NEWSLETTER

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Theme: Geospatial, DeepTech, and 4IR

ASSOCIATION OF GEOSPATIAL INDUSTRIES

In this Issue

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From the President's Desk

Cutting-edge innovations such as DeepTech, 4IR, and Geospatial technologies have been reshaping industries worldwide, driving transformative changes, and pushing the boundaries of what is possible. The convergence of these technologies has unleashed a wave of unprecedented opportunities across various sectors.

DeepTech, with its remarkable advancements in artificial intelligence, machine learning, robotics, and advanced analytics, has become a catalyst for transformation across diverse sectors. The power of these technologies is reshaping how we live, work, and interact, and their impact on the global landscape is truly awe-inspiring.

Geospatial technologies, in particular, have emerged as a vital enabler in this era of profound technological advancements. With the ability to capture, analyze, and visualize geographically referenced data, Geospatial technologies have become essential tools for understanding and navigating our increasingly complex world. By integrating location-based information into our society's digital fabric, Geospatial technologies empower decision-makers to derive meaningful insights, optimize operations, and drive intelligent solutions.

In the context of the theme of this edition, DeepTech, 4IR, and Geospatial technologies offer a wealth of possibilities. The seamless integration of Geospatial technologies with DeepTech applications is opening up new avenues for exploration, discovery, and optimization across various sectors.

At AGI, we recognize the pivotal role that Geospatial technologies play in the era of DeepTech and the 4IR. As the leading voice of the Geospatial industry in India and a thought leader in emerging technologies, we are committed to fostering innovation, sharing best practices, and facilitating collaboration among our esteemed members.

This newsletter edition serves as a platform to explore the significant role of Geospatial tools and technologies in this context. I hope you find it engaging and enlightening, offering fresh perspectives and actionable insights.

Stay tuned for an exciting journey into the world of DeepTech, 4IR, and Geospatial technologies.

Enjoy Reading!

Pramod Kaushik
President, AGI

The geospatial industry can expect several exciting trends in the coming decade as the 4IR progresses.

The combination of emerging technologies, expanded data sources, and the increasing demand for location intelligence is driving innovation, notes **Mr. Abhijit Sengupta, Senior Director and Head of Business - SE Asia & India, HERE Technologies**.

The onset of the Fourth Industrial Revolution (4IR) has paved the way for technological disruptions across every significant field. How is the Geospatial industry poised to advance, grow, and fit into this 4IR-led transformation?

The geospatial industry, which encompasses collecting, analyzing, and visualizing location-based data, has been undergoing a significant evolution in recent years. The convergence of advanced technologies such as artificial intelligence (AI), machine learning (ML), big data analytics, cloud computing, and the Internet of Things (IoT) has unlocked new opportunities for the geospatial sector to flourish.

One of the key drivers of growth for the geospatial industry in the 4IR is the increasing availability of high-resolution satellite imagery, aerial photography, and remote sensing data. These rich sources of geospatial information, coupled with advancements in computer vision and image recognition algorithms, enable us to extract valuable insights and derive actionable intelligence from vast amounts of geospatial data. This capability addresses critical challenges across various domains, including automotive, urban planning, transportation, agriculture, climate change, and disaster management.

Another significant advancement in the geospatial industry is the proliferation of location intelligence platforms that combine spatial data with advanced analytics capabilities. These platforms empower businesses and organizations to unlock valuable insights from their own data as well as external geospatial datasets. By leveraging location intelligence, companies can optimize their supply chains, target customers with personalized marketing campaigns, identify optimal store locations, and make data-driven decisions based on spatial patterns and trends.

In essence, the combination of emerging technologies, expanded data sources, and the increasing demand for location intelligence drive innovation and enable us to address complex challenges in various fields.

HERE Technologies has steadily built a robust legacy in mapping technology over the last three decades. How does HERE integrate DeepTech, 4IR, and Geospatial technologies to render its array of business solutions?

At HERE, we recognize the immense potential of DeepTech, which encompasses cutting-edge technologies like AI, ML, and advanced analytics. DeepTech plays a pivotal role in transforming how we process, analyze, and extract insights from geospatial data, empowering us to offer powerful solutions that drive business growth.

Through the integration of DeepTech, we leverage AI and ML algorithms to analyze vast volumes of geospatial information. These algorithms have been trained on extensive datasets to identify spatial patterns, detect anomalies, and predict future trends. Combining these insights with our location intelligence capabilities provides our customers with valuable business solutions that address their specific needs.

For instance, in the l**ogistics and supply chain industry**, we integrate location-based technologies with advanced analytics to optimize routes, improve delivery efficiency, and reduce operational costs. Our intelligent systems leverage real-time location data to dynamically adjust logistics operations, leading to streamlined processes and enhanced customer satisfaction.

HERE's commitment to innovation and research allows us to stay at the forefront of technological advancements. We actively explore emerging trends, collaborate with academic institutions and industry partners, and invest in research and development initiatives. This ensures that our solutions remain relevant and aligned with the ever-evolving landscape of DeepTech, 4IR, and geospatial technologies. We are dedicated to pushing the boundaries of innovation and driving meaningful change through our unique blend of technology integration.
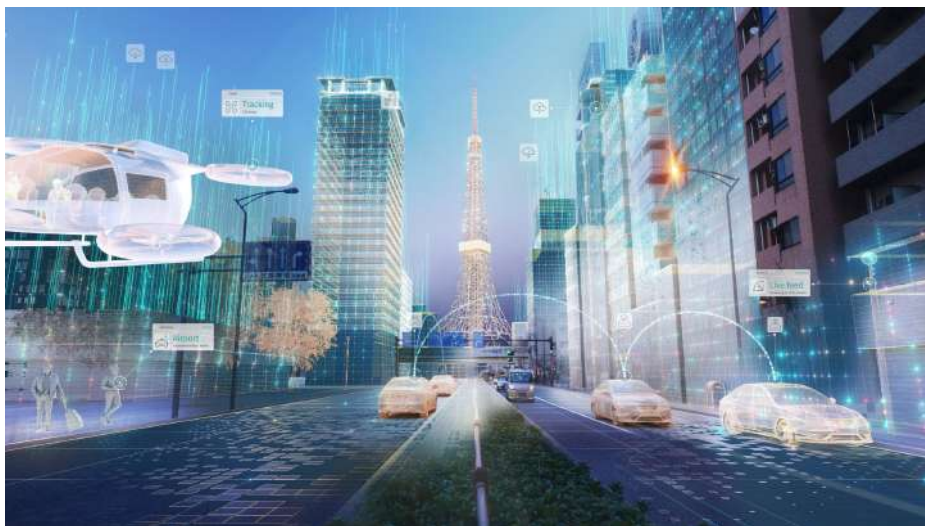
Image Source: HERE Technologies

Digital Twin technology has become the centre of attention for the industry with 4IR facilitating its growth. How is HERE leveraging this technology to deploy cross-sectoral solutions for its customers?

