–18:00 DoubleTree by Hilton Warsaw, Ballroom “Trimble”

4 generations, 1 workforce- Understand who's who in the workplace.

Cross-generational insights on how all four of the generations in the work place will shape the next normal. We listen to perspectives from Baby boomers, Gen X, Millennials and beyond. Discussing what the work place looks like, what skills will be needed to benefit society drawing from the context of Geography, Governance and Giving.

This panel brings together active industry professionals across all FIG member sectors. As members of each generation navigate the next normal they explain: What effect the pandemic will have on cross generational views of the skills they believe to be the most relevant in the future professional world of survey; and Provide insightful ideas as how we can move towards a resilient and diverse profession.



Ms. Victoria Stanley
Senior Land Administrator World Bank, USA



Mr. Marc Vanderschueren
President of Fédération Internationale des Géomètres (FGF), Belgium



Ms. Olive Powell
Head of Geography
Office for National Statistics (ONS),
Statistics Authority, UK



The keynote will be chaired by:
Dr. Diane A Dumashie
FIG Vice President; Director Dumashie Ltd;
Trustee Lionheart Benevolent Fund. UK



Mr. Israel Taiwo
Senior Lecturer
Federal Polytechnic Ado-Ekiti, Nigeria

Keynote Session 5 – Mapping the Plastic

Wednesday 14 September 9:00–10:00 DoubleTree by Hilton Warsaw, Ballroom “Trimble”

The effects of plastic pollution on the Earth’s oceans are well documented, potentially catastrophic and increasing exponentially year on year. The UN Environment Programme has calculated that each year more than 8 million tonnes of plastic ends up in the oceans. Eighty per cent of all litter in our oceans is made of plastic and, without action, by 2050 there will be more plastic in the sea than fish, by weight. This is an intolerable problem that needs immediate and far-reaching action to remedy. The surveying and spatial science profession agrees that this must stop.

FIG Working Group 4.3 – Mapping the Plastic has developed a world leading methodology to accurately extract floating plastic data (as small as 1.0 cm in length) from multi-spectral UAV images using artificial intelligence deep learning algorithms. Learn more about this exciting, ground breaking process will enable the accurate mapping and classification of floating plastic in near real time.



Let’s Map Floating Plastic in Waterways Before it Reaches the Ocean!
Mr. Simon Ironside
Land Information New Zealand’s Property Rights Group and Chair of the Working Group on Mapping the Plastic, New Zealand



The keynote will be chaired by:
Ms. Claire Buxton
Lead of Volunteer Community Surveyor Program, Canada



Mapping Small Pieces of Floating Plastic in Near Real Time
Dr. Gordana Jakovljević
Faculty of Architecture, Civil Engineering and Geodesy, Bosnia and Herzegovina

Keynote Session 6 – Technology and Visualisation for the Future

Wednesday 14 September 10:00–11:00 DoubleTree by Hilton Warsaw, Ballroom “Trimble”

This keynote focuses on the future technologies of geospatial data visualization and its role for surveyors and the role of GNSS measurements in future. This session is the last keynote session and will give you food for thought for the future.



The Changing Role of the Surveyor in the Metaverse

Mr Bryn Fosburgh

Former Vice President of Trimble, mentoring of next generation of Trimble leaders, USA; FIG Foundation Director



The keynote will be chaired by:

Dr. Krzysztof Bakuła,
Co-Congress Director, Poland



Trends in the Development of Spatial Data Visualization Methods

Prof. Robert Olszewski

Professor at the Department of Geodesy and Cartography Warsaw University of Technology, Poland



Category A – Platinum Level

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	ORBITS Engineering Firm www.orbitseng.com/

Category G – Other Sponsorship

	The Danish Society of Engineers, IDA https://english.ida.dk/
-------------------------------------------------------------------------------------	-----------------------------------------------------------------



The following technical tours have been organised for participating delegates and accompanying persons. The tours in Warsaw are being organized by a Polish tour operator. Tickets may be available for purchase from the Registration Desk.

Monday 12 September

Warsaw University of Technology

Time: 14:30–17:30 on Monday September 12

Meeting point: Registration Desk, DoubleTree by Hilton Warsaw

Warsaw University of Technology is the oldest university and also the best technical academic unit in Poland. The history of the WUT dates back to the early XIX century. In 1826, the opening of the Preparatory School for the Polytechnic Institute – the first technical school in Warsaw marked the beginning of technical education in Warsaw. In 1915 the Warsaw University of Technology – the first Polish technical university was established. Today, Our University provides the highest level of education in 32 fields of study, including English as the language of instruction, to over 34 thousand students. In the ranking of Polish universities, it has taken first place in its category for nine years.

During the trip, the participants will take part in a guided tour by the WUT Campus and the Museum of the Warsaw University of Technology. The tour will include visiting the oldest buildings of the Universities, with the Main Building and the Main Hall, which is one of the most beautiful in Europe. Then participants will have an opportunity to visit laboratories of the Faculty of Geodesy and Cartography and have a seminar with employees of the Faculty who represent its departments conducting research and educational activities in the field of geodesy, surveying, photogrammetry and remote sensing, cartography and GIS, cadaster, spatial planning. This tour will be a great opportunity to visit the University and establish new cooperation during bilateral meetings and exchange didactic and scientific experience.

Tuesday 13 September

Head Office of Geodesy and Cartography

Time: 09:00–12:00 on Tuesday September 13

Meeting point: Registration Desk, DoubleTree by Hilton Warsaw

Pickup point: Dworzec Centralny 14

Head Office of Geodesy and Cartography (GUGiK) is Polish Mapping & Cartographic Agency.

GUGiK stores, heads and shares databases from Central Geodetic and Cartographic Resource. The Authority creates and maintains www.geoportal.gov.pl for spatial information infrastructure with access to spatial data and relative services. Besides, GUGiK maintains ASG-EUPOS system with Management Centre supporting measurements and navigation and providing calculation of corrections for the respective real time services. Moreover, GUGiK leads map repository and photogrammetric archives.

1. Department of Photogrammetry and Remote Sensing (FOTO)
 - a. presentation of data acquisition and data verification methodology
 - b. data processing – e.g. 3D models
 - c. display of UAV, AR Sandbox, aerial photos scanner, Street-photo Camera
2. Aerial Photo Archive
 - a. about 700,000 analogue photos acquired since 1950s
3. Department of Geodesy and Spatial Reference Systems (GSOP)
 - a. presentation of ASG EUPOS
4. Server Room
5. Map repository
 - a. presentation of gathered maps and associate documentation
6. Department of GIS and Cartography (TOPO)
 - a. presentation of Topographical Feature Database

Tuesday 13 September

Planetarium – Copernicus Science Centre

Time: 10:15–13:15 on Tuesday September 13

Meeting point: Bus stop METRO CENTRUM NAUKI KOPERNIK 03

Pickup point: FIG shuttle bus from DoubleTree by Hilton Warsaw and other stops – see the timetable on page 66

The centre is a real paradise for science buffs, and not just the youngest ones. Here, you will discover the secrets of nature, conduct your own experiments and have fun. Don't ask for a guide at the Copernicus Science Center. Here, everyone can be a researcher and explorer and you don't have to follow anyone's rules. You can carry out your own experiments and see how your senses let you interpret the world.

Wednesday 14 September

WPG – Historical Museum of Surveying

Time: 14:30–17:30 on Wednesday September 14

Meeting point: Registration Desk, DoubleTree by Hilton Warsaw

Pickup point: Dworzec Centralny 14

On March 23rd, the National Council of Warsaw establishes the Municipal Geodetic Company. A year later, on April 19, 1951, MGC obtained legal personality and adopted the name Warsaw Geodetic Company (WPG) which is still used today. WPG founded the WPG Geodesy Museum. In the museum, you can see a cross-section of instruments used by surveyors in the 19th and 20th centuries. There are more and more exhibits from the 21st century.

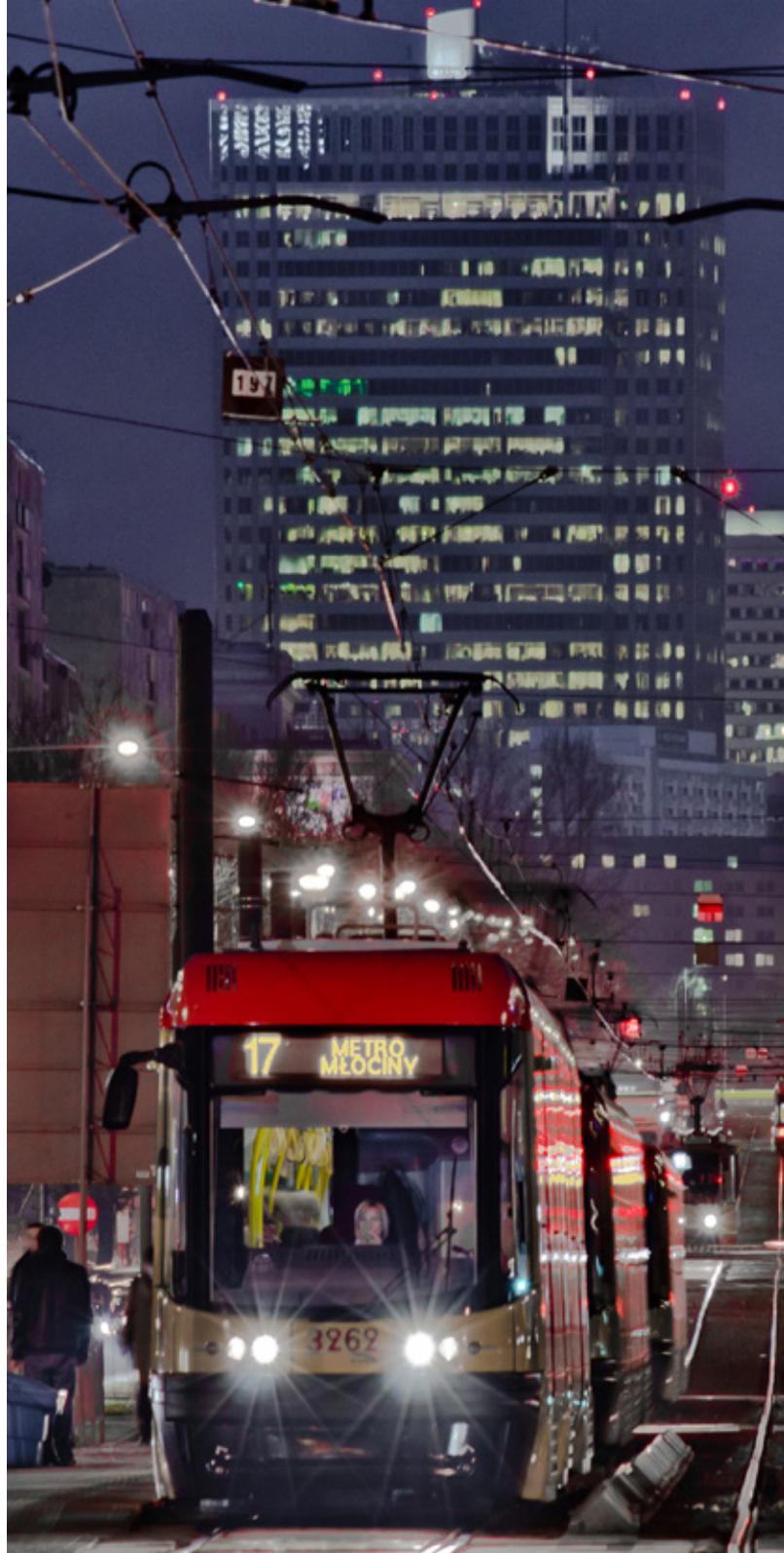


FIG Congress is much more than technical sessions. In the programme you will also find pre-events, special sessions with partners, administrative and organisational meetings, partner meetings, and forums.

Pre-Conference Events	Date	Time	Location
Mining Surveying Workshop	Saturday 10 September	09:00–17:30	Poplar
ArcGIS Parcel Fabric – Esri	Saturday 10 September	09:00–17:00	Cedar
Surveying and BIM Classroom	Saturday 10 September	09:00–17:00	Alder
FIG Young Surveyors Conference	Saturday 10 – Sunday 11 September	09:00–17:30 09:00–15:00	Pine
Reference Frames in Practice	Saturday 10 – Sunday 11 September	08:30–18:00 08:30–12:00	Sequoia
Multi-Sensor-Systems Workshop	Saturday 10 – Sunday 11 September	13:00–17:00 09:00–13:00	Hazel

PRE-CONFERENCE EVENT SPONSORS



FIG Sessions	Date	Time	Location
General Assembly – Session 1	Sunday 4 September	10:00–12:00	Online
General Assembly – Session 2	Sunday 11 September	13:00–15:30	Ballroom
Newcomers Session – Introduction to FIG Congress	Monday 12 September	08:00–08:45	Willow
FIG Member Associations Forum	Monday 12 September	16:30–18:00	Sycamore/Magnolia /Cedar
FIG Director Generals Forum	Tuesday 13 September	09:00–11:00	Sycamore/Magnolia /Cedar
FIG Corporate Member/Congress Sponsor Meeting	Wednesday 14 September	14:30–16:00	Pine/Hazel
FIG Academic Forum: VGGT and UNCCD COP 14, organised with FAO	Wednesday 14 September	16:30–18:00	Ballroom “Trimble”
Annual Meetings of FIG Commissions. Open for all interested. On Wednesday each commission organises a dinner (self-paid).	Monday 12 September Tuesday 13 September Wednesday 14 September	13:25–14:15	Various
Presidents Meeting (by invitation)	Wednesday 14 September	16:30–18:00	Sycamore/Magnolia/Cedar
General Assembly – Session 3	Thursday 15 September	10:00–13:00	Ballroom

The Engineers Band, a special instrumental band from Warsaw University of Technology, will be entertaining during the Congress dinner, where they will transmit a huge dose of positive energy to their audience, which is what makes their events so unique.



FIG Sessions with Partners

	Date	Time	Location
Joint FIG/EuroSDR Session: Framework for Effective Land Administration – NMCA Good Practices and Further Developments	Monday 12 September	14:30–16:00	Ballroom "Trimble"
FIG/GLTN Joint Session: Valuation of Unregistered Land Manual	Monday 12 September	16:30–18:00	Willow
Building Back Better Informal Settlements in the UNECE Region	Tuesday 13 September	11:30–13:00	Ballroom "Trimble"
United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) – an Update and Priorities	Tuesday 13 September	14:30–15:30	Willow
FIG/FAO/UNECE Joint Session: Accelerated Digitalisation and the Future of Land Administration in the UNECE Region and Beyond	Wednesday 14 September	11:30–13:00	Ballroom "Esri"
FIG/FAO Joint Session: Leveraging the Potential of Multi-Purpose Land Consolidation in Eastern Europe	Wednesday 14 September	14:30–16:00	Ballroom "Esri"
FIG/FAO Session: FIG Academic Forum: VGGT and UNCCD COP 14	Wednesday 14 September	16:30–18:00	Ballroom "Trimble"
GLTN and FIG Young Surveyors VCSP – Continuing on a Path of Collaboration	Wednesday 14 September	16:30–18:00	Willow

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Social Programme

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

Event	Date	Time	Location	Details
Welcome Reception	Sunday 11 September	18:45–21:00	Ballroom DoubleTree by Hilton Hotel & Conference Centre	All participants are invited
Informal Lobby Bar Get-Together	Monday 12 September	21:00–00:00	Lobby Bar DoubleTree by Hilton	Attendees are encouraged to meet in the bar area for an informal get-together and networking (own costs)
FIG Congress Dinner	Tuesday 13 September	19:30–00:00	Warsaw University of Technology	Tickets: 100 EUR *)
Commission Dinners	Wednesday 14 September		To be decided by each commission – check fig.net/fig2022	
FIG Farewell Reception	Thursday 15 September	13:00–14:30	Ballroom DoubleTree by Hilton Hotel & Conference Centre	Hosted by FIG Working Week 2023

*) Tickets available for purchase from the Registration Desk

Accompanying Persons Programme

Accompanying persons are very welcome at the FIG Congress. Included in the registration for accompanying persons is the Opening Ceremony and Welcome Reception that is taking place on 11 September 2022. Each accompanying person can also enjoy one of the half-day social tours free of charge. Welcome to Warsaw! Meeting points for the tours are indicated on the tickets.

Social Tours

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

FULL DAY TOURS

Date	Tour	Time	Price
Saturday 10 September	Kraków & Wieliczka by train	07:30–19:30	€ 184
Saturday 11 September	Chopin's Warsaw & Żelazowa Wola	09:30–16:30	€ 80
Thursday 15 September	Kraków & Wieliczka by train	07:30–19:30	€ 184
Friday 16 September	Gdansk by train (full day)	07:30–19:30	€ 152

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

HALF DAY TOURS

Date	Tour	Time	Price
Sunday 11 September	Warsaw Uprising Tour	11:15-14:15	€ 35
Monday 12 September	Polish Cuisine Culinary Workshop – Making Dumplings	09:00-11:00	€ 25
Monday 12 September	Jewish Heritage in Warsaw / visit to POLIN Museum	14:15-17:15	€ 36
Monday 12 September	Warsaw Old & New Town – Walking Tour	16:00-19:00	€ 28
Tuesday 13 September	Łazienki Royal Park	09:45-12:45	€ 39
Tuesday 13 September	Frederic Chopin in Warsaw	10:00-13:00	€ 34
Tuesday 13 September	Warsaw Old & New Town – Walking Tour	18:00-21:00	€ 28
Wednesday 14 September	Wilanów Palace	14:00-17:00	€ 45
Thursday 15 September	Warsaw Old & New Town – Walking Tour	10:00-13:00	€ 28

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

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- **RIEGL** is an international leading provider of cutting-edge technology in airborne, mobile, terrestrial, topo-bathymetric, and UAV-based laser scanning solutions for applications in surveying. At FIG 2022 in Warsaw, RIEGL will showcase their comprehensive portfolio of LiDAR sensors and systems at booth A13, supported by their distribution partner Laser-3D, www.laser-3d.pl
- **DJI Enterprise** is the global leader in the manufacture of commercial drones. Our enterprise solutions include aerial platforms,

payloads and analytic tools that can be deployed today. In relation to surveying, DJI Enterprise drones can help map, model, and inspect areas of interest. And with our solutions, you can achieve centimeter-level accuracy for surveying, automate workflows, and digitize assets.

- Founded in 1971, **Ripro Corporation** is Japan's largest manufacturer of survey markers. Ripro is committed to preserving the environment and protecting our natural resources, using 100% recycled plastic in manufacturing our markers. What is good for the Earth is good for Ripro! We use the latest technology to offer the best products to our customers. Our smart sensor-equipped Eco Marker Systems provide tools for facilities/utilities information management (Information ECO) and landslide monitoring/flood prevention (Sensor ECO).

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- **CHC Navigation** is a global provider of innovative precise navigation and positioning solutions covering a wide range of professional applications, including UAV LiDAR and conventional GNSS surveying, 3D mass data acquisition, precision agriculture, USV and real-time GNSS RTK infrastructure. Today, CHCNAV has distributors in more than 120 countries.
- **AgEagle** and our wholly owned subsidiaries, senseFly, MicaSense and Measure are actively engaged in designing and delivering best-in-class drones, sensors and software that solve important problems for our customers. Today, AgEagle is a leading provider of full stack drone solutions for customers worldwide in the surveying, GIS, agriculture, energy, and government verticals, among many others.
- **SatLab Geosolutions** is a Swedish-based global satellite positioning solutions company, founded by a group of pioneering engineers with a total of more than 40 years of experience in the GNSS industry. The SatLab Geosolutions team strives to create innovative products and provide superior complete solutions for surveying professionals around the globe.
- Established in 1983, **Carlson Software** offers advanced CAD design software, field data collection, laser measurement and

machine control products for the civil engineering, surveying, GIS, construction, and mining industries worldwide. We are proud to support you with award-winning technical support, highly precise solutions, and versatility in the tools you use every day.

- **IMG Monitoring** is a company specialized in management of complex monitoring systems for invasive construction works. In the scope of the integration of an extended number and typology of instruments and allowing the distribution of real-time monitoring data, IMG produced and developed and presents to FIG2022 its own WebGIS-DDS platform.
- **GeoSLAM** makes it easy to capture and connect data from the world around us. From the built environment to the natural world, GeoSLAM technology gives people the power to collect geospatial data from some of the most difficult environments, whether they are indoor, outdoors, underground – everywhere.
- **Terrasolid** software offers unique capabilities for processing point clouds and images of any sensor, system, and data size. Calibrate, match, and classify raw data to create 3D vector models, terrain representations, advanced visualizations, or extract features seamlessly. With the newly available wizard, processing high quality deliverables with Terrasolid is now an effortless job!

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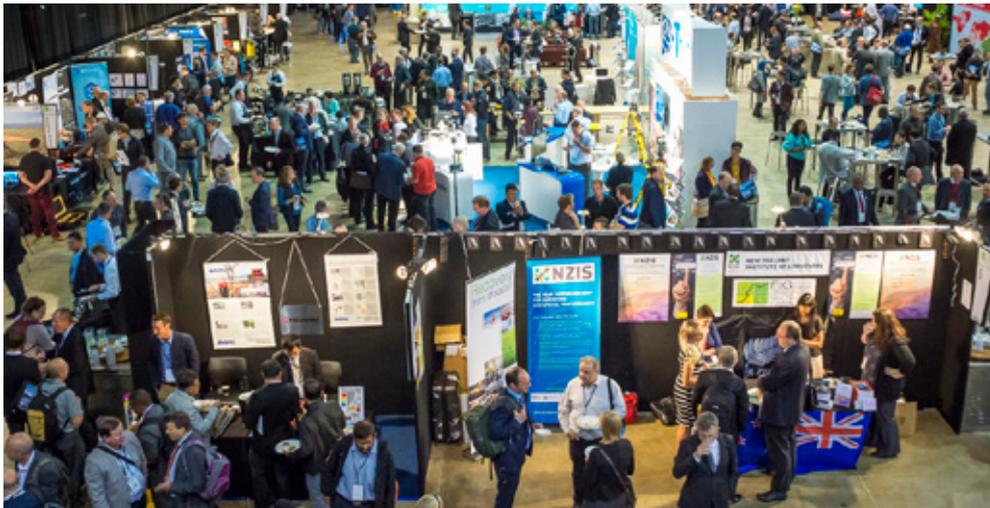
- **WPG S.A.** is a company providing services in the field of geomatics. The nature of the company makes it comparable to modern Warsaw, a modern and vibrant city that is developing rapidly.
- **OPEGIEKA** has been active in the geospatial market since 1989. Today offers full technology chain from consultation to implementation. The company focuses on R&D, photogrammetry and remo-

te sensing, geoIT and surveying.

- **SkySnap** offers solution for site inspection, monitoring and measurement, based on UAV, AUV, Lidar data that provides a quick evaluate progress of construction progress and verify completed work vs. design.

