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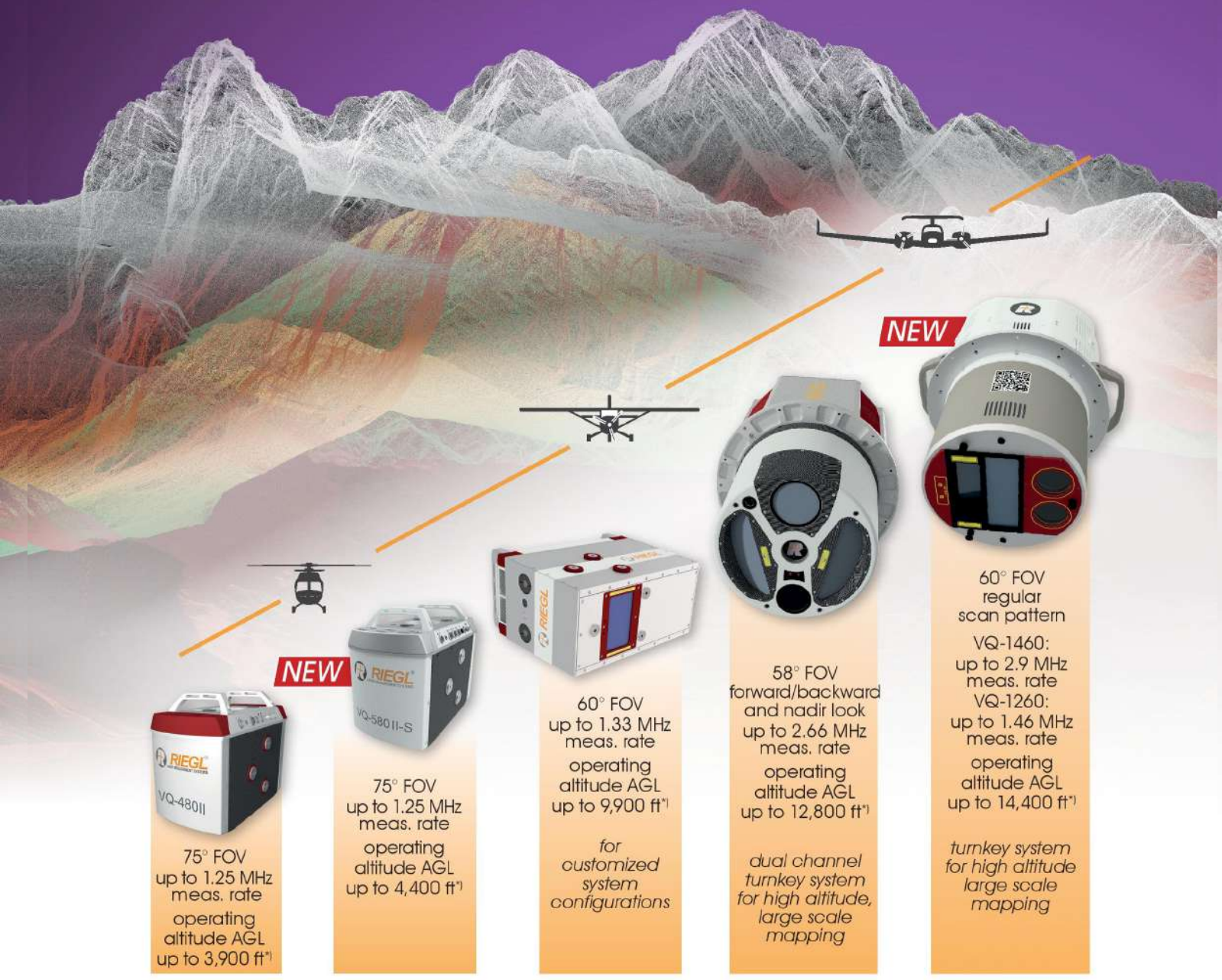


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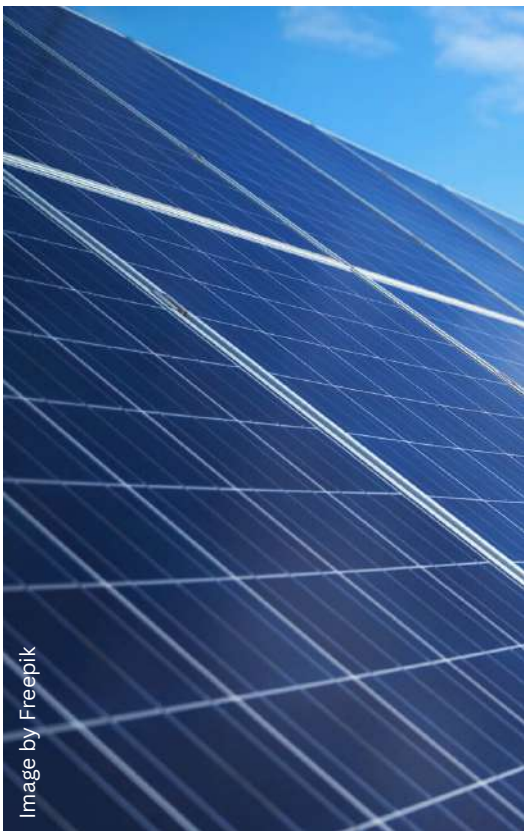

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# Editor's Note

By Ashok Prim

From its inception, the Geospatial Technology was built for its ability to determine precise position and direction. The evolution of Geospatial Technologies has brought about the integration of information and visualization. As is now commonly known, Geospatial Technology is an integral component of any aspect of infrastructure development. Renewable energy generation begins with infrastructure development. Renewable energy generation options are many but their performance and efficiency depend on location and direction.

From its current application in the siting of Solar panels, Wind towers, and Hydro-electric & Geothermal power projects, GPS coupled with GIS is uniquely positioned to locate, analyze and monitor these processes to make certain that renewable power generation sites are optimally sited and that the power generated is delivered efficiently.

Geospatial Technologies, using GIS, Augmented Reality (AR), and integrated with SaaS, are now used in monitoring and managing efficient energy production. When used locally and across networks, Geospatial Technology, will help to understand how all these systems work, interconnect, transmit and operate across multi-modal networks.

Geospatial Technologies combined with Geospatial analysis ensure the best possible renewable energy generation and transmission process for every community and improves the decision-making process for all involved.

Aerial view of a Repsol solar park in Archidona, Spain

# Accelerating The Clean Energy Transition With Geospatial Technologies

By Eva Carranza
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The transition to renewable energy is gaining momentum. Spurred by geopolitical conflict but also increased government commitment, global investment in renewable energy grew by 25% to reach a record $1.1 trillion in 2022. Governments realize that adopting renewables will help them mitigate climate change while freeing their economies from volatile fossil fuel prices and imports. Increasingly, homeowners are taking proactive steps toward sustainability and energy efficiency by incorporating solar panels and geothermal heating systems into their homes. Renewables, especially solar and wind energy, offer a promising solution for reducing greenhouse gas emissions while cutting energy costs in the long term. According to the International Energy Agency, renewable energy sources could provide up to 86% of the world's electricity by 2050.

Yet high initial financing costs continue to stand in the way of unlocking the vast low-cost renewable energy potential. For the world to reach net zero emissions by 2050, new technologies are required to drive down the costs of renewable energy production and storage capacity.

**Taking Renewable Energy Production to the Next Level with Geospatial Technologies**

Geospatial technologies are poised to play a crucial role in making renewable energy production more efficient and cost-competitive. Site selection, for example, is a crucial component of renewable energy production.

Geospatial technologies can help professionals analyze and compare different sites based on wind patterns, solar insolation, and proximity to energy transmission infrastructure. Once a windmill or solar panels are up and running, geospatial technologies can be used to map and monitor them to identify areas for improvement and maintenance, and to optimize operations.

Four case studies from Spain, Canada, the Netherlands, and China illustrate how technology-driven efficiency gains help make renewable energy production more sustainable, viable, and safe.

**Boosting Energy Production with Horizontal Axis Trackers at Solar Park in Spain**

R-evolution, the sustainable innovation and green-tech investment subsidiary of Hexagon, is leveraging technology and data to tackle ESG challenges and support the transition to clean energy. Hexagon sensors, software, and autonomous solutions help increase the efficiency and cost-effectiveness of renewable energy projects around the world.

As part of the solar initiative, R-evolution acquired 40 hectares of land (the equivalent of 60 football fields) to build a solar park in Archidona, Spain. Today, the site hosts a 16.44 MWp photovoltaic (PV) solar park with over 40,000 solar panels that convert the sun's energy into clean electricity and is connected to the grid.

The Archidona solar parks rely on Hexagon's broad range of digital reality solutions, including construction design tools, visualization platforms, and monitoring sensors and software. The resulting Smart Digital Reality of the solar park helps monitor and optimize the plant's operation from afar, enables predictive maintenance, and facilitates repairs and inspections.

The solar park features bifacial (double-sided) panels to enable energy absorption from both sides. The panels are mounted on horizontal axis trackers that allow for the tracking of the sun and automatic adjustments of the panels to increase efficiency and output. According to a 2020 research study, double-sided panels that track the sun can increase energy production by 35% and reduce the average cost of electricity by 16% compared to conventional systems.

R-evolution's photovoltaic project portfolio increases operational efficiency by creating and leveraging a Smart Digital Reality at every stage — from planning, designing, manufacturing, building, operating and optimising solar energy production. Solar tech innovations like these will continue to drive down costs while improving efficiency, a trend forecasted to continue for the next decade.

**Accelerating Solar Farm Construction with Leica Geosystems Technology**

Although the lifetime cost per kWh of solar capacity is considerably lower than the marginal generating costs of fossil fuels, solar farms require a substantial up-front investment. In addition, it takes time to realise the cost benefits. Developers must be able to accelerate project completion cost-effectively to gain the full cooperation of investors, landowners and surrounding communities.

During the construction of Canada's largest solar farm, surveyors used Hexagon technology to efficiently layout 228,000 steel piles to set the foundation for the racking and photovoltaic panels.

The tilt capabilities of the Leica GS18 T with Leica Captivate – combined with the diligence of the field crews – led to significant time and personnel cost savings. Crews could lay out piles up to 25% faster, completing hundreds of additional piles daily.

The project's surveyors used Captivate Field Software Stylesheets to manage the captured data points and streamline workflows for optimum efficiency. The software also enabled them to provide the client with daily progress updates directly from the field.

Enhancements in efficiency and transparency like these increase the competitiveness of solar energy and thus spur the adoption of clean energy solutions.

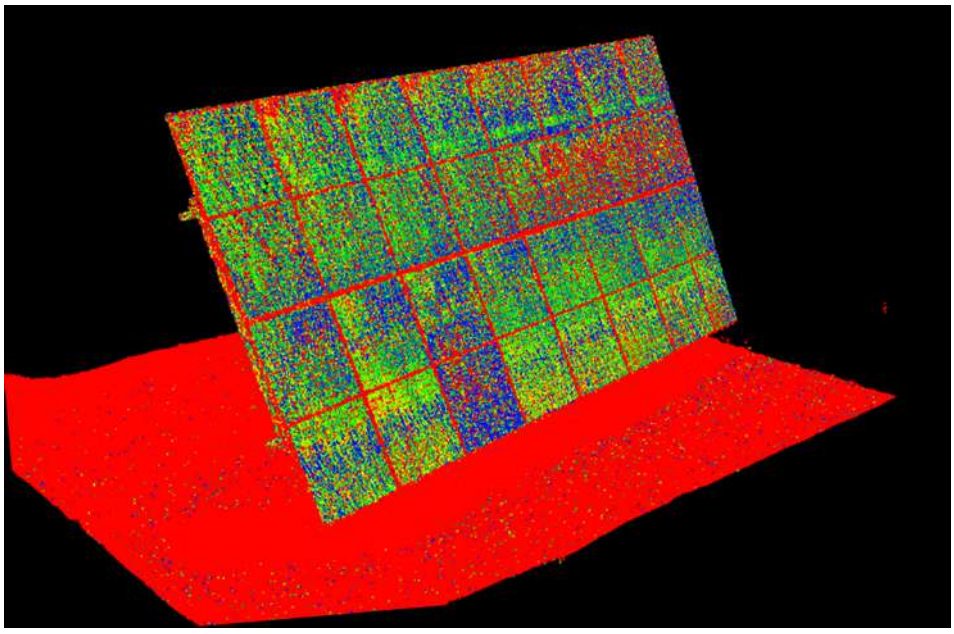


Figure 1: Solar panel imaging using the Leica BLK2GO handheld scanner.

