



International
Association
of Oil & Gas
Producers



Geomatics
Committee



Geomatics in Digital – Pioneering Digital Transformation in Energy

IOGP / Chevron / TotalEnergies 13th Geomatics Industry Day

10th-11th December 2024 [online event]

REGISTER

As the energy sector continues its digital transformation, the role of geomatics has never been more crucial. Geomatics is at the forefront of integrating geospatial data with innovative digital solutions which in turn supports the drive for safe, efficient and sustainable operations.

Geomatics already provides a robust set of digital tools and techniques that is revolutionizing how the energy industry operates. By enabling data acquisition, through advanced survey and geophysics equipment, geomatics serves as a key driver of the digital transformation. Seamlessly collected data feeds into geodetically coherent geospatial databases, which are increasingly connected to critical asset-operating applications. This integration facilitates the use of digital tools such as Digital Twins and Smart Rooms. The ability of the geomatics industry to efficiently measure, manage, transform, and visualize geospatial data - from the depths of our oceans to outer space - not only streamlines operations and enhances business decisions, but also supports sustainability goals. This makes geomatics indispensable and enticing in the modern, digital energy landscape.

The 13th Geomatics Industry Day will be co-hosted by IOGP, Chevron, and TotalEnergies. The focus of this year's event will be the role that Geomatics plays in Digital, through enabling Geospatial Data Visualization, Mapping and Analysis, embedding Machine Learning & Artificial Intelligence, developing Remote Operations, Robotics & Autonomy (RORA) and exploring emerging digital trends in geomatics.

The event will comprise two half-day sessions, split into two parts:

Day 1 (10th December 2024)

Theme 1: Spatial Visualization and Analysis

This session will focus on the use of advanced geospatial visualization techniques and analysis, that provide enhanced situational awareness and decision-making capabilities.

Theme 2: Application of Machine Learning/ Artificial Intelligence

This session will highlight the growing importance of machine learning and artificial intelligence in analyzing geospatial data (incl. GIS visualization & Remote Sensing imagery), enabling predictive insights into environmental impact, asset management, and operational optimization.

Day 2 (11th December 2024)

Theme 3: Remote Operations, Robotics & Autonomy

This session will showcase the role of remote operations, robotics, and autonomous systems in performing complex tasks in challenging environments, significantly enhancing safety, data quality and operational efficiency.

Theme 4: Future trends of Geomatics

The last session will investigate emerging digital trends that will define the future of geomatics, focusing on the drivers of cost efficiency, climate action, and safer operations.

For more information, please contact the Geomatics Committee Manager, Lucyna Kryła-Straszewska, at lks@iogp.org.



International
Association
of Oil & Gas
Producers



Geomatics
Committee



10th December 2024 – Agenda

TIME	PRESENTATION TITLE	SPEAKER	COMPANY
DAY 1 PART 1			
12:15 - 12:20	Welcome	Yen Puasa	IOGP Geomatics C. Chair, Shell
12:20 - 12:30	Word from IOGP Engineering Director	Sajeev Menon	IOGP Engineering Director
12:30 - 12:45	Introduction to IOGP Geomatics Committee	Yen Puasa	IOGP Geomatics C. Chair, Shell
12:45 - 12:50	Setting the scene for Day 1	Damian Ling	Chapter Manager – Geomatics, Geotechnical & Metocean, Chevron
12:50 - 13:10	Geomatics on the front line: refactoring the Common Operating Picture for modern crisis response	Josh Townsend	Geospatial Squad Lead, bp
13:10 - 13:30	Geo-digitalization of emergency response process in Saudi Aramco	Hussein Al-Mashouq	Geomatics Specialist, Saudi Aramco
13:30 - 13:50	SIMOPS vessel scheduling – GIS project management tool	Martin Berry	Global Data Solutions & Delivery Manager, Subsea 7
13:50 - 14:10	Geomatics' Contribution to Offshore CCS Project on Sunda-Asri Basin	Puguh Sarwanto	Lead Specialist Innovation Geomatics, Pertamina
14:10 - 14:30	Scaling Geospatial Data for AI Anomaly Detection and Computer Vision Asset Identification with Chevron Atlas	Steve Huerta	Product Manager - Enterprise Geospatial, Chevron
14:30 - 14:45	Discussion	Damian Ling	Chapter Manager – Geomatics, Geotechnical & Metocean, Chevron
14:45 - 15:15	BREAK		
DAY 1 PART 2			
15:15 - 15:20	Welcome	Damian Ling	Chapter Manager – Geomatics, Geotechnical & Metocean, Chevron
15:20 - 15:35	Keynote speech: Digital Twin and Geomatics: A Foundation for Work Transformation at Chevron	Seth Taylor	Digital Twin Technical Advisor, Chevron
15:35 - 15:55	Innovating Geomatics: Leveraging Deep Learning for Sustainable Energy Operations	Ainel Satken	Geographical Information Management Advisor, NCOC
15:55 - 16:15	Revolutionizing Oil & Gas with GeoAI: Enhancing autonomy in geospatial analysis	Frank de Morsier	COO & Co-founder, Picterra
16:15 - 16:35	Enhancing Subsea Surveys with AI: Active Learning and Simulator-Driven Techniques	Yury Brodskiy, Mike Gallol	R&D Lead, Robotics & AI, EIVA / Business Development Manager - Subsea Robotics & A, EIVA
16:35 - 16:55	Harnessing AI and Geospatial Data for Energy Asset Monitoring: Practical Insights from the Field	Lucy Kennedy	CEO and Co-Founder, Spottitt
16:55 - 17:15	Transforming Legacy Subsurface Data into Actionable Insights Using AI-Driven Digital Solutions	Romain Clavaud	GDI Director, Fugro
17:15 - 17:35	Digital engineering (and data science) to optimise design and operation of marine infrastructure	Arthur Filoche, Jeff Hansen, Marzieh Derkani	University Western Australia
17:35 - 17:50	Discussion	Damian Ling	Chapter Manager – Geomatics, Geotechnical & Metocean, Chevron
17:50 - 18:00	Closing remarks and adjourn for Day 1	Yen Puasa	IOGP Geomatics C. Chair, Shell