Sponsor Presentations

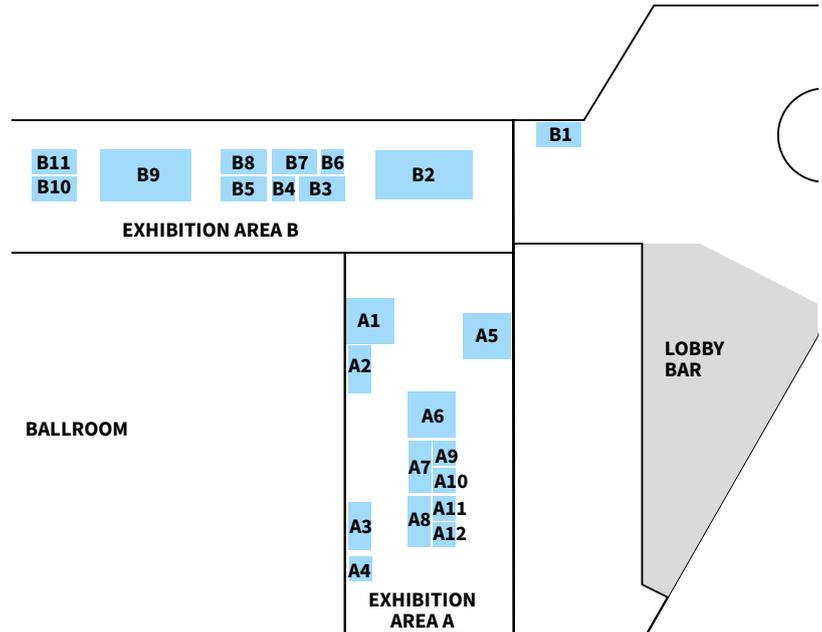
Date	Time	Hazel/Pine	Sequoia
Monday 12 Sept.	11:30	Leica Geosystems: <i>Nieustajqce Wyzwania Stawiane Przed Zawodem Geodety</i>	Terrasolid Ltd.: <i>Automatic Point Cloud Processing Wizard for UAV Lidar</i>
Monday 12 Sept.	14:30	Riegl: <i>RIEGL Waveform LiDAR: Highly Accurate, Informative Point Clouds as the Basis for the Digital Twin</i>	
Monday 12 Sept.	16:30	FARO Technologies: <i>FARO AEC Solutions</i>	
Tuesday 13 Sept.	09:00		AgEagle: <i>Use Case Spotlights: Mapping and Modelling Cities Using Drones</i>
Tuesday 13 Sept.	11:30	Opegięka: <i>Accurate, Reliable and Digital Geospatial Data Understandable by Humans and Machines as a Basis of Decision-making Processes Automation</i>	GeoSLAM: <i>3D Mobile Mapping and Handheld SLAM Technology – Revolution in Digital Construction Industry</i>
Tuesday 13 Sept.	14:30	SkySnap: <i>It's Time to Digitize Surveying – BIM, AI, Process Automation, Advanced SU for Data Collection</i>	
Wednesday 14 Sept.	11:30	Stand For Her Land: <i>Action and Advocacy for Progress on SDGs – Introducing FIG's Partnership with a Global Campaign for Women's Land and Housing Rights</i>	DJI Enterprise: <i>Best Projects Using Drones for Photogrammetry and LiDAR</i>



An exhibition is running concurrently with the conference showcasing the latest and best in surveying and spatial products and services. The exhibition is located on the ground floor in the hallway to the large ballroom and in one section of the ballroom. For up-to-date information about the exhibition, please visit fig.net/fig2022/exhibitors.htm or the Conference Web App.

Opening Hours

The exhibition is open on Sunday 18:00–21:00 and from Monday 12 September to Wednesday 14 September at 11:00–18:00.



	Hexagon/ Leica Geosystems	A1		FIG + SGP	A10		OPEGIEKA	B7
	Img Monitoring	A2		FIG Working Week 2024 Accra	A11		DJI Enterprise	B8
	Terrasolid Ltd	A3		FIG Working Week 2023 USA Orlando	A12		Trimble	B9
	GeoConnect	A4		Mosaic	B1		SatLab Geosolutions	B10
	RIEGL	A5		Esri	B2		Skysnap	B11
	FARO technologies	A6		Carlson Software Inc	B3	<p>MEET THE CANDIDATES AT THE FIG BOOTH</p> <p>The FIG General Assembly will elect two new Vice and new president. Come to the FIG Booth A10 to meet and chat with the candidates.</p> <ul style="list-style-type: none"> – Mon 12 11:00–11:30: Abbas Rajabifard – Mon 12 13:00–14:30: Brian Davies, Daniel Steudler, Qin Yan, Winnie Shiu – Mon 12 16:00–16:30: Diane Dumashie – Tue 13 11:00–11:30: Orhan Ercan 		
	CHC Navigation CHCNAV	A7		WPG S.A	B4			
	GeoSLAM	A8		AgEagle	B5			
	TopoDOT	A9		Kav-Medida Map & Roads	B6			





Rajaeel Ishkhanyan unsplash.com

TECHNICAL PROGRAMME

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

Commission 1	Professional Standards and Practice – Ms. Winnie Shiu , Hong Kong SAR, China
Commission 2	Professional Education – Assoc. Prof. David Mitchell , Australia
Commission 3	Spatial Information Management – Prof. Dr. Hartmut Müller , Germany
Commission 4	Hydrography – Prof. Dr. Mohd Razali Mahmud , Malaysia
Commission 5	Positioning and Measurement – Dr. Daniel R. Roman , United States
Commission 6	Engineering Surveys – Ms. Maria Joao Henriques , Portugal
Commission 7	Cadastre and Land Management – Dr. Daniel Paez , Colombia
Commission 8	Spatial Planning and Development – Ms. Marije Louwsma , Netherlands
Commission 9	Valuation and the Management of Real Estate – Mr. Ben Elder , United Kingdom
Commission 10	Construction Economics and Management – Mr. Alan G. Muse
Young Surveyors Network	Kwabena Asiamah , Ghana Wioleta Krupowicz , Poland
LOC	Tomasz Lipecki , Poland Violetta Sokoła-Szewiła , Poland

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- **Anil Sawhney**, United States

Sunday, 4 September 2022

Friday, 9 Sept.

Saturday, 10 September 2022

FIG GENERAL ASSEMBLY SESSION 1 – REGULAR AGENDA ITEMS AND REPORTS

SUNDAY, 4 SEPT. 10:00–12:00

VENUE: ONLINE

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

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

This first General Assembly session will include the Presidents report, the Financial Report, FIG Foundation, membership matters and other General Agenda items.

FIG COUNCIL MEETING

FRIDAY, 9 SEPT. 12:00–18:00

VENUE: OAK, DOUBLETREE BY HILTON

COMMISSION: COUNCIL

CHAIR: PROF. DR. RUDOLF STAIGER, FIG

PRESIDENT, GERMANY

- By invitation only

ACCO MEETING

SATURDAY, 10 SEPT. 09:00–17:00

VENUE: OAK, DOUBLETREE BY HILTON

CHAIR: MR. MIKAEL LILJE, FIG VICE

PRESIDENT, SWEDEN

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

- By invitation only

Saturday, 10 September 2022

REFERENCE FRAMES IN PRACTICE

SATURDAY, 10 SEPT. 08:30–18:00

VENUE: SEQUOIA, DOUBLETREE BY HILTON

COMMISSION: 5

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

The main focus is on reference frames in general with a specific focus on UN initiatives, global and regional frames as well selected national case studies. A half-day International GNSS Service (IGS) Training will also be completed.

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ARCGIS PARCEL FABRIC – ESRI

SATURDAY, 10 SEPT. 09:00–17:00

VENUE: CEDAR, DOUBLETREE BY HILTON

COMMISSION: ESRI

The Parcel Fabric is designed for any organization in any country that manages cadastral records. It was designed in line with the LADM (Land Administration Domain Model) and is currently used to manage over 25 million parcels in many countries. Extensive global engagement researching best practices, requirements, and workflows resulted in a time-tested, purpose-built solution. The Parcel Fabric was designed for the next 15–20 years and can be easily extended and configured to meet your organization specific business requirements.

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SURVEYING AND BIM CLASSROOM

SATURDAY, 10 SEPT. 09:00–17:00

VENUE: ALDER, DOUBLETREE BY HILTON

COMMISSION: 10

CHAIR: PROF. CHRISTIAN CLEMEN, GERMANY, PROF. TOMASZ OWERKO

AND MR. SZYMON GLINKA, POLAND

Building Information Modeling (BIM) is changing the way surveyors work, think, collaborate and earn money. Using and sharing multidimensional digital representations of buildings are the driving forces for the digitalization of our work. This affects many tasks surveyors and GIS professionals perform, e.g. cost estimation, GIS analysis, engineering surveying, construction work, land management and facilities management.

Scope of the Workshop:

- Teaching theoretical background of the BIM method (concepts, workflows and standards)
- Best practice presentations from large projects and SME (from surveyor’s point of view)
- Presentation of the latest software (surveying, integration and collaboration with BIM, CAD, GIS)

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YOUNG SURVEYORS CONFERENCE “VOLUNTEERING FOR THE FUTURE: SMART SURVEYORS FOR SOCIAL GOOD”

SATURDAY, 10 SEPT. 09:00–17:30

VENUE: PINE, DOUBLETREE BY HILTON

CHAIR: DR. KWABENA OBENG ASIAMA, CHAIR FIG YOUNG SURVEYORS NETWORK, GERMANY

The conference will focus on “Volunteering for the Future: Smart Surveyors for Social Good” to recognise the role of young surveyors in pushing the frontiers of the surveying profession through volunteering, playing a vital role in society. The push of smarter technologies continually expands the surveyor’s toolbox allowing for the leveraging of these technologies to meet the challenges of our times.

SPONSORED BY



MINING SURVEYING WORKSHOP

SATURDAY, 10 SEPT. 09:00–17:30

VENUE: POPLAR, DOUBLETREE BY HILTON

COMMISSION: 6

CHAIR: ENG. MARIA JOAO

HENRIQUES, CHAIR FIG COMMISSION 6, PORTUGAL

ORGANISERS: ISM, GIG RESEARCH INSTITUTE, AGH, SILESIA UNIVERSITY

The topics proposed during the workshop are related to the following three basic activities of a mining surveyor: the staking out and control of the geometry of objects will be shown by presenting laser scanning techniques, environmental impact – by assessing the transformation of the state of the surface water environment in artificially drained mining and post-mining areas for the purpose of acquiring metadata for spatial development plans, and InSAR radar analysis of surface deformations. Specialized measuring devices will also be presented, allowing to perform tests in mining shafts and excavations in a way that is unique in the world.

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SCIENTIFIC WORKSHOP ON UNCERTAINTY AND QUALITY OF MULTI-SENSOR SYSTEMS – SESSIONS 1 & 2

SATURDAY, 10 SEPT. 13:00–17:00

VENUE: HAZEL, DOUBLETREE BY HILTON

COMMISSION: 6

CHAIR: PROF. VOLKER SCHWIEGER, GERMANY

Theoretical and numerical developments as well as state-of-the-art best-practise examples (monitoring surveys: GNSS and total stations, terrestrial laser scanning, point-wise and area-wise monitoring, kinematic positioning, sensor fusion, mobile mapping) will be presented at the workshop.

- Session 1: Quality and Uncertainty, Algorithms for Kinematic Positioning Chair: Prof. Heiner Kuhlmann, Germany
- Session 2: Algorithms for Kinematic Positioning Chair: Mr. Xiong Si-Ting, China

SPONSORED BY



Sunday, 11 September 2022

REFERENCE FRAMES IN PRACTICE

SUNDAY, 11 SEPT. 08:30–12:00

VENUE: SEQUOIA

COMMISSION: 5

CHAIR: DR. DANIEL ROMAN, CHAIR FIG

COMMISSION 5, UNITED STATES

Day two of the Reference Frames in Practice Workshop.

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SCIENTIFIC WORKSHOP ON UNCERTAINTY AND QUALITY OF MULTI-SENSOR SYSTEMS – SESSIONS 3 & 4

SUNDAY, 11 SEPT. 09:00–13:00

VENUE: PLACE

CHAIR: PROF. VOLKER SCHWIEGER,

GERMANY

Day two of the Multi-Sensor Systems Workshop.

– Session 3: Monitoring Networks

Chair: Mr. Ireneusz Wyczalek,

Poland

– Session 4: Quality of Terrestrial

Laser Scanning

Chair: Eng. Maria Joao

Henriques, Chair FIG Commis-

sion 6, Portugal

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YOUNG SURVEYORS CONFERENCE “VOLUNTEERING FOR THE FUTURE: SMART SURVEYORS FOR SOCIAL GOOD”

SUNDAY, 11 SEPT. 09:00–15:00

VENUE: PINE, DOUBLETREE BY HILTON

CHAIR: DR. KWABENA OBENG ASIAMA,

CHAIR FIG YOUNG SURVEYORS NET-

WORK, GERMANY

Day two of the Young Surveyors Conference. Day one focused on the theme of the conference, Volunteering for the Future: Smart Surveyors for Social Good. In this session, the focus will be turned to the future of our network. Is our network fit for the future? How do we have to evolve as a network for the next term? How can we be responsive to the changing nature of our profession and keep relevant?

Join us in planning #ToInfiniteAndBeyond!

SPONSORED BY



Sunday, 11 September 2022

FIG GENERAL ASSEMBLY – SESSION 2 – GET TO KNOW YOUR CANDIDATES

SUNDAY, 11 SEPT. 13:00–15:30

VENUE: BALLROOM, DOUBLETREE BY HILTON

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

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

Get to know your candidates... This second General Assembly session will focus on the elections that are going to take place. To be elected are the President and two Vice Presidents.

During the session you will get to know all candidates better. Member Associations will hereafter be able to vote for their candidates.

The sessions will take place in Warsaw, Poland, at Doubletree by Hilton Conference Centre. If you will not be able to attend in person it will be possible to follow the sessions online at <https://meeting15.com/en/join-event/fig-international-federation-of-surveyors-xxvii-fig-congress-2022/4606>

OPENING CEREMONY

SUNDAY, 11 SEPT. 16:30–18:00

VENUE: BALLROOM, DOUBLETREE BY HILTON

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

Keynote Speaker: Dr. Prof. Rudolf Staiger, FIG President

There will be welcome addresses by:

- Dr. Krzysztof Bakuła, Co-Congress Director, SGP
- Mr. Piotr Uściński, Ministry of Economic Development and Technology
- Ms. Alicja Kulka, Surveyor General, Head Office of Geodesy and Cartography
- Mr. Adam Struzik, Marshal's Office of the Mazowieckie Voivodeship in Warsaw
- Dr. Rafał Trzaskowski, Warsaw president (mayor of Warsaw)
- Prof. Janusz Walo, President of Polish Association of Surveyors (SGP)
- Dr. Krzysztof Bakuła, Local Co-Congress Director

WELCOME RECEPTION / CULTURAL EVENING

SUNDAY, 11 SEPT. 18:45–21:00

VENUE: BALLROOM, DOUBLETREE BY HILTON

All delegates, registered accompanying persons and exhibitors are invited to attend the official Welcome Reception/Cultural Evening. This is an excellent opportunity to renew old friendships and make new acquaintances as you are welcomed to Warsaw.

The Welcome Reception & Cultural Evening will start just after the Opening Ceremony and Exhibition opening. In ballroom Universe you will get the opportunity to talk to other congress participants who have not been met directly at remote conferences for a long time. During this time, the organizers will also want to present Polish culture to the participants of the congress. The menu in the style of Delicacies of Polish cuisine will be served by the DoubleTree Hotel.

During the Welcome Reception/Cultural Evening there will also be a show of Polish culture related to folk dance and singing performed by The Song and Dance Ensemble of Warsaw University of Technology, which is one of the oldest student song and dance ensembles in Poland. It was founded in 1951 by a group of future engineers fascinated by Polish folklore.



CHARITY DANCE

SUNDAY, 11 SEPT. 11:00–12:00

VENUE: LIME/MAPLE, DOUBLETREE BY HILTON

Put on your dancing shoes and lets learn the basic steps of polonaise and krakowiak.

The charity dance will be led the Song and Dance Ensemble of the Warsaw University of technology. The Artistic Director of the ensemble, Mr. Jarosław Wojciechowski, along with one of the couples will lead the learning of polonaise and krakowiak, with live accompaniment performed by their pianist Krzysztof Kozłowski.

The proceeds from the Charity event will go to the FIG YSN's Volunteer Community Surveyor Programme (VCSP), and the FIG Foundation.

Cost: 10 Euros per person, and you'll get a souvenir!



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TDC

Monday, 12 September

	Ballroom "Trimble"	Ballroom "ESRI"	Walnut/Acacia	Willow	Lime/Maple
08:00–08:45				Newcomers Session	
09:00–10:00	  KEYNOTE SESSION 1: Geospatial Excellence for a Better Living – Digitalisation and Modern Surveying and Cadastre in a Post-Covid19 Era – Ballroom "Trimble"				
10:00–11:00	  KEYNOTE SESSION 2: Urban Rural Partnership – Ballroom "Trimble"				
11:00–11:30	Morning Break – Exhibition Area				
11:30–13:00	TS01A: Mines and Geohazards – Geospatial Techniques for Monitoring and Assessment – C: 6  	TS01B: Urban-Rural Land Linkages – C: 8 	TS01C: Providing a Reference Frame for Geospatial Products – C: 5	TS01D: Multidisciplinary Applications of Hydrography – C: 4	TS01E: The Third Dimension of Geospatial Information – C: 3
13:00–14:30	Lunch Break – Restaurant				
14:30–16:00	TS02A: Framework for Effective Land Administration – NMCA Good Practices and Further Developments – C: EuroSDR & FIG 	TS02B: Professional Standards and Practice – C: 1 	TS02C: Photogrammetry and UAV in Engineering Surveying – C: 6	TS02D: Definition and Approaches of Transparency – C: 9	TS02E: FIG Platinum Corporate Member Session – Leica Geosystems
16:00–16:30	Afternoon Break – Exhibition Area				
16:30–18:00	TS03A: Blended Learning for Surveying Education – C: 2 	TS03B: Coordination of Global Capacity Development – C: 2, 5 & CDN 	TS03C: Addressing Sustainability in Spatial Planning – Planning Efforts in Rural and Urban Areas – C: 8	TS03D: Valuation of Unregistered Land Manual – C: 9 & GLTN	TS03E: Financing and Performance Trends in Land Administration – C: 7

Tuesday, 13 September

09:00–11:00	TS04A: Challenges and Sustainable Solutions in Hydrography for Better Living – C: 4 	TS04B: Policy and Legal Innovations in Land Administration – C: 7 	TS04C: Open Geospatial Data and Crowdsourcing – C: 3	TS04D: Combined Techniques in Engineering Surveying – C: 6	TS04E: Blended Learning in Practice – C: 2
11:00–11:30	Morning Break – Exhibition Area				
11:30–13:00	TS05A: Building Back Better Informal Settlements in the UNECE Region 	TS05B: Land Tenure Reform System for Mars – C: YS & VCSP	TS05C: Traditional and Modern Techniques in Engineering Surveys – C: 6	TS05D: History Session – C: History	TS05E: FIG Platinum Corporate Member Session – ESRI
13:00–14:30	Lunch Break – Restaurant				
14:30–15:30	TS06A: Book Launch – Geospatial Data in the 2020s – Transformative Power and Pathways to Sustainability – C: 3  	TS06B: The FIG Mentoring Programme for Africa – C: YS, ARN 	TS06C: Spatial Planning and Affordability of Housing – C: 8 & 9	TS06D: UN–GGIM – An Update and Priorities	TS06E: Global Challenges and the Role of Land Administration Systems – C: 7
15:30–16:00	Afternoon Break – Exhibition Area				
16:00–17:00	  KEYNOTE SESSION 3: Land Governance in support of the 2030 Global Agenda – Ballroom "Trimble"				
17:00–18:00	  KEYNOTE SESSION 4: The Generational Landscape of Our Profession: Looking to the Future – Ballroom "Trimble"				

Wednesday, 14 September

09:00–10:00	  KEYNOTE SESSION 5: Mapping the Plastic – Ballroom "Trimble"				
10:00–11:00	  KEYNOTE SESSION 6: Technology and Visualisation for the Future – Ballroom "Trimble"				
11:00–11:30	Morning Break – Exhibition Area				
11:30–13:00	TS07A: Land Policy Instruments for Regional Development – C: 8  	TS07B: FIG/FAO/UNECE Joint Session: Accelerated Digitalisation and the Future of Land Administration in the UNECE Region and Beyond 	TS07C: Geospatial Analytics Use Cases – C: 3	TS07D: The Future of Land Administration: Ideas, Technologies and Processes – C: 7	TS07E: French Session 1
13:00–14:30	Lunch Break – Restaurant				
14:30–16:00	TS08A: Real Estate Data goes Geodata – C: 3 & 9 	TS08B: FIG/FAO Joint Session: Leveraging the Potential of Multi-Purpose Land Consolidation in Eastern Europe 	TS08C: Ubiquitous GNSS – C: 5	TS08D: Geospatial Data in the 2020s – C: 3	TS08E: French Session 2
16:00–16:30	Afternoon Break – Exhibition Area				
16:30–18:00	TS09A: Joint FIG/FAO Session: FIG Academic Forum: VGGT and UNCCD COP 14 	TS09B: Land Administration and the SDGs – C: 7 	TS09C Land Use Planning and Management Fed by Spatial Analyses – C: 3, 8	TS09D: GLTN and FIG Young Surveyors VCSP – Continuing on a Path of Collaboration	TS09E: Laws and Standards – C: 9

Monday, 12 September					
Sycamore/Magnolia/Cedar	Poplar/Alder	Rowan	Pine/Hazel	Sequoia	08:00–08:45
					09:00–10:00
					10:00–11:00
					11:00–11:30
TS01F: Professional Standards, Practice Development and Life-long Learning – C: 1, 2 & 7	TS01G: Innovations in Cadastral Data Capture and Analysis – C: 7	CLGE ex-board Meeting 1	Sponsor Presentation: LEICA GEOSYSTEMS	Sponsor Presentation: TERRASOLID LTD.	11:30–13:00
					13:00–14:30
TS02F: Young Surveyors and the Future of Volunteering – C: YS	TS02G: GIS for 3D Urban Planning, Construction and Valuation – C: 3, 8 & 9	CLGE ex-board Meeting 2	Sponsor Presentation: RIEGL		14:30–16:00
					16:00–16:30
TS03F: FIG Member Associations Forum	TS03G: Laser Scanning in Engineering Surveying – C: 6	CLGE ex-board Meeting 3	Sponsor Presentation: FARO TECHNOLOGIES		16:30–18:00
Tuesday, 13 September					
TS04F: FIG Director Generals Forum	TS04G: Efficient GNSS Integration with Other Sensors – C: 5	Regional Bodies Meeting		Sponsor Presentation: AGEAGLE	09:00–11:00
					11:00–11:30
TS05F: FIG Standards Meeting	TS05G: Climate Smart Planning with GIS – C: 3 & 8	GLTN Partners Meeting	Sponsor Presentation: OPEGIEKA	Sponsor Presentation: GEOSLAM	11:30–13:00
					13:00–14:30
TS06F: LADM in the Classroom – Making the Land Administration Domain Model Accessible – C: 7	TS06G: Providing Vertical Control for Hydrographers, Coastal Managers and other Disciplines – C: 5		Sponsor Presentation: SKYSNAP		14:30–15:30
					15:30–16:00
					16:00–17:00
					17:00–18:00
Wednesday, 14 September					
					09:00–10:00
					10:00–11:00
					11:00–11:30
TS07F: Innovation in Curriculum – C: 2	TS07G: FIG Platinum Corporate Member Session – Trimble		Open Meeting: STAND FOR HER LAND	Sponsor Presentation: DJI ENTERPRISE	11:30–13:00
					13:00–14:30
TS08F: FIG & the SDGs – Making the World a Better Place with Your Skills – C: TF-SDG	TS08G: Databases, Models and Software for Land Administration – C: 7	IPMS Regional Meeting	FIG Corporate Member/Congress Sponsor Meeting		14:30–16:00
					16:00–16:30
TS09F: FIG Presidents Meeting (by invitation only)	TS09G: Construction Economics and Management – C: 10				16:30–18:00

Monday, 12 September 8:00–11:30

NEWCOMERS SESSION

MONDAY, 12 SEPT. 08:00–08:45

VENUE: WILLOW, DOUBLETREE BY HILTON

CHAIR: DR. **DIANE DUMASHIE**, FIG VICE PRESIDENT, UNITED KINGDOMRAPPORTEUR: MS. **LOUISE FRIIS-HANSEN**, FIG DIRECTOR, DENMARK

New to the FIG Working Week?