**Enabling Floating Solar Farm Construction with Leica iCON gps 30 Piling System**

In the Netherlands, efforts are underway to install solar panels on floating structures in coastal areas, lagoons, and lakes. Floating solar farms have several advantages over land-based ones. For one, they don't encroach upon land that can otherwise be used to plant carbon-absorbing trees or grow food. For another, the cooling effect of the water allows the floating solar cells to run more efficiently.

Finding the right location to anchor floating solar panels and anchoring them securely enough to withstand extreme conditions remain major challenges. A Dutch construction firm specializing in anchoring systems has used the Leica iCON gps 30 piling system to position themselves when anchoring large floating solar panels. The technology allows them to reach depths of up to 40 meters without the need for divers, increasing the safety of the installation process. Hexagon's piling system enables fast navigation toward the drill location and instant, automatic logging of the as-built position.

So far, 72,000 solar panels covering 20 hectares have been installed with the help of the iCON system. The technology helps save fuel and time during the complex installation process, thus lowering overall construction costs. Keeping initial investments low is a prerequisite for the commercial success of floating solar systems, which, on average, still cost around 30% more to build than ground-mounted solar constructions.

**Ensuring the Stable Operation of Wind Farms in China with Leica Monitoring Technology**

China is heavily investing in wind farms to replace fossil energy sources. Yet wind farms are challenging to manage due to typhoons, geological disasters, material problems, unit failures, and other factors. Wind tower fans collapse frequently, affecting the operation of wind power facilities and thus making them unreliable. Disposing of wind blades from wind turbines poses logistical challenges and environmental issues, such as the potential release of toxic chemicals and the difficulty of finding suitable disposal sites. Keeping the blades functioning properly for as long as possible is essential.

At three wind farms in Dali, Yunnan province, a Chinese engineering firm has deployed Hexagon technology to monitor the deformation of 78 wind power towers.
The project uses Leica MS60 monitoring technology to obtain massive point cloud coordinate information from three sides of the wind tower every six months. Data from each period are then compared with Leica Cyclone 3DR software to analyze the deformation of the central axis and the surface of the tower.

The technology can accurately detect deformation of each position of the wind towers at the millimeter level and inform corresponding maintenance, thus ensuring the stable operation of the wind towers. Scanning and monitoring also help prevent casualties and property losses due to collapsing wind towers. Each fan unit costs around $4 million to install and generates around $400,000 worth of electricity per year. By ensuring that the fans are properly serviced and maintained, Hexagon technology enables the fans to reach or exceed their 20-year design service life.

**Conclusion**

The International Energy Agency projects that annual investments in clean energy would need to more than triple by 2030 to reach net-zero emissions by 2050.

Lowering the costs and improving the operational efficiency of renewables will be critical in convincing governments and private investors to double down on renewables. Geospatial technologies help optimise every stage of the lifecycle of renewable energy production, significantly impacting the bottom line and promoting higher adoption.

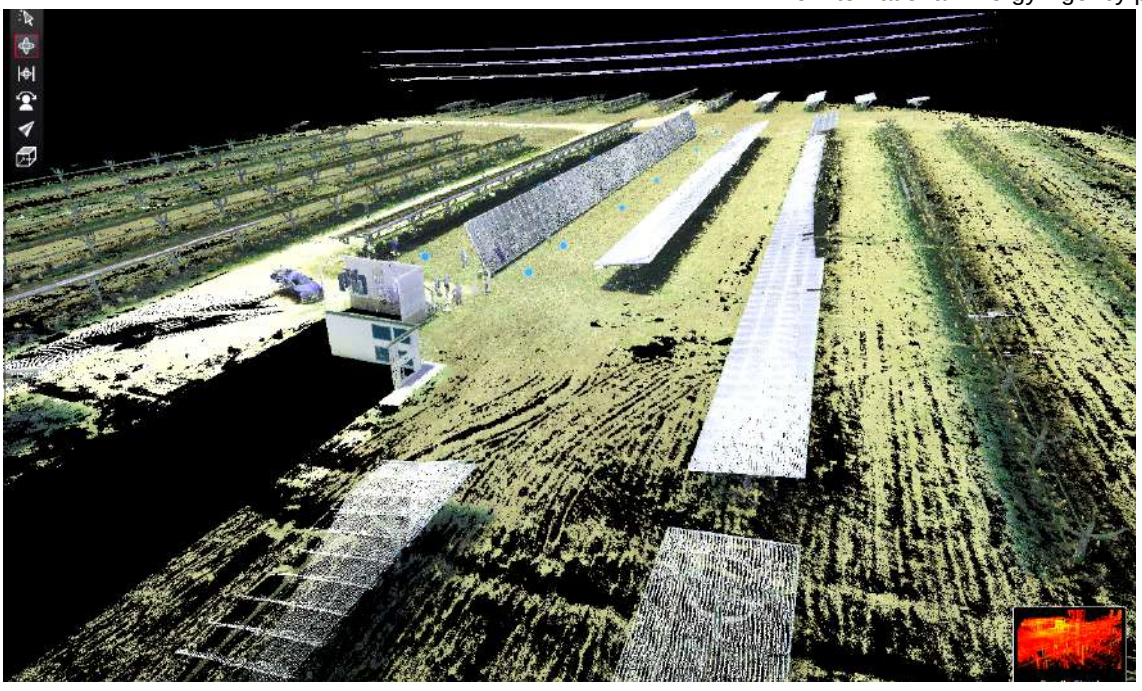
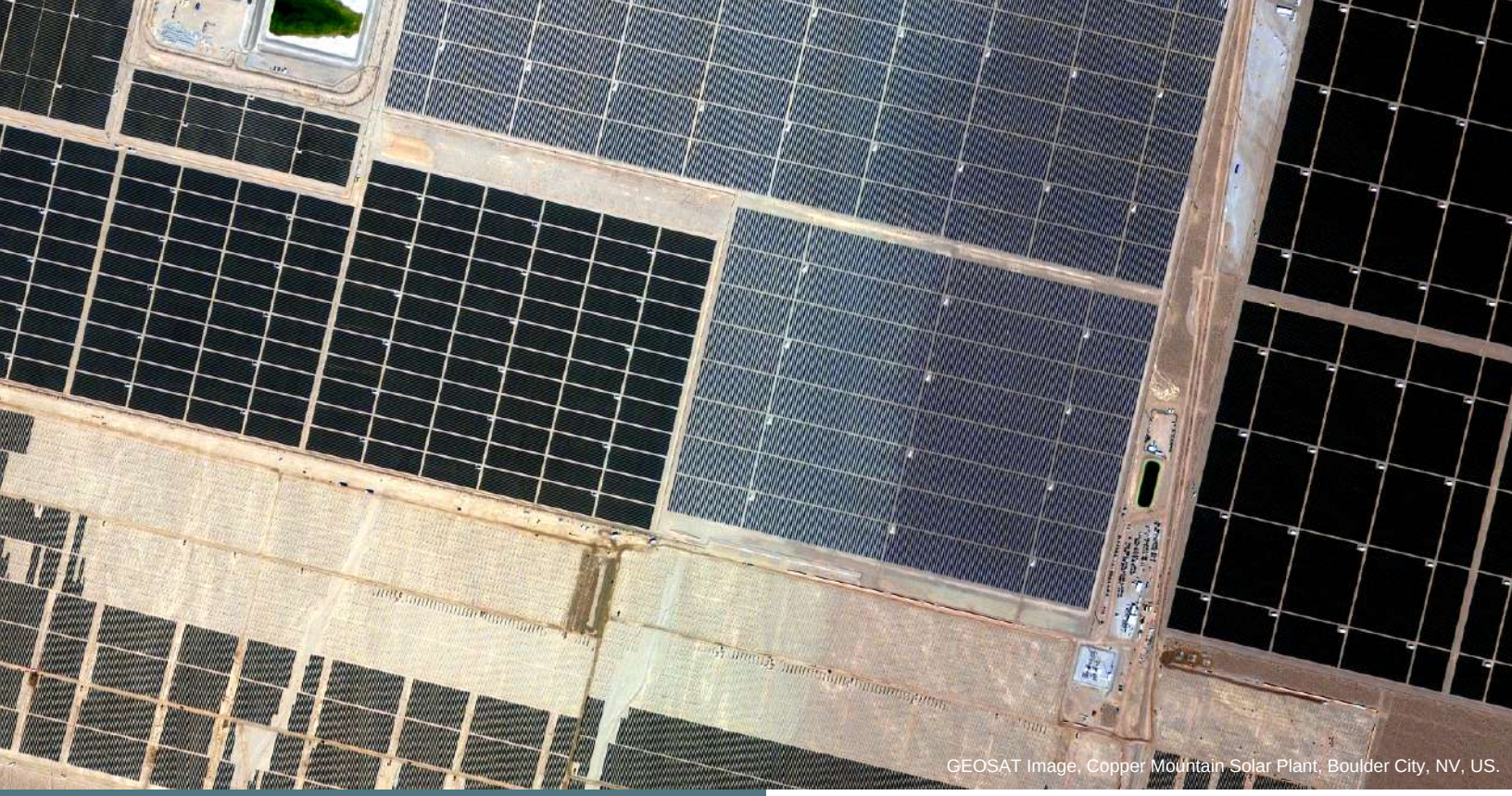


Figure 2: Digital twin technology helps optimize solar energy production.



GEOSAT Image, Copper Mountain Solar Plant, Boulder City, NV, US.

# EO As A Powerful Tool That Can Contribute To The Development Of The Renewable Energy Sector

By Javier Santos Wybenga
Business Development Director
GEOSAT

Space-based Earth Observation is driving innovation across many industries. It is a key capability to enhance effectiveness, efficiency and sustainability of resource exploitation and support the transition towards renewables.

There are no further doubts that the energy transition is one of the biggest challenges that humanity will have to face in the coming decades. And, on top of this urgency, is the need to promote this transition in a sustainable way, balancing the adoption of cleaner energy sources to decarbonize the economy by replacing fossil energies with renewables, without harming the already fragile environmental ecosystem. The “how” it can be done matters almost as much as the “what” is done.

Besides this issue being on the international agenda, this is an unpostponable transition, even when we still don't have all the answers on how to make this process as clean as possible. This reminder was one of the talking points last year, with International Energy Agency revealing that energy, the leading greenhouse gas-producing sector, increased CO2 emissions by 6% in 2021.

Finding ways to produce clean energy and effectively contribute to solving the climate emergency is, therefore, everyone's problem. In the coming years, major transformations in the renewable energy sector are on the horizon, but many other industries are focusing efforts to contribute to the challenge. The space industry, in particular Earth Observation, is one of them.

**Satellites Fostering the Energy Transition**

Satellite-based Earth Observation (EO) has proven to be a key tool in various sectors, such as agriculture, maritime surveillance, and monitoring, security, deforestation, and the development of smart cities, just to name a few. The ability to monitor large areas of our Earth in a short period of time and in a cost-efficient manner provides a powerful tool to know our World, develop businesses, and support populations.

In the specific case of the Energy sector, getting daily and intraday data from Space allows for addressing challenges at different levels, for planning, management, and operational purposes.

Thanks to the data provided by EO satellites, updated maps of the Earth's surface can be created almost in real-time, allowing for the identification and mapping of existing resources, enhancing the efficiency of exploration, monitoring infrastructures and operations, as well as assessing the environmental impact of energy activities, to ensure compliance with environmental regulations. All this fosters the Energy sector's sustainability.

EO imagery allows for the creation of data products, among which are the better-known Digital Elevation Models (DEM) and Digital Terrain Models (DTM), which can support the design, planning, and monitoring of operations and development of energy projects.

