FAST-TRACKING UVM WITHOUT SACRIFICE

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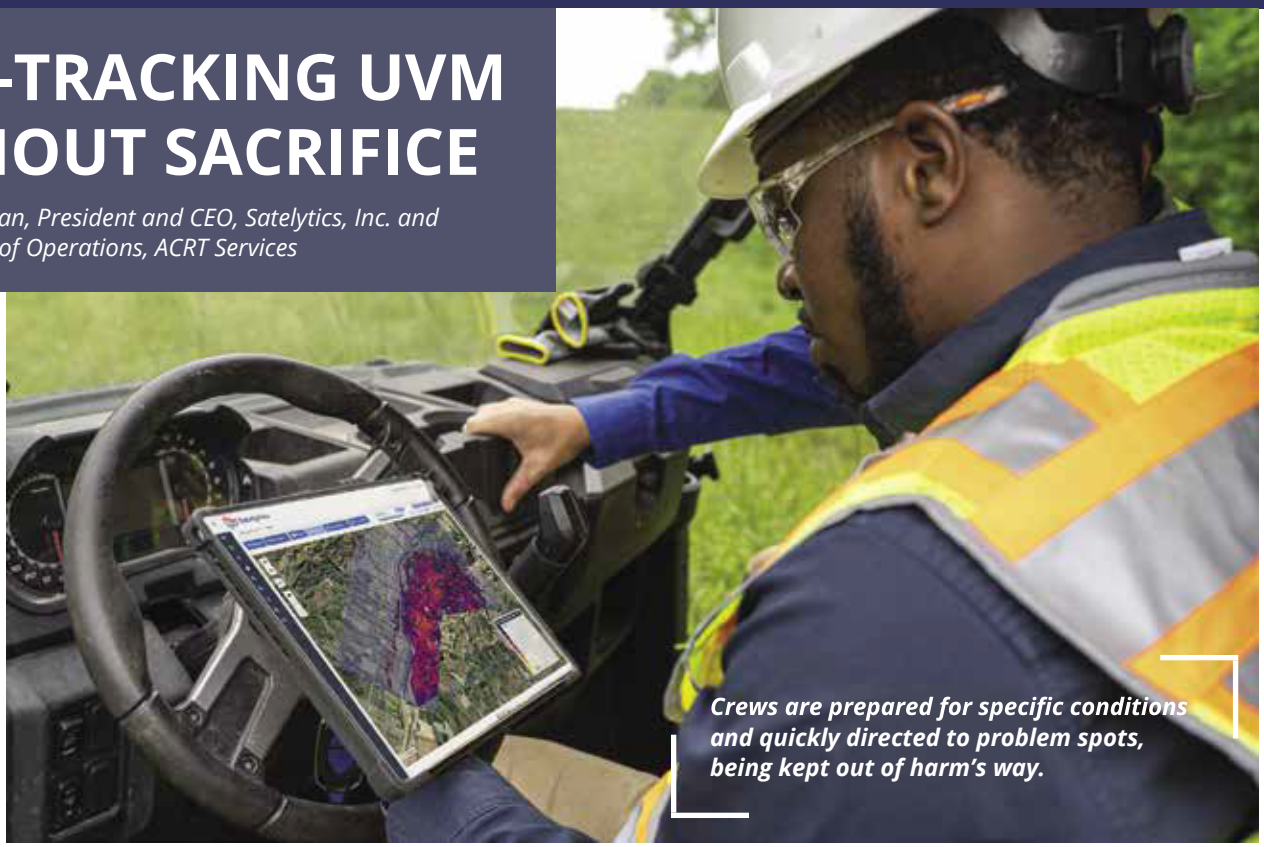


Crews are prepared for specific conditions and quickly directed to problem spots, being kept out of harm's way.

Infrastructure of the power utility industry presents a unique set of challenges. With tens of thousands of miles of transmission and distribution lines and towers, utilities and vegetation management (VM) companies face the mammoth task of inspecting and keeping these corridors clear of potential hazards. As a result, corridors are inspected and maintained on infrequent cycles spanning years—plenty of time for an accident to occur, especially in heavily forested and remote locations.

While this sounds like a tall order, quality utility vegetation management (UVM) along corridors is becoming more achievable with the aid of new and expanding technologies. Corridors can be monitored routinely without having to deploy crews into unknown dangers, thereby mitigating risk and cutting back on remediation costs.