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

**KEYNOTE SESSION 1:
GEOSPATIAL EXCELLENCE
FOR A BETTER LIVING –
DIGITALISATION AND MODERN
SURVEYING AND CADASTRE IN
A POST-COVID19 ERA**

MONDAY, 12 SEPT. 09:00–10:00

VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON

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

The keynote will set the scene of the Congress. Even though at the onset of the pandemic, many surveying, geodetic and land administration organizations were already quite far in the digitalisation of data and processes, the last two years was speeding up this transformation.

In this keynote session the speakers will take the audience through their undertakings and experiences during these past years, how the transformation has been handled, and what learnings can be drawn from this.

Ewa Surma (Poland): The Activities of GUGIK During the Pandemic (11768)

Rumyana Tonchovska (Italy): Digital Transformation and the Role of Land Administrations – FAO, FIG and UNECE/WPLA joint publications (11783)

Paweł Hanus (Poland): Better Living After Covid – the Surveyor Point of View (11775)

MORNING BREAK

MONDAY, 12 SEPT. 11:00–11:30

VENUE: EXHIBITION AREA, DOUBLETREE BY HILTON

MEET THE CANDIDATES AT THE FIG BOOTH

The FIG General Assembly will elect a new President for the term 2023–2026. Come to the FIG booth to meet and chat with the candidates. During the Coffee Break you can meet **Abbas Rajabifard**, Surveying & Spatial Sciences Institute SSSI, Australia.

**KEYNOTE SESSION 2:
URBAN RURAL
PARTNERSHIP**

MONDAY, 12 SEPT. 10:00–11:00

VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON

CHAIR: DR. **ORHAN ERCAN**, TÜRKIYE

Urban Rural Partnership is more urgent than ever in the light of an ongoing or even increasing urban rural divide in developed as well as in developing countries. Central elements are the need for comprehensive land policies, reflecting a priority on spatial and economic integration, and the importance of considering governance, infrastructure and local capacity. Join our two distinguished keynote speakers through the urban rural land linkages.

Holger Magel (Germany): Urban Rural Partnership – It's a Matter of Territorial Justice! (11774)

Robert Lewis-Lettington (Kenya): The GLTN Approach to Urban Rural Partnership (11780)

Monday, 12 September 2022 11:30–13:00

**TS01A: MINES AND GEOHAZARDS – GEOSPATIAL
TECHNIQUES FOR MONITORING AND
ASSESSMENT**

MONDAY, 12 SEPT. 11:30–13:00

VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON

COMMISSION: 6

CHAIR: MS. **ANNA SZOSTAK-CHRZANOWSKI**, CANADARAPPORTEUR: PROF. **TOMASZ LIPECKI**, POLAND

Angelica Leon (Colombia): Multitemporal Analysis of Environmental Restoration of Quarries and Intervened Areas (11299)

Jereimiah Uriah and **Chima Ogba** (Nigeria): Impacts of In-stream Sand Mining on the River Geometry in Aleto Eleme, Rivers State (11350)

Ryszard Mielińska and **Paweł Sikora** (Poland): The Use of TLS Technology in the Inventory of Damage to Building Objects Resulting from the Impact of Underground Mining Exploitation (11463)

Magdalena Łukosz (Poland): Offset-Tracking as an Effective Tool for Rapid Movements Monitoring (11622)

Roman Shults (Czech Republic), **Andrii Khalak** and **Valentyna Strilec** (Ukraine): Complex Approach to Analysis of Retaining Walls Monitoring Results (11632)

Damian Kurdek, **Agnieszka Malinowska** and **Ryszard Hejmanowski** (Poland): Measurements of the Observation of Rock Mass Movements in Field No.1 in the "klodawa" Salt Mine S.A. (11634)

Vassena Giorgio Paolo Maria (Italy): Outdoor and Indoor Mapping of a Mining Site by Indoor Mobile Mapping and Geo Referenced Ground Control Scans (11590)

Ashim Babu Shrestha, **Punya Oli** and **Sumitra Shrestha** (Nepal): Application of UAV Drone Technology in Mining Industries of Nepal (11514)

Anna Szostak-Chrzanowski (Canada), **Robert Rožek**, **Ewa Warchala** and **Stefanek Paweł** (Poland): Optimization of Existing Mining Activities Expansion in case of Increased Mining and Geological Complexity using Integrated Analysis at KGHM Polska Miedz (11613)

Edyta Puniach, **Wojciech Matwij**, **Wojciech Gruszczyński**, **Paweł Cwiąkała** and **Katarzyna Strzabata** (Poland): Automation of Land Displacement Determination Using UAV Photogrammetric Data (11435)

Agnieszka Malinowska, **Ulmaniec Paweł** (Poland), **Ebrahim Fathi Salmi** (Australia) and **Ryszard Hejmanowski** (Poland): Sinkhole Occurrence Risk Assessment and Management in Areas of Abandoned Underground Mines (11625)

Anastasia Triantafyllou, **George Vergos** and **George Tsakoumis** (Greece): Contribution of InSAR Deformation Analysis to Monitoring Coastal Erosion in the Region of Central Macedonia (11347)

CLGE EX-BOARD MEETING 1

MONDAY, 12 SEPT. 11:30–13:00

VENUE: ROWAN, DOUBLETREE BY HILTON

- By invitation only

**TS01B: URBAN-RURAL LAND
LINKAGES**

MONDAY, 12 SEPT. 11:30–13:00

VENUE: BALLROOM "ESRI", DOUBLETREE BY HILTON

COMMISSION: 8

CHAIR: PROF. **HOLGER MAGEL**, FIG HONORARY PRESIDENT, GERMANYRAPPORTEUR: MS. **MARIJE LOUWMSA**, CHAIR FIG COMMISSION 8, NETHERLANDS

Michael Klaus (China, PR): Rural Revitalization – A Key to Urban Rural Land Linkages (11761)

Uchendu Eugene Chigbu (Namibia): Urban-Rural Land Linkages: Concept Explained Using 'continuum' Theory and Metaphor (11762)

Urszula Litwin and **Szczepan Budkowski** (Poland): Application of the 3D Cadastre in Modern Rural and Urban Development (11764)

Przemysław Baster (Poland): Historical Survey Materials as an Important Basis in Rural Revitalization to Improve the Quality of Life (11765)

Martin Fritsch and **Peter Mani** (Switzerland): The Need of Resilience for Rural Societies and Economies in Alpine Regions to Profit from Emerging Opportunities in the Course of Climate Change Adaptation (11730)

Jan Jadczyzyn and **Jacek Pijanowski** (Poland): Land Consolidation and Anti-Erosion Meliorations, as Tool to Counteract Climate Change in the Water Sphere in Agricultural Areas (11628)

**SPONSOR PRESENTATION:
TERRASOLID LTD.**


MONDAY, 12 SEPT. 11:30–13:00

VENUE: SEQUOIA, DOUBLETREE BY HILTON

**Automatic Point Cloud Processing
Wizard for UAV LiDAR**
**SPONSOR PRESENTATION:
HEXAGON /
LEICA GEOSYSTEMS**


MONDAY, 12 SEPT. 11:30–13:00

VENUE: PINE/HAZEL, DOUBLETREE BY HILTON

Nieustające wyzwania stawiane przed zawodem geodety
Presenter: **Maciej Bornowski**, Leica Geosystems Sp. z o.o., Warszawa, Polska

TS01C: PROVIDING A REFERENCE FRAME FOR GEOSPATIAL PRODUCTS

MONDAY, 12 SEPT. 11:30–13:00
VENUE: WALNUT/ACACIA, DOUBLETREE BY HILTON
COMMISSION: 5
CHAIR: DR. KEVIN AHLGREN, UNITED STATES
RAPPORTEUR: PROF. RAFAL SIERADZKI, POLAND

Godfrey Toko, Richard Oput, Grace Kagoro, William Kambugu and Ibrahim Mageso (Uganda): The Uganda Geodetic Reference Frame Network (ugrn) as a Back Bone of the National Geospatial Infrastructure in Uganda (11323)

Nuddin Tengku, Simon Fuller, Alex Woods and Guorong Hu (Australia): Update on the Asia-Pacific Reference Frame (APREF) Processing Enhancements and Continuously Operating Reference Stations (CORS) Monitoring in Australia (11499)

Sammy Mwangi Matara, David Nyang'au Siriba, John Bosco Kyalo Kiema and Sammy Mulei Musyoka (Kenya): A Review of the History and Development of The Kenyan Geodetic Reference Frame (11503)

Olusola Omogunloye, Osagie Egogo Stanley, Olufemi Olunlade, Oludayo Abiodun and Babatunde Ojebile (Nigeria): A Study into the Distinction Between Ellipsoid and Planar Computations in a Geodetic Traverse Network (11530)

Richard Stanaway (Papua New Guinea): PNG2020 a New Geodetic Datum for Papua New Guinea (11537)

Richard Oput, Godfrey Toko, Grace Kagoro, Ibrahim Mageso and William Kambugu (Uganda): The Uganda Geodetic Reference Framework (UGRF) as a Backbone for the National Geospatial Infrastructure in Uganda (11580)

Tashi Tashi, Tenzin Namgay, Dorji Pelzang, Kinzang Thinley (Bhutan) and **Rui Fernandes** (Portugal): DrukRef21 – Defining the Reference Frame of Bhutan in a Deforming Region (11455)

Ahmed Nuaim, Firdous Hussain (Maldives) and **Rui Fernandes** (Portugal): MVCORS – the First Permanent GNSS Network of Maldives (11525)

Chris Pearson (New Zealand) and **Sebastien Vielliard** (France): Support for Dynamic Datums in Trimble Software (11341)

Ozge Gunes, Deniz Oz Demir and Cuneyt Aydin (Türkiye): Reference Frame of GPS-PPP Solutions in Marmara Region-Turkey (11561)

Gábor Molnár and Sándor Tóth (Hungary): Accurate PROJ Parametrization of the Uniform National Projection System of Hungary (EOV) (11649)

TS01D: MULTI-DISCIPLINARY APPLICATIONS OF HYDROGRAPHY

MONDAY, 12 SEPT. 11:30–13:00
VENUE: WILLOW, DOUBLETREE BY HILTON
COMMISSION: 4
CHAIR: DR. MALAVIGE DON ERANDA KANCHANA GUNATHILAKA, SRI LANKA
RAPPORTEUR: MR. SIMON IRONSIDE, NEW ZEALAND

Ceciliar Nkechi Baywood, Kayode David Oluwamotemi and Esomchukwu Igbokwe (Nigeria): Assessment and Analysis of Flood Vulnerability In Abia State Using Tufflow and HEC-RAS (11313)

Adam Łyszczowicz, Anna Bernartowicz and Dominika Zawierowska (Poland): Use of altimetry data to determine the height of inland water surface – the case study (11402)

Isah Abdulkadir, Nuhu Yerima NGRnoma and Abba Gana Bukar (Nigeria): An Exposition of the Estimation of the Lake Chad Shoreline Dynamics (11454)

Adin Li (China, PR): USV Hydrographic Soluton showed its advantages in Project of Ponds Sludge Removing (11636)

TS01E: THE THIRD DIMENSION OF GEOSPATIAL INFORMATION

MONDAY, 12 SEPT. 11:30–13:00
VENUE: LIME/MAPLE, DOUBLETREE BY HILTON
COMMISSION: 3
CHAIR: PROF. ANA-CORNELIA BADEA, ROMANIA
RAPPORTEUR: MR. MIRCEA NAP, ROMANIA

Mustafa Aslan, Ibrahim Canakurt, Cengiz Yildirim, Ismail Dursun and Ekrem Ayyıldız (Türkiye): 3D City Models as a 3D Cadastral Layer: The Case of the TKGM Model (11367)

Kazimierz Becek (Poland): The Time-Lapse Digital Elevation Models Difference for Change Detection of Earth's Topography (11397)

Charalabos Ioannidis, Sofia Soile, Argyro-Maria Boutsi, Styliani Verykokou, Ilias Pastos, Ioannis Tallis, Panagiotis Tokmakidis, Konstantinos Tokmakidis and Chryssy Potsiou (Greece): 5dMeteora: Information System for Multi-Level Documentation of Religious Sites and Historic Complexes (11447)

Alex CHU and Ko-kwan, Ben Fan (Hong Kong SAR, China): Opening up 3D Digital Map in Hong Kong: Pilot in Kowloon East (11495)

Ali El Hussein (USA): Drone aerial imagery and digital terrain models as tools in resolving contested borders: The case of Zambia and the Democratic Republic of the Congo (11685)

Jakub Gryzió, Paweł Czerniec and Łukasz Wilk (Poland): Web-based presentation of multisensoral 3D data on the example of the Church of St. Augustine in Warsaw (11699)

Hailun Yan and Ruisheng Wang (Canada): Automated Building Extraction from Aerial Images with An Improved End-To-End Deep-Learning-Based Approach (11721)

TS01F: PROFESSIONAL STANDARDS, PRACTICE DEVELOPMENT AND LIFE-LONG LEARNING

MONDAY, 12 SEPT. 11:30–13:00
VENUE: SYCAMORE/MAGNOLIA/CEDAR, DOUBLETREE BY HILTON
COMMISSION: 1, 2 & 7
CHAIR: DR. DAVID MITCHELL, CHAIR FIG COMMISSION 2, AUSTRALIA
RAPPORTEUR: DR. OLGA MATUK, POLAND

John Hohol (USA): The FIG Foundation – Celebrating 20 years in helping to Build a Sustainable Future (11292)

Dante Salvini, Carmen Vega Orozco and Lorenz Jenni (Switzerland): Supporting modernization of land administration in Colombia with joint further education programs (11404)

Eeke Welling and Rindert Vos (Netherlands): Lifelong learning works both ways (11415)

Tim Brouwer, Magdalena Grus, Carline Amsing and Iris Theunisse (Netherlands): Education, a Corner Stone for Digital Twin (11470)

Claire Buxton (Canada), **Roshni Sharma** (Australia), **Michelle Nagawa** (Uganda), **Jordan Palk** (Canada) and **Angela Omamuyovwi Etunovbe** (Nigeria): Mobilising Young Surveyors toward Globally Impactful Causes – The VCSF Core Team (11479)

Matjaz Grlic (Slovenia), **Vladimir Krupa** (Croatia), **Jean-Yves Pirlot** (Belgium) and **Robert Rachwal** (Poland): The CLGE Code of Professional Qualification for Property Surveyors a Harmonisation of Best Practices in Europe (11531)

Jennifer Chigbu, Njike Chigbu and Nancy Chidinma ihesiaba (Nigeria): Encouraging Female Gender Effective Professional Participation for Sustainable Development through Geomatics Education-A Win-Win initiative. (11596)

Israel Taiwo, David Elegbede (Nigeria), **Kamsin Raju, Chethna Ben** (Fiji), **Jordan Palk** (Canada), **Roshni Sharma** (Australia) and **Claire Buxton** (Canada): Building Capacity for Tenure Security with the VCSF Wisdom Workshop (11617)

Mohammed Mamman Kabir, Godwill Tamunobiekiri Pepple, Ukaeme Emmanuel Ajie and Emilia Biobebe West (Nigeria): Surveying: Academic and Professional Discipline (11705)

Lars Jämtnäs, Kent Ohlsson, Fredrik Dahlström and Christina Kempe (Sweden): Best Practice Guidelines – Enhancing the Value of the Surveyor (11569)

TS01G: INNOVATIONS IN CADASTRAL DATA CAPTURE AND ANALYSIS

MONDAY, 12 SEPT. 11:30–13:00
VENUE: POPLAR/ALDER, DOUBLETREE BY HILTON
COMMISSION: 7
CHAIR: DR. ROHAN BENNETT, CHAIR ELECT, FIG COMMISSION 7, AUSTRALIA
RAPPORTEUR: MSC. CLAUDIA STÖCKER, NETHERLANDS

Fawzi Zarzoura (Egypt), **Mosbeh Kaloop, Jong-Wan HU** (Republic of Korea) and **Tamer Elgharbawi** (Egypt): Waste Assessment and Management Utilizing Remote Sensing and Geographic Information Systems Case Study Governorate Eldakahlia (11302)

This is a peer reviewed paper.

Piotr Falkowski (Poland): The Importance of Archive Aerial Photos for Legal and Administrative Proceedings in Warsaw (11382)

Wonho Song (Republic of Korea): Generating Cadastral Maps from Aerial Photos of Rural Areas (11403)

Sheilla Ayu Ramadhani, R. Agus Wahyudi Kushendratno and Wahyu Heriyadi (Indonesia): Institutionalization of UAVs for Land Affairs and Spatial Planning in Indonesia (11449)

Ümit Yildiz, İsmail Kurukama, Mustafa Aslan and M. Zeki Adli (Türkiye): The Developments Enabled by Determining the Quality of Cadastral Data In Turkey (11508)

Solomon Njogu and Danilo Antonio (Kenya): Improving Land governance Through Innovative Rapid Mobile Data Generation Tool (11592)

Kristie Hu, Masoume Mahboubi (Canada), **Yiping Chen** (China, PR) and **Sarah Fatholahi** (Canada): Detection of Permafrost Degradation in Eastern Alaska Using Modis and Landsat Data (11672)

Dogus Guler (Türkiye), **Abdullah Alattas, Marjan Broekhuizen, Eftychia Kalogianni, Abdullah Kara and Peter van Oosterom** (Netherlands): 3D Registration of Apartment Rights Using BIM/IFC. Comparing the Cases of the Netherlands, Saudi Arabia, and Turkey (11714)

Stephen Djaba, Otoo Ebenezer and Owusu-Ansah Daniel (Ghana): Digital Surveying – The GNS Solution to Boundary Surveying and Land Registration Issues in Ghana (11735)

Mon 12 13:00–14:30

LUNCH BREAK

MONDAY, 12 SEPT. 13:00–14:30
VENUE: RESTAURANTS, DOUBLETREE BY HILTON

MEET THE CANDIDATES AT THE FIG BOOTH

The FIG General Assembly will elect two new Vice Presidents for the term 2023–2026. Come to the FIG booth to meet and chat with the candidates.

- **Brian Davies**, Canadian Institute of Geomatics CIG, Canada
- **Daniel Steudler**, GEOSUISSE, Switzerland
- **Qin Yan**, Chinese Society for Geodesy Photogrammetry and Cartography CSGPC, China
- **Winnie Shiu**, National Society of Professional Surveyors NSPS, USA

FIG COMMISSIONS ANNUAL MEETINGS FROM 13:25–14:15

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

The Commission meetings are open for everyone who are interested in the work.

- Commission 3: Spatial Information Management in **Willow**
- Commission 6: Engineering Surveys in **Lime/Maple**
- Commission 9: Valuation and the Management of Real Estate in **Poplar/Alder**

Monday, 12 September 2022 14:30–16:00

TS02A: FRAMEWORK FOR EFFECTIVE LAND ADMINISTRATION – NMCA GOOD PRACTICES AND FURTHER DEVELOPMENTS

MONDAY, 12 SEPT. 14:30–16:00
VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON
COMMISSION: EUROSADR & FIG
CHAIR: PROF. ANKA LISEC, SLOVENIA

Joint FIG and EuroSDR session.

This session will unpack key developments around the Framework for Effective Land Administration, since its endorsement by UN-GGIM in August 2020. This includes it being used to support country-level legislative developments, technical self-assessments, and translation into 5 different languages. Efforts are now underway to operationalise FELA, including in Europe, where a recent study by EuroSDR garnered inputs from 22 different countries in the region on 3 of FELA's 9 strategic pathways.