EO is also providing accurate and up-to-date information on the availability and characteristics of natural resources such as wind and solar energy. In the case of wind energy, for example, EO can be used to map wind speeds and directions before building a new wind farm, making the transformation of wind into useful energy much more efficient. The same applies to solar energy: calculate solar radiation levels in certain areas, to identify the best locations for solar power plants and even allow seamless comparison of production potential among different regions.

For the operational phase, EO is allowed to monitor the performance of renewable energy projects over time, such as tracking vegetation growth on land that has been converted to bioenergy crops or to monitor the cleanliness of solar panels and the performance of wind turbines. This information can be used to optimize the operation and maintenance of projects, helping to increase their productivity and reduce their costs.

Figure 1: GEOSAT Image, Tehachapi Pass Wind Farm, Mojave, CA, US.

**Bring Innovation and Efficiency Also To Fossil Resources to Enable Energy Transition**

In the race against time to achieve the targets set for the decarbonization of the World's economies, the focus on the mining and recycling of rare earths, and other metals is also an enabler for the Energy Transition, thus, almost paradoxically, appearing high on the priority list for renewables.

Lithium is a good case to look at this relationship. Today, lithium plays a critical role in much of what we do in our daily lives as it is an essential part of the technology that powers mobile phones, computers, power tools, storage of energy generated from wind and solar power, and is also used in medical treatments. But it is sustainable mobility, with the electrification of the automotive sector, that has made this metal one of the most sought-after minerals on Earth. The global demand for electric vehicles have risen rapidly over the past few years and the global automotive sector projections indicate a 30% increase in annual sales of electric cars by 2030.

Satellite imagery can also play a relevant role in helping geological mining exploration activities to be done in a more sustainable manner and with reduced environmental impact. With a direct application in the geological interpretation of a territory, EO also offers a growing source of information on activities related to the mineral exploration phase and detection of materials of interest allowing to focus activities in areas with lower impact on ecosystems and monitor this impact as operations are developing, in order to act as soon as environmental thresholds are crossed.

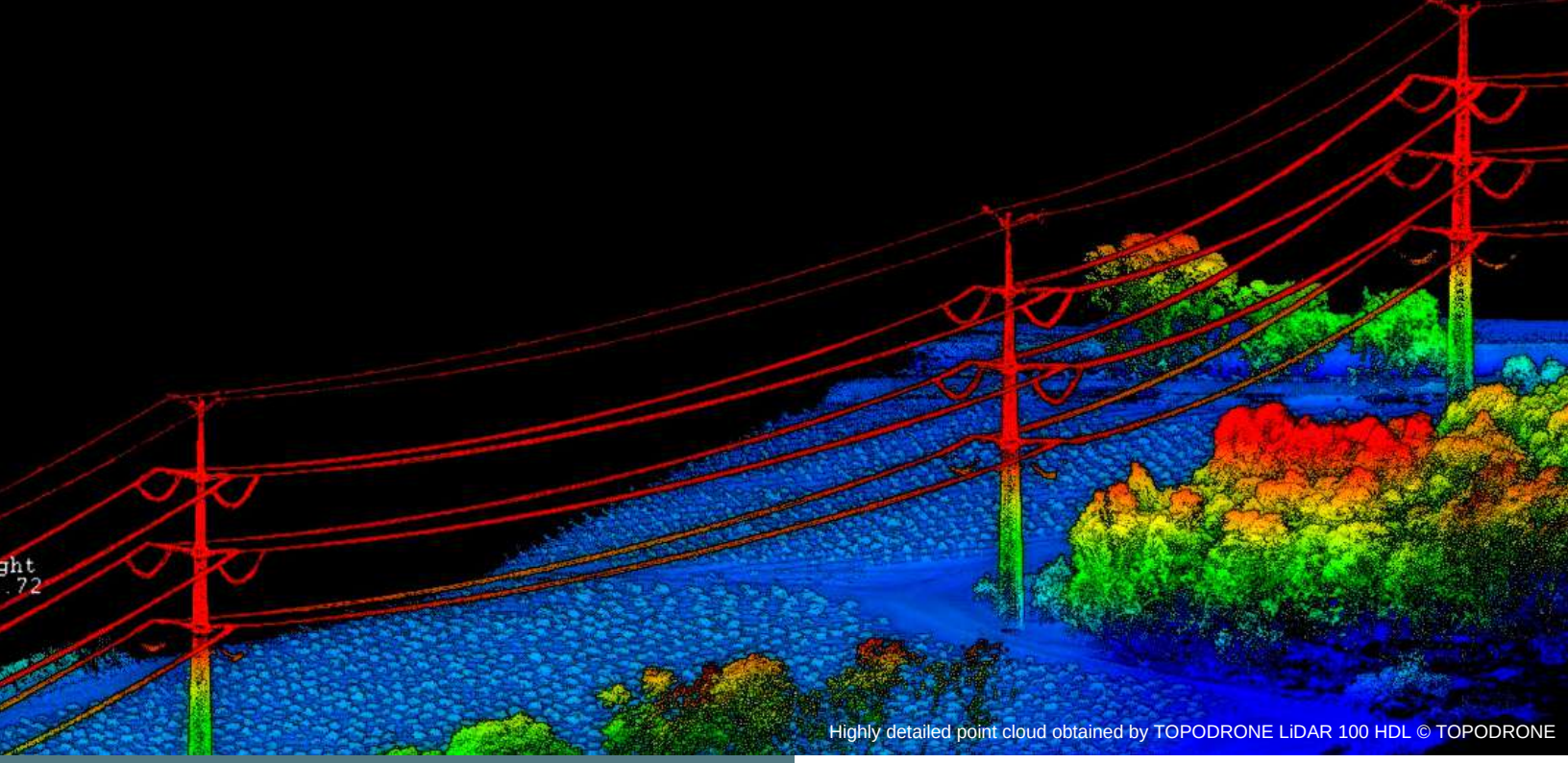
For all these purposes, Satellites are a complementary source of data that adds value to the existing ones such as aerial photography or fieldwork, namely through the possibility to obtain broad coverages in a short time, from anywhere in the World, and without requiring local operations. This, together with the spatial resolution and multispectral capabilities offered by satellites, provide a complete dataset to complement other data and to better deploy, when needed, local teams.

For the specific case of Lithium, GEOSAT has developed a model to detect lithium on the surface based on data from its satellites and partners, and a proprietary AI model.

EO is a powerful tool that can contribute to the development of the renewable energy sector in several ways. By providing accurate and up-to-date information on natural resources and environmental impacts, and improving the performance of renewable energy projects, satellite imagery can help optimise their operation and maintenance, and support renewable energy development across locations on Earth.

Figure 2: GEOSAT Image, Antwerp Port, Belgium.

Figure 3: GEOSAT Image, Diavik Diamond Mine, Canada.



Highly detailed point cloud obtained by TOPODRONE LiDAR 100 HDL © TOPODRONE

# From Reservoir Modeling To Power Line Inspection: How Airborne Surveying Contributes To Renewable Energy Development

By Maxim Baklykov
CEO
TOPODRONE



Drone-based surveying has already become an inevitable part of wind, hydro, solar, and nuclear power plant inspections and safety management while airborne LiDAR surveying has turned out to be the new norm for power line inspections. However, 2023 can become a game-changing year for UAV surveying for the needs of the power generation industry: the key breakthrough may go along with the need for environmental monitoring of floating wind turbines and solar panels. The synchronization of UAV-based photogrammetry, LiDAR, and bathymetry hardware and software solutions is expected to advance geospatial technologies for renewable energy and address both environmental queries and maintenance issues focused on electrical safety.

**How To Inspect And Map A Floating Solar Farm With Airborne Technologies**

“Floatovoltaics” is emerging and one of the fastest-growing power generation technologies as a low-carbon energy source. Floating solar panel structures could be installed on water bodies like lakes, basins, and reservoirs. Such installations offer a unique advantage: they don't take up land space which could be then used for construction and agriculture. The market for this technology is expected to grow by 43% a year over the next decade, reaching $24.5bn by 2031. Floating solar is considered a key technology in decarbonizing economies by 2050, according to NASA. As of today, the largest floating solar farm in the world is known to be located in Dezhou, Shandong, China, generating 320 megawatts (MW) per hour. But several more countries have started to launch their own projects, such as India, South Korea, Portugal, Thailand and others.

So far, TOPODRONE, a Swiss-based designer and

manufacturer of high-precision surveying equipment for installation on UAVs, vehicles, and backpacks, has contributed to surveying a floating solar panel reservoir in Northern Israel. The project was performed upon a request from the Israeli drone service provider ERELIS to conduct a pilot project of reservoir surveying with a UAV for ETZ HADEKEL Ltd. in Northern Israel.

Two-stage drone surveying was organized to deliver a high-precision 3D model of the reservoir. First, drone LiDAR survey and aerial photography were performed to identify the location of solar panels and cables in the pond: LiDAR scanning provided accurate detection of cables in the water. And second, a bathymetric survey was carried out to avoid obstacles in the water in automatic mode.

In the hardware part, aerial photogrammetry and LiDAR surveys were performed using a DJI M300 drone equipped with a TOPODRONE camera P61 and a LiDAR HI-RES system to determine the location of possible obstacles. An underwater bathymetric survey using a TOPODRONE AQUAMAPPER mounted to the same drone (in this case - it is DJI M300) was conducted to avoid detected obstacles (cables, solar panels, and other objects).

In the software part, the UgCS mission planning software with True Terrain Following mode (by SPH Engineering) was used together with an altimeter installed on the DJI M300 drone to keep the drone flight altitude at a required level. The collected LiDAR & bathymetry data was processed by TOPODRONE Post Processing software. Noticeably, the bathymetric survey results were well matched and integrated with photogrammetry and laser scanning materials and the carrier for the equipment could be a single UAV platform (in this case - it is DJI M300).

As a result, a georeferenced orthophoto map, a 3D model of the relief and objects, and a 3D model of the bottom of the reservoir, contour lines, and isobaths were generated. Such 3D models can be used for high-precision assessment of sediment volumes, general monitoring of reservoir banks, and visual monitoring. In addition, surveying with a TOPODRONE AQUAMAPPER made it possible to estimate sludge deposits in the reservoir.

**How To Inspect And Map Power Lines With Airborne LiDAR Technologies**

Power generating plants and transporting electricity is one of the most important components that ensure the functioning of today's world. Electrical power has been replacing other types of energy in many sectors of the economy. However, the main peak of power plant and power line construction fell to the 70-80s of the last century. Even though emerging renewable power technologies started to arise a few years


Figure 1: Reservoir surveying with TOPODRONE AQUAMAPPER © TOPODRONE.

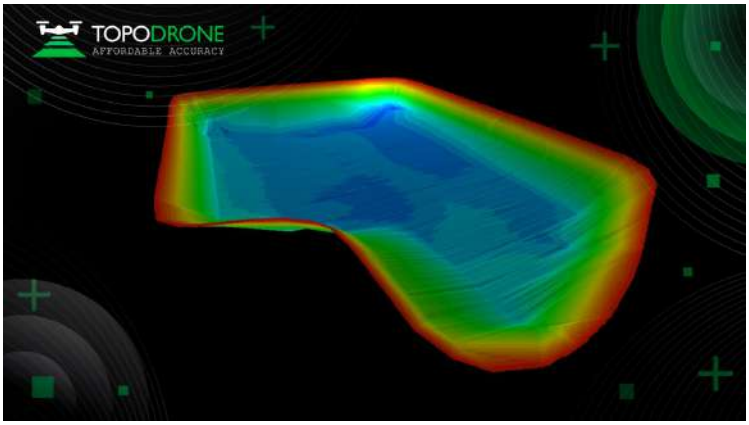



Figure 2: 3D model of a reservoir © TOPODRONE.

Figure 3: Power line inspections with TOPODRONE LIDAR HDL onboard of DJI M300 © TOPODRONE.