SEARCHING FOR A MATCHSTICK IN A HAYSTACK

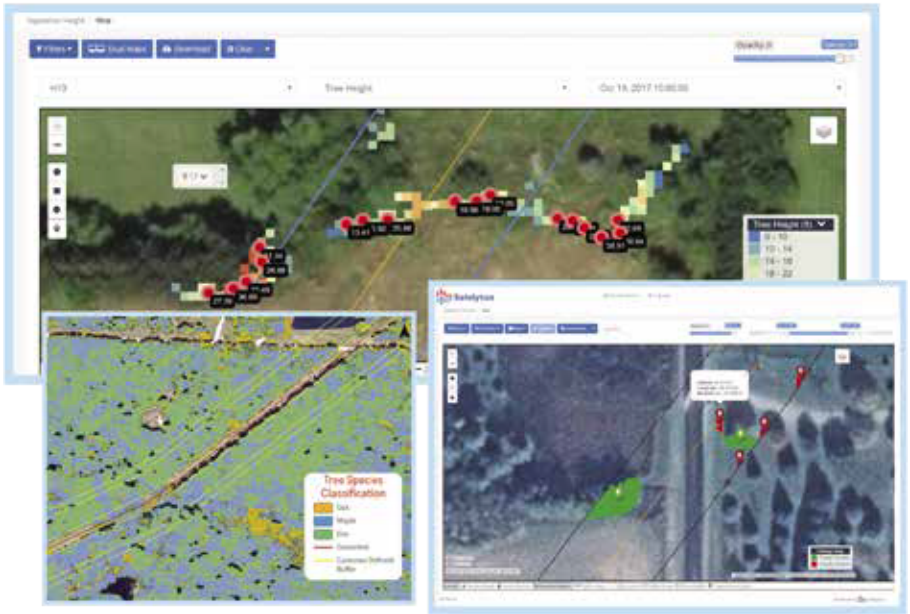
Unlike in urban settings, utility companies cannot rely on customers to spot and report encroachments on powerlines in the vast, uninhabited forested locales of transmission lines and towers. It is often up to crews in the field to find, document, and report faulty equipment, vegetation encroachments, and changes in vegetation health and growth that should be monitored closely. Overall, this process is hazardous, time-consuming, and has the potential for human error.

Likewise, flyovers present similar shortcomings—whether employing a fixed-wing aircraft or a helicopter. Many find drones to be a safer alternative, keeping operators on the ground. Unfortunately, this technology still has its drawbacks. As with ground crews and traditional aerial surveys, drones are limited in the area they can cover in a timely manner, making them impractical for surveying geographically dispersed assets. The large amounts of imagery and data that drones collect also take time to analyze and send to utilities—typically weeks or months. By the time results are ready, the data is already outdated and unable to address the current needs of the organization.

Other methods of remote sensing are being embraced by utilities for UVM. LiDAR (Light Detection and Ranging) is a method where lasers are used to measure distances to surfaces. With this information, computers generate 3-dimensional mapping of various surface characteristics. The data produced by LiDAR can show vegetation growth and decline, aid in determining canopy height, and serve as a tool in identifying plant and insect species. LiDAR is currently a tool of choice for UVM, however, it has several crucial limitations.

The most common platforms for LiDAR are fixed-wing aircraft and helicopters, both of which require human employment. Additionally, the time required to process and analyze LiDAR data is extensive. Processing does not end with the collected data reaching its intended client, either. Large data files—including point mapping—must be sifted through and interpreted. So, even after waiting months for information, answers about next steps are not straightforward.

While these remote-sensing methods may seem like a step in the right direction for the UVM industry, they lack the speed and efficiency to help prevent accidents and disasters in utility corridors. By the time a tree leaning toward powerlines has images captured, its coordinates and height determined, and maintenance scheduled, the tree could have fallen onto those lines and knocked out power or sparked a major fire before UVM crews could ever reach the tree. Disasters have happened in the UVM world when data did not make it to the right hands in a timely manner.



With geospatial analytics, the data and imagery are analyzed within hours of data capture, run through artificial-intelligence-powered algorithms, and rendered into interactive displays, visualizations, and even alerts for easy and simple digestion.