11th December 2024 – Agenda

TIME	PRESENTATION TITLE	SPEAKER	COMPANY
DAY 2 PART 1			
12:15 - 12:20	Welcome	Yen Puasa	IOGP Geomatics C. Chair, Shell
12:20 - 12:35	Word from IOGP Digital Transformation Committee Chair	Rob Kelly	IOGP Digital Transformation C. Chair, vp digital Asset Management Technology, bp
12:35 - 13:05	Keynote speech: Unleashing Geomatics-Enabled Data Product Innovation	Mick Bass	Vice President, 47Lining, Hitachi Digital Services
13:05 - 13:10	Setting the scene for Day 2	Arnaud Vidal	Head of Geospatial, TotalEnergies
13:10 - 13:30	Spatio-Temporal Enhancement of Offshore Tidal Measurements Using Satellite Altimetry in Energy Industry Applications	Kristiawan Tri Nugroho	Staff - Geomatics Operations, Petronas
13:30 - 13:50	Qualification Testing Results for the Aquanaut Vehicle	John Yamokoski	Chief Technology Officer, Nauticus Robotics
13:50 - 14:10	Our Journey to Simplification - MASS Pilot in Nigeria	Olajide Fagbewesa	Project Surveyor, Shell Companies in Nigeria (SciN)
14:10 - 14:30	Changing the Geomatics Landscape through Fast Digital Inspection	Simon Manser	Senior Subsea Survey Engineer, Chevron
14:30 - 14:50	Enhancing Operational Efficiency and Safety: Situational Awareness Applications Developed by NCOC	Anuar Ospanov	Geographical Information Management Advisor, NCOC
14:50 - 15:00	Discussion	Arnaud Vidal	Head of Geospatial, TotalEnergies
15:00 - 15:30	BREAK		
DAY 2 PART 2			
15:30 - 15:35	Welcome	Arnaud Vidal	Head of Geospatial, TotalEnergies
15:35 - 15:50	Keynote speech: Earth Observation for Low Carbon and Sustainable Energy Production in a Multi-Energy Company	Melanie Plainchault	Head of Digital Hub R&D team, TotalEnergies
15:50 - 16:10	Challenges of Digital Transformation in the Oil & Gas Sector: Data Management, Standards Update, and Integration of BIM and Digital FM Technologies	Szymon Bloch	CEO – Digital Transformation Expert, Scan 3D
16:10 - 16:30	Deployment of 3D Reality Capture Solutions at Every Scale of TotalEnergies	Simon Olive	Survey Engineer, Total Energies
16:30 - 16:50	Earth Observation for Energy: An Overview of Market Trends, Technologies, and Applications	Aravind Ravichandran	Founder & CEO, TerraWatch Space
16:50 - 17:10	Ambitious Methane Emission Reduction Goals and Monitoring Strategies	S��verine Fougeirol	Remote Sensing Engineer, TotalEnergies
17:10 - 17:30	Loggerhead: An Uncrewed Robotic System for Over the Horizon Survey, Inspection and Maintenance	Chris Sotzing	Head of Software and Autonomy, HonuWorx
17:30 - 17:45	Discussion	Arnaud Vidal	Head of Geospatial, TotalEnergies
17:45 - 17:50	Closing remarks	Yen Puasa	IOGP Geomatics C. Chair, Shell



Welcome



Yen Puasa

IOGP Geomatics Chair

Welcome to the 13th IOGP Geomatics Industry Day. This year's theme is "Geomatics in Digital – Pioneering Digital Transformation in Energy."

Geomatics continues to play a pivotal role in supporting oil and gas activities and the energy transition, by enabling accurate and trusted data, improving safe and efficient operations, and supporting a lower carbon future. We offer crucial support for the energy business of today and tomorrow.

IOGP is honored to co-host 2024 event with Chevron & TotalEnergies, to share examples of how Geomatics capabilities and ways of working are continuously evolving along with the digital transformation in our Energy Industry. The focus of this year's event will be the role that Geomatics plays in Digital, through enabling Geospatial Data Visualization, Mapping and Analysis, embedding Machine Learning & Artificial Intelligence, developing Remote Operations, Robotics & Autonomy (RORA) and exploring emerging digital trends.

These digital solutions help reduce the industry carbon and HSSE footprints, deliver more cost-effective solutions, and extract more value from our data. Throughout the Industry Day, we have a great line up of technical papers that will speak to this from our member companies, service providers and academic institutions. The intent is to raise awareness and keep abreast of relevant technologies that support safe and efficient survey operations. We also hope to share insights in the development of Artificial Intelligence and Machine Learning in data extraction, automated cleaning, processing, integration and interpretation of seabed, asset inspection and other geospatial datasets.

I would like to thank all the speakers, participants, and organizers, for your time and contributions in making this Industry Day possible. Your efforts are invaluable to the success of this forum, and I hope you will be able to take away some valuable learnings and new insights from these two days.