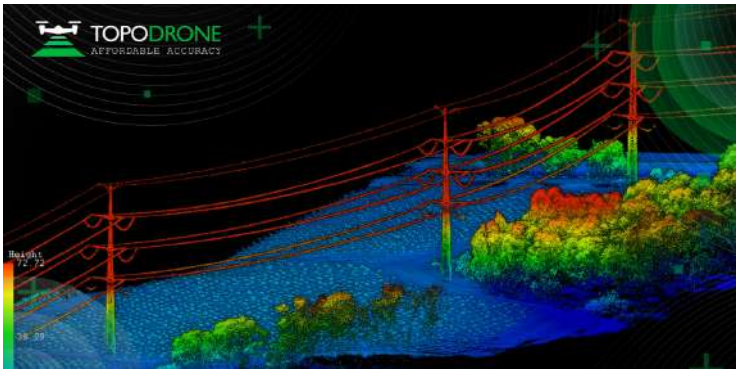



Figure 4: Highly detailed point cloud obtained by TOPODRONE LiDAR 100 HDL © TOPODRONE.

ago, in many countries electrical infrastructure has been in operation without any overhaul for over 30 years.

The task of comprehensive monitoring of power transmission lines, determining the conditions, wear, and tear of wires and contamination of insulators, detection of critical sagging, and contact of wires with the ground and various objects is crucial. Statistically, most of the damage to aerial power lines is short circuits and broken wires. The aerial survey and drone LiDAR survey allow us to solve these issues in a timely manner. A workflow example of a power line LiDAR survey could be discussed based on a case study from Israel.

The powerline route was aerial surveyed with TOPODRONE LiDAR HDL mounted on a DJI M300 drone. The survey was performed in two passes at an altitude of 80 meters. A reference base station was installed in the immediate proximity of the work area, recording static GNSS measurements throughout the duration of the flights.

The LiDAR sensor based on the Velodyne HDL32 allowed to view 360 degrees around and up to 30 degrees in forward/backward direction and obtain highly accurate and detailed three-dimensional models with a great level of detail. Thanks to the use of a tightly coupled GNSS-based inertial navigation system a point cloud was obtained with an accuracy of up to 2-3 cm in XYZ.

UgCS Expert mission planning software (by SPH Engineering) was used for this project to prepare flight paths, taking into account the location of towers and the detailed terrain model. The post-processing of GNSS measurements were performed in TOPODRONE Post Processing software. In order to determine high-precision coordinates of the base station, a calculation of static measurements in the Static Post Processing module was performed.

At the next stage high-precision trajectory was calculated using GNSS and inertial data stored at a 200 Hz rate (200 times per second) after that LiDAR point cloud generation was performed and within several minutes automatic classification and detection of wires, power line towers, vegetation, and other objects started.

The examples below demonstrate 2 types of point clouds:

1. power line mapping, characterized by clarity and detail unavailable for other models, including solid-state sensors;
2. automatic point cloud classification with highlighted power line towers, transmission lines, overhead wire, insulators, terrain and vegetation.

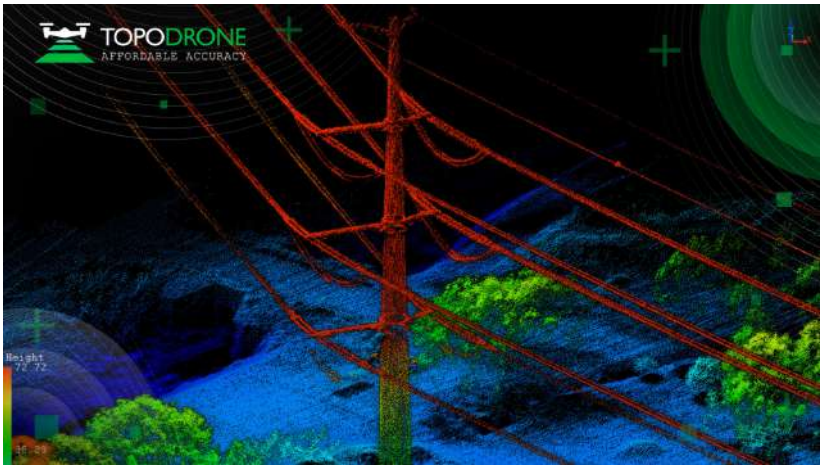



Figure 5: Highly detailed point cloud obtained by TOPODRONE LiDAR 100 HDL © TOPODRONE.

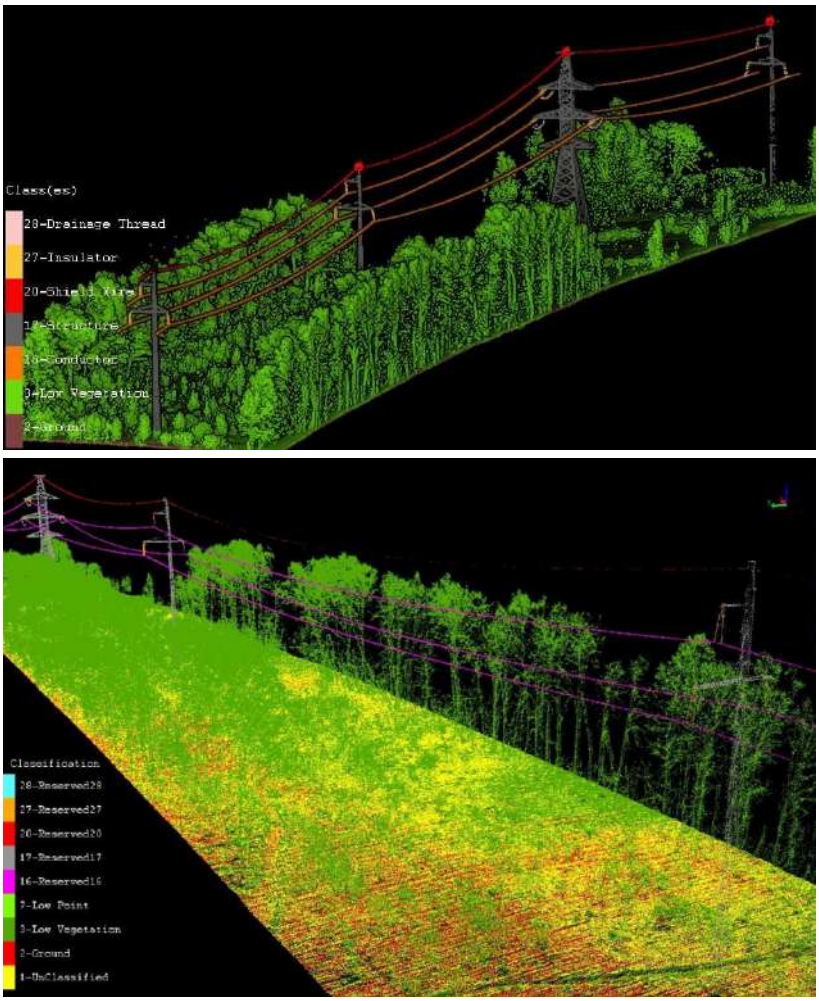



Figure 5: Automatic point cloud classification © TOPODRONE.

The final step was to analyze the existence of non-normative proximity of power lines with vegetation and other objects. The results of the automatic point cloud classification make it

possible to automatically search for objects in the non-normal proximity of power lines, to create a report, as well as to determine the angle of each pole, the sag of wires and the distance between them.

The application of airborne LiDAR technology provides not only high accuracy and detail of created 3D models, but also outstanding operational efficiency of data acquisition within a few minutes after the flight. At the same time, spectacular productivity of airborne laser scanning systems allow to survey any type of power plant or power station as well as tens of kilometers of power lines with one set of equipment engaging one or two trained specialists, extremely cutting time and expenses for field work and data processing.

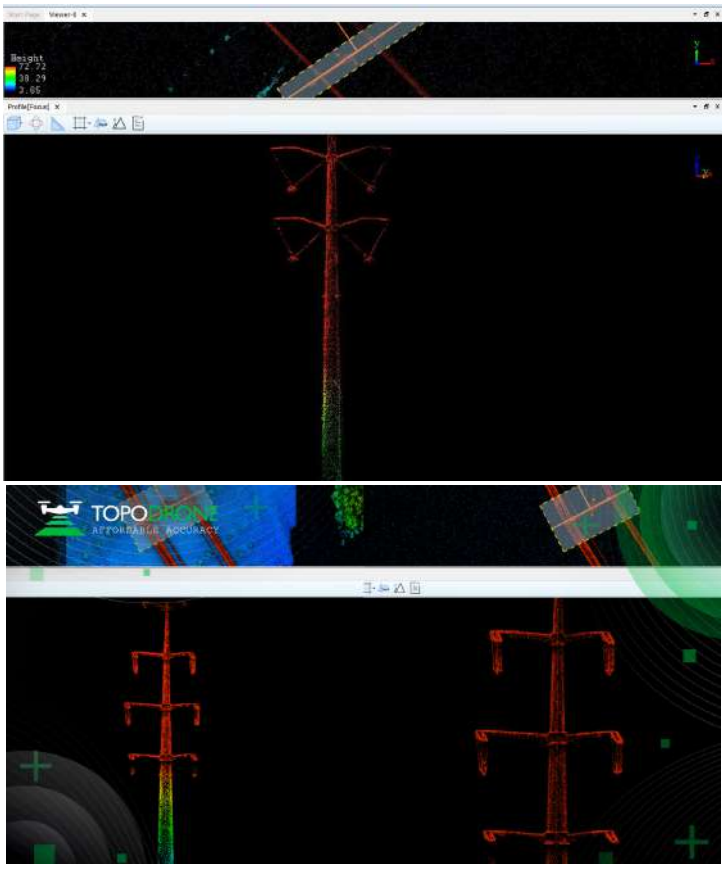



Figure 6: Cross-sectional view © TOPODRONE.

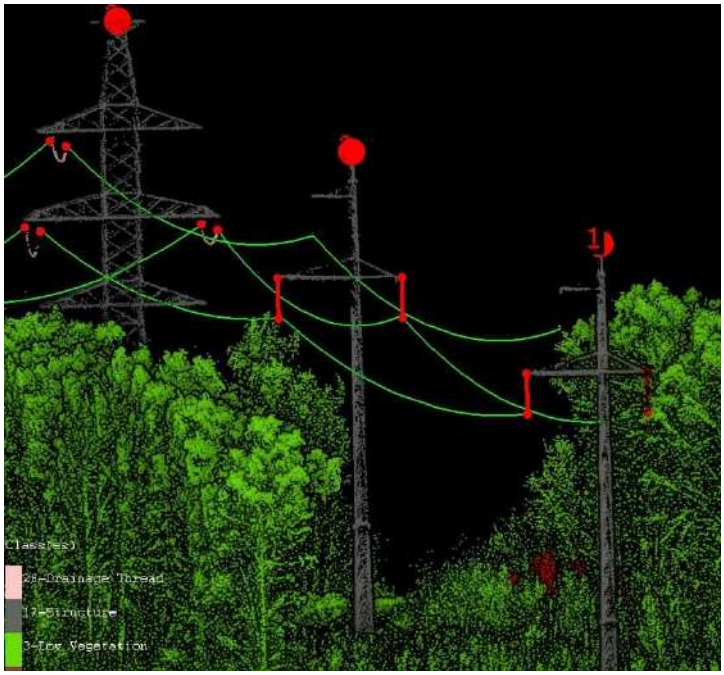



Figure 7: Automatic point cloud classification © TOPODRONE.

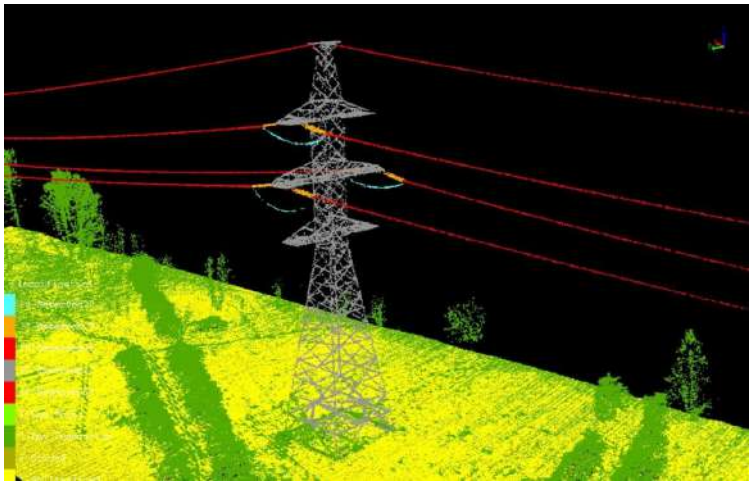


Figure 8: Automatic point cloud classification © TOPODRONE.