Digital twin technology has emerged as a powerful tool for bridging the physical and digital worlds, allowing organizations to create virtual replicas of physical assets, systems, or processes. At HERE, we recognize the immense potential of digital twin technology and its ability to transform various industries. By leveraging this technology, we can deploy cross-sectoral solutions that deliver value to our diverse customer base.

One way we utilize digital twin technology is by creating virtual representations of urban environments. These virtual replicas enable our customers to gain a comprehensive understanding of urban landscapes, infrastructure, and mobility patterns. For instance, in the transportation sector, our digital twin technology enables us to monitor and simulate traffic flows, predict congestion, and optimize route planning. By integrating real-time data from various sources, including connected vehicles, sensors, and public transportation systems, we create dynamic digital twins that provide accurate and up-to-date information.

In the logistics and supply chain industry, our digital twin technology allows us to create virtual replicas of warehouses, distribution centers, and entire supply chain networks. By modeling these complex systems, we can optimize inventory management,

simulate different scenarios, and identify opportunities for efficiency improvements. Our customers can leverage these digital twins to streamline operations, reduce costs, and enhance supply chain resiliency.

At HERE, our commitment to cross-sectoral solutions means that we apply digital twin technology across various industries, including retail, energy, and environmental management. Through our innovative use of this technology, we strive to empower our customers across industries and contribute to a more efficient, sustainable, and connected future.

With 4IR being underway, and the focus of both governments and businesses shifting towards "smart", sustainable, customer-centric solutions and services, what are some top trends the Geospatial industry can earmark for the decade?

The geospatial industry will witness increased integration of AI and ML techniques to extract valuable insights from vast amounts of geospatial data. AI-powered algorithms will automate the analysis of spatial information, while ML models will improve prediction accuracy and optimize resource allocation in various domains. The proliferation of IoT devices and sensor networks will generate an unprecedented amount of geospatial data. The integration of geospatial data with IoT will enable the development of connected vehicles, smarter cities, intelligent transportation systems, and efficient supply chains.

With increasing environmental concerns, the geospatial industry will

play a vital role in addressing sustainability challenges and mitigating the impacts of climate change. The integration of geospatial data with climate models and predictive analytics will enable proactive decision-making for sustainable development and resilience planning.

Lastly, as the geospatial industry continues to grow, there will be a greater focus on privacy, ethics, and responsible data governance. Stricter regulations and frameworks will be implemented to protect individual privacy rights and ensure the ethical use of geospatial data. Companies in the geospatial industry will prioritize transparency, data anonymization, and the secure handling of sensitive location information.

Lastly, please share with us some developments in the pipeline for HERE Technologies that would excite the Geospatial and broader tech community in India.

We have several exciting developments in the pipeline that would undoubtedly excite India's geospatial and broader tech community. We are actively working on expanding our location data coverage and enhancing the accuracy and granularity of our datasets for the Indian market. We are also investing in advanced analytics capabilities to address the diverse needs and challenges businesses face in India.

Furthermore, we are actively exploring partnerships and collaborations with local startups, academic institutions, and government bodies in India. These partnerships will foster innovation, knowledge sharing, and the co-creation of location-based solutions that address the unique requirements of the Indian market. By leveraging the expertise and capabilities of the broader tech community in India, we aim to create a vibrant ecosystem that accelerates the adoption and impact of location-based technologies across various industries.

Lastly, we are working on enhancing the user experience and accessibility of our location intelligence platforms and APIs for developers in India. This will enable developers to easily integrate location intelligence into their applications, fostering the creation of innovative solutions and services that cater to specific needs in various sectors.

Special Feature

The Confluence of Geospatial, DeepTech, and 4IR Technologies

Sakshi Singh, AGI

The transformative potential of DeepTech, 4IR, and Geospatial technologies is reshaping industries, revolutionizing business models, and driving innovation at an unprecedented pace. These technologies, once seen as separate entities, are increasingly converging and creating synergies that amplify their impact.

Understanding DeepTech, 4IR, and Geospatial Technologies

DeepTech, encompassing artificial intelligence, machine learning, robotics, and advanced analytics, has revolutionized the way businesses operate. It enables organizations to unlock valuable insights from vast amounts of data, optimize operations, and enhance efficiency. By leveraging advanced algorithms, predictive modeling, and automation, DeepTech empowers data-driven decision-making, transforming industries across the board.

Simultaneously, the Fourth Industrial Revolution (4IR) is blurring the lines between the physical, digital, and biological realms. It is a confluence of technologies that include the Internet of Things (IoT), blockchain, augmented reality (AR), virtual reality (VR), and more. 4IR is creating a new paradigm where these technologies interact and collaborate, amplifying their individual potentials.

At the heart of this convergence lies Geospatial technology. Geospatial technologies provide a spatial context to the digital revolution, including satellite imagery, remote sensing, geographic information systems (GIS), and global navigation satellite systems (GNSS). These tools capture, analyse, and visualise geographically referenced data, comprehensively understanding our complex reality.

Geospatial technology is not just about mapping locations; it integrates with DeepTech and 4IR to create intelligent solutions. Combining Geospatial data with advanced analytics, AI, and IoT enables organisations to derive meaningful insights from spatial information. By harnessing the power of location.

Intelligence, businesses gain a deeper understanding of spatial patterns, correlations, and interactions, unlocking new opportunities for optimisation, innovation, and problem-solving.

The Power of Integration: Benefits and Applications

The convergence and interplay between DeepTech, 4IR, and Geospatial technologies create a multiplier effect, enhancing their transformative potential. The integration of these technologies enables organisations to tackle complex challenges and drive positive change in various sectors. It allows for real-time monitoring, predictive analytics, and intelligent decision-making based on spatial insights, optimising resource allocation, enhancing operational efficiency, and improving customer experiences.

