SECURITY SALES &INTEGRATION

INDUSTRY'S #1 TECHNOLOGY & BUSINESS AUTHORITY SINCE 1979

EXCLUSIVE!

JCI TAKES CONTROL OF ITS BUILDINGS DESTINY

Tyco Pieces Complete Service/Products Puzzle

ORIGINAL RESEARCH

2017 COMMERCIAL END-USER STUDY

82% Plan to Buy, But Costs Weigh Heavier

SPECIAL SECTION

CRITICAL INFRASTRUCTURE

- ◆ **Federal Contracting Guide**
- ◆ **Securing Sensitive Assets**
- ◆ **Power Substation Project**

Speco is serious about
CYBERSECURITY
UL 2900-2-3 CERTIFICATION

See Our Ad On **Pg.1**

speco technologies

ELECTRICAL SUBSTATION INFUSED WITH POWERFUL SURVEILLANCE

Find out how VTI Security protected a large electrical substation with a radar-thermal imaging solution, helping the end customer gain exceptional situational awareness beyond the fence line. **By the Editors of** *Security Sales & Integration*

MORE THAN 55,000 electrical substations dot the United States, in urban centers to far-flung desolate locales and all points in between. Along with power plants and transmission lines, these critical infrastructure facilities provide power for tens of millions of people as well as businesses, large and small. Playing an integral role in the daily operations of the nation, it is imperative these sites remain secure from intrusion and sabotage.

If just a small number of key substations were rendered inoperable, the U.S. could face a serious blackout. Consider the ease at which rifle-wielding snipers in 2013 knocked out 17 transformers at PG&E Corp.'s Metcalf transmission substation near San Jose, Calif., which funnels power to Silicon Valley.

The gunmen first slipped undetected onto the compound and severed underground cables to an emergency phone system. Taking position from behind a chain-link fence, they opened fire on the transformers, causing more than $15 million in damage, and then vanished. Although electric-grid officials rerouted power to prevent a blackout, it took utility workers nearly a month to make repairs and bring the substation back to life.

The event was a catalyst for the Federal Energy Regulation Commission (FERC) establishing new security standards for utilities. One of the most notable policies introduced was the Critical Infrastructure Protection Standard 014 (CIP-014). The statute requires utilities to identify "mission critical" facilities and assets, conduct a security inspection to identify threat and implement a security system to address those risks.

In response to security incidents such
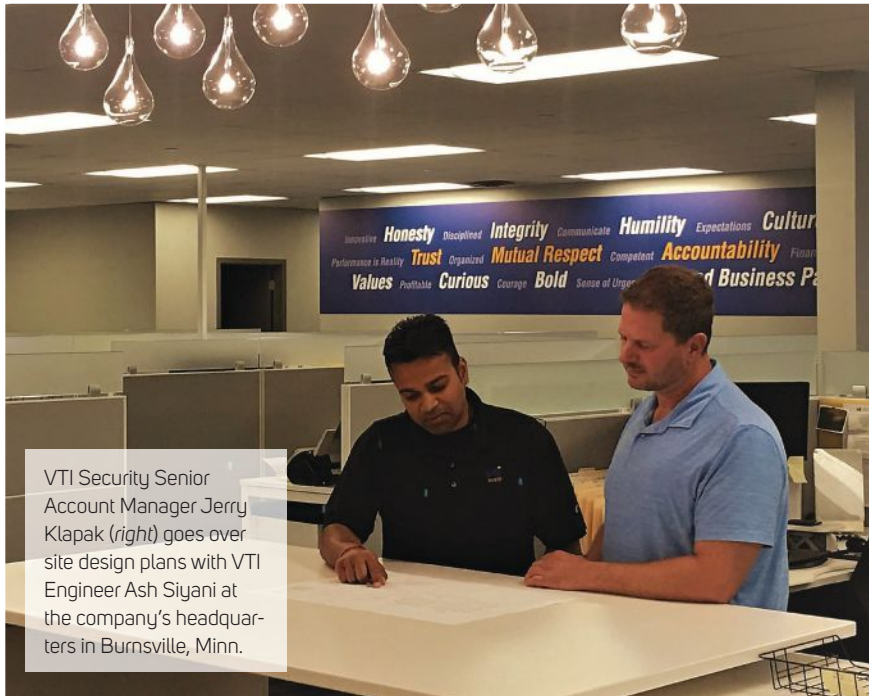
VTI Security Senior Account Manager Jerry Klapak (*right*) goes over site design plans with VTI Engineer Ash Siyani at the company's headquarters in Burnsville, Minn.

as Metcalf and other FERC activities, a large electrical utility with hundreds of substations across the nation began looking to expand security beyond its fence line about four years ago. The end user wanted to enhance and possibly replace costly, traditional fence protection systems. These included fiber optics, microwave barriers and video analytics.