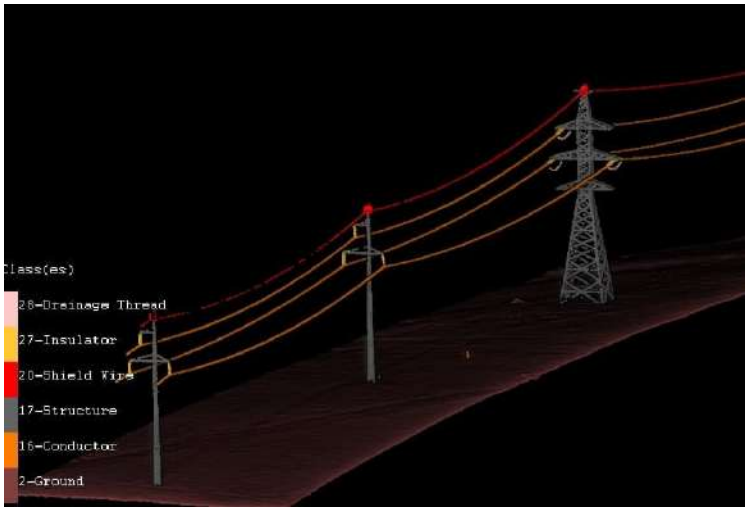



Figure 9: Based on the results of the point cloud classification, the location of wires and insulators was vectorized.

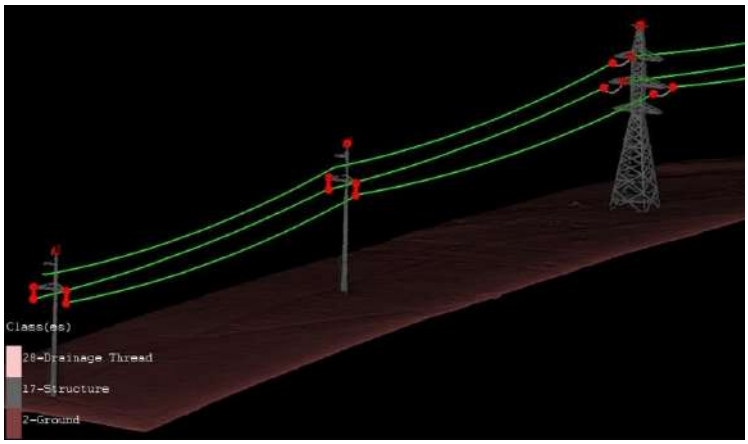



Figure 10: Automatic point cloud classification. Vectorised location © TOPODRONE.

# Utilities Can't Decarbonize Without Location Intelligence

By Bruce Taylor
Utilities Industry Lead and Partner
Locana

The utilities industry is undergoing the most significant transformation in its history, and GIS technology has a pivotal role to play in this industry-wide shift. The transformation is all about carbon. Utilities are setting ambitious Net-Zero emissions goals with aggressive timelines for decarbonizing their operations. A recent study by S&P Global Market Intelligence reported that 70% of the largest electric and gas utilities have set targets equivalent to Net-Zero or have announced plans to comply with similarly aggressive state mandates. High profile examples of this include National Grid, Hydro One, Southern Company, Eversource and First Energy, which are now aiming to hit their Net-Zero goals and interim milestones years even a decade or two ahead of their original schedules.

Those ambitious goals are prompting an industry discussion about how utilities can meet those milestones, but these conversations often overlook one of the most critical tools for achieving their Net-Zero goals: location intelligence. Without a strategy for utilizing location intelligence delivered by Enterprise GIS systems, utilities will face a far steeper, potentially impossible, route to their sustainability goals. Simply put: the success of these initiatives hinges on whether utilities have the right GIS strategy.

GIS is critical to achieving utilities' decarbonization goals because the role location-based data plays in utilities is so central to their operations.

Nearly every piece of infrastructure of a utility's operations generates location-based data. That ocean of data contains critical information and decision-guiding insights for utilities – particularly for sustainability and Net-Zero initiatives – but turning that raw data into actionable information has traditionally been a challenge.

Utilities have relied on their GIS departments that do exactly that for decades, but the scale of those efforts has been limited by the limited number of people trained in this highly technical work. Their talents were strategically put to use in a few key areas of particular value, including site selection, storm recovery, and support of mobile crews working on site. The potential was always there for location intelligence to play a much larger role, and it's finally coming to fruition at the exact moment when utilities need it to achieve their ambitious sustainability goals.

That shift is happening now because of next-generation Enterprise GIS, which puts the power of geospatial-driven insights into every department of large organizations like utilities. This empowers users across utilities to harness the power of location intelligence for the first time. That kind of democratization of location intelligence tools is happening at the perfect time because so many of the operational initiatives that will move utilities closer to their Net-Zero goals depend on location-driven insights such as:

- The deployment of DERs to increase the scale of renewable energy assets
- Infrastructure upgrades to enable smart grid capabilities
- Implementation of IoT sensor networks to measure environmental data and equipment performance
- Mapping of land holdings to identify potential offsets
- Capacity planning as grids become sophisticated meshes of traditional infrastructure and microgrids
- Real-time DER and microgrid monitoring
- Peak load management involving smart meter programs
- Power storage in commercial and residential battery systems
- Expanded vegetation management to protect distributed assets beyond traditional power lines
- Enhanced support of mobile crews who are supporting renewable assets
- Measurement of decarbonization efforts
- And so much more

Without location intelligence, planning, implementing and measuring each of those programs is much more difficult to execute – posing major roadblocks to Net-Zero momentum in the process. To illustrate this, let's look at the deployment and management of renewables, which is one of the key areas where location intelligence is having a major impact. Field crews using mobile devices are accelerating the timeline for installations of renewable assets and the smart grid infrastructure that supports DERs. These devices utilize location intelligence to help plan these projects and make the installation processes far more efficient. These devices also capture and verify location-based data that give utilities a far more accurate view of their infrastructure, supporting the creation of digital twin models that support many aspects of operations.

Once those renewables are operational, the role of location intelligence becomes even more vital, providing real-time information that enables utilities to understand the status of DERs and microgrids and orchestrate the distribution of energy across a far more complex landscape of energy generation, transmission, storage, and consumption.

Location intelligence also has a crucial role to play in one of the hardest aspects of Net Zero initiatives: accurately measuring and reporting progress towards achieving and sustaining those objectives. Measurement of sustainability is one of the most complex aspects of green initiatives across every market, but it is particularly complex in the utility industry because of the sheer scale of infrastructure, the number of assets, and the number of generation and consumption points in smart grids. That measurement and reporting is far more difficult without the analytics and reporting that location intelligence delivers.

Location information is at the center of every utility's efforts to implement their Net-Zero plans, but the key question is whether they can translate the ocean of raw data into actionable information for each of the programs above. Today, the answer to that question for the vast majority of utilities is "not yet." One reason why is the quality of their data: utilities' location-based data is often trapped in outdated systems, siloed in separate areas of the organization. Another reason utilities can't answer that question in the affirmative is the age of their legacy geospatial software, which should be updated and integrated. Both of those challenges are eminently fixable, with the right location intelligence strategy.

Utilities that understand how much their sustainability goals depend on location intelligence will be able to accelerate their decarbonization programs and put themselves on a more successful path, which will be integral to shifting the entire utilities industry to a more sustainable model.

**About the Author**
Bruce Taylor is a Partner at Locana and the Utilities Industry Lead. His 25-year career in utilities includes both consulting as well as seven years as a GIS manager for a metro Atlanta utility. He has developed GIS strategy and managed utility GIS implementations at some of North America's largest utilities.

Image by Freepik

# Geospatial Technology for Renewable Energy Management

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Energy is always in demand both for household and industrial use, and the Earth's population has to manage energy sources depletion before running short. Renewable energy sources are a great solution to this issue, and satellite remote sensing technology helps in its control. Furthermore, such sources can fuel remote sensing itself, for example, solar illumination is used to recharge the batteries of satellites operating in space.

Space technology nowadays assists in researching the energy of the sun, water, and wind, and mapping their favorable concentrations. Satellites can provide data on water temperatures and speed flows to predict their effect on environmental communities.

**Space Monitoring Technology**

With all the useful insights that geospatial technology can highlight in multiple spheres, raw satellite imageries often need help comprehending and require proper spatial analysis. EOS Data Analytics (EOSDA) is among the leading companies that provide satellite analytics worldwide. EOSDA harnesses artificial intelligence and machine learning to obtain readable data for 22 industries, with a keen focus on the monitoring of agricultural lands.

EOSDA analytics prompts well-grounded and effective decision-making in every segment of the agricultural sector, enabling the company's clients to have more profitable businesses. However, EOSDA products and services have

been developed with environmental protection and sustainability in mind.

Together with Greenpeace Global Mapping Hub, EOS Data Analytics co-hosted a free webinar in October 2022. The online event was devoted to the assistance of crop monitoring systems and other satellite technologies in supporting a sustainable environment by promoting responsible forestry and agriculture. Webinar presenters also covered the capabilities of EOSDA products in environmental monitoring, which is important in research undertakings and mitigating the negative footprint of farming activities on planet Earth.

In January 2023, the company launched the first satellite of its 7-unit proprietary EOS SAT constellation and completed its service-rendering cycle, including data retrieval, processing, and delivery of geospatial imagery analytics. So far, EOS SAT is the first satellite constellation specially designated for farming needs, thus leading out satellite crop monitoring on essentially advanced levels. Among other advantages, space technology and satellite imagery analytics help in reducing resources and energy use, as well as in adopting renewable options. EOS Data Analytics is highly dedicated to making its own contribution to the renewable energy sector by:

- identifying favorable locations for wind farms and solar plants;
- monitoring their operation;
- assisting in the management and optimization of their work.

**Sources of Renewable Energy**

As the name suggests, renewable energy is one with the possibility to be naturally restored, and the main idea about renewables is that they can be replenished faster than they are consumed. Such sources are numerous. The most typical examples of renewable energy sources are solar light and wind. Others include hydropower from water streams, vegetation biomass energy, geothermal energy (internal heat of our planet), and more.

Renewable power is relatively cheaper and is by far friendlier to the environment than traditional one.

**1. Solar Power**

Solar energy is the energy of sunlight that is typically collected and converted to electric power in photovoltaics. The greatest advantages of this source are that the Sun provides this energy in abundance, and solar energy production by panels does not imply harmful greenhouse gas emissions, say, as fossil fuels do. Solar energy has been used to heat water in outdoor tanks and generate electricity for individual households, industrial enterprises, educational and healthcare institutions, governmental and non-governmental organizations, spacecraft, farming equipment, automobiles, etc.

Figure 1: EOS DATA Analytics have developed an algorithm based on remote sensing imagery analysis which constructs a mosaic of the globe every 2 weeks; determining the number of solar plants and calculating their square, average performance, and many other factors.

Because traditionally derived energy becomes more and more expensive year by year, solar power gains more popularity and a wider scope of applications. In this regard, geospatial technology turns helpful in solar radiation quantifying and modeling, as well as solar plants deployment, maintenance, optimization, and monitoring.

Increase Energy Production through Terrain Simulations
Satellite-derived geospatial data proves useful in solar energy generation and transportation. Georeference and GIS mapping allow for thorough control of solar plant operation in a specified location:

- timely response to any technical issues;
- equipment failure prevention measures;
- quantitative and qualitative power generation predictions;
- assessment of environmental impacts;
- minimization of competition with wildlife habitats and agricultural lands.