With the convergence of these technologies, we are witnessing new frontiers of innovation and collaboration with an array of benefits:

Enhanced Data Analytics: Integrating DeepTech, 4IR, and Geospatial technologies allows organisations to harness the power of advanced analytics on rich and diverse datasets. Deep learning algorithms, machine learning models, and predictive analytics techniques can be applied to geospatial data, unlocking valuable insights. Organisations gain a deeper understanding of complex phenomena by analysing spatial patterns, correlations, and interactions, enabling better-informed decisions.

Comprehensive Decision-Making: The convergence of these technologies provides a comprehensive view of data, enabling more informed decision-making. Geospatial data adds a spatial context to deep analytics, offering insights into the physical environment, land usage, and infrastructure networks. This comprehensive understanding helps organisations optimise resource allocation, plan efficient routes, and make location-specific decisions.

Real-Time Monitoring and Response: Integrating DeepTech, 4IR, and Geospatial technologies enable real-time monitoring and response systems. IoT sensors and Geospatial tools collect real-time data, providing organisations with up-to-date information on parameters such as traffic flow, environmental conditions, and equipment performance. This allows for timely interventions, proactive maintenance, and optimised operations

Predictive Analytics and Forecasting: The convergence of these technologies empowers organisations to employ predictive analytics and forecasting models with spatial insights. Businesses can anticipate future trends, demand patterns, and potential issues by analysing historical geospatial data and incorporating real-time inputs. This helps optimise supply chains, plan infrastructure development, and make proactive business decisions.

Improved Problem-Solving Capabilities: Integrating DeepTech, 4IR, and Geospatial technologies enhances problem-solving capabilities by combining computational power, data-driven insights, and spatial context. Organisations can employ AI-driven algorithms, image recognition, and natural language processing to analyse geospatial data and solve complex problems. For instance, emergency response systems can utilise real-time location data and AI-powered algorithms to optimise response times and resource allocation during crises.

Optimal Resource Allocation: The convergence of these technologies enables optimal resource allocation by considering both spatial and non-spatial factors. Combined with AI algorithms, geospatial data can help organisations optimise routes, fleet management, and energy distribution. This leads to cost savings, increased operational efficiency, and reduced environmental impact.

Enhanced Collaboration and Visualization: Integrating DeepTech, 4IR, and Geospatial technologies facilitates collaboration and visualisation of complex data. Virtual and augmented reality tools and geospatial data allow stakeholders to immerse themselves in virtual environments, making it easier to understand and communicate spatial information. This enhances team collaboration, improves stakeholder engagement, and enables effective communication of insights.

Industry Applications and Use Cases

DeepTech, 4IR, and Geospatial technologies are becoming interconnected building blocks for transformative solutions in various sectors, as highlighted below.

Healthcare: Researchers may leverage AI algorithms and Geospatial data to identify correlations between geographic factors and disease prevalence for predicting disease outbreaks and tailoring healthcare interventions. Integrating 4IR technologies with Geospatial tools allows for remote patient monitoring and telemedicine. IoT devices collect patient data and geolocation information to track health parameters and provide virtual healthcare services, especially in remote areas.

Manufacturing: By combining DeepTech, 4IR, and Geospatial technologies, manufacturers can implement predictive maintenance practices. Sensors and IoT devices collect real-time data on machine performance, while AI algorithms analyse this data to predict maintenance needs. Geospatial information adds context, helping prioritise maintenance activities based on location and criticality. DeepTech and Geospatial technologies also enable manufacturers to optimise their supply chains. By integrating AI-powered demand forecasting, real-time inventory tracking, and Geospatial data on transport routes, manufacturers can minimise delays, reduce costs, and improve overall supply chain efficiency.

Retail: DeepTech, 4IR, and Geospatial technologies enable retailers to personalise marketing campaigns based on customer location data. By analysing customer behaviour, foot traffic patterns, and demographic data, retailers can target specific regions with tailored promotions, improving customer engagement and driving sales. Geospatial technologies combined with AI algorithms can also help optimise store layouts. By analysing customer flow, product placement, and real-time data on shopper behaviour, retailers can design store layouts that maximise customer satisfaction, enhance product visibility, and optimise the shopping experience.

Conclusion

The synergy between Geospatial technologies, DeepTech, and 4IR marks a transformative era. As we navigate the intricate intersections of these technological frontiers, the potential for groundbreaking advancements in diverse sectors becomes increasingly evident.

Utilizing Multisource Geospatial Solutions to Build a Better World

Sai Arul and Madhav Ragam, Maxar Technologies

Geospatial technologies are revolutionizing national economies, playing critical roles in domains as varied as national security, infrastructure monitoring and management, and disaster relief and recovery. Semi-automated geospatial solutions combining Earth observation with artificial intelligence, machine learning, and computer vision are spreading fast.

For more than two decades **Maxar has been a world leader in satellite-based electro-optical imagery collection**. We are not just at the forefront of showing what is happening in the world in near real-time, but collectively we have built a 20-year foundational 2D Vivid basemap of the Earth that supports planning, insight and action.

As geospatial intelligence capabilities, technologies and requirements have evolved, so has the need for providers like Maxar to offer more comprehensive and complex solutions that incorporate new sources of data and break down old silos and barriers between providers of those sources.

This is why we have wholeheartedly embraced offering—both directly and through strong partnerships—multisource solutions and products that help our customers in India and around the world see, understand and act.

Synthetic Aperture Radar

Through a strategic constellation access agreement with Umbra, Maxar has dedicated capacity from satellites in Umbra's synthetic aperture radar (SAR) imagery constellation, enabling us to provide customers with assured access to the highest resolution commercially available Earth observation data taken day and night and in all weather conditions. Maxar also leverages decades of SAR processing expertise and our 3D datasets to enhance processing of the SAR imagery, delivering even more actionable insights.

This combined offering, which will be fully integrated by 2024, represents the most advanced multisource geospatial intelligence solution for a wide range of government and commercial applications.

Use cases include:

- Maritime domain awareness: Monitor broad maritime areas to detect ships, pollution and oil to effectively cue patrol assets.

- Disaster management and response: Rapidly map the extent of flooding over broad areas and create regional or national-scale digital elevation models for future simulations and modeling.
- Surveillance and intelligence: Detect changes and activity across large areas or frequently monitor sites of interest to analyze patterns of life.