Eva-Maria Unger (Netherlands), **Joep Crompvoets** (Belgium), **Rohan Bennett** (Netherlands), **Frédéric Cantat** (France) and **Anka Liseč** (Slovenia):
 Advancing FELA – The Framework for Effective Land Administration (11446)

Fatemeh Jahani Chehrehbargh, **Abbas Rajabifard**, **Mohsen Kalantari Soltanieh** (Australia) and **Daniel Steudler** (Switzerland):
 Advancing Land Administration System – Implications of Recent International Trends (11489)

Anna Bober (Poland):
 Tasks and Challenges of National Mapping Agency of Poland in the Field of Data Acquisition (11687)

Brandon Tourtelotte (USA):
 GIS in Land Administration Can Help You Implement the FELA and Support the SDG's (11559)

Sanja Zekušić (Croatia) and **Ewa Surma** (Poland):
 Example of Cooperation in EU Funded Project on Improving Spatial Data Services in the Republic of Moldova (11782)

CLGE EX-BOARD MEETING 2

MONDAY, 12 SEPT. 14:30–16:00
VENUE: ROWAN, DOUBLETREE BY HILTON

- By invitation only

TS02B: PROFESSIONAL STANDARDS AND PRACTICE

MONDAY, 12 SEPT. 14:30–16:00
VENUE: BALLROOM "ESRI", DOUBLETREE BY HILTON
COMMISSION: 1
CHAIR: MS. WINNIE SHIU, CHAIR FIG COMMISSION 1, HONG KONG SAR, CHINA
RAPPORTEUR: MR. TIMOTHY BURCH, CHAIR ELECT FIG COMMISSION 1, UNITED STATES

Haim SREBRO (Israel):
 28 Years of Successful Joint Israeli-Jordanian Boundary Making and Boundary Maintenance – Part 2 (11556)

Torben Juulsager (Denmark):
 Advocacy and Promotion of the Surveying Profession Through the Danish Association of Surveyors (11727)

Andrew Evans, **Ivor Barbrook**, **Genna Rourke** and **Ian Heaphy** (United Kingdom):
 Transforming the Civil Engineering Surveyor (11519)

Buddhi Narayan Shrestha (Nepal):
 Impact of COVID-19 on Nepal-India Border and Borderland Communities. (11351)

Paweł Hanus, **Adrianna Berenson** and **Ludmiła Pietrzak** (Poland):
 Surveying Licenses to Perform Surveying (Geodetic) Works in Poland (11365)

TS02C: PHOTOGRAMMETRY AND UAV IN ENGINEERING SURVEYING

MONDAY, 12 SEPT. 14:30–16:00
VENUE: WALNUT/ACACIA, DOUBLETREE BY HILTON
COMMISSION: 6
CHAIR: ENG. MARIA JOAO HENRIQUES, CHAIR FIG COMMISSION 6, PORTUGAL
RAPPORTEUR: MR. ION-ANASTASIOS KAROLOS, GREECE

Olga Chumak, **Julia Gorkovchuk** and **Denys Gorkovchuk** (Ukraine):
 Research of Algorithms for Generating Point Clouds with Various Software Tools on the Example of the Monument to Bohdan Khmelnytsky (11381)

Katarzyna Bobkowska, **Paweł Tysiąc** and **Paweł Burdziakowski** (Poland):
 New Solutions to Artificial Light at Night Monitoring with Uavs: a Review of a New Uav Platform (11395)

Katarzyna Strząbata, **Paweł Cwiąkała**, **Edyta Puniach**, **Wojciech Gruszczński** and **Wojciech Matwij** (Poland):
 Determination of Buildings Tilts on the Basis of UAV Photogrammetric Data (11434)

Anna Fryskowska-Skibniewska and **Piotr Grzywina** (Poland):
 Comparative Analysis of the Point Clouds Generated from UAV Image Data and Terrestrial Laser Scanning for Modeling Information About Historic Buildings (hBIM) (11500)

Asmamaw Gebrehiwot and **Leila Hashemi-Beni** (USA):
 UAV Surveying for Environmental Studies (11621)

Heinz-Jürgen Przybilla and **Kersten Thomas P.** (Germany):
 Aspects of Quality Control for UAV Applications in Photogrammetry (11755)

Mohamed Mostafa, **Srdjan Sobol** and **Joe Hutton** (Canada):
 UAV Multi-Sensor Payloads for High Precision Aerial Surveys (11485)

Ahmed Elamin and **Ahmed El-Rabbany** (Canada):
 UAV-Based Pavement Crack Detection Using Deep Convolutional Neural Networks (11620)

Jakub Górka (Poland):
 Analysis of the Possibility of Automating the Photogrammetric Mission Planning for Unmanned Aerial Vehicle, Based on Data from Airborne Laser Scanning (11448)

Dorota Marczykowska, **Jaroslav Czajka**, **Wojciech Ostrowski** and **Magdalena Pilarska-Mazurek** (Poland):
 Assessment of the Possibility of Using the SAND Library for Processing Point Clouds in the Big Data Environment on the Example of UAV-LiDAR Data for a Forest (11679)

Paulina Zachar, **Wojciech Ostrowski**, **Konrad Sosnowicz**, **Radostaw Palak** and **Krzysztof Bakula** (Poland):
 Application of AI Tools to the Inventory of Technical and Transportation Infrastructure Based on UAV Data (11691)

TS02D: DEFINITION AND APPROACHES OF TRANSPARENCY

MONDAY, 12 SEPT. 14:30–16:00
VENUE: WILLOW, DOUBLETREE BY HILTON
COMMISSION: 9
CHAIR: MR. PETER R. ACHE, CHAIR ELECT FIG COMMISSION 9, GERMANY
RAPPORTEUR: MR. JAMES KAVANAGH, UNITED KINGDOM

Luc Hermans, Ruud Kathmann and Marco Kuijper (Netherlands):
 Model-To-Model Validation: Using Validation Models in Real Estate Assessment (11571)

Ruud Kathmann, Luc Hermans and Marco Kuijper (Netherlands):
 What Makes a Real Estate Market Transparent? (11611)

Risto Peltola and Mikko Korpela (Finland):
 Remarks on the Story of Land Prices, Told by House Prices (11540)

Monsurat Ayojimi Salami and Harun Tanrivermis (Türkiye):
 Transparency and Affordability of Housing Market: Evidence from Sectorial Level Analysis in Turkey (11732)

TS02E: FIG PLATINUM CORPORATE MEMBER SESSION – LEICA GEOSYSTEMS

MONDAY, 12 SEPT. 14:30–16:00
VENUE: LIME/MAPLE, DOUBLETREE BY HILTON

The Continuing Challenges Facing The Surveying Profession

The surveying profession is under increasing pressure to do “more with less”. In this presentation, the latest innovations from Leica Geosystems will be highlighted that help you to grow your business, have the upper hand in attracting and retaining the best talent, win more business and generate new revenue. Be inspired to enable your organizations to run faster, leaner and more effectively than you ever thought possible.

Presenters:
Craig Hill and Hannes Maar, Leica Geosystems AG, Heerbrugg, Switzerland



TS02F: YOUNG SURVEYORS AND THE FUTURE OF VOLUNTEERING

MONDAY, 12 SEPT. 14:30–16:00
VENUE: SYCAMORE/MAGNOLIA/CEDAR, DOUBLETREE BY HILTON
COMMISSION: YS
CHAIR: DR. KWABENA OBENG ASIAMA, CHAIR FIG YOUNG SURVEYORS NETWORK, GERMANY
RAPPORTEUR: MS. FERAH KOKSAL, GERMANY

Since the network’s establishment in 2006, the network has grown in many ways, and seen several changes. The recent impact of the pandemic changed the nature of volunteering, with the goal of the fifth term gradually evolving to be responsive to these changes. The underlying aim of the current term has been to build a sustainable network. With the backdrop of this strong foundation built over the years, this session will review the achievements of the FIG YSN over the past four years, and to plan into the future of our Network.”

TS02G: GIS FOR 3D URBAN PLANNING, CONSTRUCTION AND VALUATION

MONDAY, 12 SEPT. 14:30–16:00
VENUE: POPLAR/ALDER, DOUBLETREE BY HILTON
COMMISSION: 3, 8 & 9
CHAIR: DR. ENRICO RISPOLI, ITALY-
RAPPORTEUR: MS. MARIA GRAZIA SCORZA, ITALY

Stephen Dauda Yabo, Kaka Zenabu Atta and Ishaq Sani Muhammad (Nigeria):
 3D Modelling of Faculty of Physical Science Ahmadu Bello University Zaria Kaduna State Nigeria (11278)

Cevdet Ekmel Hatipoglu, Kucuk Huseyin, Ekrem Ayyildiz, Hamza Durdu and Ismail Dursun (Türkiye):
 3d City Models Management Information System Design: the Case of Turkey (11368)

Darko Sisko, Vlado Cetl, Vojkan Gavrilovic and Danko Markovic (Croatia):
 Application of 3D City Model in Spatial Planning of the City of Zagreb (11603)

Abbas Rajabifard, Soheil Sabri and Yiqun Chen (Australia):
 Digital Twin for the Next Generation of Urban Land Administration and 3D Spatial Planning (11729)

Łukasz Kulesza (Poland):
 Application of DTM in Urban Planning Process to Improve Air Quality. (11750)

AFTERNOON BREAK

MONDAY, 12 SEPT. 16:00–16:30
VENUE: EXHIBITION AREA, DOUBLETREE BY HILTON

MEET THE CANDIDATES AT THE FIG BOOTH

The FIG General Assembly will elect a new President for the term 2023–2026. Come to the FIG booth to meet and chat with the candidates. During the Coffee Break you can meet **Diane Dumashie**, Royal Institution of Chartered Surveyors RICS, UK.

SPONSOR PRESENTATION: RIEGL

MONDAY, 12 SEPT. 14:30–16:00
VENUE: PINE/HAZEL, DOUBLETREE BY HILTON



RIEGL Waveform LiDAR: Highly Accurate, Informative Point Clouds as the Basis for the Digital Twin



DoubleTree by Hilton | Hotel & Conference Centre | Warsaw

Monday, 12 September 2022 16:30–18:00

TS03A: BLENDED LEARNING FOR SURVEYING EDUCATION

MONDAY, 12 SEPT. 16:30–18:00
VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON
COMMISSION: 2
CHAIR: DR. DAVID MITCHELL, CHAIR FIG COMMISSION 2, AUSTRALIA
RAPPORTEUR: PROF. ALBINA MOŚCICKA, POLAND

Audrey Martin (Ireland), **David Mitchell** (Australia) and **Dimo Todorovski** (Netherlands): Lessons from the COVID-19 Pandemic: Staff and Student Perspectives (11757)

William Kelly (United Kingdom), **David Mitchell** (Australia) and **Dimo Todorovski** (Netherlands): On Good Practices in Blended Learning (11758)

Mohsen Kalantari, David Mitchell (Australia) and **Dimo Todorovski** (Netherlands): Blended Learning Technology and Infrastructure (11759)

Dimo Todorovski (Netherlands) and **David Mitchell** (Australia): Benefits of Blended Learning for Surveying Education (11760)

CLGE EX-BOARD MEETING 3

MONDAY, 12 SEPT. 16:30–18:00
VENUE: ROWAN, DOUBLETREE BY HILTON

- By invitation only

SPONSOR PRESENTATION: FARO TECHNOLOGIES

MONDAY, 12 SEPT. 16:30–17:30
VENUE: PINE/HAZEL, DOUBLETREE BY HILTON

FARO AEC Solutions

TS03B: COORDINATION OF GLOBAL CAPACITY DEVELOPMENT

MONDAY, 12 SEPT. 16:30–18:00
VENUE: BALLROOM "ESRI", DOUBLETREE BY HILTON
COMMISSION: 2, 5 & CDN
CHAIR: DR. DANIEL ROMAN, CHAIR FIG COMMISSION 5, UNITED STATES
RAPPORTEUR: DR. KEVIN AHLGREN, UNITED STATES

- UN HLG Education Activities – **Mikael Lilje**
- FIG Education and the Academic Community – **Rosario Casanova**
- IAG/IGS and Training Opportunities – **Allison Craddock**
- UN SCoG WG ETCB – **Daniel Roman**
- Update on ETCB Global Survey – **Ryan Keenan**
- CDN AP – **Andrick Lal**

TS03C: ADDRESSING SUSTAINABILITY IN SPATIAL PLANNING – PLANNING EFFORTS IN RURAL AND URBAN AREAS

MONDAY, 12 SEPT. 16:30–18:00
VENUE: WALNUT/ACACIA, DOUBLETREE BY HILTON
COMMISSION: 8
CHAIR: MS. MARIJE LOUWSMA, NETHERLANDS
RAPPORTEUR: DR. ADRIANNA CZARNECKA, POLAND

Walter Timo de Vries, Pamela Durán-Díaz, Vineet Chaturvedi (Germany), **Chandran Remi** (Japan) and **Ampelman Luc** (Poland): Exploring Geospatial Methods of Detecting Rural Vitality, Vulnerability and Versatility in Rural Regions in Bavaria (11549)
Dionysia-Georgia Perperidou and **Eleftherios Poulis** (Greece): Blue-Green Infrastructure and Urban Renewal: the Case of Illysus and Eridanos Rivers, Athens, Greece (11605)

Søren Brandt Pedersen (Denmark): Expropriation of Land Rights for Implementation of International Infrastructure Projects (11572)

Anna Bielska, Natalia Sajnog and **Katarzyna Sobolewska-Mikulska** (Poland): The Use of the Concept of Smart Villages in the Multifunctional Development of Rural Areas on the Example of the Mazowieckie Voivodeship (11595)

Xavier Prigent (France): The New Challenges of Urban and Rural Planning in Europe Proposal of a Game to Set up the Territorial Strategy (11428)

Marije Louwsma and **Lisette Meij** (Netherlands): Strengthening Land Use Planning – Setting up a Planning System in Rwanda (11521)

Tanka Prasad Dahal, Reshma Shrestha and **Purna Bahadur Nepali** (Nepal): Analyzing the Linkages between Land Use Zoning and Food Availability in Nepalese Context (11581)

TS03D: VALUATION OF UNREGISTERED LAND MANUAL

MONDAY, 12 SEPT. 16:30–18:00
VENUE: WILLOW, DOUBLETREE BY HILTON
COMMISSION: 9 & GLTN
CHAIR: MR. JAMES KAVANAGH, UNITED KINGDOM

Joint UN-Habitat-GLTN/FIG session. The 2021 Valuation of Unregistered Land manual (as jointly prepared by UN-Habitat, GLTN, FIG, IVSC, RICS), has been gaining significant traction and adoption in land valuation for large-scale land acquisition in the global south. The expert group has engaged with the World Bank, IGAD and numerous national land commissions (most recently Kenya, Indonesia and Uganda) and professional surveying institutions on the manual and developing a better understanding of this complex and often fractious area of practice. The manual, which builds upon the 2018 Policy Guide, and its use has also led to a significant evolution of 'valuation' understanding, especially on non-market value (social, cultural and natural) and its incorporation into current practices. The session will highlight the key features of the manual and how it works, explore the evolution of understanding of the non-market value and its significance and discuss various global case studies on unregistered land and the acquisition, valuation and compensation processes in operation (or not!). This will be a very interactive session with a Q&A session; the manual is arguably one of the most important outputs in our global land sectors in recent years.

TS03E: FINANCING AND PERFORMANCE TRENDS IN LAND ADMINISTRATION

MONDAY, 12 SEPT. 16:30–18:00
VENUE: LIME/MAPLE, DOUBLETREE BY HILTON
COMMISSION: 7
CHAIR: MS. VICTORIA STANLEY, UNITED STATES
RAPPORTEUR: MS. ESTHER MWAURA-MUIRU, KENYA

Keinde Babalola, Simon Hull and **Jennifer Whittal** (South Africa): Assessing Land Administration Systems and their Legal Frameworks: A Constitutional Focus (11295)

This is a peer reviewed paper.

Nick Land (United Kingdom): Automating National Mapping & Cadastre with GeoAI (11424)

Jean-François Dalbin and **Florian Lebourdais** (France): How to Remedy the Problems Generated by Undivided Real Estate Inheritance to Improve Land and Property Management: the Case of French Polynesia (11426)

Andrii Martyn, Taras Ievsiukov, Anatolii Poltavets and **Oleg Tsvyakh** (Ukraine): Improving the Risk Management of Professional Activities of Surveyors in Ukraine: Certification, Insurance, Cadastral Registration (11451)

Safar Untong and **Doria Tai** (Malaysia): Sabah Geo Hub – Driving the modernised SDI (11487)

Albertus Yogo Dwi Sancoko, Sheilla Ayu Ramadhani, Dony Erwan Brilianto and **Septein Parnia Swantika** (Indonesia): COVID-19 Pandemic and Land Administration Modernization in Indonesia (11490)

Bastiaan Reydon (Netherlands), **Gabriel Siqueira, Delaíde Passos** (Brazil), **Mathilde Molendijk** (Netherlands) and **Piet Spijkers** (Colombia): Improvements in the Colombian Land Administration System: possible contribution from the Brazilian experience (11554)

Claudia Stöcker, Auriol Degbello (Germany), **Kaspar Kundert** (Rwanda), **Ernst Peter Oosterbroek** (Netherlands), **Antoine Houedji** (Benin) and **Angela Schwering** (Germany): Accelerating Participatory Land Rights Mapping with Smartlandmaps Tools: Lessons Learnt from Benin (11615)

Adamu Bala (Nigeria), **Menare Royal Mabakeng** (Namibia) and **Terwase Tosin Youngu** (Nigeria): Corruption of Land Administration in Sub-Saharan Africa: Reports from Nigeria and Namibia (11648)

Moritz Schularick, Francisco Amaral, Martin Dohmen and **Jonas Zdrzalek** (Germany): High Quality Long-Run Real Estate Price Indices for Germany (11752)

Monday, 12 September 2022 16:30–18:00

TS03F: FIG MEMBER ASSOCIATIONS FORUM

MONDAY, 12 SEPT. 16:30–18:00

VENUE: SYCAMORE/MAGNOLIA/CEDAR, DOUBLETREE BY HILTON

CHAIR: MS. PAULA DIJKSTRA, NETHERLANDS

Presidents and representatives are invited to this Forum to discuss issues of relevance and importance to member associations, to network and to exchange. Attendees can raise issues relevant to their association or discuss FIG matters and this meeting will be held prior to the Presidents meeting, so that if needed, messages can be brought to FIG President and council. Suggested topics are the impact and lessons learned of the pandemic on the member associations, future of FIG Conferences seen from a national association point of view, feedback on the voting for the FIG General Assembly in the future – should it continue to be online, should it be online but in real-time, should it be back to paper voting?

TS03G: LASER SCANNING IN ENGINEERING SURVEYING

MONDAY, 12 SEPT. 16:30–18:00

VENUE: POPLAR/ALDER, DOUBLETREE BY HILTON

COMMISSION: 6

CHAIR: PROF. CORINNA HARMENING, GERMANY

RAPPORTEUR: MS. PAULINA ZACHAR, POLAND

Anna Płatek-Żak and Dorota Zawieska (Poland):

Comparison and Evaluation of Image Matching and Airborne Laser Scanning Point Clouds for Generating Canopy Height Model (11440)

Janina Zaczek-Peplinska and Krzysztof Książek (Poland):

The Use of Terrestrial TLS Laser Scanning to Control Deformation of Tanks for Liquid Substances (11471)

Yiping Chen (China, PR), Lanying Wang (Canada), Cheng Wang (China, PR) and Jonathan Li (Canada):

High accuracy Digital Terrain Models Generation along Roads Using Mobile Laser Scanning Data (11498)

Ninkov Tosa, Pavlovic Spasoje, Susic Vladimir and Ninkov Djordje (Serbia):

Application of Mobile Laser Scanning and Gis Technologies in Projects of Mapping and Formation of the Gis Database of Street and Road Corridors (11509)

Iwan Suhendra, Ragil Karim, Billy Silaen and Darmawan Eka Wicaksono (Indonesia):

Mobile Laser Scanner Technology to Detect Road Settlement in Sodong Bridge, Trans Sumatera Toll Road (11518)

Janina Zaczek-Peplinska and Maria Kowalska (Poland):

Evaluation of the LiDAR in the Apple iPhone 13 Pro for use in Inventory Works (11458)

Jacobo Alberto Ortiz Barrientos and Giorgio Paolo Maria Vassena (Italy):

IMMS vs Static LiDAR Survey to Extract Bim Models of Social Housing Buildings: a Case Study (11696)

Stylianios Bitharis, Ion-Anastasios Karolos, Vasileios Tsioukas, Christos Pikridas and Vasileios Bantis (Greece):

Industrial Area 3D Geometric Documentation Using Terrestrial Laser Scanners (11296)

Ion-Anastasios Karolos, Stylianios Bitharis, Vasileios Tsioukas, Christos Pikridas, Sotirios Kontogiannis, Theodosios Gkamas and Nikolaos Zinas (Greece):

Proposed 4.0 Industrial Management System for Daily Operations That Poses Point Cloud Assets with Annotated Real-Time Sensory Measurements and Utilizes Unsupervised Alert Logic (11297)

This is a peer reviewed paper.

Sandra Staiger (Germany):

The Geometry of Crime Scenes – Some Case Studies (11756)

Darius Popovas, Thomas Luhmann (Germany), Denys Gorkovchuk, Julia Gorkovchuk (Ukraine), Maria Chizhova and Mona Hess (Germany):

VRscan3D – an Interactive Simulator for Terrestrial Laser Scanning (11771)

Monday, 12 September 2022 21:00–00:00

INFORMAL LOBBY BAR GET-TOGETHER

MONDAY, 12 SEPT. 21:00–00:00

VENUE: LOBBY BAR, DOUBLETREE BY HILTON

Attendees are encouraged to meet in the bar area for an informal get-together and networking (own costs).



DoubleTree by Hilton Hotel & Conference Centre Warsaw



www.hilton.com

Tue, 13 7:00–9:00

Tuesday, 13 September 2022 9:00–11:00

FIG FOUNDATION MEETING

TUESDAY, 13 SEPT. 07:00–09:00
VENUE: OAK, DOUBLETREE BY HILTON
CHAIR: MR. JOHN HOHOL, PRESIDENT
FIG FOUNDATION, UNITED STATES

- By invitation only

GLTN: STDM MEETING

TUESDAY, 13 SEPT. 07:30–09:00
VENUE: CHESTNUT, DOUBLETREE BY
HILTON

- By invitation only

TS04A: CHALLENGES AND SUSTAINABLE SOLUTIONS IN HYDROGRAPHY FOR BETTER LIVING

TUESDAY, 13 SEPT. 09:00–11:00
VENUE: BALLROOM "TRIMBLE", DOUBLE-
TREE BY HILTON
COMMISSION: 4
CHAIR: DR. MOHD RAZALI MAHMUD,
MALAYSIA
RAPPORTEUR: MR. GORDON
JOHNSTON, UNITED KINGDOM

Ndukwe Chiemelu and Ugonna Nkwunonwo (Nigeria):
Multi-Criteria Evaluation of Sites
for Small Hydropower Energy
Potential in Eastern Nigeria Using
Geospatial Technology. (11539)

Luigi Sinapi (Monaco):
The S-100 – Universal Hydro-
graphic Data Model: a Revolution-
ary Approach to Nautical Car-
tography and Maritime Services
(11663)

Gordana Jakovljević (Bosnia and
Herzegovina), **Miro Govedarica**
(Serbia) and **Flor Álvarez**
Taboada (Spain):
Mapping Plastic Based on Multi-
spectral UAV Images (11715)

REGIONAL BODIES MEETING

TUESDAY, 13 SEPT. 09:00–11:00
VENUE: ROWAN, DOUBLETREE BY
HILTON

- By invitation only

TS04B: POLICY AND LEGAL INNOVATIONS IN LAND ADMINISTRATION

TUESDAY, 13 SEPT. 09:00–11:00
VENUE: BALLROOM "ESRI", DOUBLETREE BY HILTON
COMMISSION: 7
CHAIR: MR. DANIEL PAEZ, CHAIR FIG COMMISSION 7, AUSTRALIA
RAPPORTEUR: DR. DANIEL STEUDLER, SWITZERLAND

Katarzyna Kocur-Bera and Aleksandra Pietrulinska (Poland):
Cadastral Data Modernisation in the Land Management Process (11345)

Pawet Hanus, Andrzej Hopfer and Ludmiła Pietrzak (Poland):
Analysis of Selected Legal Methods of Supporting the Development and
Protection of Agricultural Land in Poland (11366)

Andre Kwitowski (Netherlands):
Is Land Administration (LA) Sector Free from Any Corruption? (11379)

Sanne Hekman and Marcos Buiza (Netherlands):
Striving for a More Positive Registration (11411)

Okan Yılmaz and Mehmet Alkan (Türkiye):
Creation of Spatial Plans Package for the Representation of Rrrs Caused
by Spatial Plans Within the LADM Standard: a Case Study for Turkey
(11437)

Máté Lehoczky and Zoltán Tóth (Hungary):
Cadastral Map Update with Modern Technologies in Hungary (11459)

Rohan Bennett (Australia), **Eva Unger** (Austria), **Vincent Verheij**,
Haico Van der Vegt (Netherlands), **Suren Tovmasyan** (Armenia), **Indra**
Hutabarat (Indonesia), **Aram Gugaryats** (Armenia), **Aulia Latif** (Indone-
sia) and **Chalemeyan Trdat** (Armenia):
Digital Transformation of Land Administration: Stages, Status, and
Solutions (11482)

Dave Stow, Michael Hill and Anthony Beck (United Kingdom):
Evolving Registration – How Do Established Registrars Embrace Change?
(11522)

Marcin Karabin and Robert Łuczynski (Poland):
The Issues Regarding the Compliance of Data Contained in the Cadastre
and Land Register in Poland (11532)

Janis Kaminskis, Leila Neimane (Latvia), **Mina Adel Shokry Fahim**
(Egypt), **Konradas Jankunas** (Lithuania) and **Iveta Stamure** (Latvia):
Characteristics and Dynamics of the Latvian, Lithuanian and Egyptian
Marine Cadastre (11579)

Godfrey Toko, William Kambugu, Grace Kagoro, Richard Oput and
Jimmy Alani (Uganda): The Consideration of Slaac Tool in Systematic
Land Registration in Uganda (11585)

Oyedokun Abiodun, Joseph Odumosu and Omope Omodare
(Nigeria):
Land Administration and Policy Issues in The Nigerian Scenario: An
Overview (11633)

Anthony Burns (Australia), **Micah Ingalls** (Laos, PDR) and **Kate**
Rickersey (Australia): Thinking and Working Politically in the Land
Sector in Mekong Region (11651)

Ihor Tsyupak and Ihor Trevoho (Ukraine): Development of Linear
Spatial Geodesic Standards for Calibration of Total Station and Receiv-
ers GNSS (11655)

Israel Taiwo (Nigeria), **Maurice Nyangkori, Kezia Erumbi** (Uganda),
Edwin Nyandeché (Kenya), **Pondo Letwin** (Zimbabwe), **Sylian**
Muramira (Rwanda) and **Ibrahim Mukaila** (Nigeria):
An Analysis of Land Demarcation Practices in Africa at the emergence of
Fit-for-Purpose Approaches (11700)

TS04C: OPEN GEOSPATIAL DATA AND CROWD-SOURCING

TUESDAY, 13 SEPT. 09:00–11:00
VENUE: WALNUT/ACACIA, DOUBLE-
TREE BY HILTON
COMMISSION: 3
CHAIR: DR. SAGI DALYOT, ISRAEL,
CHAIR ELECT FIG COMMISSION 3
RAPPORTEUR: MR. LEONARDO
FRANCHI, ITALY

Marcel Kindsvater and Markus Schaffert (Germany):
Mapping Tranquil Landscapes
with Social Media Data. a Case
Study in the Context of Sustain-
able Transformation (11321)
This is a peer reviewed paper.