Floating solar plants seem to be a promising alternative to land-based deployment since this option doesn't only eradicate the expansion of agricultural and wildlife territories but allows for water cooling of equipment systems. However, choosing favorable water surfaces for suitable solar panel locations is often challenging, and this is where satellite technologies can help. Furthermore, satellite data enable experts to calculate current and potential solar energy generation on a certain territory.

The correlation between square meters and the amount of energy produced helps to optimize the plant area coverage and minimize the aforementioned agricultural and wildlife competition. High-resolution imagery (30 cm-1 m) helps

determine the most favorable solar plant location, and frequent satellite revisits (up to several revisits per day) allow for effective operation control. All in all, geospatial data can tell an expert if the questioned water or ground surface is suitable to house a solar plant and enables preliminary calculation of the optimal terrain size.

***Optimization and Improvement upon Solar Panel Maintenance***

After deployment, solar plant facilities require systematic control that ensures their proper functioning, and monitoring through geospatial data allows for adequate equipment maintenance. Providing valuable insights remotely, satellite imagery is particularly useful when it comes to controlling large territories, while GIS data shows the exact place with probable equipment failures.

Such failures may occur due to physical damage by birds, downpours, or windstorms, and can be detected by high-resolution optical satellite imagery. Furthermore, solar panel malfunctioning due to weather extremities can be prevented if managers are aware of impending events, thanks to satellite-driven weather forecasts.

On top of that, geospatial technology can do even more. Radar-equipped remote sensing media can identify malfunctioning issues like overheating, which is not visible to the human eye. In every detected case, solar plant facilities require proper human inspection, but geospatial technology speeds up troubleshooting with early warnings.

**2. Bioenergy**

Plants are capable of turning sunlight energy into chemical one in the process of photosynthesis. So, vegetation biomass can be further converted into bioenergy either by direct burning or making liquid and gaseous biofuels. However, plants are not the sole bioenergy source.

Other sources to derive renewable energy include animal manure human sewage and organic wastes. Examples of biomass for renewable energy comprise:

- Wood and all sorts of timber procession wastes, including wood proper, wood pellets, chips, sawdust, and lignin-rich black liquor from wood pulp.
- Organic urban wastes like paper, cotton, wood materials, and culinary wastes.
- Animal manure and fats as well as human sewage for biofuel (biogas) production.
- Technical agricultural crops for biofuel production and their residues: corn, sorghum, rapeseed, canola, soybeans, sugarcane, sugar beet, and others.

The demand for technical biofuel plants urges the expansion of land for their production, but crop monitoring and respectively farm management turn challenging when the areas are vast. Nonetheless, satellite imagery can be helpful in this regard, providing regular monitoring of agricultural lands.

By making data-driven decisions, agriculturalists can increase their business profitability and mitigate the negative impact on the environment by decreasing chemical pollution. In particular, satellite crop monitoring provides information on soil moisture, weather conditions, and other important agricultural factors. Satellite-derived vegetation indices report plant greenness intensity, which allows for assessing crop productivity and making necessary amendments in growing conditions.

However, farmers are not the only users of crop monitoring systems. Satellite remote sensing provides actionable insights for all renewable energy stakeholders and is helpful in business planning, policy-making, enterprise establishment and deployment, crop processing, transportation, energy distribution, and more.

Crop monitoring also helps to detect low-yielding agricultural fields suitable for second-generation biofuel production. Assessing the farm productivity allow for predicting raw material supplies and deciding on favorable locations for processing enterprises. Satellite data is also used to estimate the potential of abandoned farming areas for the renewable energy sector.

**3. Wind Energy**

Energy-production capacity of wind has been discovered millennia ago. The wind potential on our planet is enormous, and by far exceeds the potential for traditional electric-power

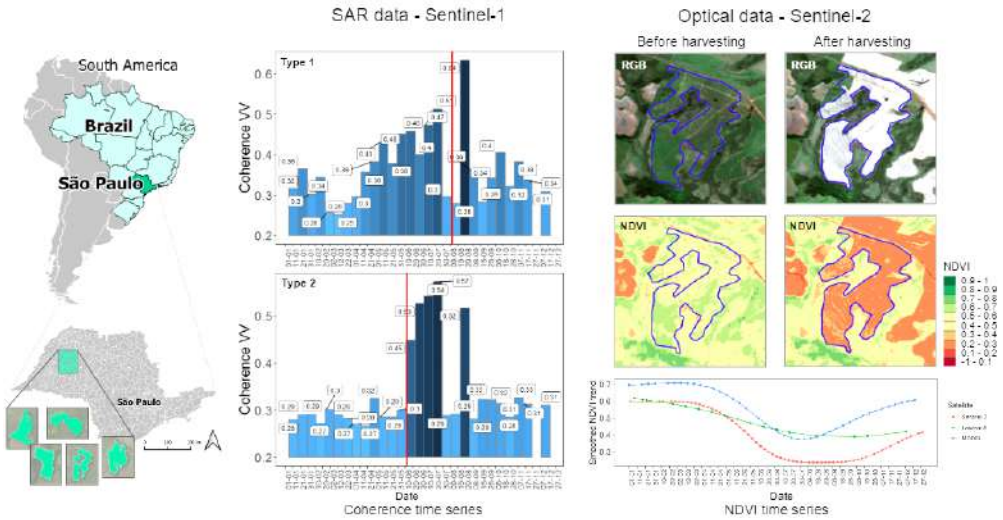


Figure 2: Harvest monitoring of sugarcane in Brazil by EOSDA CropMonitoring.

production. Wind energy is derived from large turbines rotated in windy weather, and the stronger the wind gusts, the more energy can be produced.

Humankind can flaunt the successful experience of using wind farms both on water surfaces and land (off-shore and on-shore respectively). However, this alternative energy sector has considerably advanced in recent years. Apart from the industrial potential to produce more powerful equipment with bigger turbines, present-day wind energy production, and its management are strongly supported by remote sensing applications.

There are windy days in any Earth's corner, yet not each place is suitable for a wind plant site. Tracking weather trends through historical satellite data allows for choosing the best location, and regular wind farm monitoring from space facilitates managerial decisions. The best sites to house wind farms are often located in remote places, so their control with geospatial technology is quite often the only feasible option.

However, typical weather trends and climatic peculiarities are not the only information that satellites can provide. GIS mapping contains several layers, and the best thing is that they can be collected in a single interactive map, which is very convenient for analysis. To realize the area's potential, a wind energy expert needs to know:

- density of the local population for consumption assessment;
- distance to roads for the best logistic solutions;
- land use for understanding possible environmental impacts;
- area slope and elevation (which often affects wind speed);
- wind properties for an adequate resource assessment.

Essential wind properties include wind speed (velocity), as well as density and volume of air masses (respectively the mass and amount of air). Understanding the resource potential is important to calculate the required height of turbines and the size of their rotors, as well as decide on the best deployment.

Combined with ground topographic data and other sources, GIS maps reveal all determining parameters to make the best location choice, as well as outline the area limitations. Such limitations include transmission lines or bird migration routes and other environmental factors. Having all the necessary data at hand in a single GIS map prompts brilliant decisions.

**3. Hydropower**

Nowadays, hydropower stations produce the greatest amounts of renewable electricity worldwide using the energy of water. Hydropower production relies on the law of gravity and it is generated by flowing or dropping water currents.

Figure 3: EOSDA Analytics applies object recognition technology to provide accurate and scalable Wind Farm performance calculations.

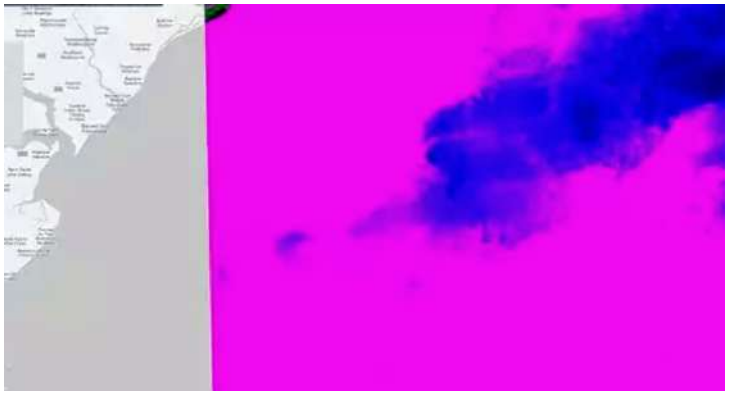

Figure 4: Satellite-facilitated water surface inspection enables precise determination of wind speed and direction.

Hydropower stations can be installed either on still water bodies or rivers, where water flows from higher to lower locations.

Proper operations of hydropower stations strongly depend on the amounts of available water typically supplied with regular rainfall. Correspondingly, droughts adversely affect the capacity of hydropower stations and can cause their malfunction.

When planning and constructing hydropower stations, experts need to analyze the proximity of water bodies, as well as rainfall patterns in the area. Geographical information systems (GIS) can help to decide on possibly suitable locations.

Hydropower stations vary in area and equipment size, from large-scale plants with huge dams to local run-of-river facilities. Their size affects their deployment, varying in area size, investment and maintenance costs, environmental impact, as well as the time for construction, staff training, and other factors. Respectively, smaller projects are less expensive and faster to deploy but the capacity of their facilities and generated hydropower volumes are also lower. Typically, run-by-river turbines are rotated with water passing through penstock pipelines, entering them from higher locations and further flowing downstream the river.

The great thing about geospatial technology (and particularly, geographical information systems) is that it enables hydrological modeling. It becomes possible by combining topographic and weather data, both from the ground and space. A GIS map includes data on elevation (DEM, or Digital elevation models), soil properties, soil cover, land use, riverbed boundaries, watershed areas, and climatic peculiarities (rainfall, relative air humidity, current and accumulated temperatures, wind speed, etc.).

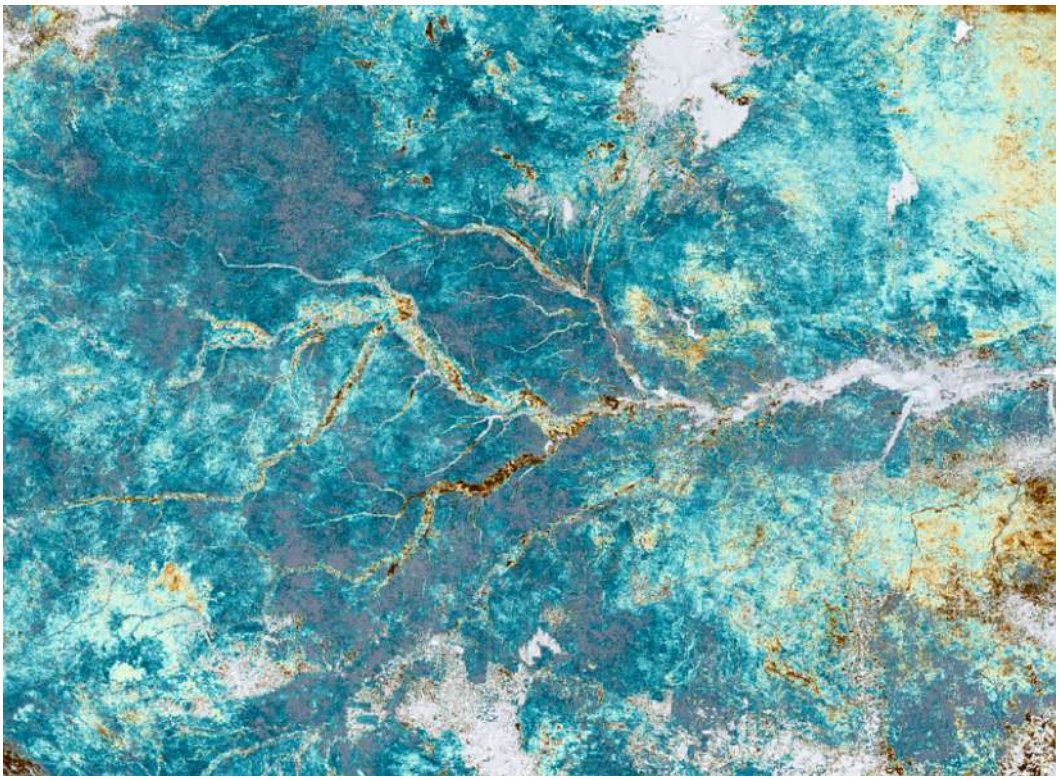

Figure 5: Satellite imagery of the topography of the river and near the river.