Radio Frequency Spectrum

The world relies on the RF spectrum and its uses, from enabling economies through wireless connectivity, mobile networks, and satellite communications, to providing critical safety and security measures from both civil and defense organizations. But industry and governments lack access to accurate and actionable information. To fill this gap, Maxar measures the global radio frequency environment and provide the most advanced insights available on spectrum use and wireless networks. Our data empowers wireless-centric organizations, regulators, investors, and defense and intelligence organization to make smarter, faster, data-driven decisions that meet the current and future challenges of global RF use.

Combining ground, aircraft and satellite-based sensors, we accurately measure radio frequency spectrum and wireless networks across the world to unlock hidden insights using patented systems and methods. Our automated approach to comprehensive data collection supports interests across

Image Source – Maxar Technologies
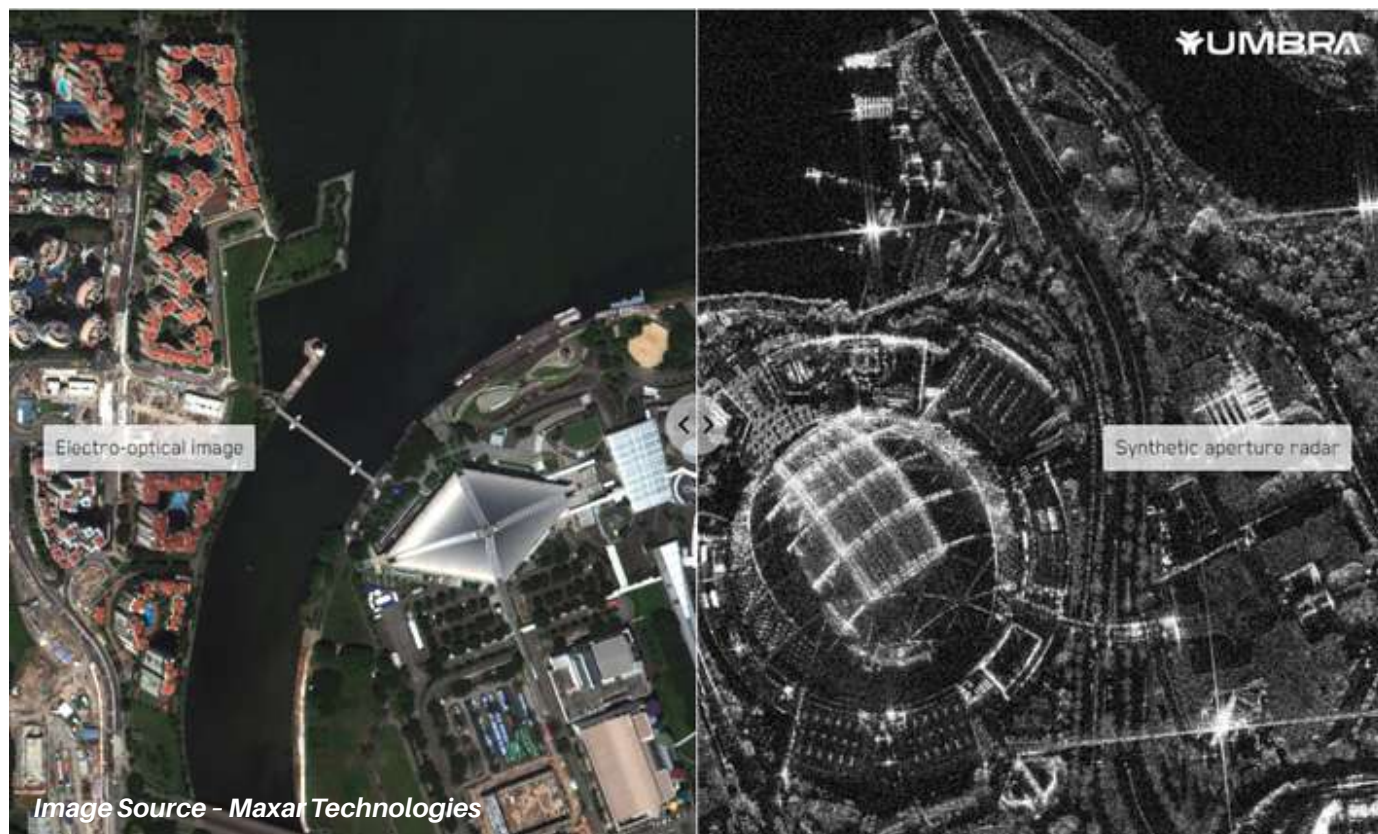
and public sector organizations by collecting data across all frequencies.

The radio frequency spectrum landscape is ever-changing. From assessing your capabilities, to benchmarking competitor activity, or identifying opportunities — our diverse solutions can solve your toughest problems.

Crow's Nest Maritime Monitoring and Security (MMS)

Maxar's Crow's Nest MMS capabilities leverage space-based optical and radar imagery and advanced machine learning to provide vessel detection and critical insight for maritime security agencies, offering near real-time monitoring solutions for complex problems on the high seas.

Use cases include:
- **Protecting legal fishing operations**: We help maritime enforcement agencies to more effectively intervene and manage vulnerable fish populations.
- **Countering illicit trafficking**: Because they are largely unmonitored, the world's oceans are notorious for drug- and human-trafficking routes.

- Detect ships of interest and quickly task the Maxar satellite constellation to collect the fresh optical imagery, enabling agencies to identify vessels with confidence and provide evidence of activity.
- **Monitoring ports remotely**: Monitoring foreign naval installations and other points of interest is a high-stakes operation for many nations. Simplifies remote monitoring with on-demand access to Maxar's 20-year image archive and built-in analysis tools.
- **Offshore petroleum monitoring**: Monitor drilling vessels for regulatory compliance and safety and actively search for potential spills.

The Globe in 3D

Maxar is building the Globe in 3D to provide our customers with the most accurate representation of Earth for simulation, training, navigation, network planning, consumer gaming and other complex environments. Our approach combines decades of deep mission understanding and a proven foundation of commercial technology to deliver solutions with unrivaled speed, scale and cost-effectiveness.

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provide our customers with the most accurate representation of Earth for simulation, training, navigation, network planning, consumer gaming and other complex environments. Our approach combines decades of deep mission understanding and a proven foundation of commercial technology to deliver solutions with unrivaled speed, scale and cost-effectiveness.

Maxar's 3D and elevation models enable you to measure and analyze your projects in 3D for a more complete picture of the situations that matter to your organization. With our geospecific Precision3D mapping and Precision3D Registration (P3DR) software, you can automatically georegister imagery to the Globe in 3D, allowing you to precisely and rapidly geolocate sensor data collected by sources including drones and airplanes.