Organizing Committee



Zurinah Yen Puasa, Geomatics Committee Chair, Shell

Yen has over 30 years with Shell in Upstream conventional and unconventional businesses, and also providing support for downstream and renewable energy.

She joined Shell in 1991 directly from high-school, and awarded in-service scholarships from Brunei Shell to obtaining a degree in Surveying from Newcastle university in 1995 and a Masters in Remote Sensing from University College London in 1998. She started in Mapping & GIS and later created the Remote Sensing section in BSP before embarking on her first international career in the North Sea as Portfolio Advisor and Project Surveyor in 2001. Until 2014, Yen held various global discipline and regional leadership roles of increasing seniority in Shell International and Asia Pacific Region, and further broadened as a Development Planner for Integrated Gas in Shell Technology Center Bangalore. At this point Yen was focusing on driving decision quality for Shell Integrated Gas projects in Sakhalin and Australia.

Yen returned to lead Geomatics Hub team in the Americas, before taking her current role as Geomatics manager in Shell Global Solutions B.V, providing geospatial solutions for Subsurface and Integrated gas Growth team in Europe, Nature Base Solutions and Renewable Energy business. She took on the IOGP Geomatics Committee Chair role in 2022. Born in Brunei, Yen is a single parent of her 15 year old son. Outside work, Yen loves spending time with her friends and family and investing time in her passion for travelling and seeing the world.



Walter Jardine, Geomatics Committee Vice-Chair

Walter Jardine, Geomatics Committee Vice-Chair Walter Jardine has over 30 years' experience in providing survey & positioning and geospatial information management support across the full exploration & production field life cycle. This has included support to land and marine seismic operations; site and route survey acquisition; rig and well positioning; many facets of project construction, installation and decommissioning; asset integrity management; and operations support & mapping.

Prior to retiring in October 2020, Walter provided 20 years of resident survey and positioning operations support and management for bp in the North Sea, Trinidad and Azerbaijan, before taking up bp's Global Survey Authority role in 2014. Prior to joining bp, Walter worked as a land and offshore survey contractor for 12 years, including stints in many corners of the world. He is currently Vice-Chair of the IOGP Geomatics Committee, having chaired the committee between 2016 and 2019. Walter has an honours degree in physical Geography, and diploma and masters degree in Surveying, and was chartered in 1992 (RICS).



Arnaud Vidal, Head of Geospatial, TotalEnergies

Arnaud Vidal is a seasoned expert in Geospatial technology, currently serving as the global Head of Geospatial at TotalEnergies. With over 20 years of experience in the oil and energy sector, Arnaud has built a distinguished career characterized by his technical prowess and strategic leadership.

After earning an engineering degree in Geodesy & Topography from INSA Strasbourg in France, Arnaud began his career with Fugro, where he specialized in data acquisition and geodesy for the energy sector. His expertise soon led him to TotalEnergies, where he has held various key positions, including Senior Surveyor and Head of Geomatics. In these roles, he gained deep experience in marine and subsea survey operations, pipeline routing, and GIS data management.

As Head of Maps and Technical Data for Exploration in HQ, Arnaud led the first implementation of the OSDU standard at TotalEnergies, showcasing his ability to drive digital transformation. Since 2021, he has led a multidisciplinary team within TotalEnergies' OneTech branch, providing cutting-edge Geospatial solutions across the energy sector, covering geodesy, surveying & reality capture, GIS and Remote Sensing.

Arnaud's career is marked by a commitment to innovation, precision, and collaboration. He is passionate about the potential of Geospatial technology to advance the energy industry, particularly through the integration of AI and machine learning. His leadership continues to inspire advancements in Geospatial applications, ensuring TotalEnergies remains at the forefront of the industry.



Organizing Committee



Damian Ling, Chapter Manager – Geomatics, Geotechnical & Metocean, Chevron

I am a Chapter Manager at Chevron's Technology Centre (CTC), the industry's first integrated technology company focused on supporting upstream major capital projects and Research & Development. CTC provides leading-edge solutions that differentiate performance and position Chevron to compete in the future energy landscape. In this role, I lead a small team of technical experts who work with the base business and upstream growth segments to provide expert solutions. As part of my role as a technical leader, I also engage with emerging technology within the subsea space by participating in special research and technology development assignments. One of our more exciting technology development assignments involves collaborating within an industry alliance to develop autonomous vehicles.

Before joining Chevron, I worked for two survey companies — DOF Subsea and InterMoor Marine Services — and was fortunate enough to work with many tier 1 contractors and small operators. Achievements in my previous roles included negotiating a multiyear international master service agreement with my primary client.

I am truly passionate about my work and always eager to connect with other hydrographic surveyors. While I enjoy all aspects of my job, my favourite stage of a project is collaborating with our EPIC contractors to devise and implement innovative solutions via the application of emerging subsea technology.

I hold an MBA in Oil and Gas from Robert Gordon University and a BSc in Surveying & Land information from the University of the West Indies.



Lucyna Kryla-Straszewska, Principal Manager, Digital and Geomatics, IOGP

Lucy Kryla-Straszewska holds a Masters in Physical Oceanography, is a GIS (geographic information system) specialist, and has over 10 years of international project management experience.

She joined IOGP in 2012, and managed both the Geomatics and Metocean Committees and over twenty of their global subject matter expert teams until 2022.

She has been recently appointed to provide support to newly established Digital Transformation Committee. Lucy served as a company representative for a number of global forums within educational, energy, geospatial and defence industries.