Martin Salzmann (Nether-
lands):
Open Access Data: Why We Want
Access to All Data, But Are Hesit-
ant to Share Our Own Data. the
Issue of Trust Revisited. (11466)

João Godinho (Ireland) and
Carolina Rocha (Portugal):
MapOurForest – Designing a Vol-
unteered Geographic Informa-
tion Systems for Reforestation
Associations. (11563)

Hassan Musa, Hafiz Naiya,
Mustapha Muhammad,
Shuaibu Bala and Garba
Samuel Sule (Nigeria):
Quality Analysis of OpenStreet-
Map and Digital Elevation Data
Based North-Western Nigeria
(11646)

Konstantinos Apostolopoulos,
Giannis Kourtis, Chryssy
Potsiou, Vassilios Tsihrintzis
and **Loukas Tzanis** (Greece):
Crowdsourced Geospatial Data
for Hydrological Applications
for Emerging Needs in the Post
COVID-19 Era (11717)

Anna Bober (Poland):
Automatic Production of Topo-
graphic Maps (11788)

SPONSOR PRESENTATION: AGEAGLE



TUESDAY, 13 SEPT. 09:00–10:00
VENUE: SEQUOIA, DOUBLETREE BY HILTON

Use Case Spotlights: Mapping and Modelling Cities Using Drones
Presenter: **Mirakhmad Aliakbarov**, Regional Sales Manager, AgEagle



TS04D: COMBINED TECHNIQUES IN ENGINEERING SURVEYING

TUESDAY, 13 SEPT. 09:00–11:00
VENUE: WILLOW, DOUBLETREE BY HILTON
COMMISSION: 6
CHAIR: ENG. **MARIA JOAO HENRIQUES**, CHAIR FIG COMMISSION 6, PORTUGAL
RAPPORTEUR: PROF. **CORINNA HARMENING**, GERMANY

Aiham Hassan, Li Zhang, Gabriel Kerekes and Volker Schwieger (Germany): Fusion of Inhomogeneous Geodetic Data for Rock Cliff Monitoring: a Case Study of the Lian-yi Cliff in Three Gorges National Geological Park in China (11340)
This is a peer reviewed paper.

Caneren Gül, Taylan Öcalan, Erdem Damcı and Çağla Şekerci (Türkiye): Integration of a Geodetic Grade GNSS Receiver and an Android Dual-Frequency Smartphone with Low-Cost IMU for Seismogeodetic Applications (11413)

Krzysztof Karsznia, Janina Zaczek-Peplinska, Sławomir Łapiński and Waldemar Odziemczyk (Poland): The Functionality Assessment of Geodetic Monitoring Systems for Analyzing Structural Elements (11414)

Volker Schwieger, Li Zhang, Otto Lerke and Laura Balange (Germany): The Research Cluster Integrative Computational Design and Construction (IntCDC) – Current Engineering Geodetic Contributions (11422)

Rinaldo Paar, Ante Marendić, Ivan Jakopc, Miodrag Roic and Hrvoje Tomic (Croatia): Development and Application of IATS for Structural Health Monitoring (11421)

Daniel Schröder (Germany): The Permanent Three-Dimensional Data Acquisition of Geotechnical Structures Using Web-Based Application of Terrestrial LIDAR – Chances and Risks from an Engineering Geodetic Point of View (11520)

Harris Perakis, Manos Orfanos, Ioannis Stratakos, Vassilis Gikas and Charalampos Albanopoulos (Greece): Towards a Prototype Low-Cost/ Multi-Rf Based Positioning System for Underground Marble Quarry Management: Design Considerations and Preliminary Results (11659)

Helena Laasch, Nathalie Ryter, Isabelle Steffen, Alexander Reske, Ephraim Friedli and Valens Frangez (Switzerland): Automated Inspection within Galleries of Large Dams (11349)

Izabela Wilczynska and Bartłomiej Cmielewski (Poland): Semi-Automatic Measuring Device for Survey Selected Parameters of the Railway Roads (11694)

TS04E: BLENDED LEARNING IN PRACTICE

TUESDAY, 13 SEPT. 09:00–11:00
VENUE: LIME/MAPLE, DOUBLETREE BY HILTON
COMMISSION: 2
CHAIR: DR. **DIMO TODOROVSKI**, CHAIR ELECT FIG COMMISSION 2, NETHERLANDS
RAPPORTEUR: MS. **MONIKA PRZYBILLA**, GERMANY

Elżbieta Bielecka, Albina Mościcka, Agnieszka Zwirowicz-Rutkowska and Krzysztof Pokonieczny (Poland): Blended Learning Model for Higher Education in Geodesy and Geoinformation: Students' Perspective. (11338)

Dimo Todorovski (Netherlands) and **Jennifer Whittal** (South Africa): Regional Academic Networks, capacity building and knowledge sharing (11342)

Punya P Oli and Kriti Kajol Chudal (Nepal): College Activities During the Covid 19 Pandemic (11383)

Maria Amalia Florez Huertas (Colombia), **Daniel Casalprim** (Spain) and **Ivan Dario Carrillo Duran** (Colombia):

The Land Administration System Training Experience in Colombia from 2015 to 2021: Achievements, Challenges and Opportunities (11486)

Agustyarsyah Agustyarsyah, Muyadi Mulyadi and Kariyono Kariyono (Indonesia): Blended Learning Method to Accelerate Human Resource Capacity Development Program for Spatial Planning In Indonesia: Challenge And Opportunity (11523)

Robert Kingdon, Church Ian, Dare Peter and Santos Marcelo (Canada): A Year of Blended Learning at UNB: Transforming a Geomatics Program (11600)

Michael Mayer, Monika Przybilla, Kamm Bettina, Susanne Krüger and Jan Rabold (Germany): Training of Ethical Competencies in Bsc Degree Programs – a Digital, Multi-Perspective, and Student-Centered Approach (11637)

alain De Wulf, Axel Annaert, Jana Ameye, Philippe De Maeyer and Greet Deruyter (Belgium): Experiences running the new Belgian E-Learning Oriented IHO Cat. B Hydrography Program (11683)

TS04F: FIG DIRECTOR GENERALS FORUM

TUESDAY, 13 SEPT. 09:00–11:00
VENUE: SYCAMORE/MAGNOLIA/CEDAR, DOUBLETREE BY HILTON
CHAIR: DR. **FRIDOLIN WICKI**, SWITZERLAND

The FIG Director Generals' Forum brings together Chief Executives and Director Generals of national (and sub-national) public agencies that are responsible for national mapping, land management, and related tasks.

The theme for the FIG Congress 2022 is about “Volunteering for the future – Geospatial excellence for a better living”. In line with this overall theme, the DG Forum will focus on how our national mapping and cadastre agencies can respond to the global challenges and support the wider society. How can we be successful to share our official and authentic data across institutional and territorial boundaries and make them available for the benefit of all?

- Opening and Welcome
- **Dr. Fridolin Wicki**, Director Swiss Federal Office of Topography swisstopo
- National Geoinformation Strategies, a European and Global Perspective
- **Ingrid van den Bergh**, Director IGN Belgium
- National Geoinformation Strategy in Austria
- **Wernher Hoffmann**, Director BEV Austria
- National Geoinformation Strategy of Finland
- **Pekka Halme**, NLS Finland
- Strategy Geoinformation Switzerland
- **Dr. Christine Najar**, Swiss Federal Office of Topography swisstopo
- Potential SDGs Implications on Geoinformation Strategies
- **Dr. Eva-Maria Unger**, Kadaster International/KU Leuven
- Moderated Panel Discussion with all speakers. Possible topics to be raised by moderator:
 - roles of regional and global bodies
 - priorities for developing and developed countries
 - resilience of systems in the face of global challenges
 - how does land administration fit in
 - impact of GI strategy
 - arguments for investment in GI

TS04G: EFFICIENT GNSS INTEGRATION WITH OTHER SENSORS

TUESDAY, 13 SEPT. 09:00–11:00
VENUE: POPLAR/ALDER, DOUBLETREE BY HILTON
COMMISSION: 5
CHAIR: PROF. **GUENTHER RETSCHER**, AUSTRIA
RAPPORTEUR: PROF. **JANUSZ WALO**, POLAND

Pajtim Zariqi and Guenther Retscher (Austria): Bluetooth Low Energy (BLE) for Covid-19 Contact Tracing Using Smartphones in Four Different Scenarios (11359)

Nander Yang (China, PR): Novel Solution of GNSS and Instar System for Fully Automated Mine Monitoring (11371)

James Kavanagh and Allan Jamieson (United Kingdom): Earth Observation and Aerial Surveys 6th Edition and the Geospatial Sector (11384)

Andreas Slateff and Guenther Retscher (Austria): Data Quality and Outdoor Positioning Accuracy of Recent Smartphones with Dual Frequency GNSS Receivers (11575)

Lance Lan (China, PR): Introduction of Next Generation Visual Positioning Technology Brought by Hi-Target (11645)

Anna Przewięźlikowska, Małgorzata Buško, Klaudia Wójcik and Wioletta Ślusarczyk (Poland): Using Modern Mobile Technology to Update Geodetic Network Points (11753)

Rafał Sieradzki, Jacek Paziewski, Katarzyna Stepniak, Radosław Baryła and Tomasz Zielinski (Poland): Quality Assessment of GNSS Observations from Recent Low-Cost Receivers (11439)

Ahmed El-Mowafy (Australia), **Kan Wang** (China, PR) and **Amir Allahviridzadeh** (Australia): The Potential of LEO Mega-Constellations in Aiding GNSS to Enable Positioning in Challenging Environments (11396)

Ashwani Kumar, Nishita Singh, Deepak Kumar Singh and Salil Goel (India): Zero Velocity Detection in Foot-Mounted Inertial Sensors: Novel Method for Generating Zero Velocity Labels and a Comparative Analysis of Data Driven Methods (11541)

Yoav Coller, Ori Cohen and Rabinovitch Eyal (Israel): The Revolution Of Advanced Technologies As a Platform For Mapping, GIS And Autonomous Vehicles (11591)

Franck Schmidt, Daniel Willi (Switzerland), **Antoine Carreaud** (France) and **Fabien Délèze** (Switzerland): New Automatic Method of Free Stationing by Drone (11369)

Klaudia Onyszko and Anna Frykowska-Skibniewska (Poland): Analysis of the Possibility of Classification the Types of Utilities Networks on the GPR Images (11529)

Tue 11:00–11:30

MORNING BREAK

TUESDAY, 13 SEPT. 11:00–11:30

VENUE: EXHIBITION AREA, DOUBLETREE BY HILTON

MEET THE CANDIDATES AT THE FIG BOOTH

The FIG General Assembly will elect a new President for the term 2023–2026. Come to the FIG booth to meet and chat with the candidates. During the Coffee Break you can meet **Orhan Ercan**, Turkish Chamber of Survey and Cadastral Engineers HKMO, Türkiye

Tuesday, 13 September 2022 11:30–13:00

TS05A: BUILDING BACK BETTER INFORMAL SETTLEMENTS IN THE UNECE REGION

TUESDAY, 13 SEPT. 11:30–13:00

VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON

COMMISSION: UNECE & FIG

CHAIR: DR. PROF. **CHRYSSE POTSIU**, FIG HONORARY PRESIDENT, GREECERAPPORTEUR: MR. **STEVEN NYSTROM**, UNITED STATES

Joint UNECE and FIG session.

In the context of the ongoing COVID-19 pandemic, UNECE prepared the COVID-19 Recovery Action Plan for Informal Settlements in the UNECE Region. This Recovery Action Plan aims at providing cities with robust and efficient action measures to enhance the integration of informal settlements in the urban fabric while recovering from the crisis caused by the pandemic. The Plan is underpinned by assessment reports on informal settlements in the four project cities: Bishkek, Kyrgyzstan as well as Tirana, Albania; Podgorica, Montenegro; and Skopje, North Macedonia.

The **Building Back Better Informal Settlements in the UNECE Region** session is designed to:

- Raise awareness about the implementation of the COVID-19 Recovery Action Plan for Informal Settlements in the UNECE Region and its key deliverables,
- Discuss with representatives of local and national authorities and local stakeholders how to best implement the Plan's recommendations within their specific contexts.
- Present the online learning platform for the Recovery Action Plan with resources and trainings on the Plan's implementation amongst other resources.

Welcome greetings by **Rudolf Staiger**, FIG President and a brief introduction by **Gulnara Roll**, UNECE.

Steven Nystrom (USA), **Chryssy Potsiou** (Greece), **Rik Wouters** (Netherlands) and **Amie Figueiredo** (Switzerland):

The UNECE Publication "COVID-19 Recovery Action Plan for Informal Settlements in the ECE Region" Goals, Targets and Actions (11654)

Chryssy Potsiou (Greece), **Steven Nystrom** (USA), **Rik Wouters** (Netherlands), **Alexandre Babak Hedjazi** and **Matteo Tarantino** (Switzerland):

The Supporting Material for the Implementation of the Unece Publications "guidelines for Formalization of Informal Constructions" and "COVID-19 Recovery Action Plan for Informal Settlements in the ECE Region" (11653)

Darko Vucetic (Serbia):

Informal Development in Serbia. Building Back Better in the Post-Covid 19 Era (11719)

Nurzat Abdyrasulova, **Bakytbek Statybekov** (Kyrgyzstan) and **Steven Nystrom** (USA):

Public Administration of Capital Construction of the City Hall of Bishkek: Solving the Problems of Informal Settlements in the City of Bishkek (11720)

TS05B: LAND TENURE REFORM SYSTEM FOR MARS

TUESDAY, 13 SEPT. 11:30–13:00

VENUE: BALLROOM "ESRI", DOUBLETREE BY HILTON

COMMISSION: YS & VCSP

CHAIR: MS. **ROSHNI SHARMA**, AUSTRALIARAPPORTEUR: MS. **CLAIRE BUXTON**, CANADA

A group of Martians have asked the assistance of humans to create a land administration system on Mars. How will you go about it? What method will you go about in doing this, keeping in mind that you still want to preserve their land practices, heritage, and values. It is expected that young surveyors around the world who took part in this challenge will get value from being involved in this opportunity, which will:

- Provide them with a chance to network with other like-minded surveying enthusiasts from around the world
- Explore a fun, thought-provoking concept to put their knowledge and skills to practice in a new way, learning by doing
- Create a project concept that will be a useful demonstration of initiative on how land administration systems can be used to support creating a sustainable environment, which can add value to their resumes.

Join us in this session as we look at the results from the teams of young surveyors who took on this challenge, to espouse the values of the FIG-YSN VCSP – Curiosity, Volunteerism, Respect, and Sustainabilityrk.

GLTN PARTNERS MEETING

TUESDAY, 13 SEPT. 11:30–13:00

VENUE: ROWAN, DOUBLETREE BY HILTON

- By invitation only

TS05C: TRADITIONAL AND MODERN TECHNIQUES IN ENGINEERING SURVEYS

TUESDAY, 13 SEPT. 11:30–13:00

VENUE: WALNUT/ACACIA, DOUBLETREE BY HILTON

COMMISSION: 6

CHAIR: PROF. **HEINZ-JUERGEN PRZYBILLA**, GERMANYRAPPORTEUR: MS. **HELENA LAASCH**, SWITZERLAND

Patrycja Wyszowska and **Robert Duchnowski** (Poland): Msplit Estimation as a Method for Processing Heterogeneous Data (11513)

Armands Celms, **Janis Kaminskis**, **Sintija Cegele**, **Jānis Kliive** and **Miks Brinkmanis-Brimanis** (Latvia): Justification of Junfied Geodetic Network for Rail Transport Infrastructure Project Rail Baltica (11682)

Gołuch Piotr, **Ćmielewski Kazimierz**, **Krzysztof Karsznia** and **Janusz Kuchmister** (Poland): The Automation of Deflection Measurements of Engineering Objects Employing a Physical Pendulum and One-Mage Photogrammetry (11726)

Ireneusz Wyczałek, **Piotr Marciniak** and **Zdzisław Pawlak** (Poland): Static and Dynamic Measurements of the Historic Wooden Church Building in Domachowo (11355)

Jakub Markiewicz, **Dariusz Gotlib** (Poland), **Stawomir Łapiński** and **Miłosz Gnat** (Poland): One-Stop-Lab CENAGIS: from Calibration of Surveying Devices and Application Testing to Large-Scale Geodata Computation (11469)

Katarzyna Stepniak, **Jacek Paziewski**, **Rafał Sieradzki** and **Radosław Baryła** (Poland): Applicability of Recent Low-Cost GNSS Receivers to Deformation Monitoring (11505)

Zbigniew Siejka and **Violetta Sokola-Szewiola** (Poland): Detection of Measurement Errors in the Time Series of the Coordinates of Surface Movement Monitoring Points with the Use of Satellite Navigation Systems (11599)

Noaman Sheik (Pakistan), **Greet Deruyter**, **Alain De Wulf** and **Peter Veelaert** (Belgium): A First Step Towards Automatic Construction Progress Monitoring (11665)

Peter Bauer and **Werner Lienhart** (Austria): VRsurv: a Virtual Planning and Educational Tool for Surveying Tasks (11588)

SPONSOR PRESENTATION: GEOSLAM

TUESDAY, 13 SEPT. 11:30–12:00

VENUE: SEQUOIA, DOUBLETREE BY HILTON

3D Mobile Mapping and Handheld Slam Technology – Revolution in Digital Construction Industry

Presenter: **Tomas Blaha**, Channel Sales Manager – Europe



TS05D: HISTORY SESSION

TUESDAY, 13 SEPT. 11:30–13:00
VENUE: WILLOW, DOUBLETREE BY HILTON
COMMISSION: HISTORY
CHAIR: MR. **JOHN BROCK**, AUSTRALIA
RAPPORTEUR: PROF. **IRENEUSZ WYCZAŁEK**, ROMAN GEZIKIEWICZ, POLAND

John Brock (Australia): Kosciuszko and Strzelecki: The Mountain and the Men! (11432)

György Busics and **Sándor Tóth** (Hungary): The Reconstruction of the Medieval Unit of length Based on the Sizes of Contemporary Round Churches (11314)
This is a peer reviewed paper.

Mariusz Meus (Poland): Scientific communication about geodesy and land surveying: activity of the geodesic educational initiative 'Honorable Krakow Meridian' from Poland. (11377)

John Brock (Australia): Surveyors on Banknotes, Coins and Stamps (11790)

TS05E: FIG PLATINUM CORPORATE MEMBER SESSION – ESRI

TUESDAY, 13 SEPT. 11:30–13:00
VENUE: LIME/MAPLE, DOUBLETREE BY HILTON
COMMISSION: ESRI

A special session organised by FIG Platinum Corporate member ESRI



TS05F: FIG STANDARDS MEETING

TUESDAY, 13 SEPT. 11:30–13:00
VENUE: SYCAMORE/MAGNOLIA/CEDAR, DOUBLETREE BY HILTON
COMMISSION: STANDARDS NETWORK*
CHAIR: MR. **DAVID MARTIN**, CHAIR FIG STANDARD NETWORK, 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

TS05G: CLIMATE SMART PLANNING WITH GIS

TUESDAY, 13 SEPT. 11:30–13:00
VENUE: POPLAR/ALDER, DOUBLETREE BY HILTON
COMMISSION: 3 & 8
CHAIR: DR. **KWABENA OBENG ASIAMA**, CHAIR FIG YOUNG SURVEYORS NETWORK, GERMANY
RAPPORTEUR: MS. **SAHINKAYA CEMRE**, TÜRKIYE

Martínez-Fernández Marcos (Spain), **Musæus Simon** (Germany), **Jadot André** (Belgium), **Tidmarsh Rachel** (United Kingdom) and **Romanowski Florian** (Poland):

The Benefits of Using Aerial Survey Data with a Particular Focus on Climate Change Applications and EU Strategy for Data and Digital Transformation (11664)

Ayubella Angraini Leksono, Amalia Nanda Syafira, Evita Mahar Dewi, Muhammad Arif Sadewo, Rusdianto Efendi, Yuliana Susilowati and Bambang Edhi Leksono (Indonesia): Design of Integrated Coastal Defense and Renewable Energy Power Plant for Mundu Bay Based on Shoreline Management Plan (11675)

Hamidreza Ostadabbas, Frank Friesecke, Franz-Josef Behr, Alexander Vincent (Germany), **Mohammad Hosseingholizadeh** (Iran) and **Sanchalita Bandyopadhyay**: Optimizing and Simplifying the Process of Energy Efficiency Estimation for Urban Redevelopment Areas by Using Open Source Gis Solutions (11570)

Joanna Nowak Da Costa (Poland) and **Conrad Bielski** (Germany): Open Spatial Data to Reporting on Accessibility of Urban Green Spaces (11609)

Dionysia-Georgia Perperidou and Andreas Xydopoulos (Greece): Bridging Air Pollutants Distribution to 3D City Model: the Case of Chalandri Municipality, Greece (11601)

Ana-Cornelia Badea and George Badea (Romania): Open Geospatial Data and Tools for Sustainable Cities – Advantages and Disadvantages (11392)

Mateus Magarotto, Inês Calor, José António Tenedório (Portugal), **Monica Ferreira da Costa** (Brazil) and **Pereira da Silva Carlos** (Portugal): GIS Model to Analyse the Vertical Growth in Coastal Cities (11306)

LUNCH BREAK



TUESDAY, 13 SEPTEMBER 13:00–14:30
VENUE: RESTAURANTS, DOUBLETREE BY HILTON

The lunch is sponsored by: FARO Technologies.

FIG COMMISSIONS ANNUAL MEETINGS FROM 13:25–14:15

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

The Commission meetings are open for everyone who are interested in the work.