Planners and decision-makers rely on Maxar 3D models for advanced communications networks and digital simulations in urban areas, line-of-sight analyses and flood mapping in suburban areas, and topographic maps and pipeline planning in rural areas, among other critical use cases across the globe.

Leveraging GeoAI in the BFSI Sector

In the rapidly evolving digital age, the banking, financial services, and insurance (BFSI) sector face growing challenges. Customer expectations for personalized and convenient experiences are on the rise, while banks strive to enhance efficiency and reduce costs. Fortunately, the integration of Location Intelligence (LI) and Artificial Intelligence (AI) through GeoAI presents an innovative solution that empowers banks to meet these challenges head-on.

LI uses data about physical locations to provide insights into customer behaviour and trends. AI can analyse this data to identify patterns and make predictions. Together, LI and AI can help banks for

- **Empowering Customer Engagement**: Leveraging GeoAI for Personalized Experiences and Targeted Marketing
- **Optimizing Physical Presence**: Strategic Branch Locations and ATM Networks through GeoAI
- **Fortifying Security Measures**: Fraud Detection and Prevention with GeoAI
- **Enhanced Risk Assessment**: Leveraging GeoAI for Informed Lending Decisions.
- **Future-proofing the BFSI Sector:** Embracing GeoAI to Stay Ahead of the Competition.

As the BFSI sector continues to transform, LI and AI will become increasingly important tools for banks. These technologies can help banks to stay ahead of the competition and deliver the best possible experience to their customers.

Understanding Location Intelligence

Location intelligence (LI) is the process of gathering, analysing, and utilizing spatial or geographic data to gain valuable insights and make informed decisions. LI can be used to understand customer behaviour, identify new business opportunities, assess risk, and optimize resource allocation. Location intelligence (LI) data can be collected from a variety of sources, including mobile devices, social media, and government databases. This data can then be analysed using a variety of tools and techniques, such as geospatial analytics, machine learning, and artificial intelligence.

The Hidden Cost of Non-Data Management

BFSI institutions can use location intelligence (LI) to improve their operations in several ways, including:

- **Geospatial Analytics**: LI can be used to analyse geographical patterns and trends, helping BFSI institutions to identify new business opportunities, assess risk, and optimize resource allocation.
- **Site Selection and Expansion**: LI can assist in identifying strategic locations for branches, ATMs, or other financial service centres based on demographic data, market demand, and competition analysis.
- **Risk Assessment and Fraud Detection**: LI can help in identifying suspicious activities, patterns, or potential fraud by analysing geospatial data related to transactions, customer behaviour, and historical patterns.
- **Disaster Management**: LI can aid in assessing and mitigating risks associated with natural disasters, enabling BFSI organizations to proactively prepare and respond to crises.

LI is a powerful tool that can be used by BFSI institutions to improve their operations and deliver better services to their customers. As the world becomes increasingly interconnected, LI will become even more important for BFSI institutions that want to stay ahead of the competition.

Artificial Intelligence in BFSI

Artificial Intelligence refers to the development of computer systems capable of performing tasks that typically require human intelligence, such as natural language processing, machine learning, deep learning, and predictive analytics.

Applications of AI in BFSI include:

- **Customer Service and Personalization**: AI-powered chatbots and virtual assistants enable 24/7 customer support, address queries, provide personalized recommendations, and facilitate self-service transactions.
- **Fraud Prevention and Detection**: AI algorithms can analyse vast amounts of data in real-time, identifying anomalies, detecting fraudulent activities, and minimizing financial losses.
- **Credit Scoring and Risk Assessment**: AI models leverage historical and real-time data to assess creditworthiness, predict default rates, and optimize loan approval processes.
- **Investment Advisory and Wealth Management**: AI algorithms provide data-driven insights, portfolio recommendations, and automated trading strategies to assist investors and wealth managers.
- **Regulatory Compliance**: AI systems aid in monitoring and analysing vast amounts of data, ensuring compliance with regulatory requirements, and detecting potential breaches or suspicious activities.

Synergies between Location Intelligence and Artificial Intelligence: The Power of Geospatial-AI

Location intelligence (LI) and artificial intelligence (AI) are two powerful technologies that can be used to improve decision-making, customer experience, and risk management in the BFSI sector. When combined, these technologies create a powerful new tool called geospatial AI.

- **Enhance Decision Making**: Geospatial AI can be used to make data-driven decisions based on both spatial and non-spatial insights. This can help BFSI organizations optimize resource allocation, risk assessment, and business expansion strategies. For example, geospatial AI can be used to identify areas with high potential for new customers, assess the risk of fraud or theft in a particular location, and plan the location of new branches or ATMs.
- **Improve Customer Experience**: Geospatial AI can be used to offer personalized services, location-specific offers, and targeted marketing campaigns to enhance customer engagement and satisfaction. For example, geospatial AI can be used to send targeted marketing messages to customers based on their location, offer discounts or promotions to customers who visit certain locations, and provide customer support that is tailored to their specific needs.

- **Improve Risk Management**: Geospatial AI can be used to proactively assess risk, detect fraud, and manage disasters. This can help BFSI organizations strengthen their overall security posture and protect their customers. For example, geospatial AI can be used to identify potential fraud patterns, track the movement of large sums of money, monitor customer behaviour for signs of suspicious activity, and prepare for and respond to natural disasters.