Keynote speakers



Mick Bass, Vice President, 47Lining, Hitachi Digital Services

Mick has more than 30 years of experience in the design of distributed systems, as well as the definition, build, and launch of managed service platforms most recently focused in the energy industry. During his career, he's held multiple executive positions at technology and consulting firms and is focused on helping enterprise customers generate value by aligning industrial process optimization services and capabilities with high-value business problems. Mick holds BS in Computer Engineering, University of Illinois, MS in Management of Technology, MIT and is AWS Professional-Level Certified Solutions Architect.



Robert David Kelly, Ph.D., VP Digital Product, Asset Management, bp

Rob was appointed Vice President, Digital Production & Projects in bp's Innovation & Engineering organization in January 2021 as part of the 'Reinventing bp' re-organization. In January 2022 the bp Refineries were added to his portfolio, and then in January 2023 the digital support to Subsurface, Wells and Low Carbon Energy businesses. He is based in Houston, with accountability to deliver Digital Transformation across bp's Production & Operations and Gas & Low Carbon Energy entities.

Rob's previous role was Head of bp's Upstream Digital Organization from 2019 to 2020, with accountability for shaping and delivering bp's Upstream digital transformation.

From 2011 to 2019 Rob was VP Technical Functions for bp's Global Projects Organization, with accountability for all engineering and project controls resources in major projects, ownership of the project common process and verifying it's use in BP's major projects portfolio.

From 2001 to 2011, Rob led a number of Projects of increasing scale and complexity in Azerbaijan (Shah Deniz), Colombia (GTL), North Sea (Glen Lyon and Clair Ridge) and Algeria (In Salah and In Amenas).

Rob has 36 years industry experience, joining bp straight from college in 1988. His career has spanned a variety of roles world-wide including digital, logistics, commercial, operations, project management, joint venture management and strategy in London, Aberdeen, Grangemouth, Teesside, Jakarta, Baku, Houston and Bogota. Rob has a first-class honors BSc in Chemistry and a PhD in Organometallic Chemistry, both from Imperial College, London. He is a member of the Royal Society of Chemistry and an associate of the Royal College of Science.

Rob lives in Houston and is married to Fransisca, with a daughter (Jennifer – aged 25) and a son (James – aged 21).



Seth Taylor, Product Owner of Geospatial Asset Integrity, Chevron

Seth Taylor is Digital Twin Technical Advisor at Chevron Technical Center, where he supports enterprise activities to develop and deliver digital twin solutions to Chevron's global operating assets. As Smart Facilities Program Manager since 2015, he worked closely with Chevron's Upstream and Downstream business units to accelerate asset digitization via digital capture, 3D visualization, equipment analytics, and scalable data integration. His team's work in this space helped to establish the technical foundation for subsequent digital twin implementations across Chevron. Seth holds a PhD in Engineering from the University of California, Berkeley and has worked in technology development and deployment for over 20 years, including prior positions with General Electric and Northrop Grumman. He joined Chevron in 2012 and is currently based in El Segundo, California.



Melanie Plainchault, Head of Digital Hub R&D team, TotalEnergies

After a PhD dedicated to wireless communication systems for Mistubishi Electric and Telecom ParisTech, a few years at Direction Generale de l'Armement, Melanie joined TotalEnergies ten years ago as a software developer. Willing to go back to research, she took the opportunity in 2019 to lead a project dedicated to high performance scientific visualization. In 2021, she became the head of the R&D Digital Hub leading actions from atomic scale modeling up to satellite images analysis.



International
Association
of Oil & Gas
Producers



Geomatics
Committee



Theme 1 – Spatial Visualization and Analysis

Geomatics on the front line: refactoring the Common Operating Picture for modern crisis response

Josh Townsend, Geospatial Squad Lead, bp

This presentation demonstrates how the latest geospatial technologies have been employed to create a modern, high-performance, and robust Common Operating Picture for crisis response in an international energy company. Building on guidance from the original IOGP/Ipieca Work Pack 5 guidance, the framework has been internally adapted and updated to align with digital innovation and emergency management practices. This has led to the potential revision of the publication. This presentation showcases the important role that Geomatics plays in delivering spatial analytics and situational awareness for safety-critical response operations.

Geo-digitalization of emergency response process in Saudi Aramco

Hussein Al-Mashouq, Geomatics Specialist, Saudi Aramco

The presentation showcases geomatics contributions to a newly deployed centralized Computer-Aided Dispatching (CAD) solution. The result has digitally transformed Saudi Aramco's emergency response process, and facilitated centralized dispatch of support for oil & gas field units across the kingdom of Saudi Arabia.

This presentation elaborates on the challenges of implementing the CAD system over an extensive geographical area, compared with a single smart-city installation for example at a local public-safety answering point (PSAP).

Technical details include: i. Integration of information via interoperable web mapping services, including location intelligence to accurately locate emergency calls onshore and offshore. (e.g. spatial addressing, up-to-date base mapping information, points of interest, and building information); ii. Designing the system operating model using geospatial analysis (hexagonal gridding / hotspot mapping) to determine CAD mobile application network coverage used by emergency response field units in their assigned zones.

SIMOPS vessel scheduling – GIS project management tool

Martin Berry, Global Data Solutions & Delivery Manager, Subsea7

For several years, Subsea7 Project teams have utilized a web-based GIS visualization tool to optimize and simulate vessel scheduling during project execution. Developed by the GIS and Data Solutions group, various geospatial analysis tools and improvements support more predictable project performance, compared with conventional off-the-shelf systems.