- Commission 2: Professional Education in **Willow**
- Commission 5: Positioning and Measurement in **Lime/Maple**
- Commission 7: Cadastre and Land Management in **Poplar/Alder**

SPONSOR PRESENTATION: OPEGIEKA



TUESDAY, 13 SEPT. 11:30–13:00
VENUE: PINE/HAZEL, DOUBLETREE BY HILTON

Accurate, Reliable and Digital Geospatial Data Understandable by Humans and Machines as a Basis of Decision-making Processes Automation



Tuesday, 13 September 2022 14:30–15:30

TS06A: BOOK LAUNCH – GEOSPATIAL DATA IN THE 2020S – TRANSFORMATIVE POWER AND PATHWAYS TO SUSTAINABILITY

TUESDAY, 13 SEPT. 14:30–15:30
VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON
COMMISSION: 3
CHAIR: PROF. **HARTMUT MÜLLER**, CHAIR FIG COMMISSION 3, GERMANY
RAPPORTEUR: MR. **MARKUS SCHAFFERT**, GERMANY

At this Special Session, the new FIG Publication No 78 will be officially launched. Authors from Commissions 3 and 8, the Young Surveyors Network, and the Volunteer Community Surveyor Program have collaborated to design and write this publication in a joint effort. The publication highlights the impact of geospatial data for spatial planning, health, diversity, volunteerism, cadastre, and the property market in the 2020s

Programme:

- Introduction (**Hartmut Müller & Markus Schaffert**, FIG Commission 3)
- Spatial Planning and Geo-Information (**Marije Louwsma & Cemre Sahinkaya**, FIG Commission 8)
- The Spatial Dimension of Health (**Sagi Dalyot & Marije Louwsma/Hartmut Müller**, FIG Commission 3 and 8)
- Diversity in Geospatial Context (**Roshni Sharma**, VCSP)
- eVolunteering by Land Surveyors (**Claire Buxton**, VCSP & **Sagi Dalyot**, FIG Commission 3)
- Cadastre and the Property Market (**Enrico Rispoli**, **Maria Scorza**, **Chryssy Potsiou & Marije Louwsma**)
- Discussion (panelists and audience)

TS06B: THE FIG MENTORING PROGRAMME FOR AFRICA

TUESDAY, 13 SEPT. 14:30–15:30
VENUE: BALLROOM "ESRI", DOUBLETREE BY HILTON
COMMISSION: YS, ARN
CHAIR: PROF. **JENNIFER WHITTAL**, SOUTH AFRICA
RAPPORTEUR: DR. **KWABENA OGBEN ASIAMA**, CHAIR FIG YOUNG SURVEYORS NETWORK, GERMANY

How can we help young surveyors transition into the industry?

How can we build soft skills to help young surveyors in their career paths and build resilience in our profession?

How can we volunteer as practicing seasoned surveyors to make a real difference? How can corporate sponsors become involved?

Join us in our interactive session to share experiences of the FIG Pilot Mentoring Programme for Africa and hear about the future of this successful initiative.

TS06C: SPATIAL PLANNING AND AFFORDABILITY OF HOUSING

TUESDAY, 13 SEPT. 14:30–15:30
VENUE: WALNUT/ACACIA, DOUBLETREE BY HILTON
COMMISSION: 8 & 9
CHAIR: MR. **PETER R. ACHE**, CHAIR ELECT FIG COMMISSION 9, GERMANY
RAPPORTEUR: PHD. **WIOLETA KRUPOWICZ**, POLAND

Marta Figurska (Poland): Alternative Approaches to Perception of Space in Spatial Analyses Using GIS Tools: a Polish Case Study (11385)

Jennilee Kohima, Royal Mabakeng and Laina Alexander (Namibia): Reception Areas Analyzing the Delivery of Land for Housing in Namibia (11562)

Monika Siejka and Monika Mika (Poland): Real Estate Market Activity During Corona Pandemic – Case Study in Krakow (11597)

Björn Haack (Germany): Real Estate Market Shifts in the Retail Sector in Germany – a Change of Times and Due to the COVID-19-Pandemic (11327)

TS06D: UNITED NATIONS COMMITTEE OF EXPERTS ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT (UN-GGIM) – AN UPDATE AND PRIORITIES

TUESDAY, 13 SEPT. 14:30–15:30
VENUE: WILLOW, DOUBLETREE BY HILTON
COMMISSION: UN-GGIM & FIG
CHAIR: MS. **ALLISON CRADDOCK**, AFGHANISTAN
RAPPORTEUR: MR. **MIKAEL LILJE**, FIG VICE PRESIDENT, SWEDEN

Joint UN-GGIM and FIG session.

The UN-GGIM has celebrated its first ten years with noting many important deliverables as e.g. the Integrated Geospatial Information Framework, Framework for Efficient Land Administration, the decisions to establish two Global Centres of Excellence and much more. UN-GGIM have also achieved an UN resolution on "A global geodetic reference frame for sustainable development". This year, UN-GGIM reported to Ecosoc about the need to strengthen its institutional arrangement. This session will present the status, activities of UN-GGIM with special focus on the European entity. We will also present the ongoing work to implement the Integrated Geospatial Information Framework (IGIF).

Mari Khardziani (Georgia): Strengthening NSDI in Georgia – Using IGIF to Support the Process (11789)

Tomaž Petek (Slovenia) and **Carol Agius** (Malta): UNGGIM Europe – Contribution to the More Effective Management and Availability of Geospatial Information in Europe (11607)

James Norris (United Kingdom): UN-GGIM Europe, Presenting Our Five Priority Areas. (11784)

Mikael Lilje (Sweden): Implementing the Strategy for the High Level Group of Integrated Geospatial Information Framework (11785)

Andrick Lal (Fiji): Support Activities and Seminars for the Development of a Sustainable Geospatial Information Management in the Pacific (11786)

Eva-Maria Unger (Netherlands): Support Activities for the Development of a Sustainable Geospatial Information Management by Cadaster (NL) (11787)

TS06E: GLOBAL CHALLENGES AND THE ROLE OF LAND ADMINISTRATION SYSTEMS

TUESDAY, 13 SEPT. 14:30–15:30
VENUE: LIME/MAPLE, DOUBLETREE BY HILTON
COMMISSION: 7
CHAIR: DR. **MIKA-PETTERI TÖRHÖNEN**, UNITED STATES
RAPPORTEUR: PROF. **ELŻBIETA BIELECKA**, POLAND

Frank Pichel (USA), **Justus Wambayi** and **Diana Kyalo** (Kenya): Fit-for-Purpose to Formality: An Analysis of Land Tenure Intervention Applying Fit-for-Purpose Approaches and Leading to Formally Recognized Land Rights (11429)

Paul DeVries and **Bastian Reydon** (Netherlands): Are the Dutch People Migrating from the Urban to Rural Areas: Some Evidence (11555)

Linda ter Heerdt and **Nick van Apeldoorn** (Netherlands): How to Innovate Successfully a Case Study on the Netherlands' Land Registry and Mapping Agency (11582)

Adrian Oscar Byssolini (Argentina): The Importance of People in Geographic Information Systems (11594)

Katarzyna Bularska, **Marcin Lis** and **Artur Radziemski** (Poland): The City of Poznań – Photogrammetry – from Cadastre to Digital Twin (11662)

SPONSOR PRESENTATION: SKY SNAP

TUESDAY, 13 SEPT. 14:30–15:30
VENUE: PINE/HAZEL, DOUBLETREE BY HILTON

It's Time to Digitize Surveying – BIM, AI, Process Automation, Advanced SU for Data Collection

Presenter: **Łukasz Czerwiński**, CEO at SkySnap

Tuesday, 13 September 2022 14:30–15:30

**TS06F: LADM IN THE CLASSROOM –
MAKING THE LAND ADMINISTRATION DOMAIN
MODEL ACCESSIBLE**

TUESDAY, 13 SEPT. 14:30–15:30

VENUE: SYCAMORE/MAGNOLIA/CEDAR, DOUBLETREE BY HILTON

COMMISSION: 7

CHAIR: DR. **DIMO TODOROVSKI**, CHAIR ELECT FIG COMMISSION 2,
NETHERLANDS

RAPPORTEUR: MR. **DOGUS GULER**, TÜRKIYE

LADM in the classroom – making the Land Administration Domain Model accessible How do you as land professional explain LADM to your colleagues, managers, and the next generation?

This session will present a teaching methodology that starts from the concrete level (end product) and not from the abstraction level (UML). This means starting from a cadastral map with visually linked rights and entitled parties. Then the translation of this data into database tables is the next level of understanding. What do these tables look like for the data shown on the map? Finally, the link between database tables and UML diagrams is presented to the students. This approach is presented here also taking into account different tenure situations. Along with the didactic approach, we made an effort to ensure the datasets have a low entry barrier regarding financial costs and software availability.

Programme:

- Introduction by **Peter van Oosterom**
- School for Land Administration by **Paula Dijkstra**
- LADM in the Classroom – The Booklet by **Malumbo Chipofya**
- LADM in the Classroom – The demonstration by **Andre da Silva**
- 3D Description of Condominium Rights in Turkey: Improving the Integrated Model of LADM and IFC by **Guler Dogus et al.**
- Data Migration Process to LADM-COL Model by **Cardona Leonardo et al.**

Q&A

Dogus Guler and **Tahsin Yomralioglu** (Türkiye):

3D Description of Condominium Rights in Turkey: Improving the Integrated Model of LADM and IFC (11309)

This is a peer reviewed paper.

Leonardo Cardona, Andrés Guarín, Daniel Casalprim, Ivan

Salazar and **Fabian Pineda** (Colombia):

Data Migration Process to LADM-COL Model (11630)

Christiaan Lemmen, Andre da Silva Mano and **Malumbo**

Chipofya (Netherlands):

LADM in the Classroom – Making the Land Administration Domain Model Accessible (11734)

**TS06G: PROVIDING
VERTICAL CONTROL
FOR HYDROGRAPHERS,
COASTAL MANAGERS AND
OTHER DISCIPLINES**

TUESDAY, 13 SEPT. 14:30–15:30

VENUE: POPLAR/ALDER, DOUBLETREE BY HILTON

COMMISSION: 5

CHAIR: MR. **DAVID AVALOS**, MEXICO

RAPPORTEUR: DR. **WITOLD**

KAZIMIERSKI, POLAND

Ileana Spiroiu, Radu – Dan – Nicolae Crişan, Irina Belinschi, Vlad Sorta and **Neculai Avramiuc** (Romania): Determination of a New Gravitric Quasigeoid for Romania (11305)

Erkin Mirmakhmudov and **Gulsara Tleumuratova**

(Uzbekistan): Determination of the Level Posts Coordinates of Uzbekistan (11319)

Francis Okeke, Victor Nnam and **Joseph Odumosu** (Nigeria):

Transformation of Global to Local Geoid for Regional Geoid Modeling: Results from Enugu State, Nigeria (11335)

Kevin Ahlgren, Jacob Heck, Galen Scott and **Brian Shaw** (USA):

A Nation of Volunteered Data: Analysis of the NGS's GPS on Bench Marks Project (11681)

FIG CONGRESS DINNER

TUESDAY, 13 SEPT. 19:30–00:00

VENUE: WARSAW UNIVERSITY OF TECHNOLOGY

In cooperation with FIG Foundation and supported by Trimble

The most exclusive dinner of the Congress will take place in a unique place, the cradle of Polish Surveying in the best technical university in Poland, the Warsaw University of Technology. In the Main Building, where the Faculty of Geodesy and Cartography is located, Main Hall designed by Stefan Szyller and built in 1901 is one of the most beautiful venue for distinctive events. On these walls, you will also be able to notice targeted control points used as a reference in students' exercise, but attendees will for sure be more focused on the festival of the lights and sounds prepared by organizers.

Tuesday, 13 Sept. 16:00–18:00

**KEYNOTE SESSION 3:
LAND GOVERNANCE IN SUPPORT OF
THE 2030 GLOBAL AGENDA**

TUESDAY, 13 SEPT. 16:00–17:00

VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON

CHAIR: DR. **ROHAN BENNETT**, CHAIR ELECT FIG COMMISSION 7, AUSTRALIA

The global sense of urgency and the pressure on land have showed an increase of the relevance of surveying and geo-information towards the achievement of the SDG's. Land governance is about the policies, processes and institutions by which land, property and natural resources are managed. Therefore, land governance plays a key role in achieving the SDGs where more than half of the goals are directly land related. In this regard, the global surveying profession holds an important position as the custodians of the people to land relationship. This session will unfold the concept of responsible land governance and the importance of including all land, people and land rights at a countrywide scale. Further, the session will align the concepts with the 2030 Agenda for Sustainable Development and how FIG supports the SDGs. The agenda provides us a roadmap towards a more sustainable world. Providing leadership as FIG, as professional and as a citizen on the SDGs will be of great added value. This session sets the scene how you can actively contribute to volunteering for the future for our profession, society and our planet at the same time.

Stig Enemark (Denmark):

Responsible Land Governance and Secure Land Rights in Support of the 2030 Global Agenda (11558)

Paula Dijkstra (Netherlands):

Taking Action to Transform Our World into a More Sustainable Environment (11781)

Panelist: Dr. **Kwabena Obeng Asiana**, Chair FIG Young Surveyors Network

**KEYNOTE SESSION
4: HOW THE LAND
PROFESSION SKILLS MAY
THRIVE IN THE POST
2020 PANDEMIC WORLD –
INSIGHTS FROM ACROSS
THE GENERATIONS:
GEOGRAPHY,
GOVERNANCE AND
VOLUNTEERING**

TUESDAY, 13 SEPT. 17:00–18:00

VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON

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

4 generations, 1 workforce- Understand who's who in the workplace.

Cross-generational insights on how all four of the generations in the work place will shape the next normal. We listen to perspectives from Baby boomers, Gen X, Millennials and beyond. Discussing what the work place looks like, what skills will be needed to benefit society drawing from the context of Geography, Governance and Giving.

This panel brings together active industry professionals across all FIG member sectors. As members of each generation navigate the next normal they explain: What effect the pandemic will have on cross generational views of the skills they believe to be the most relevant in the future professional world of survey; and Provide insightful ideas as how we can move towards a resilient and diverse profession.

Speakers of the session:

- Ms. **Victoria Stanley**, Senior Land Administrator World Bank, USA
- Ms. **Olive Powell**, Head of Geography, Office for National Statistics (ONS), Statistics Authority UK
- Mr. **Israel Taiwo**, Senior Lecturer, Federal Polytechnic Ado-Ekiti, Nigeria
- Mr. **Marc Vanderschueren** President of Fédération Internationale des Géomètres (FGF), Belgium



Wednesday, 14 Sept. 09:00–11:00

KEYNOTE SESSION 5 KEYNOTE SESSION: MAPPING THE PLASTIC:**WEDNESDAY, 14 SEPT. 09:00–10:00****VENUE:** BALLROOM "TRIMBLE", DOUBLETREE BY HILTON**CHAIR:** MS. CLAIRE BUXTON, LEAD VSCP, CANADA

The effects of plastic pollution on the Earth's oceans are well documented, potentially catastrophic and increasing exponentially year on year. The UN Environment Programme has calculated that each year more than 8 million tonnes of plastic ends up in the oceans. Eighty per cent of all litter in our oceans is made of plastic and, without action, by 2050 there will be more plastic in the sea than fish, by weight. This is an intolerable problem that needs immediate and far-reaching action to remedy. The surveying and spatial science profession agrees that this must stop.

FIG Working Group 4.3 – Mapping the Plastic has developed a world leading methodology to accurately extract floating plastic data (as small as 1.0 cm in length) from multi-spectral UAV images using artificial intelligence deep learning algorithms. Learn more about this exciting, ground breaking process will enable the accurate mapping and classification of floating plastic in near real time. The keynote will be chaired

Simon Ironside (New Zealand) and **Gordana Jakovljević** (Bosnia and Herzegovina): Mapping the Plastic (11770)

KEYNOTE SESSION 6: TECHNOLOGY AND VISUALISATION FOR THE FUTURE**WEDNESDAY, 14 SEPT. 10:00–11:00****VENUE:** BALLROOM "TRIMBLE", DOUBLETREE BY HILTON**CHAIR:** DR. KRZYSZTOF BAKUŁA, CO-CONGRESS DIRECTOR, POLAND

This keynote focuses on the future technologies of geospatial data visualization and its role for surveyors and the role of GNSS measurements in future. This session is the last keynote session and will give you food for thought for the future.

Bryn Fosburgh (USA): The Changing Role of the Surveyor in the Metaverse (11766)

Robert Olszewski (Poland): Trends in the Development of Spatial Data Visualization Methods (11767)

EUROPEAN GEODESY MONUMENT**WEDNESDAY, 14 SEPT. 10:30–11:00****VENUE:** THEATER SQUARE, OLD TOWN, WARSAW

In 1880, in the Theatre Square in front of the Jablonowski Palace, a stone pillar was erected surrounded by an iron railing with a sign indicating the geographical location and the height above sea level and the level of Vistula. The Warsaw meridian passes through the top of the pillar and top of the clock tower of the Jablonowski Palace, which served as point measurements.

This year the monument has been restored and changed into the European Geodesy Monument. Prof. **Janusz Walo**, President of the Association of Polish Surveyors (SGP) and Prof. Dr. **Rudolf Staiger** will represent FIG at the opening.



Hubert Smiternka
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Wednesday, 14 Sept. 11:30–13:00

TS07A: LAND POLICY INSTRUMENTS FOR REGIONAL DEVELOPMENT**WEDNESDAY, 14 SEPT. 11:30–13:00****VENUE:** BALLROOM "TRIMBLE", DOUBLETREE BY HILTON**COMMISSION:** 8
CHAIR: PROF. WALTER TIMO DE VRIES, GERMANY
RAPPORTEUR: PROF. JACEK PIANOWSKI, POLAND

Adrianna Czarnecka and **Wioleta Krupowicz** (Poland): Participatory Approach in Land Consolidation in Poland – Crowdsourcing Application Test Feedback (11631)

Hermann Hentunen and **Kalle Kontinen** (Finland): Surveying the Regional Need for Land Consolidations from GIS Information in Finland (11374)

Artur Warchot and **Monika Balawejder** (Poland): The Use of Orthophotomaps to Verify the Network of Agricultural Transport Roads in the Land Consolidation Project (11668)

Kwabena Asiamah (Germany), **Lixian Chen** (China, PR), **Charles Atakora** and **Winrich Voss** (Germany): An Interrogation of the Land Consolidation Traditions of the People's Republic of China, Germany, The Netherlands and Rwanda (11535)

Uchendu Eugene Chigbu (Namibia), **Michael Klaus** and **Wenjun Zhang** (China, PR): Aiming at a Better Impact of the Land Professions: the Role of Academic and Policy Dialogues (11308)

TS07B: ACCELERATED DIGITALISATION AND THE FUTURE OF LAND ADMINISTRATION IN THE UNECE REGION AND BEYOND**WEDNESDAY, 14 SEPT.****11:30–13:00****VENUE:** BALLROOM "ESRI", DOUBLETREE BY HILTON
COMMISSION: FIG, FAO & UNECE**CHAIR:** MS. RUMYANA TONCHOVSKA, FAO

Joint FIG, FAO and UNECE session.

This session explores the future of land administration through the lenses of digital disruption and accelerated digital transformation – with a specific focus on lessons from the UNECE region.

Attendees of the session will hear from leaders across multiple land agencies, from both the UNECE and globally, recapping the journey of those agencies through the pandemic disruption, responses, and where they sit now. Also launched will be a new FAO/FIG/WPLA publication titled 'Digital Acceleration and the Future Land Administration in the UNECE region' that synthesises the lessons of at-distance webinars by FAO and WPLA on the same topic. The session will conclude with a panel session focusing on unpacking on land administration agencies have fundamentally changed post-pandemic, and what future action plans and investments are most needed in the sector.

TS07C: GEOSPATIAL ANALYTICS USE CASES**WEDNESDAY, 14 SEPT. 11:30–13:00****VENUE:** WALNUT/ACACIA, DOUBLETREE BY HILTON**COMMISSION:** 3**CHAIR:** PROF. PIETRO GRIMALDI, ITALY**RAPPORTEUR:** MR. CROMWELL MANALOTO, ITALY

Angelina Ageenko and **Lars Bodum** (Denmark): Landslide Susceptibility Mapping in Denmark – a Machine Learning Approach (11291)

Krzysztof Pokonieczny (Poland): Methodology of Terrain Classification in Terms of Military Passability (11318)

Haowen Yan, Weifang Yang and **Xiaoming Lu** (China, PR):

Similarity-Based Principles in Map Generalization (11339)

Gabriel Scarmana (Australia): Estimation of Papaya Fruit Volume and Surface Area Using a Dual Ellipsoid Representation and Image Analysis (11346)

Samuel Larbi Darko and **Andrews Kwasi Afforo Odoom** (Ghana):

The Impact of Surveying and Mapping in Transforming Ghana's Energy Sector; A Case Study of Electricity Company of Ghana (ECG) Asset Mapping Project (11358)

Njike Chigbu, Maduabughichi Okezie, Chidiebere Nnadiogbulam, Imaga Itam Lekwa and **Michael, M. Apeh** (Nigeria):

Geospatial Technologies Application in Small and Medium Scale Enterprises (SMEs)-A strategy for Poverty Reduction in Sub-Saharan aFRICA. (11456)

Cemre Sahinkaya-Oezer, Uwe Altröck and **Sercan Kadir** (Germany):

An Analysis on the Changing "Give Away" Practices in Germany: The Case of Neustadt District, Dresden (11475)

Cheuk-man, Danny Yeung, Kwan-ming, Eric Cheung and **Yi-tak, Lily Leung** (Hong Kong SAR, China): Leveraging GIS for Battle Against COVID-19 in Hong Kong (11497)

Philipp Luz, Thomas Pany, Christian Lichtenberger, Martin Grzebellus and **Volker Schwieger** (Germany): Ghosthunter III – Detection of Wrong-way Drivers (11527)

Agnieszka Ochalek, Tomasz Lipiecki, Jaśkowski Wojciech and **Jabłoński Mateusz** (Poland): Measuring, Protecting and Spreading the Knowledge About Underground Cultural Heritage with the Usage of Modern Technologies (11644)

Divyani Kohli (Netherlands): Tenure from Above: Can Remote Sensing Be Used in Support of Land Administration? (11701)

Mark Cygan (USA): Innovation and Implementation of an Integrated Geospatial Infrastructure (11709)

TS07D: THE FUTURE OF LAND ADMINISTRATION: IDEAS, TECHNOLOGIES AND PROCESSES

WEDNESDAY, 14 SEPT. 11:30–13:00
VENUE: WILLOW, DOUBLETREE BY HILTON
COMMISSION: 7
CHAIR: MS. KATE RICKERSEY, AUSTRALIA
RAPPORTEUR: DR. AGNIESZKA CIENCIAŁA, POLAND

SURVEY REVIEW AWARD WINNER:

Adamu Bala (Nigeria), **Saied Pirasteh** (China, PR), **Yahaya Abbas Aliyu**, **AbdulAzeez Aliyu**, **Swafiyudeen Bawa** and **Ibrahim Abdulwahab** (Nigeria): Mapping and Suitability Analysis of Existing Electoral Polling Units in Katsina Local Government Area of Katsina State, Nigeria (11312)
This is a peer reviewed paper.