Geospatial AI is a powerful new tool that can be used to improve decision-making, customer experience, and risk management in the BFSI sector. As these technologies continue to develop, they will become even more valuable to BFSI organizations that want to stay ahead of the competition and deliver the best possible experience to their customers in the dynamic landscape of the digital age.
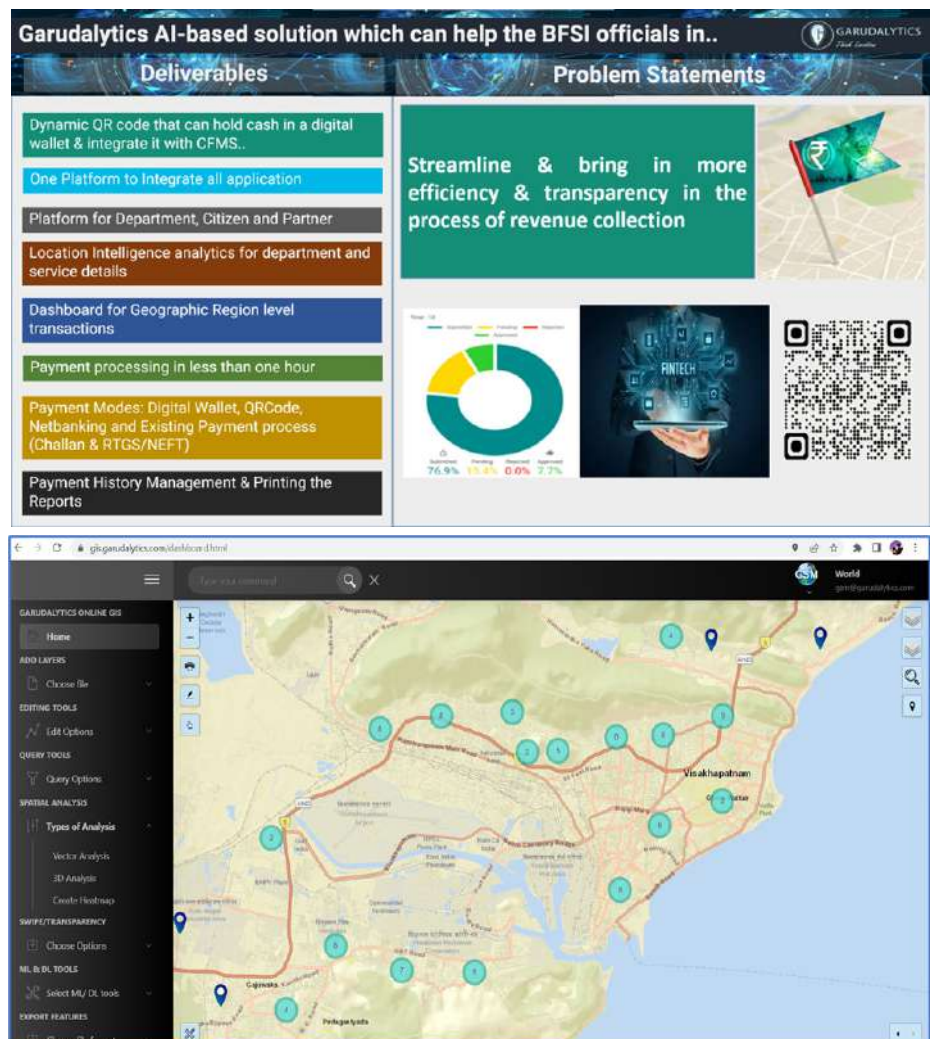
Images Source: Garudalytics

Geospatial, Deep Tech, and 4IR: The Convergence of Innovation, Technologies & the Future of Businesses

Priyanka Pandit, Ceinsys

The Fourth Industrial Revolution (4IR) is distinguished by the merging of digital, physical, and biological technologies, which has resulted in the emergence of novel technologies and business models that are reshaping our lifestyle and work. Among the key areas of innovation within 4IR, geospatial technology and deep tech are particularly noteworthy. These technologies are driving innovation and growth in various industries, unlocking new opportunities for both individuals and businesses.

Geospatial Technologies

Geospatial technology is a term used to describe the utilization of geographic information systems (GIS) and other tools to scrutinize and present spatial data. It finds its application in diverse fields, from environmental management and urban planning to logistics and transportation. The most significant advantage of geospatial technology is that it empowers businesses and organizations to make informed decisions based on real-time data. For instance, a logistics company can use GIS to optimize its delivery routes and minimize fuel consumption. In contrast, a city planner can use GIS to pinpoint high-traffic congestion areas and devise targeted solutions.

Deep Tech

Deep tech encompasses technologies that are rooted in scientific advancements and research, including but not limited to artificial intelligence (AI), blockchain, and quantum computing. These technologies are typically intricate and necessitate substantial investment in research and development. The most significant advantage of deep tech is its potential to revolutionize industries and generate fresh prospects for growth and innovation. For instance, AI has the capability to automate monotonous tasks and enhance decision-making, whereas blockchain can be used to create reliable and transparent systems for handling transactions and data.

Fourth Industrial Revolution (4IR)

The Fourth Industrial Revolution (4IR) has given rise to various innovations, including geospatial technology and deep tech, which are propelling progress and advancement in numerous industries. These technologies are generating prospects for both businesses and individuals and have the potential to tackle some of the most critical social and environmental issues.

The Intersection of Geospatial, Deep Tech and 4IR

The amalgamation of geospatial, deep tech, and 4IR is generating fresh prospects for growth and innovation across a vast spectrum of industries. For instance, the employment of GIS and AI can optimize logistics and supply chain management, while blockchain can establish secure and transparent systems for handling spatial data.

In general, the confluence of geospatial, deep tech, and 4IR is ushering in a novel epoch of innovation and growth in the digital economy. As these technologies evolve and mature, we can anticipate witnessing an even broader range of exciting opportunities in the years to come. **Ceinsys Tech Ltd** is an industry leader in Geospatial, Deep Tech and on the footprints of 4IR. We are a got-to solutions provider in domestic as well as in the international markets. We are always striving and working towards our motto of "Enhancing Possibilities".

Hexagon introduces HxGN Smart Sites for Managing Complex Sites

Hexagon's Safety, Infrastructure & Geospatial division announced HxGN Smart Sites, a real-time data visualization and location intelligence solution for complex site operations, such as industrial facilities, airports, hospitals and entertainment venues.

HxGN Smart Sites combines any type of real-time, dynamic and static data into a 3D common operational picture – a digital twin of facilities and their operations. It turns disparate data into usable information and brings shared situational awareness to all stakeholders in any closed environment with critical infrastructure.

BASF is a pilot customer for HxGN Smart Sites, which grew from a solution Hexagon originally built for BASF using Hexagon's Luciad technology for data integration, visualization and analysis. The BASF site in Antwerp is the largest chemical production site in Belgium and the second-largest BASF site in the world. The site has 360 miles of underground pipelines, 3,500 employees and 50 production installations.

"BASF and Hexagon look back on a successful cooperation of more than

20 years," said Albrecht Helmer, BASF's manager of digital engineering.

HxGN Smart Sites provides a holistic view of any complex site by connecting with other data sources and systems, such as computer-aided design (CAD), building information modeling (BIM), enterprise resource planning (ERP) and workforce systems. By easily integrating and converging data from existing operational systems, HxGN Smart Sites helps streamline workflows, maximizing the safety and resilience of operations and enabling better and faster decisions.