Project Managers and clients coordinating complex, multi-year operations can better analyse and predict the potential impact of vessel proximity (SIMOPS) and/or inactivity. By integrating geographical data with project schedules, the tool simulates vessel movement and can monitor non-project vessels in real time.

Independent project teams can address conflict alerts to optimize operational efficiency and mitigate uncertainty. Historically, significant effort was required to manually re-format schedule change data for the GIS.

In 2024, the solution was significantly enhanced, including allowing Microsoft Project data to be imported and linked rapidly to proposed subsea infrastructure locations, reducing data updates from weeks to under an hour. Third-party data can also now be added, further enhancing the tool's collaboration functionality.



Theme 1 – Spatial Visualization and Analysis

Geomatics' Contribution to Offshore CCS Project on Sunda-Asri Basin

Puguh Sarwanto, Lead Specialist Innovation Geomatics, Pertamina

Pertamina is planning a Carbon Capture and Storage (CCS) project in the Karimata Strait. An effective Measurement, Monitoring and Verification plan (MMV) is required to address key site-based CO₂ injection and storage assurance risks and comply with regulatory requirements. As recommended by IOGP, geomatics is playing its role in the process of setting MMV goals, and then executing the MMV programme throughout the life cycle. This includes the following tasks: i. ensuring the geodetic integrity of seismic data; ii. providing marine geohazard data to support shallow drilling hazard assessment; iii. supporting positioning aspects of the drilling program; iv. delivering geospatial visualisation and analysis, using Machine Learning and Geo-AI tools where appropriate; v. All this supports suitable decision-making for the initial drilling, injection and containment programme and then ongoing inputs to geological integrity monitoring of the storage complex, plume migration, and results distribution to the buyer.

This presentation underlines the pivotal role geomatics plays in CCS projects, supporting the industry in achieving sustainability and greenhouse gas (GHG) emission targets. The presentation has been developed by early-career geomatics personnel, which in turn supports future sustainability.

Scaling Geospatial Data for AI Anomaly Detection and Computer Vision Asset Identification with Chevron Atlas

Steve Huerta, Product Manager - Enterprise Geospatial, Chevron

Specialists across Chevron collect and manage rich media including images and videos, to support facility and operations management. Example use cases include refinery drone and robotic inspections, satellite monitoring of sensitive habitats, and LiDAR for methane detection. As technology advances and data collection accelerates, Chevron's volume of unstructured media has surged.

Traditionally such data is stored locally, with inconsistent metadata, hindering discovery and sharing. Chevron Atlas addresses this challenge by applying ingestion, storage and cataloguing standards to ensure discoverability. Interoperable APIs, mapping tools, and SDKs enable AI-driven insights which promote autonomous operations, enhanced safety, reduced environmental impact, and improved efficiency.

The Atlas enterprise solution accesses geospatial data with scaled analytics for object and change detection, image classification, labelling, and asset visualization. APIs standardize remotely acquired data within Chevron's data lake. Using open-source OGC standards like 3D Tiles and SpatioTemporal Asset Catalog (STAC), Atlas facilitates the creation of Digital Twins and advanced AI analytics, driving daily operations and autonomous systems.



International
Association
of Oil & Gas
Producers



Geomatics
Committee



Theme 2 – Application of Machine Learning/ Artificial Intelligence

Innovating Geomatics: Leveraging Deep Learning for Sustainable Energy Operations

Ainel Satken, Geographical Information Management Advisor, NCOC

This presentation highlights how the NCOC Geomatics/GIM team is integrating transformative GIS technologies and digital solutions with satellite imagery to digitalize work process and thus enhance safe, efficient, and sustainable operations. Example use cases discussed are as follows: i. As water levels decline, coastline detection is crucial for addressing marine safety and logistical challenges in the Caspian Sea. In the Northern part of Caspian Sea, non-commercial satellite imagery and deep learning technology aid coastline analysis for development planning; ii. Caspian seal survey outputs processing is automated by the GIM team, improving productivity and accuracy in both counting, and classifying pups and adults; iii. The GIM team digitalizes legacy geological maps of variable and challenging quality, using deep learning technology to create accurate features and digital models for analysis.

Field road detection can identify unauthorized entry and optimize patrol routes using high-resolution commercial imagery, with one particular advantage being coverage in previously inaccessible locations.

Revolutionizing Oil & Gas with GeoAI: Enhancing autonomy in geospatial analysis

Frank de Morsier, COO & Co-founder, Picterra

The O&G industry is at a pivotal moment, where the capacity to manage and analyse geospatial data at scale can profoundly impact operational efficiency, environmental sustainability, and safety standards. Geo-AI represents a major advance, transforming data usage and unlocking critical insights into physical assets.

Picterra's geoAI platform is a fully productised solution that transforms geospatial data management through the full field lifecycle, allowing decentralised access to geospatial analysis tools autonomously across teams and regions, and integration of geospatial intelligence into operations, without extensive data science expertise.

This autonomy enables streamlined workflows and decision making across a variety of use cases. Several practical use cases are explored, using environmental impact monitoring as an example: analysis of vegetation and deforestation or afforestation for nature-based solutions (NBS), monitoring of rehabilitation efforts, supporting carbon removal initiatives, conducting fire risk assessments, and operations optimization and risk management – e.g waterbody detection near critical infrastructure.

Furthermore, a glimpse is offered into some of the latest technology developments, such as change detection and leveraging diverse imagery types and resolution for model training, to illustrate the geoAI platform's versatility and power in real-world applications.