The utility company looked to systems integrator VTI Security for a recommendation. Read on to learn how VTI deployed a cost-effective solution that seamlessly integrated thermal cameras, radar detection and video management software (VMS) to meet its end customer's security challenges and expectations.

Finding a Radar Solution Partner

VTI Security, based in Burnsville, Minn., is an industry-leading integrator that has been servicing security needs in the commercial, utility and oil and gas sectors for more than 35 years. To determine the best system for its end customer, VTI reviewed six different technologies at the end of 2012.

"VTI was looking for solutions that could be deployed successfully in varying environmental conditions with the lowest total cost of ownership to our client," says Jerry Klapak, senior account manager for VTI Security.

The systems integrator worked with its client to conduct several daytime and nighttime penetration tests and simulations before recommending a solution.

"Tests were performed to identify potential blind spots and technology vulnerabilities to tampering to ensure the effective range and use of systems matched the manufacturers' published specifications," Klapak explains. "We looked at how they performed in the challenging environment of substations where considerations of the ground grid, varying quality of fencing, and limited line of sight due to geography or steel structure must be considered when selecting technology."

VTI also tested how well the systems integrated with existing security platforms. After a series of field deployments and a cost analysis, VTI selected Spotter-RF's product as its sole radar standard for perimeter solutions.

"Our findings were that SpotterRF not only provided the most comprehensive detection in a substation environment, but SpotterRF was also by far the most cost-effective total solution based on the ability to mount equipment on existing structures," Klapak says.

SpotterRF, based in Orem, Utah, provides perimeter protection through its patented Compact Surveillance Radar (CSR) systems, which deliver up to 300 acres of radar tracking power in a handheld, four-pound device. The CSRs are said to provide security monitors with 100% coverage in all weather conditions. They are designed to detect threats up to 3,300 feet beyond the fence line and give early warnings to staff before situations escalate.

Thermal and Visible Light Imaging

Upon selecting a radar system, VTI also needed a video manufacturer to supply cameras that could detect intruders at great distances. In 2015, VTI approached FLIR Systems through a manufacturer representative firm in Minnesota. The companies met together and FLIR's technology was evaluated.

"We found that FLIR provided the most seamless integration with Spotter-RF while providing an image quality that surpassed other manufacturers, particularly on the thermal side of the system," Klapak says. "Not only was the image resolution superior, but the FLIR p/t/z cameras also feature modular payloads, which allows our clients to change thermal cameras at any time if the need for a different focal length is required."

The ability for the FLIR cameras to perform beyond published performance was another added benefit.

"The cameras provided usable video beyond what they specified for classifying human targets," Klapak continues. "Our clients also have a comfort level with FLIR based on the use of their thermography technology in their operational divisions."

FLIR's PT-Series was selected for the perimeter solution at the substation. The PT-Series is a high performance, dual-sensor pan/tilt camera system that features both thermal and visible-light imaging. The pan/tilt mechanism gives end users accurate pointing control, while providing fully programmable scan patterns, as well as radar slew-to-cue and slew-to-alarm functions.

The PT-Series addresses the need for wide area perimeter monitoring, intrusion detection and global awareness, explains John Distelzweig, general manager at FLIR Systems.

"Utilizing our 640 X 480 resolution, the thermal camera produces sharp images with greater scene detail for threat recognition and alarm assessment. Our latest variant includes a thermal camera with a 14x continuous optical zoom and an extreme 1080p low-light visible camera with a 30x zoom," Distelzweig says. "Built to withstand varying environmental factors, the PT-Series also supports extreme temperature range, has de-icing capabilities, and is certified for shock and vibe resistance."

Achieving a Seamless Integration

To maximize performance of the radar-thermal solution, VTI worked closely with SpotterRF and FLIR.

"VTI partnered with both manufacturers to ensure they committed not only to integration on the platforms and equipment in use today, but also that they would continue to support future versions of firmware and hardware as the technology changes," Klapak says.