Understanding accurate water amount potential and knowing regional peculiarities help determine water-generated electricity prices and specifics of dam construction, e.g., their length, height, drainage positioning, etc. Such insights are also useful to optimize hydropower station operations.

In some northern countries with abundant snowfall like Norway, hydropower stations can cover nearly all electricity needs, and satellite-based digital elevation modeling turns extremely useful. It allows for predicting snow-melting run-offs that can be used to produce hydroelectric power. Such predictions are made by analyzing the thickness of snow cover, soil temperature, weather temperature, wind speed, and other parameters collected both from available space and ground data sources.

Satellite imageries are acquired by optical and radar sensors. While optical imagery data may be insufficient due to cloud cover, radar satellites provide the necessary information even when the sky is overcast. Thus, geospatial technology is used in assessing potential water volumes and hydropower produced, as well as predicting floods and mitigating their consequences.

**4. Geothermal Energy**

Geothermal energy is also used as a source to generate alternative energy through the heat stored inside the Earth. The heat in the core of our planet accumulated after its formation and was released in the process of radioactive agents' splitting. Geothermal energy can be found far beneath the Earth's surface – namely, in its center. The main sources of geothermal energy are the Earth's core fluids and hot rocks.

The probing of suitable sites for harvesting this energy type is typically performed by drilling. This method allows for measuring the temperature in the heart of our planet at different depths. Drilling is quite an accurate method but it involves considerable financial inputs and human efforts.

SAR-equipped (synthetic aperture radar) satellites offer a comparatively cheaper method to identify the Earth's geothermal potential. Furthermore, SAR remote sensing is extremely handy for remote and hard-to-reach places.

SAR satellite imageries are suitable not only for a direct and indirect mapping of potential locations of geothermal energy plants and planning their favorable deployment but for the monitoring of geothermal energy harvesting and optimization of facilities exploitation.

Different methods of SAR data analysis allow for understanding the geophysical, geochemical, and geological properties of our planet. Furthermore, Earth observation has been considerably improved by a rising number of satellites with better equipment and more frequent revisits. Besides, thermal infrared sensors are reliable media to provide accurate information. Suitable geothermal energy plant locations can be also identified with thermal springs and other visible on-ground markers or aerial vehicles.

These data sources are augmented with remote sensing, and advanced technologies of digital satellite imagery processing and AI-powered analytics open up new horizons to unlock the geothermal and other alternative energy potentials of our planet.

## GEO NEWS

January 01, 2023 - March 15, 2023

### ISRO Successfully Completed Flight of Small Satellite Launch Vehicle

Small Satellite Launch Vehicle (SSLV) successfully launched three satellites into their intended orbits. In its second developmental flight, the SSLV-D2 vehicle placed EOS-07, Janus-1 and AzaadiSAT-2 satellites into their intended 450 km circular orbit with an inclination of 37 degrees. SSLV is the new small satellite launch vehicle developed by ISRO to cater the launch of small satellites up to 500 kg to Low Earth Orbits on 'launch-on-demand' basis. SSLV-D2 carried EOS-07, a 153.6 kg Earth Observation Satellite realised by ISRO; Janus-1, a technology demonstration satellite weighing 10.2 kg belong ANTARIS, USA; and AzaadiSAT-2, a 8.8 kg satellite realised by Space Kidz India by integrating various scientific payloads developed by 750 girl students across India.

### NOAA Selects Woolpert for Hydrographic Survey and Bathymetric Data Collection

Woolpert has been selected by the NOAA to perform hydrographic surveying and collect bathymetric data in the Chesapeake Bay Watershed. The $5.5 million award with a $1.4 million option, funded in part by the bipartisan Infrastructure Investment and Jobs Act, is being administered through NOAA's Office of Coast Survey hydrographic services contract. Woolpert will employ five of its survey vessels and display data collected in real time to support inundation modeling, floodplain analysis, and coastal resilience. These data will serve several missions in years to come, including navigation, inundation modeling, floodplain analysis, and coastal resilience.

### Airbus Wins Contract from Angola for Earth Observation Satellite Angeo-1

Airbus Defence and Space has announced an agreement for Angeo-1, the first very high performance Angolan Earth observation satellite, to be manufactured by Airbus Defence and Space in France, which strengthens the collaboration between the two countries. An Airbus S250 optical satellite, Angeo-1 builds upon Airbus' more than 30 year experience in building highly reliable space systems. Once in operation, it will become the most advanced satellite in its class in the region, positioning Angola as a leading space power.

### EgSA Signs MoU with BIRA-IASB to Leverage Space Technology for Socio-Economic Growth in Egypt

In a press release by the Middle East News Agency, the Egyptian Space Agency (EgSA) and the Royal Belgian Institute for Space Aeronomy (BIRA-IASB) have signed a MoU to advance collaborative efforts in space science and satellite infrastructural development for socio-economic benefits. In addition, the MoU ensures both parties are dedicated to the peaceful use of outer space for continuous research and developmental growth.

### Geospatial Tech Firm Sets its Sights on Sustainable Data Solutions

MGISS works with clients such as Northumbrian Water Group, Severn Trent Water and the National Trust, replacing traditional environmental surveying methods with GIS-based solutions, increasing both time efficiencies and the quality of data capture. The firm provides forward-thinking solutions to the utilities, environment and infrastructure sectors, supporting clients to future-proof their assets, avoid sector disruption, and reduce emissions and minimise waste.

### Lemur Mobile GIS Solution from Locana Now an SAP® Endorsed App

Locana, an international leader in spatial technology, has announced that SAP has premium certified Locana's Lemur mobile GIS solution as an SAP Endorsed App. It is available on SAP® Store as part of SAP's industry cloud portfolio for the Energy and Natural Resources and Public Sector industries. SAP Endorsed Apps are a category of solutions from SAP's partner ecosystem that help customers become best-run, intelligent enterprises.

### Geospatial Imagery Analytics Market Revenue to Hit US$50 Bn by 2032

As per a recent industry report put forward by Global Market Insights, Inc. Geospatial Imagery Analytics Market is forecast to register its name in the billion-dollar fraternity down the line of seven years, by exceeding a revenue of USD 50 billion by 2032 with a projected CAGR of 20% over 2023-2032. Based on analytics type, the geospatial imagery analytics market from the image-based analytics segment is expected to register massive growth during 2023-2032.

### MGISS Secures ESA Backing to Protect UK Utilities

MGISS has launched a new project, part-funded by the European Space Agency (ESA), to help minimise nationwide disruptions to gas and water supply. The project, Interruption Prevention Alert Service (IPAS), will use cutting-edge technology to identify and locate development risks within close proximity of critical utility assets. Gas and water outages caused by developments are a growing problem and IPAS will offer a preventative solution, using satellite data and services to automatically detect changes to the built environment.

### ISRO and Bhutan Inaugurated India-Bhutan SAT Ground Station

Recently, the ground station for India-Bhutan Sat at Thimphu was inaugurated. This ground station will enable Bhutan to receive data from India-Bhutan SAT, pertaining to its territory, directly from the satellite and process in real-time.

### TOPODRONE Synchronized LiDAR and Bathymetric Surveying Methods to Study a Floating Solar Farm in Israel

TOPODRONE, a Swiss based designer and manufacturer of high-precision surveying equipment, has synchronized airborne photogrammetry, and LiDAR and bathymetric surveying methods which was used to study a floating solar farm. The surface of the reservoir is covered by solar panels, which made it difficult to carry out work using standard methods of surveying from a boat. The collected LiDAR & bathymetry data was processed by TOPODRONE Post Processing software. As a result, a georeferenced orthophoto map, a 3D model of the relief and objects, a 3D model of the bottom of the reservoir, contour lines and isobaths were generated.

### Tuck Mapping Adds Capacity with UltraCam Falcon Mark 2

Tuck Mapping has taken delivery of a second UltraCam Falcon Mark 2 large format aerial camera in mid-February 2023. Featuring an image footprint of 17,310 x 11,310 pixels and a capture rate of 1.35 seconds per frame, the UltraCam Falcon Mark 2 is the perfect aerial camera for capturing large areas in a short time, even at lower altitudes, shortening the hours needed for collection and optimizing flying windows. Simultaneous collection of LiDAR and imagery at fast speeds improves efficiency and reduces costs.

### Eurosense Generates Textured LOD 2 City Models from UltraCam Imagery

Eurosense has achieved outstanding results in creating high-quality watertight building models of Old Town Graz, Austria, at Level of Detail (LOD) 1 and 2, using Vexcel's state-of-the-art UltraCam large-format aerial systems and UltraMap photogrammetric processing software in conjunction with RhinoTerrain and DAT/EM software solutions. The Vexcel and RhinoTerrain products have proven to be a perfect match for Eurosense, as they complement each other seamlessly.

### HERE Technologies and Iteris Partner to Create New Smart Mobility Solutions

HERE Technologies has recently announced a multi-year agreement to integrate a broader suite of location-based services and user capabilities from HERE Technologies into Iteris' ClearMobility® Platform, including HERE Traffic Products, HERE Maps and HERE platform services. The integration of the additional HERE Technologies' components will enhance the dynamic contextual services of the ClearMobility Platform and enrich the insights of Iteris' mobility intelligence application, ClearGuide®. As a result, map content and data provided by HERE and visualized through ClearGuide will provide actionable insights to various users, including transportation engineers, transportation planners, infrastructure operators, and roadway construction teams.

### YellowScan Announces New General Manager in the USA

YellowScan is pleased to announce that Justin Wyatt will become the new US General Manager of YellowScan Inc., the US subsidiary of YellowScan, effective January 16th, 2023.

### Hexagon and BUMA Successfully Deploy MineOperate OP Pro in Indonesia

Hexagon's Mining division has been awarded an eight-year fleet management project by PT Bukit Makmur Mandiri Utama (BUMA). As part of this project, Hexagon successfully deployed 150 units of HxGN MineOperate OP Pro to BUMA's IPR site operation in Indonesia with the system optimally running within three months. The phased deployment covers Hexagon's fleet management, asset health and enterprise analytics solutions implemented by the Hexagon team on-site from June to September 2022.

### Leica BLK2FLY Selected as Finalist in CONEXPO-CON/AGG Inaugural Next Level Awards program

Leica Geosystems has recently announced that CONEXPO-CON/AGG and the International Fluid Power Exposition (IFPE) have selected the Leica BLK2FLY as one of the top 10 finalists for the Awards Program. The CONEXPO-CON/AGG Next Level Awards celebrate exhibiting companies that are pushing the boundaries and developing next-level products, technologies and services designed to advance the construction industry.

### HERE Works with AWS to Provide Indoor/Outdoor Device Positioning Services

HERE Technologies has announced its work with AWS to deliver developers with improved performance for indoor/outdoor positioning capabilities to track and manage any number of IoT devices.Across industries and sectors, devices and applications demand reliable and accurate positioning information, regardless of environment or signal availability from GNSS.

### ISRO Received the Jointly Developed NASA-ISRO SAR (NISAR) Satellite from NASA

The NASA-ISRO SAR (NISAR) satellite was delivered to the Indian Space Research Organisation (ISRO) in Bengaluru by the US space agency. NASA and ISRO collaborated to create NISAR, a Low Earth Orbit observatory. The integrated payload of NISAR comprising ISRO's S-band Radar and NASA's L-band Radar reached Bengaluru in the early hours of March 6, 2023 and moved to UR Rao Satellite Centre, Bengaluru for carrying out further testing and assembly with ISRO's satellite bus.