Enhancing Subsea Surveys with AI: Active Learning and Simulator-Driven Techniques

Yury Brodskiy, R&D Lead - Robotics & AI / Mike Gallol, Business Development Manager - Subsea Robotics & A, EIVA

This presentation explores how machine learning and artificial intelligence can enhance subsea survey analysis through active learning and simulator-based approaches. Gathering sufficient training data can be challenging, and labelling data for each new task a model has to learn is time-consuming. EIVA's research demonstrates how simulators can pre-train neural networks in virtual environments, preparing them for real-world subsea operations. This method accelerates training, reduces dependence on large amounts of real-world data, and improves the accuracy and adaptability of AI systems in complex subsea conditions.

Active learning optimizes data usage by selecting the smallest subset of data required to achieve performance comparable to models trained on full datasets. Using a Monte Carlo dropout technique, this approach reduces unnecessary labelling and highlights the limitations of neural networks in new environments. It allows users to ensure high-quality analysis and initiate model retraining when necessary. By giving users direct control over machine learning models, active learning enables more precise semantic analysis of large-scale survey data.

In summary, integrating active learning with simulator-based training reduces data requirements, while ensuring AI models retain high performance and adaptability. This enhances confidence in applying AI, allows better training and handling of real-world conditions, and can deliver more robust and accurate survey results.



International
Association
of Oil & Gas
Producers



Geomatics
Committee



Theme 2 – Application of Machine Learning/ Artificial Intelligence

Harnessing AI and Geospatial Data for Energy Asset Monitoring: Practical Insights from the Field

Lucy Kennedy, CEO and Co-Founder, Spottitt

As the energy sector undergoes digital transformation, integrating geospatial data is revolutionizing infrastructure monitoring and maintenance. This presentation provides practical insights on how asset monitoring and operational efficiency may be enhanced through the integration of AI with satellite imagery and other remotely sensed data.

Presentation topics include: i. best practices for incorporating complex geospatial data within asset monitoring workflows; ii. common use cases, technical limitations and strategies to maximize geospatial analytics value; iii. recent advances in sensor resolution and pricing models and how this influences monitoring capability; iv. managing AI limitations and accuracies and aligning with legislative requirements.

Spottitt's experience has been gained through collaboration with numerous energy companies globally. Machine learning algorithms automate data analysis, enabling rapid identification of risks such as vegetation encroachment, climate-induced asset vulnerability, land movement and construction hazards. This flexibility allows for customized monitoring strategies, resulting in more reliable infrastructure, greater climate resilience, better alignment with right-of-way policies and regulatory compliance.

Transforming Legacy Subsurface Data into Actionable Insights Using AI-Driven Digital Solutions

Romain Clavaud, GDI Director, Fugro

As the O&G industry transitions, the focus has predominantly been on subsurface reservoir conditions. While these efforts can optimize production and maximizing returns, digitalizing the management of surface-level, man-made assets interacting with natural forces (e.g. ground, waves, and environmental conditions)—remains underexplored. These interactions significantly impact asset design, construction, and maintenance.

Considerable legacy data (platform, pipeline, refinery and processing plant etc.) remains locked in inaccessible formats, limiting its use. The industry's reliance on single use, project-specific data can hamper advanced analytics, predictive maintenance and cross-asset analysis.

This presentation introduces a novel approach to unlocking and leveraging legacy shallow ground data. The first step involves automating legacy PDF data ingestion, into a structured geospatial database. A machine learning algorithm was developed, capable of extracting and digitizing PDF borehole log data, transforming them into actionable datasets. Asset stability and performance can then be examined from a comprehensive 3D ground model created from the data.

This can address structural design challenges, such as foundation behaviour and operational concerns like rig move optimisation and location-specific hazard assessment. Whilst shallow subsurface data is the focus, integration with metocean, environmental, and other datasets presents a powerful opportunity to enhance asset decision-making, predictability, and safety. Unlocking and harnessing legacy data can deliver a more informed, efficient, and sustainable approach to asset management in the O&G industry.



Theme 2 – Application of Machine Learning/ Artificial Intelligence

Digital engineering (and data science) to optimise design and operation of marine infrastructure

Dr Arthur Filoche, Jeff Hansen, Marzieh Derkani, University Western Australia

The Australian Research Council's Industrial Transformation Research Hub for TIDE (Transforming Energy Infrastructure through Digital Engineering) is a collaboration of researchers, operators, contractors, and engineering consultancies. TIDE investigates how data and observation from current and legacy offshore projects can optimize the future design and ongoing operation of marine infrastructure. The study is relevant within both conventional and new energy sectors.

One initiative within TIDE focuses on improving surface wave predictions using data science methods, whereby novel machine learning-based methods are being developed to enhance site-specific spectral wave forecasts and calibrate spectral hindcasts. This involves training a machine learning model on archived spectral forecasts and hindcasts, as well as corresponding buoy observations. A second initiative targets improvement in broad-scale wave forecasts with an emphasis on enhancing the accuracy and reliability of swell predictions through data assimilation techniques, which integrate observational data with numerical model estimates to refine forecast accuracy. Together, this industry focused research seeks to reduce uncertainty in planning and executing a range of offshore operations.



International
Association
of Oil & Gas
Producers



Geomatics
Committee



Theme 3 – Remote Operations, Robotics & Autonomy

Spatio-Temporal Enhancement of Offshore Tidal Measurements Using Satellite Altimetry in Energy Industry Applications

Kristiawan Tri Nugroho, Staff - Geomatics Operations, Petronas

With extensive geospatial coverage and robust time series data on sea surface height, spatio-temporal multi-mission satellite altimetry tidal modelling offers a promising solution to enhance accuracy and reduce variability in various offshore applications. This presentation reviews the current use of satellite altimetry data in oil and gas operations, focussing on the impact in offshore operations.