High-performance interactive maps and visualizations of large volumes of data are also key features. Users

can zoom in and out, pan around, select specific features and query underlying data to easily find information and put it in context.

"The value of HxGN Smart Sites is in its name - it transforms complex facilities and operations into smart sites with connected and integrated environments," said Dirk Wagemans, vice president, commercial, Hexagon's Safety, Infrastructure & Geospatial division. "As BASF can attest from its successful use of this technology, having full situational awareness is key to keeping a site running smoothly and efficiently, no matter how large or complex."

Visit the Hexagon website to learn more about HxGN Smart Sites.

Image source: Hexagon

Oracle Cloud Infrastructure: Empowering Geospatial Workloads for Enhanced Innovation and Transformation

The next-generation cloud designed to run any application, faster and more securely, for less.

Oracle Cloud Infrastructure (OCI) offers a comprehensive suite of tools and a robust architecture that enables seamless migration of enterprises from on-premises environments to the cloud. With advanced automation and built-in security features, OCI provides superior threat mitigation, facilitating efficient migration and cost-effective operations. OCI, designed to run applications faster and more securely, encompasses a wide range of services including AI and data science capabilities.

Leveraging its industry-leading scalability, availability, and governance features, Oracle Cloud Infrastructure supports emerging technologies such as AI, machine learning, IoT, blockchain, and human interfaces. Oracle Cloud spans 42 interconnected geographic regions, offering a complete suite of Oracle Cloud Applications and more than 100 Oracle Cloud Infrastructure services, with another 9 regions planned.

Oracle has commercial and government-specific regions and supports private connections with dozens of network partners as well as direct interconnection with Microsoft Azure.

Oracle Cloud Infrastructure (OCI) is a cutting-edge cloud platform that empowers enterprises to migrate, build, and run diverse IT applications with improved efficiency and security. By offering Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) in its second-generation cloud, Oracle is the only provider that delivers a comprehensive suite of cloud services. Furthermore, OCI's Autonomous Database services leverage a high-speed network, enabling rapid deployment of mission-critical applications to foster continuous innovation.

Oracle Cloud Infrastructure for Geospatial Workloads

Oracle's Autonomous Database is a fully automated service that simplifies the development and deployment of application workloads, regardless of their complexity or scale. Leveraging the spatial features of Oracle Autonomous Database, enterprises can incorporate location intelligence into their business processes and applications seamlessly. Oracle provides robust tools for loading, preparing, processing, analyzing, and publishing geospatial data, facilitating the integration of geospatial information with departmental and enterprise data stores. The ecosystem of specialized software, including GIS software and developer toolkits, ensures flexibility and enables organizations to mix and match tools that best suit their needs. By natively storing geospatial data in Oracle Autonomous Database, organizations gain efficiencies and enable a wide range of analytics, data warehousing, transaction processing, and mixed workload use cases while preserving existing investments in other tools and development.

Oracle Converged Database

Simplifying Multi-Workload Environments: Oracle's Converged Database offers a unique ability to run various workloads, including relational, spatial (geolocation and mapping analytics), graph, blockchain, text, XML, and JSON, simplifying application development. This simplification is further supported by Oracle's Accelerated Data Science (ADS) Library toolkit, which accelerates the entire data science workflow, facilitating the faster and easier
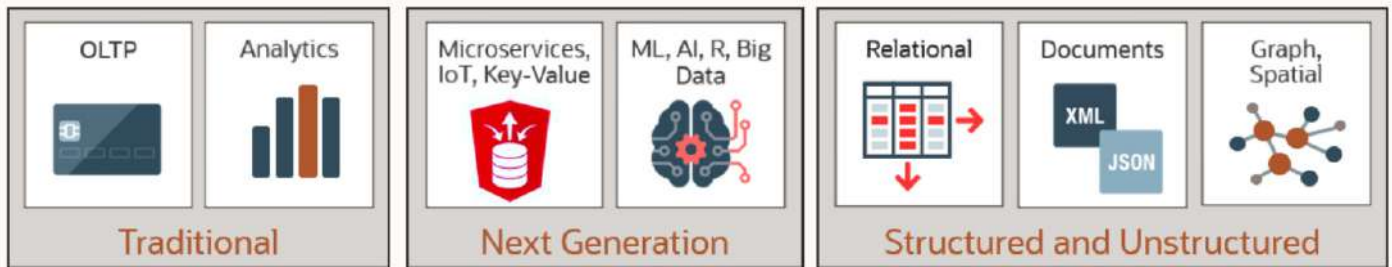
creation of high-quality models. With over 30 out-of-the-box algorithms, Oracle Autonomous Database capabilities empower organizations to leverage advanced data science techniques effectively.

Converged Oracle Database:
Simplifies Applications with Unique ability to run any combination of workloads on any data, further simplifying development – including Relational, Spatial - Geolocation and mapping analytics, Graph, Blockchain, Text, XML, JSON.

Oracle's Accelerated Data Science (ADS) Library toolkit: Accelerates the entire data science workflow, making it faster and easier to produce high-quality models. Contains 30+ out of the box algorithms Autonomous Database Capabilities

Oracle Artificial Intelligence (AI) Platform for Geospatial Workflows

Through Oracle Cloud, GEOINT professionals can rapidly build, launch, and customize end-to-end AI services that accelerate and enhance intelligence insights. By providing a unified platform that combines spatial data administration, analytical skills, and other capabilities, Oracle Converged Database significantly benefits GIS data. The scalable architecture and diverse service offerings of Oracle Cloud contribute to supporting spatial applications and fostering the 4IR.

Security is a fundamental design principle within Oracle Cloud Infrastructure. Accredited through Impact Level 5 for US national security, Oracle Cloud can be utilized by the GEOINT community for sensitive but unclassified training and pipeline development. The cloud infrastructure offers robust security

measures such as customer isolation, data security, internal threat detection, and highly automated threat remediation. Oracle's extensive portfolio of security services ensures comprehensive protection.

Enabling Migration and Accelerating Machine Learning in Geospatial Workloads

Oracle Cloud Infrastructure simplifies the migration of existing Python models used in unique GEOINT workflows to the cloud using Conda. Oracle Data Science Service leverages Conda package and environment manager for building and managing machine learning environments, allowing data scientists to import environment specifications and seamlessly run their models in Oracle Cloud.