John Gitau, **Jean du Plessis** and **Danilo Antonio** (Kenya): An Innovative Land Information Tool for Documenting Tenure Rights of the Urban Poor in Namibia (11560)

Charl-Thom Bayer (Namibia) and **Laura Meggiolaro** (Italy): Open Data for Improved Land Governance (11573)

Baiq Elfa Desfira, **Lalu Akhmad Farhan** and **Bambang Edhi Leksono** (Indonesia): Design Recommendations to Enhance The Digital Transformation of Lulu Akhmad Farhan Licensed Cadastral Surveyor Bureau (KJSB) (11751)

Helge Onsrud, **Frank Haugan** and **Oskar Henriksen** (Norway): A Practical Approach to Quality Control of Geographic Information (11769)

Maurice Barbieri (Switzerland), **Florian Lebourdais** (France), **Ivars Nudiens** (Latvia) and **Enrico Rispoli** (Italy): GISCAD-OV: Galileo High Accuracy Service: a contribution of Surveyors to GNSS (11773)

TS07E: FRENCH SESSION 1

WEDNESDAY, 14 SEPT. 11:30–13:00
VENUE: LIME/MAPLE, DOUBLETREE BY HILTON
CHAIR: MR. MARC VANDERSCHUEREN, BELGIUM

Khalid Youfsi (Morocco): Transparency and Land Management Conflict (11748)

Jean-François Dalbin (France): Comment Remédier aux Problèmes Générés par les Indivisions Successorales Immobilières pour Améliorer la Gestion Foncière: le Cas de la Polynésie Française (11743)

Godelive Phanzu Vangu (Democratic Republic of Congo): Contribution à la Réinvention de l'Aménagement du Territoire Post-Covid 19, Cas de la Ville de Kinshasa (11738)

Matjaz Grilc (Slovenia), **Vladimir Krupa** (Croatia), **Jean-Yves Pirlot** (Belgium) and **Robert Rachwal** (Poland): Code of Professional Qualifications for Property Surveyors (11740)

Marc Vanderschueren (Belgium): L'Impact "COVID" sur les Activités de la FGF. (11741)

TS07F: INNOVATION IN CURRICULUM

WEDNESDAY, 14 SEPT. 11:30–13:00
VENUE: SYCAMORE/MAGNOLIA/CEDAR, DOUBLETREE BY HILTON
COMMISSION: 2
CHAIR: PROF. PAWEŁ HANUS, POLAND
RAPPORTEUR: DR. MALUMBO CHIPOFYA, NETHERLANDS

Wei Li, **Xukang Xie**, **Pengcheng Gao**, **Qianwen Wang** and **Xiaohang Wang** (China, PR): Exploration of Ubiquitous Mapping in Engineering Practice Curriculum System of Universities in the Intelligent Age (11285)

Jelena Gabela, **Guenther Retscher**, **Georg Gartner**, **Andrea Binn** (Austria) and **Vassilis Gikas** (Greece): Overview Of The Pbl In Geodesy, Geoinformatics And Transport Engineering Education (11322)
This is a peer reviewed paper.

Wafula NABUTOLA, **Wafula Luasi NABUTOLA** and **Wafula Luasi NABUTOLA** (Kenya): Why and How to Ensure Inclusive Education Opportunities for all Kenyan Students: A Historical Perspective (11393)

Moonsik Kim (Republic of Korea): Simulated Survey Training Using Game Engine (11400)

Derek Spalton, **Matthew Whomsley**, **Alison Xu** and **Jay Lawrence** (United Kingdom): Developing Interactive Digital Learning Resources- A Case Study for MSc Surveying Modules (11427)

Michael Mayer (Germany): On the Acquisition of GNSS Competencies Hand in Hand with Personal Competencies in the Introductory Phase of BSc Engineering Degree Programs (11457)

Joanna Pluto-Kossakowska, **Kinga Węzka**, **Dariusz Gotlib** and **Krzysztof Bakuta** (Poland): Mobile Mapping and Navigation Systems – a New Master's Program in the Field of Geomatics Launched in Covid Pandemic Time (11465)

Reshma Shrestha and **Ganesh Prasad Bhatta** (Nepal): Curriculum Assessment Framework of Land Management Education for Capacity Building in Nepal: A case of Master in Land Administration at Kathmandu University (11584)

Malgorzata Veróné Wojtaszek, **György Busics** and **Valéria Balázsik** (Hungary): Teaching Precision Farming for Agricultural Engineers: Experiences and Lessons Learned (11642)

Craig Roberts (Australia): Milking a Rich Education from an Old School Technique (11657)

Witold Kazimierski, **Jacek Lubczonek**, **Marta Włodarczyk-Sielicka**, **Grzegorz Zaniewicz** and **Izabela Bodus-Olkowska** (Poland): Hydrography Education in Geodesy Courses – Case Study in Maritime University of Szczecin (11713)

TS07G: FIG PLATINUM CORPORATE MEMBER SESSION – TRIMBLE

WEDNESDAY, 14 SEPT. 11:30–13:00
VENUE: POPLAR/ALDER, DOUBLETREE BY HILTON

A special session organised by FIG Platinum Corporate member Trimble.

Trimble's FFP solution
 Trimble's FFP solution combines Trimble Penmap and Trimble Catalyst GNSS to a straightforward data collection toolset which offers flexible accuracy, reliable positions, easy-to-use workflows and cost-efficiency.

Penmap field data collection software offers professional land administration data collection for everyone. Penmap supports domain models like STDM or LADM which enables stakeholders to work with a domain model in the field for mapping, GIS, tenure and form based data collection.

Trimble Catalyst is a revolutionary GNSS concept delivering affordable and flexible GNSS positioning-as-a-service for FFP data collection. The concept contains the simple, lightweight and low cost Trimble DA2 GNSS receiver and on-demand, accuracy-based corrections worldwide.

Speaker: **Markus Koper**

Geospatial Data's role in Digital Construction

In today's modern age of geoinformation, surveyors and construction professionals find themselves at a crossroads where innovation has intertwined their deliverables and workflows like never before. Historically approached as two separate industries with independent solutions, Trimble has dared to do just the opposite and bring them together through technology advancements in scanning, connectivity, modeling, digital twins, and cloud data processing. Learn how Trimble is using geospatial data as the foundation for the new age of digital construction.

Speaker: **Stephanie Michaud**



OPEN MEETING: STAND FOR HER LAND



WEDNESDAY, 14 SEPT. 11:30–13:00
VENUE: PINE/HAZEL, DOUBLETREE BY HILTON

Join the session to learn more about Stand For Her Land (S4HL) and their work. Earlier this year FIG and S4HL signed a Memorandum of understanding.

Esther Mwaura-Muiru (Kenya) and **Beth Roberts** (USA): Action and Advocacy for progress on SDGs – Introducing FIG's Partnership with a Global Campaign for Women's Land and Housing Rights (11777)

SPONSOR PRESENTATION: DJI ENTERPRISE



WEDNESDAY, 14 SEPT. 11:30–12:10
VENUE: SEQUOIA, DOUBLETREE BY HILTON

Best Projects Using Drones for Photogrammetry and LiDAR
 Presenter: **Florian Ogier**, Business Development Manager – France, DJI Enterprise

Wed, 14 13:00–14:30

LUNCH BREAK



WEDNESDAY, 14 SEPT. 13:00–14:30
 VENUE: RESTAURANTS, DOUBLETREE BY HILTON

The lunch is sponsored by:
 TERRASOLID

FIG COMMISSIONS ANNUAL MEETINGS FROM 13:25–14:15

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

The Commission meetings are open for everyone who are interested in the work.

- Commission 1: Professional Standards and Practice in **Willow**
- Commission 4: Hydrography in **Lime/Maple**
- Commission 8: Spatial Planning and Development in **Poplar/Alder**

Wednesday, 14 September 2022 14:30–16:00

TS08A: REAL ESTATE DATA GOES GEODATA

WEDNESDAY, 14 SEPT. 14:30–16:00
 VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON
 COMMISSION: 3 & 9
 CHAIR: MR. **PETER R. ACHE**, CHAIR ELECT FIG COMMISSION 9, GERMANY
 RAPPORTEUR: MS. **ANGELA OMAMUYOVWI ETUONOVBE**, NIGERIA

Cromwell Manaloto and **Daniele Brancato** (Italy):

What the Future Holds for the Banca del Dato Immobiliare? – Insights and Reflections (11589)

Katherine Smyth (USA): Operationalizing the LADM Valuation Information Model in ArcGIS (11460)

Christina Mauer (Germany): Digital Processes in Real Estate Appraisal – Opportunities for Efficiency and Objectivity (11678)

Ron Dalumpines, Javier Clavijo (Canada), **Jason Buchanan, Ryan Chacon** and **Trent Larson** (USA): Using GeoAI in Property Valuation (11702)

TS08B: LEVERAGING THE POTENTIAL OF MULTI-PURPOSE LAND CONSOLIDATION IN EASTERN EUROPE

WEDNESDAY, 14 SEPT. 14:30–16:00
 VENUE: BALLROOM "ESRI", DOUBLETREE BY HILTON
 COMMISSION: FIG & FAO
 CHAIR: MR. **MAXIM GORGAN**, FAO LAND TENURE OFFICER, REU, HUNGARY AND MS. **MARIJE LOUWSMA**, CHAIR FIG COMMISSION 8, NETHERLANDS
 RAPPORTEUR: MR. **BRADLEY PATERSON**, FAO REU

Joint FIG and FAO Session.

The objective of the session is to present and discuss the perspectives and need for multi-purpose land consolidation instruments in Eastern Europe. The session begins with a keynote presentation on the potential of multi-purpose land consolidation and includes three country presentations on initial experiences with multi-purpose land consolidation and the expected way forward.

Programme:

- Opening by FAO and FIG co-chairs
- Keynote presentation on the potential of multi-purpose land consolidation in countries in Eastern Europe. **Morten Hartvigsen**, Land Tenure Officer, FAO REU
- Introduction of land consolidation in Georgia. **Gizo Chelidze**, Head of Department, Ministry of Environmental Protection and Agriculture, and **Elene Grigolia**, Project Manager, National Agency of Public Registry
- Initial experiences with multi-purpose land consolidation in North Macedonia and the way forward. **Kiril Georgievski**, Head of Land Consolidation Department, Ministry of Agriculture, Forestry and Water Economy, North Macedonia.
- Potential for multi-purpose land consolidation in Turkey. **Fatma Tüz Zehra Gülsever**, Deputy Head of Land Consolidation Department, DSI, Ministry of Agriculture and Forestry.
- Questions to the presenters and discussion of the potential for multi-purpose land consolidation in countries in Eastern Europe
- Conclusions and wrap-up by co-chairs.

TS08C: UBIQUITOUS GNSS

WEDNESDAY, 14 SEPT. 14:30–16:00
 VENUE: WALNUT/ACACIA, DOUBLETREE BY HILTON
 COMMISSION: 5
 CHAIR: DR. **RYAN KEENAN**, CHAIR ELECT FIG COMMISSION 5, AUSTRALIA
 RAPPORTEUR: DR. **JACEK PAZIEWKI**, POLAND

Slawomir Cellmer, Krzysztof Nowel, Artur Fischer and **Dawid Kwasiak** (Poland): Precise Satellite Positioning Based on a Search Procedure in the Coordinate Domain (11407)

Robert Galatiya Suya, Yung-Tsang Chen, Chiew-Foong Kwong and **Penghe Zhang** (China, PR): Noise Characterization in BeiDou-3 Multi-Frequency Observables (11516)

Olusola Omogunloye, Oluwapelumi Agunwa, Olufemi Olunlade, Oludayo Abiodun and **Babatunde Ojebile** (Nigeria): Comparative Analysis of Geodetic Distance Computational Methods, Using the Normal Probability Statistical Plot (11544)

Bartłomiej Oszczak (Poland): Mathematical Model and Results of a New Positioning Algorithm (11692)

Israel Taiwo (Nigeria) and **Jordan Palk** (Canada): Positioning Accuracy of Trimble DA1 Catalyst Receiver in Ado-Ekiti, Nigeria (11698)

Gintcho Kostov (Bulgaria): Assessment of the Accuracy and Reliability of GNSS Measurements in RTK Mode, Performed with Inclined Pole, Applying Fuzzy Logic (11450)

Ashraf Abdallah (Germany), **Agag Tarek** (Egypt) and **Volker Schwieger** (Germany): Validation of CODE-GIM and Regional Ionosphere Model (RIM) for Single Frequency GNSS PPP Solution using Bernese GNSS software – Case Study: Egyptian Nile Delta (11375)

This is a peer reviewed paper.

novXperience AWARD WINNER:

Ola Øvstedal, Johan Tobias Arnell, Isak Foss Ingebrigtsen, Simen Walbækken Tangen and **Bjørn-Eirik Roald** (Norway): A Comparison of Survey-Grade GNSS Receivers by Means of Observation and Coordinate Domain Approaches; Traditional Vs Low-Budget (11320)
This is a peer reviewed paper.

Miguel González-Calvo, Xiaoguang Luo, José Amado Aponte and **Bernhard Richter** (Switzerland): Improved High-Precision RTK Positioning Through Multipath Reduction and Interference Mitigation (11557)

Paweł Wielgosz, Anna Krypiak-Gregorczyk, Wojciech Jarmotowski and **Beata Milanowska** (Poland): Validation of UWM New Global Ionosphere Model During the Most Severe Geomagnetic Storm of the Year 2018 (11725)

Paweł Zalewski (Poland): GNSS Performance Standards in the Maritime Domain (11352)



TS08D: GEOSPATIAL DATA IN THE 2020S

WEDNESDAY, 14 SEPT. 14:30–16:00
VENUE: WILLOW, DOUBLETREE BY HILTON
COMMISSION: 3
CHAIR: MR. MARKUS SCHAFFERT, GERMANY
RAPPORTEUR: MS. SAHINKAYA CEMRE, TÜRKİYE

Magdalena Grus, Ronald Bokhove and Marc van Aniel (Netherlands): National Sensor Registry a Step Forward (11370)

Tatjana Budimirov, Vladimir Bulatović, Marko Marković, Mehmed Batilović and Zoran Sušić (Serbia): Application of IoT in Civil Engineering and Geodesy (11409)

Maria Ruiz and Teresa Martinez (Spain): EU Space Programmes for Geomatics (11418)

Dariusz Gotlib, Kamil Choromański and Bogusław Kaczatek (Poland): CENAGIS Geo-Cyberinfrastructure as a R&D Environment for a Surveyor 4.0 (11452)

Andy Wilson, Mark Tabor, Anthony Beck and Karen Hunt (United Kingdom): Re-Imagining the Role of a National Mapping Agency to Support Spatially Enabled Governance (11524)

Dejan Vasic and Marina Davidovic (Serbia): Application of Artificial Intelligence in Road Infrastructure Management (11583)

Marina Davidovic and Dejan Vasic (Serbia): Comparative Analysis of Automatic Methods for Road Infrastructure Elements Extraction from Point Cloud (11586)

Njike Chigbu and Michael Apeh (Nigeria): Object-Based Image Analysis Technique in e-Cognition Environment -A Paradigm for Sustainable Resource Inventory. (11598)

IPMS REGIONAL MEETING

WEDNESDAY, 14 SEPT. 14:30–16:00
VENUE: ROWAN, DOUBLETREE BY HILTON

- By invitation only

TS08E: FRENCH SESSION 2

WEDNESDAY, 14 SEPT. 14:30–16:00
VENUE: LIME/MAPLE, DOUBLETREE BY HILTON
CHAIR: MR. MARC VANDERSCHUEREN, BELGIUM

Mohammed Amine Hafid and Bouhadjar Meguenni (Algeria): Adapter les Machines de Routage à un Réseau Routier pour Améliorer la Qualité des Déplacements Urbain de la Ville d'Oran (11674)

Xavier Prigent (France): The New Challenges of Urban and Rural Planning in Europe Proposal of a Game to Set up the Territorial Strategy Proposition d'un Jeu Pour Mettre en Place la Stratégie Territoriale (11745)

Jean-Yves Pirlot (Belgium): The Creation of the Ordre des Géomètres-Experts in Belgium (11739)

Francis Gabele (Belgium): Le Nouveau Droit des Biens en Belgique « Le bornage » (11742)

Benbrahim Ahmed (Morocco): Projet de Reforme de la Gestion Administrative et Financiere des Instances Ordinales de L'ONIGT (11747)

FIG CORPORATE MEMBER / CONGRESS SPONSOR MEETING

WEDNESDAY, 14 SEPT. 14:30–16:00
VENUE: PINE/HAZEL, DOUBLETREE BY HILTON
CHAIR: PROF. DR. RUDOLF STAIGER, FIG PRESIDENT, GERMANY
RAPPORTEUR: MS. LOUISE FRIIS-HANSEN, FIG DIRECTOR, DENMARK

The 2022 FIG Corporate Members Meeting is where the corporate membership within FIG meets the FIG Administration to exchange information, provide feedback and discuss on-going and proposed activities. Sponsors and exhibitors of the FIG Congress are welcome to attend.

TS08F: FIG & THE SDGS – MAKING THE WORLD A BETTER PLACE WITH YOUR SKILLS

WEDNESDAY, 14 SEPT. 14:30–16:00
VENUE: SYCAMORE/MAGNOLIA/ CEDAR, DOUBLETREE BY HILTON
COMMISSION: TF-SDG
CHAIR: MS. PAULA DIJKSTRA, NETHERLANDS

Be inspired by surveyors from all over the world how they contribute to achieving the SDG's. The Task Force on SDGs and FIG will set the scene and give a general introduction about the SDG's, the role of FIG and how you as a surveyor can contribute. In smaller groups you will have the chance to learn more about the interpretation of the indicators, how you apply social responsibility within your organisation or inspirational examples of congress participants. We will wrap up with your recommendations of how surveyors can make the sustainable world a reality.

Rosario Casanova (Uruguay): Education on the Geographic Indicators of the Sustainable Development Goals in Uruguay (11293)

TS08G: DATABASES, MODELS AND SOFTWARE FOR LAND ADMINISTRATION

WEDNESDAY, 14 SEPT. 14:30–16:00
VENUE: POPLAR/ALDER, DOUBLETREE BY HILTON
COMMISSION: 7
CHAIR: DR. UCHENDU EUGENE CHIGBU, NIGERIA
RAPPORTEUR: DR. EVA-MARIA UNGER, AUSTRIA

Benard Odhiambo, Gordon Okumu Wayumba, Japheth Nyandoro, Kipchumba Evans and Julia Wakaba (Kenya): 3D Cadastral Modelling for Registration of Sectional Rights, Tax Collection and Integration into the National Land Information Management System in Kenya (11289)

Nur Zurairah Halim, Nazirah Mohamad Abdullah, Muhammad Salim Mohammed Asari and Mohamad Zaki Mohd Ghazali (Malaysia): The SmartKADASTER Way – An Approach Towards 3D Geovisualisation Beyond Cadastre Purposes in Malaysia (11316)
This is a peer reviewed paper.

William Kambugu, Richard Oput, Grace Kagoro, Godfrey Toko and Jimmy Alani (Uganda): The Consideration of Slaac Tool in Systematic Land Registration in Uganda (11324)

Brent Jones (USA): Operationalizing Modern Cadastre with GIS (11344)

Hannes Maar (Switzerland): Automated Pole Functionalities for Advancing Productivity of Total Station Workflows (11353)

Amir Bar-Maor (Netherlands) and **Katherine Smyth** (USA): ArcGIS & LADM (ISO 19152): from Conceptual to Implementation (11373)

Mulyadi Mulyadi and Akhmad Faizal (Indonesia): Web-Based 3D Cadastre's Data Visualization In Indonesia: Challenges And Opportunity (11378)

Frank van den Heuvel, Juriaan Lucassen, Eric Hagemans, Gerbrand Vestjens, Mark van den Broek, Lense Swaenen, Wim Florijn and Stefan Bussemaker (Netherlands): Renewal of the Cadastral Map of the Netherlands, an Iterative Adjustment Approach (11408)

Christelle van den Berg (Netherlands), **Eva-Maria Unger** (Austria), **Rohan Bennett** (Australia) and **Chrit Lemmen** (Netherlands): Towards Effective Land Administration: What Is Striking About the Digital Transformation for Land Administration in Developing Context (11410)

Arve Leiknes, Vemund Hansen, Leiv Bjarte Mjøs, Helge Nysæter and Per Ove Røkke (Norway): Simplified Methods for Correcting the Norwegian Cadastral Map (11538)

Lopang Maphale, Kabelo Mokwena, Michael Bagadzi Manisa, Mooketsi Segobye and Yashon Ouma (Botswana): A Strategy for Virtually Sharing of Geographic Information by Botswana National Mapping Agency (11602)

Agnieszka Cienciola, Agnieszka Bieda and Szymon Sobura (Poland): Geospatial Products in the Registration of Photovoltaic Installations and Their Parameters (11640)

Charisse Griffith-Charles (Trinidad And Tobago): Open Access Data in the Cadastral Environment – An Evaluation (11686)

Thomas Dabiri (Nigeria): Agrocadastral Mapping of Palm Trees on Farmlands for a Good Land Use and Poverty Eradication in Delta State of Nigeria (11707)

TS09A: JOINT FIG/FAO SESSION: FIG ACADEMIC FORUM: VGGT AND UNCCD COP 14

WEDNESDAY, 14 SEPT. 16:30–18:00
VENUE: BALLROOM "TRIMBLE", DOUBLETREE BY HILTON
COMMISSION: FIG & FAO
CHAIR: DR. DAVID MITCHELL, CHAIR FIG COMMISSION 2, AUSTRALIA AND MS. TEA DABRUNDASHVILI, LAND TENURE OFFICER, FAO

The AC-Forum is organised jointly by FIG and FAO. How to integrate VGGT into the implementation of the United Nations Convention to combat desertification and to achieve land degradation neutrality – land-based solutions, involving Land Administration (LA)/Land Management (LM) instruments to combat climate change?

During the session it will be discussed how to apply integrated VGGT into the implementation of the Convention and land degradation neutrality – land-based solutions, involving LA/LM instruments to combat climate change.

The session will start by a presentation of the linkages between VGGT and LDN and will present newly launched FAO UNCCD Technical Guide on the integration of the VGGT into the implementation of the United Nations Convention to Combat Desertification (UNCCD) and Land Degradation Neutrality (LDN). The session will follow with a panel session focusing on unpacking on those aspects of implementation by stakeholders, including Academia and what future action plans and possible investments are most needed in their respective domain.

TS09B: LAND ADMINISTRATION AND THE SDGS

WEDNESDAY, 14 SEPT. 16:30–18:00
VENUE: BALLROOM "ESRI"
COMMISSION: 7
CHAIR: MS. PAULA DIJKSTRA, NETHERLANDS
RAPPORTEUR: DR. LUDMIŁA PIETRZAK, POLAND

Uchendu Eugene Chigbu, Menare Royal Mabakeng, Laina Alexander, Mario Siukuta, Ntwala Vanessa Simataa (Namibia) and **Penehafo Ricardo**: Tenure-Restoration Nexus for Local Action in Africa: Identifying Customary Enablers and Disablers of Tenure in Land Restoration (11304)
This is a peer reviewed paper.