Recent advances in spatio-temporal tidal measurements are discussed, along with opportunities for further optimization in offshore applications. In oil and gas fields, improvements can enhance the integration of various upstream processes, especially in offshore field development, where tight vertical accuracy is increasingly critical.

Expanded spatial coverage of tidal observations, through satellite altimetry, makes tidal prediction and tidal datum derivation at any offshore location more accessible. Ongoing spatio-temporal refinement studies will further strengthen the reliability and integrity of offshore vertical reference systems.

To support wider adoption, a publicly accessible digital platform, <https://tidalprecision.com>, was developed to maximize benefits and expand implementation across Malaysian waters and nearby regions.

Qualification Testing Results for the Aquanaut Vehicle

John Yamokoski, Chief Technology Officer, Nauticus Robotics

Nauticus Robotics recently completed the qualification program for its novel subsea robotic vehicle, 'Aquanaut', designed to address the energy industry's needs sustainably. Capable of a wide range of missions, including environmental monitoring, benthic surveys, and subsea asset integrity inspection and maintenance, Aquanaut performs tasks tetherlessly with a blend of onboard intelligence and operator supervision.

The qualification program involved rigorous testing under various marine conditions, proving its robustness in both deep-sea and coastal environments. Results demonstrated reliable performance, high quality data accuracy, and extended deployment times which exceeded industry standards for battery-powered vehicles. The success of these tests also validates its platform-agnostic software, ToolKITT, which provides command and control functionality during tetherless operations.

These outcomes indicate new options for operational paradigms, including reduced staffing in offshore teams, lower costs and emissions, and simultaneous, mixed-platform operations delivery.

Our Journey to Simplification - MASS Pilot in Nigeria

Olajide Fagbewesa, Project Surveyor, Shell Companies in Nigeria (SciN)

Mobilizing seabed surveys in Nigerian territorial waters presents significant challenges, including concerns around vessel suitability, availability, expertise, and security. These issues affect project delivery schedules, which are compounded by a requirement to mobilise two security vessels to provide suitable cover for crewed vessels, increasing overall personnel exposure hours.

A pilot deployment of Maritime Autonomous Surface Ships (MASS) has reduced personnel exposure by 90%. Residual security risks such as MASS theft and sabotage are mitigated by deploying one security vessel. This configuration optimizes data acquisition and processing turnaround times, supporting better-informed business decisions.

Aligned with Shell's commitment to net-zero emissions by 2050, hybrid MASS deployment reduces GHG emissions by 90% and plastic waste by 95%. Industrial mission opportunities for MASS are numerous, yet challenges remain in implementing regulatory and policy frameworks within Nigeria's territorial seas.

This presentation highlights the success of the first MASS deployment in Nigeria, covering the challenges encountered, gaps to be addressed and future opportunities.



Theme 3 – Remote Operations, Robotics & Autonomy

Changing the Geomatics Landscape through Fast Digital Inspection

Simon Manser, Senior Subsea Survey Engineer, Chevron

Fast Digital Inspection (FDI) has revolutionized the geomatics landscape, with geospatial support now extending beyond the acquisition and processing of traditional subsea survey data. Geomatics expertise and applications, already well established in the energy industry, are ideally positioned not only to acquire subsea geospatial data, but also to deliver digital platforms that support advanced visualisation and analysis of 2D and 3D asset information.

Direct integration of geomatics with asset integrity applications enhances situational awareness, by combining insightful FDI outputs with asset component and anomaly datasets, utilising digital data and technology such as 3D point clouds, mesh models, pseudo videos, non-contact Cathodic Protection, methane detection, and sound spectrograms.

This presentation explores the role of geomatics in collaborating with asset integrity management, to provide advanced geospatial visualization. This collaboration aims to enable preventative maintenance and intervention through integrated, accessible and visualized datasets. By working together, decision-making capability is enhanced, and additional value delivered through simplified workflows, and reduced processing times.

Enhancing Operational Efficiency and Safety: Situational Awareness Applications Developed by NCOC

Anuar Ospanov, Geographical Information Management Advisor, NCOC

The NCOC Geomatics/GIM team has developed situational awareness applications to enhance real-time monitoring and improve operations. The following applications are discussed: i. Integrated Situational Awareness Dashboard (ISAD) - developed for the Security Team, allowing real-time tracking of marine vessels, patrol vehicles, personnel, CCTV locations, and air quality stations; ii. Oil Spill Response Equipment app - providing real-time equipment availability visualisation, crucial for rapid response; iii. Subsoil Monitoring app - detects land displacement and seismic activity, via monitoring stations, ensuring timely response where required; iv. Web solutions for flood preparedness in the Atyrau region – daily visualisation of satellite imagery and water levels, for the Crisis Management Team; v. Mobile solutions - enabling effective site monitoring and vehicle inspection by the Security and Road Safety teams; vi. Editable web apps for the Emergency Response Planning and Pipeline teams - supports information updates, ensuring asset integrity and security.