By leveraging Oracle's managed AI services, accessing OCI infrastructure and platform services, geospatial scientists can accelerate the creation and deployment of machine learning models. Oracle Cloud offers scalable storage, price prediction and management, blockchain security, high-performance computing, data pipeline services, autonomous databases, automated machine learning, automated jobs, and data lakehouses, providing an ideal environment for AI acceleration.

Empowering Citizen Data Scientists and Analysts

Oracle Machine Learning (OML) AutoML, a component of OML on Oracle Autonomous Database, empowers citizen data scientists and analysts by providing a no-code, browser-based interface that automates the machine learning modeling process and simplifies deployment. With a user-friendly interface and a comprehensive set of objects and methods, OML AutoML

enables rapid adoption of machine learning classification and regression algorithms throughout the enterprise. OML AutoML on Oracle Autonomous Database, provides a no-code browser-based interface that automates the machine learning modeling process and simplifies deployment to just a few clicks. **Oracle Cloud seamlessly integrates with various cutting-edge technologies**, including big data analytics, blockchain, and artificial intelligence. By combining spatial data with other data sources, organizations can leverage these technologies to drive innovation in industries such as autonomous vehicles, smart grids, supply chain optimization, and precision agriculture. Oracle Cloud's scalable infrastructure, spatial database services, geospatial analytics capabilities, and integration with spatial tools, along with its support for IoT data management, machine learning, AI services, and other 4IR technologies, enable efficient utilization of spatial data and facilitate innovation during the Fourth Industrial Revolution.

Conclusion

Oracle Cloud Infrastructure provides a market-leading price/performance ratio, making it the optimal choice for running Oracle Database, the industry standard for mission-critical enterprise applications. By leveraging Oracle Cloud's scalable infrastructure, comprehensive suite of services, advanced security features, and seamless integration with emerging technologies, organizations can efficiently migrate their geospatial workloads to the cloud, driving innovation, transformation, and enhanced operational efficiency.

Events and Engagements

- AGI was invited to discuss the formation of a national committee for formulating the proposal for a **Geospatial Sector Skill Council** in India, as envisaged in the National Geospatial Policy 2022, by the Department of Science & Technology, Government of India.

- AGI participated in the virtual **OGC India Forum** meeting, welcoming the new India Lead.

- AGI is exploring collaborations with **Business Swden**, starting with participation and co-hosting a session in the India-Sweden Mining Day 2023.

- AGI has joined the **Smart Cities India Expo 2024** as an Association Partner, offering exclusive branding and visibility opportunities to the AGI member ecosysem.

Webinars

- AGI conducted a **Virtual Symposium on the "What's Powering the Next in Geospatial"** with senior leaders from the government, industry and academic experts on India's National Technology Day. The interactive session broke down the road ahead by having experts analyze key opportunities, expectations, breakthroughs, and requirements shaping the Geospatial ecosystem. The eminent panel comprised:

- Dr. R.S. Sharma, Chairman, Geospatial Data Promotion and Development Committee (GDPDC)
- Mr. Sonmoni Borah, Joint Secretary, Department of Land Resources, GoI
- Sh. Sambasiva Rao, Director Survey, Directorate of Survey and Land Records,
- Govt of Kerala
- Mr. Ashish Kumar Jena, Joint Secretary, Government of Odisha
- Mr. Nikhil Kumar, Senior Vice President, AGI

- AGI co-hosted a **Webinar on the Applications of Geospatial Technologies for Smart Cities** with our academic partner, CEPT University, Ahmedabad.

- AGI co-hosted a Webinar on **Synergy of Geospatial Technologies and AI: Current Trends & Future** with our academic partner, IIT Tirupati Navavishkar I-Hub Foundation.

We value your feedback

AGI seeks to explore various avenues to enhance the quantum of interaction between geospatial industry units, academia, government and various other geospatial players. Therefore, we keenly look forward to your feedback and suggestions on various issues that can help meet our objectives. Write to: sakshi.singh@agiindia.com

Technology Day Symposium
What's Powering the Next in Geospatial?

Sh. R. S. Sharma, IAS Retd
Chairman, GDPDC

"For a long time, we had an ostrich-like approach [with data] wherein nothing was to be shared due to security and sensitivity concerns... This was something that needed to be demystified and debunked. The new Geospatial Policy 2022 is really a landmark in this sector... My congratulations to AGI and to all of you on this Technology Day for this announcement."

Sh. Sonmoni Borah, IAS
Joint Secretary, DoLR
Member, GDPDC

"The Policy outlines many opportunities... One is the engagement with line ministries and departments. Second is the Unified Geospatial Interface which is a critical component for sharing Geospatial data and improving its access in the country. Another opportunity can be a study of national and international standards since various line ministries and departments are working on different platforms."

Sh. Sambasiva Rao, IAS
Director Survey,
Government of Kerala

"The applications of GIS have evolved tremendously over the last 10 years. A decade back GIS applications were not so user-friendly. The technology was relegated to only a few sectors and few people. It has come a long way now. However, most of the applications we use are restricted to map-based services, planning, management, and decision-making support tools currently. But there seems to be a lot of scope."

What's Powering the Next in Geospatial?

AGI

"We are very far behind as far as Geospatial data creation is concerned. The government has a very run-of-the-mill approach when it comes to creation of data, and now that we have started using the services of the private sector and services of people who have domain expertise in the sector, this is emerging as one of the major opportunities for quality data creation."

Sh. Ashish Kumar Jena, OAS
Joint Secretary, Govt of Odisha

"New use cases and tech innovation are very important in concretizing as to where location intelligence and Geospatial technology are heading beyond the obvious applications of natural resources, disaster management and urban infrastructure: Automotives, eCommerce, Food Delivery, Transportation & Logistics, BFSI, Retail & QSR, Telecom & Utilities, Healthcare & Pharma, and Rail & Waterways."

Sh. Nikhil Kumar
Senior Vice President, AGI

"Geospatial technology offers a lot of opportunity in context of the large employable population in India, and what we call the neo-professionals...To implement these opportunities, the requisites are very large. As academic institutes, we need to invest in capacity building... IIT Bombay looks at this as a consortium approach in multiple ways, e.g. training and placing our staff across the world."

Sh. Sumit Sen
Chief Executive, GISE Hub, IITB

Watch the session recording on AGI India's YouTube Channel ▶