NOT OUT OF THE WOODS YET

The challenges don't end once areas in need of maintenance are identified. Problem spots must be tagged and documented before remediation planning. Photos and GPS coordinates are recorded by UVM crews and uploaded to their platform of choice for the utility client to view. If that platform is not well integrated, information retrieval becomes an unnecessary hurdle for utilities and the information, presenting additional roadblocks to remediation.

On the other end of remediation, similar issues occur when documenting remedial actions, making important information inaccurate or inaccessible. Further, with the transmission of large volumes of documentation detailing work completed (and not completed), utilities are presented with an overwhelming amount of information to catalog and digest. With such mass quantities of data, it is easy to miss vital details. It also can lead to data misinterpretation and general misunderstanding.

GEOSPATIAL ANALYTICS REVEALS ACTIONABLE INFORMATION

With so many barriers for efficient, timely data capture and risk mitigation for utilities, how can the power-generation industry and its utility partners ever hope to make meaningful progress? One solution already in use in several utilities across the country is geospatial analytics—a method for capturing and analyzing the imagery utilities and their partners need to make more informed and proactive decisions.

The most common image-capturing platforms employed in geospatial analytics are satellites, which reduce the risks of sending employees to the field to obtain data. Visible light and other portions of the electromagnetic spectrum from the sun are reflected off objects and constituents on earth to a satellite or other image-capturing platform. These spaceborne and aerial sensors collect multispectral and hyperspectral data, imagery consisting of petabytes of data. These sensors detect specific bands—or parts—of the electromagnetic spectrum. Combinations of these bands make up spectral signatures, which are like special DNA or unique fingerprints for objects and phenomena.

All of this data and imagery is analyzed within hours of data capture, run through artificial-intelligence-powered algorithms (utilizing flavors of AI called machine learning and convolutional neural networks). Many complex algorithms can be run at the same time, isolating spectral signatures within the pixels of captured images. Detection algorithms then render this data into interactive displays, visualizations, and even alerts for easy and simple digestion.

With this mix of science and technology, algorithms can detect and often quantify specific constituents, as well as observe changes in conditions and encroachments. From satellite imagery, plant speciation can be ascertained, and tree height and density can be measured and assessed. Geospatial analytics also makes remote land use classification possible, in addition to measuring land movement and identifying encroachments and corridor changes. All of this can be achieved simultaneously from a single set of data in a timely manner and without human error or safety risks.

EMPOWERING UTILITY VEGETATION MANAGEMENT

Utilizing geospatial analytics in UVM efforts helps mitigate safety hazards, reduce risk, and narrow and identify work zones faster. Crews are immediately directed to problem spots, regardless of the size of the area of interest (AOI) being monitored. Field crews do not need to search for the proverbial needle in the haystack. Instead, crews are deployed only to specific problem spots when their expertise is needed to address the problem. Thus, these crews are prepared for specific conditions and can be further kept out of harm's way. Vegetation concerns are investigated quicker, preventing or minimizing more disastrous events—such as forest fires—and restoring services more quickly after an event.

The documentation process is equally streamlined, with prompt alerts and comprehensive maps and details. The data included in the documentation is the specific problem, location, and magnitude, along with additional qualitative information. Raw imagery, maps, charts, and graphs can be viewed. Audit

Crews are dispatched immediately and use their expertise to address vegetation concerns before disastrous events occur.

trail information can be recorded. Past data and imagery are available and can be compared with current data and side-by-side dual maps. This comparison feature allows the progress of remediation efforts to be checked, tracked, and confirmed, all while having records of every stage along the way.

Geospatial analytics continues to give customers advantages long after remediation. The documentation process of geospatial analytics is certainly beneficial to work performed by UVM crews, but it also is an asset to those in the company who handle insurance, regulation, and litigation inquiries. An ongoing audit trail provides valuable proof that potential threats are being remedied before they become disasters. Insurers offer lower premiums when advanced technology like this demonstrates reduced risk. If utilities find themselves being questioned by regulators or facing legal repercussions, they will have dated, documented proof of actions taken and their effects.

With recent events, increased industry regulation, and even the pandemic necessitating greater and faster insights into VM programs, ACRT Services and Satelytics, Inc. have partnered to explore geospatial analytics for the utility industry. Already in use at several organizations across the country, geospatial analytics have been helping to make UVM efforts more proactive, enhancing their visibility and ensuring utilities are able to continue delivering uninterrupted electricity, water, and gas. The results are undeniably favorable, and we look forward to reporting more in the future.

Author Bio

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