The integrator worked with each company's support and development teams, as well as the VMS manufacturer Verint to ensure the technologies not only worked with one another, but also met the client's needs for bandwidth consumption and VMS interface and display.

"Testing of the integration was done to ensure the functionality committed to was complete and validated by both manufacturers as well as our team before we deployed them at our client's sites," Klapak says.

Together, the SpotterRF C20 and C40 radars and FLIR PT-Series cameras deliver maximum coverage and detection, he continues.

"The distinct advantage for using radar-thermal technology is being able to get notifications of activity outside the perimeter of the site with video verification so the threat can be identified and responded to before they ever enter the site," Klapak says. "In addition to this pre-alert, the devices provide an added layer of safety during non-alarm events by ensuring the PT cameras are following activity within the fence without operator intervention."

When someone walks into the field of view of SpotterRF's C20 or C40 radar, the radio waves bounce off the person and

(*top*) In the event an intruder walks into the field of view of SpotterRF's radar, radio waves bounce off the person and back to the radar, which then calculates the precise GPS location of the target and target size. The position information is then relayed to SpotterRF's NetworkedIO server. (*bottom*) To maximize performance of the radar-thermal solution, VTI worked closely with support and development teams from SpotterRF and FLIR, as well as VMS provider Verint.

back to the radar, which then calculates the precise GPS location of the target and target size and relays that position information to SpotterRF's NetworkedIO server.

The NetworkedIO server then tells the PT-Series camera to zoom to that location and keeps cueing the camera automatically on the target, moving with and tracking the target. The NetworkedIO server provides a web-based map display of the radar tracks and FLIR cameras. It displays a satellite map with the tracks and camera position superimposed along with the video feed, streaming lining target identification, visual verification, assessment and response.

Additionally, because the radars cue the cameras, the cameras only move upon detection, which can significantly extend the shelf life of the cameras and

potentially allow them to last for years without replacement.

"The PT-Series slews to the cue of the SpotterRF detection at an impressive speed," adds Distelzweig. "This dynamic combination of technologies not only delivers superior coverage, but also underscores the importance of system integration. At FLIR, we are committed to this standard. We ensure our cameras are built with the ability to interface with other systems so that our partners have the ability to design customized solutions for maximum impact."

The FLIR and SpotterRF solution addresses an important pain point for the perimeter security and intrusion detection market.

"In the past, utilities tried to use video analytics to find targets. Because these

systems were outdoors, a number of environmental factors affected performance, including weather, lighting and moving trees," says Logan Harris, CEO of SpotterRF. "However, by combining our radar with FLIR's pan tilt thermal cameras, you're able to solve this problem.

"Together," Harris continues, "Spot-terRF's radar technology and FLIR's thermal imaging are able to locate a person in a 15- or 100-acre space, see hundreds of yards beyond the fence line, cue the camera, and alert the personnel all without the help of an operator."

In the past, only military organizations could access this level of advanced technology. Now, the FLIR and Spotter-RF solution makes this security capability accessible and affordable for critical infrastructure, power distribution and commercial applications.

Happy Critical Infrastructure Camper

"Our client is very pleased with the ability of the technologies to provide security for their critical sites," Klapak says.

One surprising benefit, Harris adds, was the ability to use both the thermal cameras and radars for additional security and production uses. The end user now uses the radars to activate security lighting based on motion within and outside the fences. This provides not only a green approach to security by lowering energy costs, but also improves customer relations by reducing light pollution in residential neighborhoods.

The entire team was also impressed by the solution's cost-effectiveness and minimal installation time.

"By providing a solution that was lower cost than the initial technologies under consideration, which required a greater level of infrastructure, they were able to deploy security to a greater number of sites," Klapak explains.

Unlike deploying fiber-optic cables on fence lines, which requires months for digging trenches, the FLIR and SpotterRF solution allows installers to mount the radars and cameras on control shacks and lattice poles. This process only requires a week for installation, Klapak says.

"The deployment occurred four times faster than was anticipated," Harris says. "VTI installed the systems at 25-30 sites in just three months."

VTI began installation in 2016 with plans to roll out the solution in a phased approach as part of a multiyear plan. On average, each substation has two FLIR PT-Series cameras and four SpotterRF radars (two per camera).

Some of VTI's other clients are also expected to deploy the same solution over the next few years based on the success the integrator has proven in the utility environment. Between the current client and other utility clients now working with VTI to deploy systems, 60-90 additional sites may be deployed. **SSI**