Angela Baker and Bodossian Léa (Belgium): Open Maps for Europe: a Customised Approach to Unlocking the Value of Official Geospatial Information Through Open Data (11363)

Sinan Çotak, Bilal Erk and İbrahim Cankur (Türkiye): Possible Socio-Economic Reflections of 3D Cadastre Studies (11387)

Umit Yildiz, Murat Gurel, Sultan Kocaman Gökceoglu (Türkiye) and **Jaap Zevenbergen** (Netherlands): Possible Negative Legal Impacts on Cadastral Work Due to Lack of Perception on Spatial Uncertainty (11389)

Naa Lamkai Quayee-Ballard, Daniel Asenso-Gyambibi, Jonathan Quayee-Ballard and Benedict Asamoah (Ghana): Application of Smart Technologies in Cadastral Surveying of Large Areas in Ghana (11390)

Shen Ying, Wenting Zhang, Meng Wang, Renzhong Guo, Houlei JIA, Cuiping Zhang, Xueye CHEN and Chengpeng Li (China, PR): Regulations and Utilizations for 3D Marine Cadastre in China (11453)

Denis Tabučić, Željko Obradović (Bosnia and Herzegovina) and **Zimic Andja** (Sweden): Digital Transformation of Public Land Administration Services in Federation of Bosnia and Herzegovina (11468)

Ian Harper (Australia), **Virgo Eresta Jaya and Sofyan Khairul Anwar** (Indonesia): Lessons Learnt in Reviewing Technologies Utilised to Improve Capacity and the Spatial Integrity of the "One Map Project" in Indonesia or Other Fit-For-Purpose Land Administration Systems. (11511)

David Elegbede (Nigeria), **Shristi Paudel** (Nepal) and **Syilion Muramira** (Rwanda): Making a Difference Through Volunteering: the Experience of Deploying Young Surveyor Volunteers. (11533)

Marisa Balas (Mozambique), **Chistiaan Lemmen** (Netherlands), **Rosana Albuquerque** (Portugal) and **Isabel Casimiro** (Mozambique): Factors Contributing to Gender Inequality in Land Access and Land Tenure Security in Sub-Saharan Africa: A Literature Review (11673)

Monika Mika, Żanna Stręk and Monika Siejka (Poland): Selected Aspects of Cadastre 2020 Functioning in Poland (11754)

TS09C: LAND USE PLANNING AND MANAGEMENT FED BY SPATIAL ANALYSES

WEDNESDAY, 14 SEPT. 16:30–18:00
VENUE: WALNUT/ACACIA, DOUBLETREE BY HILTON
COMMISSION: 3, 8
CHAIR: DR. UCHENDU EUGENE CHIGBU, NIGERIA
RAPPORTEUR: MS. MARIJEE LOUWSMA, CHAIR FIG COMMISSION 8, NETHERLANDS

Menare Royal Mabakeng, Jennilee Kohima, Laina Alexander and Vanessa Simataa (Namibia): The Emergence of Namibia Openstreetmap Community, Supporting GIS Data Generation for Informal Settlements (11565)

Łukasz Kuzak, Marianna Ulanicka-Raczyńska and Alina Kaczejewska (Poland): The Use of Spatial Data to Identify Land Reserves for Minimising the Negative Effects of COVID-19 Pandemic on the Example of Selected Districts of Warsaw (11661)

Ali El Hussein (USA) and **Ali Sagashya** (Zambia): Image Acquisition Planning and Execution as a Foundation for Strengthening Institutional Services for Municipal Land Management and Planning: Lusaka, Zambia (11684)

Iwan Hermawan, Dhono Nugroho, Halim Wiranata and Audita Widya Astuti (Indonesia): Thematic Geoportal Dashboard Connectivity to Optimize Planning Phase of Trans Sumatera Toll Road (11510)

Ntwala Vanessa Simataa, Laina Alexander, Mario Siukuta, Penehafo Ricardo, Menare Royal Mabakeng, Jennilee Kohima, Malcon Mazambani and Elvena Hayford (Namibia): "Digital Namibia" – a National Geographic Portal for Urban Planning (11552)

Jakub Kaczorowski (Poland): Making Public Transport More Accessible with GIS Location-Allocation Analyses (11722)

Prosper Laari and Gideon Sagoe (Ghana): Regional Reorganisation in Ghana: Implication on Spatial Extent and Proximity to Equitable Access to Critical Public Services (11328)
This is a peer reviewed paper.

Bingxu Hu, Hongjie He (Canada) and **Yiping Chen** (China, PR): AI-Powered Mapping of Land Disturbance Associated with Oil and Gas Resource Development Using Satellite Imagery (11695)

Kurotamuno Peace Jackson, Lawrence Olaniran Olagunju, Godwill Tamunobiekiri Peple and Mohammed Mamman Kabir (Nigeria): Agricultural Land Suitability Study for Rice Farming in Nigeria (11703)

Priscilla Djaba and Djaba Stephen (Ghana): Optimising the Spatial Distribution of Fire Stations in the Urban Sphere, a Case Study of Greater Accra Metropolitan Area, Ghana (11332)

Edward A. A. Kwesi, Rita Sewa Kyere, John K Annan, Comfort Assencher and Kwame Tenadu (Ghana): Landfill Site Suitability Assessment Based on Public and Affected Community Views (11484)

TS09D: GLTN AND FIG YOUNG SURVEYORS VCSP – CONTINUING ON A PATH OF COLLABORATION

WEDNESDAY, 14 SEPT. 16:30–18:00
VENUE: WILLOW, DOUBLETREE BY HILTON
COMMISSION: YS & GLTN
CHAIR: MS. CLAIRE BUXTON, LEAD VCSP, CANADA
RAPPORTEUR: MS. ANGELA OMAMUYOWVI ETUONOVBE, NIGERIA

It is five years since the first Volunteer Community Surveyors were deployed globally and the Volunteer Community Surveyor Program has been continuing in earnest. With many tangible outcomes to report on, the ability for the FIG Young Surveyors Network to continue this outreach program is proven. In the third year of a four-year strategic plan (ending May 2024), the time is right to plan the next upscaling. Big picture thinking requires reflecting, courageous conversation, and debate. At this session you can expect all of these with contributions from GLTN and VCSP team members alongside other partners and mentors to the program. The outcomes of this healthy debate will be combined with feedback from a workshop held during the Young Surveyors Conference. Audience participation will be encouraged.

TS09E: LAWS AND STANDARDS

WEDNESDAY, 14 SEPT. 16:30–18:00

VENUE: LIME/MAPLE, DOUBLETREE BY HILTON

COMMISSION: 9

CHAIR: MR. **PETER R. ACHE**, CHAIR ELECT FIG COMMISSION 9, GERMANY

RAPPORTEUR: MR. **RUUD KATH-MANN**, NETHERLANDS

James Kavanagh and Ben Elder (United Kingdom): Valuation of Unregistered Land Operational Manual – Next Stages (11388)

Albert Fittkau (Germany): Munich Model of “socially Fair Use of Land” Urban Development Contracts as an Instrument for the Creation of Affordable Housing (11528)

Kauko Viitanen and Raisa Harju (Finland): Views on the Needs to Develop the Authorization and Supervision Activities of Real Estate Valuers (11444)

David Hunt (United Kingdom): A Framework for Appraising the Legislation and Implementation of Expropriation for Public Utility in Post-transitional Countries: Full Compensation and the Role of the Valuer (11576)

Andreas Jardin (Germany): Amendment of the “Immobilienwertermittlungsverordnung” (Ordinance on the Valuation of Property) in Germany (11712)

Yeşim Tanrıvermiş and Harun Tanrıvermiş (Türkiye): The Farmland Fragmentation and Assessment of Legal Regulations for the Prevention of Farmland Fragmentation Within the Framework of Land Management in Turkey (11731)

FIG COMMISSION DINNERS

WEDNESDAY, 14 SEPT. 19:30–23:00

VENUE: VARIOUS

To be decided by each commission. Everyone is welcome, please contact the commission chair.

TS09F: FIG PRESIDENTS MEETING

WEDNESDAY, 14 SEPT. 16:30–18:00

VENUE: SYCAMORE/MAGNOLIA/CEDAR, DOUBLETREE BY HILTON

COMMISSION: FIG

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

- By invitation only

TS09G: CONSTRUCTION ECONOMICS AND MANAGEMENT

WEDNESDAY, 14 SEPT. 16:30–18:00

VENUE: POPLAR/ALDER, DOUBLETREE BY HILTON

COMMISSION: 7 & 10

CHAIR: MR. **STAMATIS KOTOUZAS**, WORLD BANK

RAPPORTEUR: DR. **KRZYSZTOF KARSZNIA**, POLAND

Elzbieta Bielecka, Damian Wierzbicki and Olga Matuk (Poland): Automated Building Extraction from Dense LIDAR Data (11343)

Szymon Glinka, Tomasz Owerko and Karolina Tomaszewicz (Poland): Information Exchange Using the Open IFC Format from a Surveyor’s Perspective (11472)

Nikola Vučić, Damir Šantek and Jelena Unger (Croatia): Cadastral surveys of construction areas (11476)

Leikny Gammelmo (Norway): Using KPIs to measure and achieve data quality of cadastral data (11647)

Esther Oluwafolakemi Ola-Ade (Nigeria), **Adetayo Onasosen** (South Africa), **Gbemisola Akinola, Kudirat Ibilola Zakaryyah and Oluwatosin Olorunda** (Nigeria): Remote Working in the Face of the Pandemic: Current Issues, Technological Impacts and Future Implications. (11697)

Sara Bender and Christian Stoy (Germany): Construction Project Management Using Digital Models: Construction Cost Planning in Early Project Phases (11723)

Cornel Paunescu, Valentin Mihalcea and Vlad Paunescu (Romania): Considerations regarding the accuracy of determination of surfaces (11733)

FIG GENERAL ASSEMBLY – SESSION 3

THURSDAY, 15 SEPT. 10:00–13:00

VENUE: BALLROOM, DOUBLETREE BY HILTON

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

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

Results of the elections; wrap up from the Congress week, upcoming conferences; Closing ceremony

FAREWELL RECEPTION, HOSTED BY FIG WORKING WEEK 2023

THURSDAY, 15 SEPT. 13:00–14:30

VENUE: BALLROOM

Delegates are invited to this farewell to the FIG Congress 2022 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 2023 in Orlando, Florida, USA. The reception is hosted by the FIG Working Week 2023.



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THE FIG FOUNDATION

The FIG Foundation is an independent body under the International Federation of Surveyors and has been established for the purpose of raising funds to finance surveying education development projects and supporting young surveyors in order to build a sustainable future.

The FIG Foundation will build a sustainable future by:

- grants and scholarships to projects, for instance to develop curricula for surveying education, training and capacity building, especially in developing countries;
- encouraging research into all disciplines of surveying and to disseminate the results of that research;
- promoting high standards of education and training for surveyors and to facilitate continuing professional development;
- educating people in the disciplines of surveying, particularly in developing countries and countries in transition;

- promoting the use of distance learning, networking, eLearning and knowledge management in 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 Congress you support the FIG Foundation with 10 EUR. Your participation in the Gala Dinner also supports the Foundation. If you would like to give an extra donation contact the FIG Office in room Larch on the first floor.

More information at fig.net/figfoundation.



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THINGS TO SEE AND DO IN WARSAW

Getting to and from the Conference Venues

During the conference there will be a shuttle bus service from the city center to the venue of the Congress. See page 66 for the timetable.

Emergency Services

In emergencies, dial 112 to call police, fire or ambulance.

Getting to Know Warsaw

With Warsaw at the heart of Poland, and Poland at the heart of Europe, it is common meeting place, not only for political and scientific conferences, but also for business and cultural events.

With modern architecture, friendly infrastructure and creative inhabitants – here lies the beating heart of business. But behind the bustle of the business world you can feel the rhythm of the city, try the many and varied tastes of the city's restaurants, stroll along the banks of Vistula or simply get lost in the backstreets and discover something fascinating.

Historical City

During your stay in Warsaw, try to find a little time to visit some of the city's excellent museums and galleries. Stop by the Royal Castle, the Museum of Warsaw, or visit another former royal residence – the Royal Łazienki Museum – located in the most beautiful park in the city. If you haven't been before, take a trip to the Warsaw Rising Museum, dedicated to the heroism of Varsovians and the events of the final months of World War II. The POLIN Museum of the History of Polish Jews will introduce you to the 1,000-year-old history of Polish Jews.

Chopin's City

Fryderyk Chopin is known all around the world as one of the greatest composers and pianists of the 19th century. Warsaw is the city, where Fryderyk grew up and spent his formative years.

The Fryderyk Chopin Museum at Warsaw's Ostrogski Palace is one of the most highly acclaimed modern biographical museums in Europe

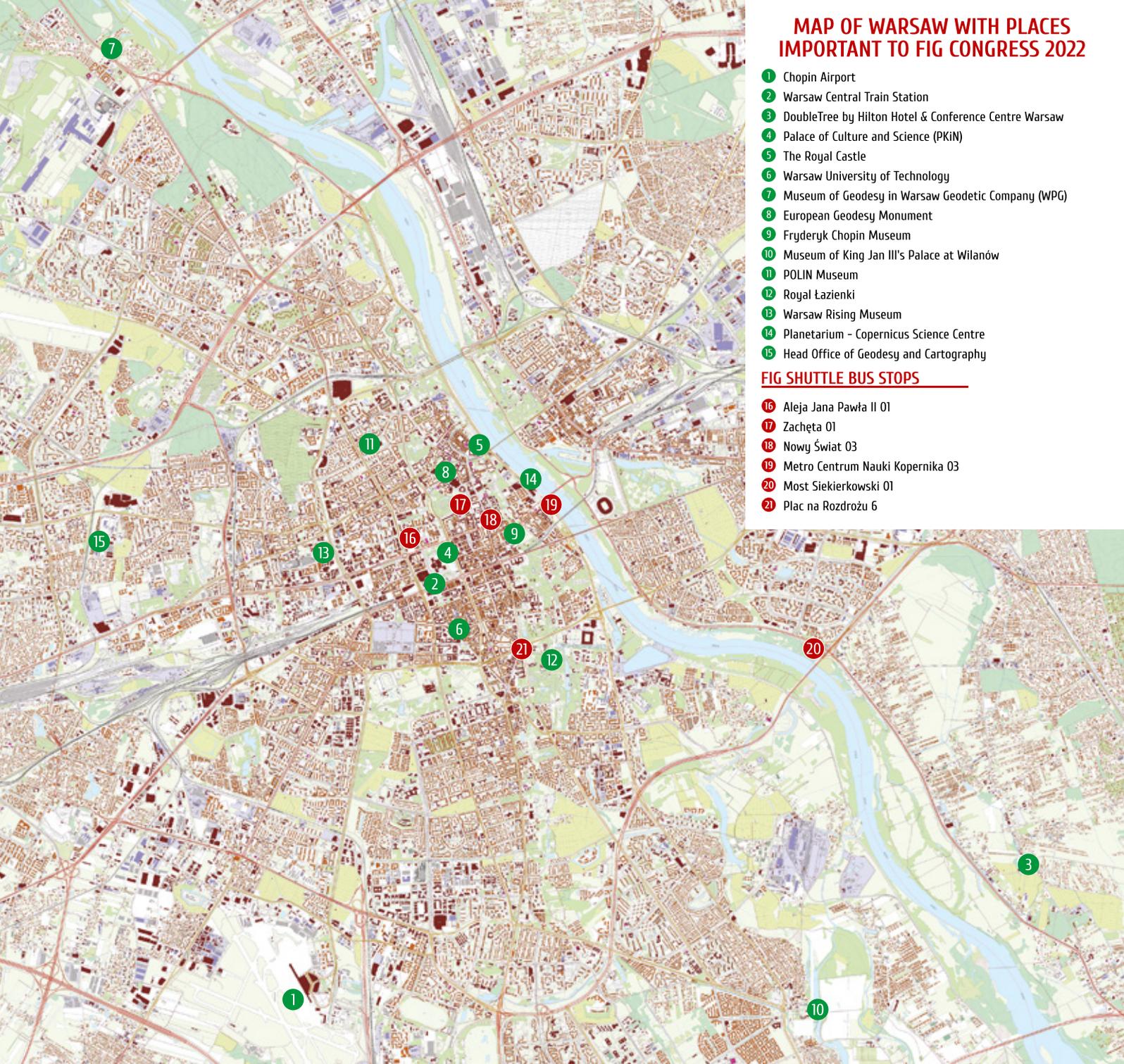
Open-air concerts are held at the feet of the monument to Fryderyk Chopin every Sunday from May until September. Many concerts are organized in the prestigious venues in the city.

MAP OF WARSAW WITH PLACES IMPORTANT TO FIG CONGRESS 2022

- 1 Chopin Airport
- 2 Warsaw Central Train Station
- 3 DoubleTree by Hilton Hotel & Conference Centre Warsaw
- 4 Palace of Culture and Science (PKiN)
- 5 The Royal Castle
- 6 Warsaw University of Technology
- 7 Museum of Geodesy in Warsaw Geodetic Company (WPG)
- 8 European Geodesy Monument
- 9 Fryderyk Chopin Museum
- 10 Museum of King Jan III's Palace at Wilanów
- 11 POLIN Museum
- 12 Royal Łazienki
- 13 Warsaw Rising Museum
- 14 Planetarium - Copernicus Science Centre
- 15 Head Office of Geodesy and Cartography

FIG SHUTTLE BUS STOPS

- 16 Aleja Jana Pawła II 01
- 17 Zachęta 01
- 18 Nowy Świat 03
- 19 Metro Centrum Nauki Kopernika 03
- 20 Most Siekierkowski 01
- 21 Plac na Rozdrożu 6



Green City

Warsaw is a green and refreshing destination with its 346 leafy squares and 96 parks covering a quarter of the city.

The largest and most impressive of these is the Royal Łazienki Park and Palace complex covering 76 ha of parkland in the middle of the city and containing some beautiful architecture.

There is also the incredible green roof of the University Library, one of the largest rooftop gardens in Europe, with a view looking out over the Vistula River and the “PGE Narodowy” Stadium.



Szczorzeszyński | PD, Wikimedia Commons



7th FIG Young Surveyors Conference
Volunteering for the Future: Smart Surveyors for Social Good





YSN Charity Dance: Polonaise and Krakowiak

Beneficiaries:




Put on your dancing shoes and let's learn the basic steps of Polonaise and Krakowiak. The charity dance will be led by the Song and Dance Ensemble of the Warsaw University of Technology. The Artistic Director of the Ensemble, Mr. Jarosław Wojciechowski, along with one of the couples will lead the learning of the dance, with live accompaniment performed by their pianist Krzysztof Kozłowski.

Proceeds from the charity event will go to the FIG YSN's Volunteer Community Surveyor Programme, and the FIG Foundation

**Sunday 11th
September 2022**

11:00 - 12:00
Maple-Lime room

Cost: 10 Euros per person, and you'll get a souvenir!



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Filip Kwiatkowski Muzeum Geologiczne



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Shuttle Bus Warsaw City Center – Double Tree by Hilton Hotel & Congress Center

SUN – 11/09/2022	Congress venue Double Tree	V Hotel Warsaw Most Siekierkowski 02	Palace of Culture & Science / Hotels Dworzec Centralny 14	Warsaw Rising Museum	Chopin Airport Arrivals						
Departure time	10:45	10:53	11:02	11:15	11:45						
	12:30	12:38	12:47		13:12						
	13:50	13:58	14:07		14:32						
SUN – 11/09/2022	Congress venue Double Tree	V Hotel Warsaw Most Siekierkowski 02	Łazienki Królewskie Plac Na Rozdrożu 6	Palace of Culture & Science / Hotels Dworzec Centralny 14	Grzybowski Square / Hotels Aleja Jana Pawła II 01	Old Town / Castle Square / Hotels Zachęta 01	Chopin Museum Nowy Swiat 03	Centrum Nauki Kopernik Metro Centrum Nauki Kopernik 03	V Hotel Warsaw Most Siekierkowski 1	Congress venue Double Tree	
	8 min (5 km)	9 min (5,5 km)	10 min (3 km)	4 min (1,1 km)	4 min (1 km)	4 min (1,4 km)	4 min (1 km)	10 min (6 km)	7 min (5,1 km)	0 min (0 m)	
Departure time	15:20	15:28	15:37	15:47	15:51	15:55	15:59	16:03	16:13	16:20	
	16:20	16:28	16:37	16:47	16:51	16:55	16:59	17:03	17:13	17:20	
	17:50	17:58	18:07	18:17	18:21	18:25	18:29	18:33	18:43	18:50	
	19:20	19:28	19:37	19:47	19:51	19:55	19:59	20:03	20:13	20:20	
	20:50	20:58	21:07	21:17	21:21	21:25					
MON/TUE/WED 12–14/09/2022	Congress venue Double Tree	V Hotel Warsaw Most Siekierkowski 02	Łazienki Królewskie Plac Na Rozdrożu 6	Palace of Culture & Science / Hotels Dworzec Centralny 14	Grzybowski Square / Hotels Aleja Jana Pawła II 01	Old Town / Castle Square / Hotels Zachęta 01	Chopin Museum Nowy Swiat 03	Centrum Nauki Kopernik Metro Centrum Nauki Kopernik 03	V Hotel Warsaw Most Siekierkowski 1	Congress venue Double Tree	
	8 min (5 km)	9 min (5,5 km)	10 min (3 km)	4 min (1,1 km)	4 min (1 km)	4 min (1,4 km)	4 min (1 km)	10 min (6 km)	7 min (5,1 km)	0 min (0 m)	
Departure time				7:00	7:06	7:11	7:15	7:19	7:29	7:36	
	7:50	7:58	8:07	8:17	8:21	8:25	8:29	8:33	8:43	8:50	
	9:20	9:28	9:37	9:47	9:51	9:55	9:59	10:03	10:13	10:20	
	10:50	10:58	11:07	11:17	11:21	11:25	11:29	11:33	11:43	11:50	
	13:50	13:58	14:07	14:17	14:21	14:25	14:29	14:33	14:43	14:50	
	15:20	15:28	15:37	15:47	15:51	15:55	15:59	16:03	16:13	16:20	
	16:50	16:58	17:07	17:17	17:21	17:25	17:29	17:33	17:43	17:50	
	18:20	18:28	18:37	18:47	18:51	18:55					
TUE – 13/09/2022	Double Tree			Politechnika Warszawska				Centrum Nauki Kopernik		Double Tree	
Departure time	10:00							10:15		–	
	18:45			19:15						–	
	19:00			19:30						–	
	–			22:00						22:20	
	–			22:30						22:50	
	–			23:00						23:20	
	–			23:30						23:50	
THU – 15/09/2022	Congress venue Double Tree	V Hotel Warsaw Most Siekierkowski 02	Łazienki Królewskie Plac Na Rozdrożu 6	Palace of Culture & Science / Hotels Dworzec Centralny 14	Grzybowski Square / Hotels Aleja Jana Pawła II 01	Old Town / Castle Square / Hotels Zachęta 01	Chopin Museum Nowy Swiat 03	Centrum Nauki Kopernik Metro Centrum Nauki Kopernik 03	V Hotel Warsaw Most Siekierkowski 1	Congress venue Double Tree	
	8 min (5 km)	9 min (5,5 km)	10 min (3 km)	4 min (1,1 km)	4 min (1 km)	4 min (1,4 km)	4 min (1 km)	10 min (6 km)	7 min (5,1 km)	0 min (0 m)	
Departure time				8:15	8:19	8:23	8:27	8:31	8:41	8:48	
	9:20	9:28	9:37	9:47	9:51	9:55	9:59	10:03	10:13	10:20	
	13:20	13:28	13:37	13:47	13:51	13:55	13:59	14:03	14:13	14:20	
	14:50	14:58	15:07	15:17	15:21	15:25					



Surveying Basics

Crossword Puzzle



Across

- Professional Land Surveyor
- Optical survey instrument
- Vertical angle
- Survey glass
- Detailed record of real estate and property
- Survey mark
- Satellite-based survey equipment
- Elevation reference point
- Survey pole
- Horizontal angles

Down

- Network adjustment method
- Wooden survey stake
- Boundary reference point
- Survey legs
- Small wooden survey reference point
- Survey with elevations
- Locate known coordinates
- Trimble Office Software



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FIG Working Week 2024

Accra, Ghana | MAY, 2024



**BUILDING RESILIENT ENVIRONMENT:
SURVEYORS INNOVATION FIT FOR FUTURE**



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FIG Working Week 2025

Brisbane, Australia | 1-5 June



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FIG XXVIII Congress 2026

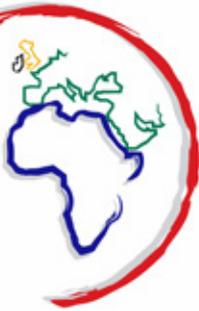
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The South African Geomatics Institute (SAGI)



May 2026



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