Collectively, these systems and applications enhance situational awareness, decision making, environmental management, and safety oversight, reducing operational risk and improving efficiency



International
Association
of Oil & Gas
Producers



Geomatics
Committee



Theme 4 – Future trends of Geomatics

Challenges of Digital Transformation in the Oil & Gas Sector: Data Management, Standards Update, and Integration of BIM and Digital FM Technologies

Szymon Bloch, CEO – Digital Transformation Expert, Scan 3D

Digital transformation in the O&G sector faces numerous challenges, including data management, standards updates, and the integration of technologies such as drones, 3D scanning, ground-penetrating radar (GPR). This presentation studies some of these examples.

Efficient storage, management and analyse of increasingly large datasets is a primary issue, and updating standards is another significant challenge. As technologies evolve, regular standards updates are required to ensure compatibility and interoperability. Non-compliance with standards can lead to significant safety and operational issues.

Converting data to Building Information Model (BIM) and Digital Facility Management (Digital FM) is often a time-consuming process, demanding precise and up-to-date data, advanced format and source conversion tools, and specialized knowledge.

Technology is now central to data collection. Drones provide data from hard-to-reach areas, 3D scanning enables creation of accurate spatial models and GPR allows examination of underground structures. Integrating these technologies with existing data management systems and BIM/Digital FM standards requires a coordinated approach and advanced technological solutions.

Effective management of these processes is crucial for improving safety and operational efficiency in the industry.

Deployment of 3D Reality Capture Solutions at Every Scale of TotalEnergies

Simon Olive, Survey Engineer, Total Energies

Integration of 3D reality capture solutions, tailored to company use cases, marks a transformation spatial visualization in TotalEnergies. Current geospatial data is available and visualised remotely across the value chain, enhancing efficiency and opening new collaboration and problem-solving avenues. The technology provides a seamless and immersive experience, capturing spatial data accurately and creating comprehensive 3D models that can be analysed in near real-time by both internal and external stakeholders.

Adopting this strategy involves establishing a seamless workflow, from technology selection to data visualization. Governance benefits include improved project management, enhanced safety through better preparation or remote inspections, and increased response agility. There is significant potential for 3D reality capture to revolutionize operations and decision-making processes, contributing to TotalEnergie's GHG emissions ambitions by reducing downtime and travel to sites.

Many challenges have been addressed to manage rapid deployment: technology selection for each site and use case, training and empowering local stakeholders, delivering a cost-effective data flow from acquisition to visualization, and aligning data management and governance with each asset's lifecycle.

Earth Observation for Energy: An Overview of Market Trends, Technologies, and Applications

Aravind Ravichandran, Founder & CEO, TerraWatch Space

Over the past decade, the Earth Observation (EO) sector has seen rapid growth with the launch of hundreds of commercial and governmental satellites, equipped with a variety of remote sensing instruments. This expansion has led to the development of new applications across multiple sectors, particularly in the energy sector, including areas such as renewables, environmental monitoring, and greenhouse gas emissions tracking. Additionally, artificial intelligence has emerged as a foundation technology for processing and analysing remotely sensed data, presenting significant additional potential benefits for the energy sector.

The convergence of AI and satellite data brings both opportunities and challenges for the adoption of these technologies. This presentation provides an overview of the EO market, explore existing and emerging EO applications in the energy sector, discusses challenges in adopting satellite data, and offers an outlook of the future for the remote sensing sector.



International
Association
of Oil & Gas
Producers



Geomatics
Committee



Theme 4 – Future trends of Geomatics

Ambitious Methane Emission Reduction Goals and Monitoring Strategies

Séverine Fougérol, Remote Sensing Engineer, Total Energies

TotalEnergies is committed to significantly reducing its methane emissions, with ambitious targets of a 50% reduction by 2025 and an 80% reduction by 2030, both relative to 2020 levels. To achieve these goals, a monitoring strategy is employed that includes both source-level and site-level sensors and satellite imaging.

At the source level, sensors are deployed to continuously monitor methane emissions, ensuring real-time data collection and immediate response capability. On-site, the AUSEA sensor, mounted on drones, provides detailed and localized emission data. This is complemented by satellite imagery, which offers a broader perspective, tracking significant emissions across both operated and non-operated sites, using freely available satellite imagery.

The integration of these two technologies not only facilitates the mitigation of leaks but also ensures preparedness in addressing alerts from organizations such as UNEP (the United Nations Environmental Programme). By leveraging satellite data, TotalEnergies can monitor and respond to emissions effectively, enhancing transparency and accountability.

Loggerhead: An Uncrewed Robotic System for Over the Horizon Survey, Inspection and Maintenance

Chris Sotzing, Head of Software and Autonomy, HonuWorx

HonuWorx was founded in Aberdeen in 2020, and is developing a unique uncrewed subsea system for deploying worker robots, replacing the current method which uses offshore support vessels. The company's patented approach substitutes these large, diesel-powered vessels with the Loggerhead™ all-electric, semi-Autonomous Underwater Vehicle 'mothership' that deploys a Remotely Operated Vehicle (ROV) – the 'worker vehicle', thereby enabling robotics personnel to be relocated to the safety of onshore. By reducing the cost, carbon footprint and personnel risks of subsea survey, inspection, and maintenance operations, HonuWorx's technology development supports a sustainable and profitable offshore energy sector.

A proprietary cloud-based platform, HonuNet™, paired with a tethered communications buoy, enables onshore control and supervision. A collaborative and autonomous coordination system supports robust, efficient mission delivery in challenging, remote environments, whilst the mothership eliminates risks associated with weather and ROV deployment. The modular configuration offers scalability, options for diverse tasks, and long-term viability.

The presentation provides examples of cost and enhanced safety, data quality, and operational efficiency across various subsea applications, highlighting the importance of robust geospatial intelligence in next-generation robotics solutions.