### Trimble Technology to Help Power Nissan's Most Advanced Driver Assist System to Date

Trimble has recently announced that Nissan Motor Co. Ltd. will use Trimble RTX® technology as its high-accuracy positioning source, enabling the hands-off and guided freeway driving capabilities of the ProPILOT Assist 2.0 driver assistance system, available initially on the 2023 Nissan Ariya. While positioning with standard Global Navigation Satellite System (GNSS) signals may drift up to 10 meters (25 feet), Trimble RTX provides higher accuracy and enables consistent lane determination for driving applications. This makes Trimble RTX a key component for many of the latest driver assistance systems like the ProPILOT Assist 2.0. Increasingly being used on freeways, lane-level accuracy via advanced driver assistance systems (ADAS), where the driver is still the ultimate decision maker, is a key enabler in the journey to fully autonomous solutions. The ProPILOT Assist 2.0 system enables hands-off driving while cruising in a single lane. The Trimble RTX network is supported by a globally redundant and resilient infrastructure.

### Leica Geosystems Simplifies Utility Detection With New Intuitive Locator Technology

Leica Geosystems has recently announced the new Leica DD175 utility locator and Leica DA175 signal transmitter complement the existing Leica DD100 series and help operators easily detect underground utilities to ensure site workers' safety. Locating the position of underground cables and pipes before excavation is paramount for site workers' safety. The Leica DD175 and Leica DA175 feature an intuitive design that enhance the user experience and advance automatic controls for simplified utility detection.

### Space-tech Innovator Zenno Welcomes Erica Lloyd Aboard

Auckland headquartered space-tech company Zenno Astronautics (Zenno) has announced that technology executive Erica Lloyd is joining the team as Chief Revenue Officer. The company is remaking what is possible for satellite design and function with its proprietary superconducting magnet technology. Zenno offers the global space industry the ability to reduce energy use coupled with enhanced reliability and accuracy.

### Hexagon Helps Chattanooga Improve Road Safety

Hexagon has announced that University of Tennessee at Chattanooga (UTC) has selected HxGN Connect, Hexagon's real-time incident center as a service, to support a research project for better understanding, predicting and responding to traffic accidents within Chattanooga and the surrounding area. Using a ML-based model, multisensory data and HxGN Connect, researchers and government organizations can analyze and visualize past accidents and patterns, predict future roadway crashes.

### Panaji's ODP for 2031 Will Include A Zoning Plan Based on GIS

The Goa government has issued a call for proposal to empanelled consultants for the preparation of a geographical information system (GIS)-based zoning plan for Panaji's outline development plan (ODP), 2031. The North Goa Planning and Development Authority has already created a draught ODP for the area, which the government has approved. Based on the draught ODP, the consultant will create a GIS database of the planning area, which will include base map layers, existing land use, and pertinent data from stakeholder departments. The ODP is a long-term planning document that provides a conceptual layout that integrates buildings, social situations, and their surrounding environments and guides future growth and development.

### HawkEye 360's Sixth Satellite Cluster Begins Operation

HawkEye 360 Inc., the world's leading defense technology company for space-based radio frequency (RF) data and analytics, has recently announced its Cluster 6 satellites have begun operation. The rapidly growing constellation can collect up to 24 times per day over a region of interest, as often as once every hour. The enhanced payloads and an additional ground station optimizes the speed for delivering increased quantity and quality of data to customers around the world. The commissioning of these three satellites expands HawkEye 360's constellation to 18 satellites with enhanced data collection in the 15 -18 GHz frequency range. Cluster 6 is our first cluster to enter an inclined orbit, allowing HawkEye 360 to collect more data in high-demand mid-latitude regions. HawkEye 360 will continue expanding the constellation.

## PRODUCT LAUNCH

January 01, 2023 - March 15, 2023

### Galileo High Accuracy Service to Deliver 20 cm Horizontal Accuracy

Galileo has started providing it's High Accuracy Service. Now, Galileo is the world's first GNSS to provide free, high-accuracy Precise Point Positioning (PPP) corrections via the Galileo signal in space (E6-B) and the internet. When processed by a suitable algorithm in the users' receivers tracking the Galileo E6-B signal, these adjustments enable the computing of a high-accuracy positioning solution in real-time. The typical accuracy is below a few decimetres (25cm horizontal) in nominal conditions of operation.

### Leica Geosystems Announces the Release of Leica HawkEye-5

Leica Geosystems has recently announced the release of the Leica HawkEye-5, the new highly efficient airborne bathymetric LiDAR solution for deep water surveying. The upgraded technology increases survey efficiency by up to 25% compared to previous generations. The Leica HawkEye-5 expands the capabilities of the Leica Chiroptera-5 bathymetric LiDAR system, enhancing the productivity of applications such as nautical charting,etc..

### Hexagon Announces New Platform for Defense Mobile Apps

The new Android platform enables developers to build applications with 2D/3D views, featuring military symbology and supporting many geospatial data types, including vector data, raster data, elevation data, point clouds and 3D meshes – the same capabilities found in desktop, in-vehicle and browser applications built with LuciadLightspeed, LuciadCPillar and LuciadRIA.

### Navigate New Waters with UltraMap Version 6

Vexcel Imaging has recently released the latest version of its all-in-one photogrammetric software suite UltraMap, with sophisticated and best-in-class water handling features, an enhanced Ortho module performance and a redesigned Ortho reprocessing workflow. UltraMap v6.0 introduces True Pixel Processing (TPP), a proprietary raw data processing approach in the Essentials module and supports professional data production for the recently launched UltraCam Eagle 4.1.

### Immersal Oy launches Immersal City-Scale Visual Positioning System

Immersal Oy, part of Hexagon, has recently announced at the Mobile World Congress (MWC) in Barcelona, Spain, the launch of Immersal City-Scale, a Visual Positioning System (VPS). This innovative solution offers unmatched accuracy in outdoor location-based services for mobile network operators and their enterprise customers.

### EagleView Unveils Revolutionary Geospatial Platform for Industries and Public Sector

EagleView Technologies has recently announced the release of its powerful platform for strategic customer and partner access. The EagleView Platform will provide customers and partners the capabilities to access interactive experiences, improve current workflows and create services and solutions with the same core capabilities and tools that power EagleView's renowned products and services. The platform includes the capability to leverage EagleView's library spanning multiple decades and 20 million+ square miles of geospatial images and data.

## GEO EVENTS

**April 25-27, 2023**
**GISTAM 2023**
Prague, Czech Republic
*https://gistam.scitevents.org/Home.aspx*

**April 11-12, 2023**
**Geodesign Summit**
California, USA
*https://bit.ly/3TrCEUk*

**April 18-19, 2023**
**QGIS '23 User Conference**
's-Hertogenbosch, The Netherlands
*https://uc2023.qgis.nl/*

**May 2-5, 2023**
**GWF 2023**
Rotterdam, The Netherlands
*https://geospatialworldforum.org/*

**May 2-5, 2023**
**Spring NEARC Conference**
Kingston, RI, USA
*https://www.northeastarc.org/spring-nearc.html*

**May 21-24, 2023**
**GEOINT 2023 Symposium**
St. Louis, MO, USA
*https://usgif.org/geoint-symposium/*

**June 26 – July 2, 2023**
**FOSS4G | 2023**
Prizren, Kosovo
*https://2023.foss4g.org/*

**July 10-14 2023**
**ESRI User Conference**
San Diego, CA, USA
*https://www.esri.com/en-us/about/events/uc/overview*

**Octopber 16-19, 2023**
**GeoSmart India 2023**
Hyderabad, India
*https://www.geospatialworld.net/event/geosmart-india-2023/*

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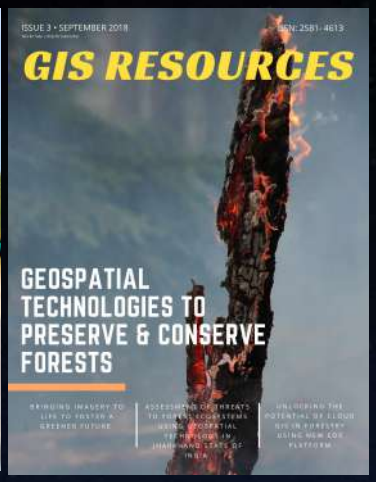


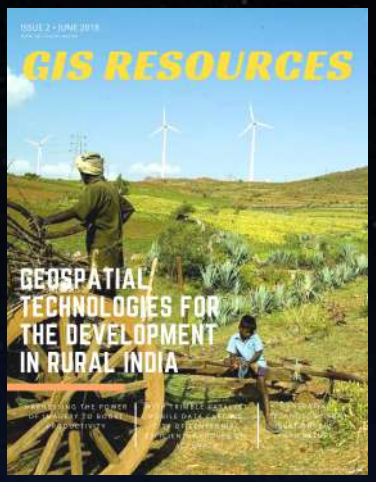


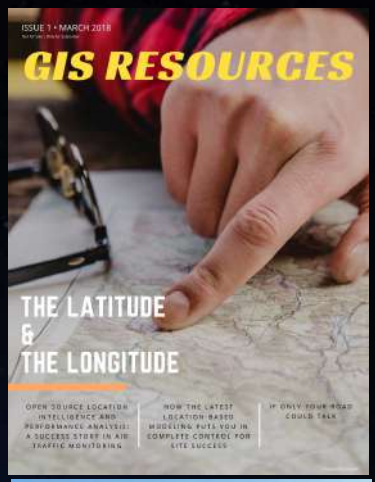


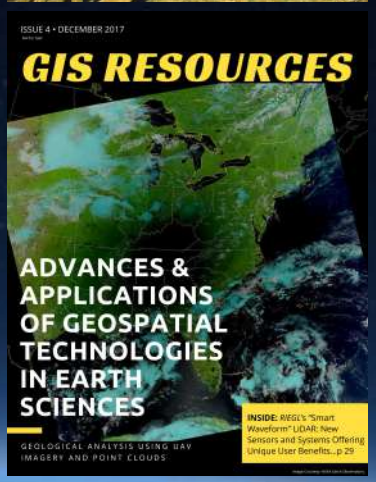


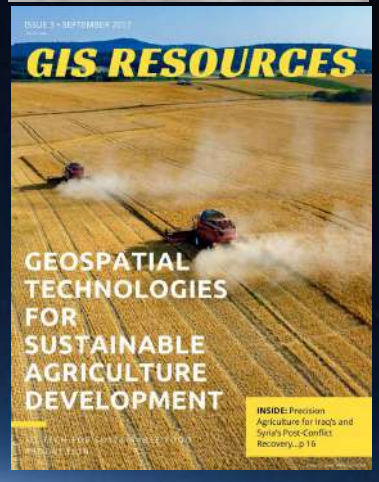



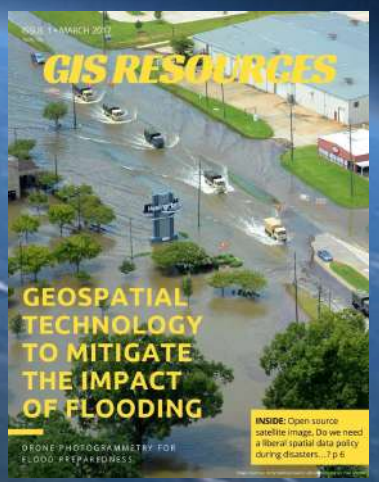


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9th International Conference on Geographical Information Systems Theory, Applications and Management

Prague, Czech Republic
25-27 April, 2023

The International Conference on Geographical Information Systems Theory, Applications and Management aims at creating a meeting point of researchers and practitioners that address new challenges in geo-spatial data sensing, observation, representation, processing, visualization, sharing and managing, in all aspects concerning both information communication and technologies (ICT) as well as management information systems and knowledge-based systems. The conference welcomes original papers of either practical or theoretical nature, presenting research or applications, of specialized or interdisciplinary nature, addressing any aspect of geographic information systems and technologies.

## CONFERENCE AREAS

- Data Acquisition and Processing
- Remote Sensing
- Modeling, Representation and Visualization
- Knowledge Extraction and Management
- Domain Applications

**MORE INFORMATION AT: HTTPS://GISTAM.SCITEVENTS.ORG/**

## *UPCOMING SUBMISSION DEADLINES*

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