

THERMAL IMAGING SYSTEMS REENERGIZE ELECTRIC GRID SECURITY

REINFORCING AN INVALUABLE UTILITY

DRS Technologies
Commercial Infrared Systems





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The Electric Grid: An Invaluable Utility

Our nation's expectation for reliable, uninterrupted electrical power to fuel all aspects of life—our business commerce, our homes, our hospitals, etc.—has escalated to such a high degree of confidence that we don't give it a second thought. A large majority of the world's population expects this vital necessity as a self-sufficient commodity, however invaluable it may be. Yet, when we examine the far reaching impact of the grid on the sustainability of our critical infrastructure we realize that this asset is far too valuable to settle for minimal security provisions.

The U.S. electric grid, for example, delivers power to millions of end users from a vast array of resources, electricity generators, power distribution and substations across the country. Described by the National Academy of Engineering as the “supreme engineering achievement of

the 20th century,” the grid is now so wide-spanning that almost half of all U.S. energy budget is involved in the generation of electrical power.

Despite the continuing modernization efforts and equipment upgrades, electrical power delivery interruptions do occur, most often from system overload/capacity limitations on the hottest summer days or during severe storms that physically damage the apparatus or facilities because of high winds or falling tree limbs.

Unfortunately, capacity limitations and damage from falling debris are not the only threats to the electric grid. Recently, several occurrences of suspicious activities at electrical facilities around the country have highlighted the grid's susceptibility to sabotage or terrorist attack.

According to a recent oversight report issued by New Jersey's Regional Operations Intelligence Center (ROIC), several local NJ events and three higher-profile national incidents—all

within an eight-month span—highlight the grid's vulnerability:

- January 2014 – Tucson, AZ: Several bolts were deliberately and skillfully removed from an electrical tower's support structure in an apparent attempt to cause the structure to collapse.
- October 2013 – Jacksonville, AR: After several acts of vandalism in the prior months, a suspect cut into two electrical poles and used a tractor to pull them down, cutting power to thousands of customers.
- April 2013 - San Jose, CA: Snipers fired dozens of rifle shots at an electrical transmission substation, damaging several transformers, causing widespread damage.

There is not enough intelligence information to link these individual occurrences together into a larger pattern of an organized campaign against existing power facilities. Yet even if these specific events eventually prove to be just isolated examples



of vandalism or theft, their existence serves to illustrate the palpable reality of just how vulnerable and unprotected our nation's electric grid really is.

Protecting the Grid—What's Missing?

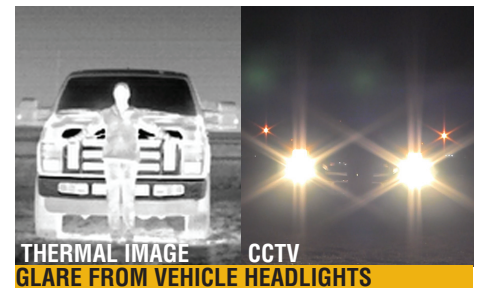


There is no one simple fix for the countless environmental challenges, persistent acts of vandalism and destructive criminal acts that confront the safety of the electrical grid. However, key areas of vulnerability have been identified when persistent surveillance is interrupted by a lack of ambient light in the dark of night, or poor weather conditions such as

fog, haze and rain. By identifying these short-comings solutions can be specified that provide a more secure grid and ultimately, a better fortified critical infrastructure.

All of these solutions may offer certain factions of visibility, but none are immune to glare from external lighting from cityscapes or vehicle headlights and will fail to detect subjects hiding behind visual obscurants such as foliage or distant fence lines.

To bridge the technology gap between conventional surveillance methods and truly reliable detection, Security Systems Integrators are looking to modern camera systems that employ cutting-edge sensors that are not dependent on visible light. They seek camera systems offering consistent video both day and night, in the face of external glare, and in unfavorable environmental conditions. Robust thermal infrared security camera systems meet these requirements.



Calling in Thermal Reinforcements

Thermal imaging technology delivers markedly superior image quality (detail and contrast) under the widest range of adverse conditions. True infrared sensors collect information from the emitted energy (or heat) that every person, object and structure radiates. It is this distinct characteristic that allows thermal sensors to produce a consistent image, regardless of available ambient light. The warmer an object, the more energy is emitted. The advanced sensors embedded in thermal cameras detect infrared energy and respond by generating

Common Security Implementations

Conventional CCTV cameras have historically been installed as a default security measure to monitor sensitive areas and record any suspicious activity. However, CCTV cameras alone do not have the performance capability to meet critical security demands under challenging environmental conditions and cannot continuously provide accurate visual data when nightfall removes natural lighting.

High-mast lighting may be installed for an added measure of security in an effort to illuminate a perimeter, increasing the CCTV performance. Still, the high-mast lighting can add definition to certain blind-spots, allowing vandals to evade detection by passing through shadows and distant corners. The range performance of the CCTV cameras remains limited by the reach of the light source. Furthermore, high power lighting is inefficient prompting municipalities to impose restrictions to limit the amount of light pollution.

Infrared (IR) illuminators can be deployed to overcome many of susceptibilities inherent in security systems that must operate at night. IR illuminators have proven useful for close-range surveillance in low-light scenarios in optimal, dry weather conditions, but have potential deficiencies when rain, fog and haze is introduced which degrades image quality. IR illuminators cast a low-grade infrared energy out onto the target that is received by the embedded sensor. This technology, however, still does not provide sufficient range in most sites.

CCTV coupled with Video Analytics has proven to be a notable upgrade to security systems employing conventional CCTV surveillance. Video analytics software is designed to operate with existing camera installations, providing an added degree of detection capability to CCTV prompting alerts when a given scene is altered by people, vehicles or objects. To its detriment, the video analytics operating on CCTV camera inputs is subject to producing false positives or false negatives, particularly in scenarios where activities occur at a great distance, there is little or no ambient light, or CCTV cannot correctly recognize a human as compared to an animal.



The Critical Upgrade: Thermal + Video Analytics

In today's most secure installations, Video Analytics software is commonly deployed to improve automated monitoring of multiple locations or sensors. WatchMaster® thermal camera systems coupled with intelligent video analytics will serve to provide both significantly lower false alarms rates and fewer false positives – a prevalent challenge of video analytics providers. Because thermal imaging cameras detect longer infrared wavelengths as opposed to the shorter visible light waves that conventional CCTV senses, thermal imaging is an ideal pairing for video analytics engines. While there are varying degrees of effectiveness when it comes to video analytics products, thermal cameras, such as the WatchMaster® thermal camera line, provide a greater level of data for the analytics algorithms to process, with the truest detection available today. With more data from the scene, analytics algorithms are able to discern between an animal and a crouched intruder – a benign event and a threat, all while decreasing operational costs for security personnel.



are intended to safeguard our nation's electrical grid, is to detect threats and deliver this vital information. With thermal imaging systems deployed, risk and vulnerabilities are significantly curtailed. The persistent and accurate detection capability of DRS WatchMaster® thermal cameras are enabling better security performance where it is needed.

As innovative designs from DRS' infrared detector development continue to drive down the cost of commercial thermal surveillance systems, consider the incalculable worth of the electric grid to our quality of life. Then, consider the cost of not addressing its security vulnerabilities. Now realize that the unequalled performance of DRS thermal cameras are not only a necessary solution to one of our most crucial assets, they are also simply the best value.

To get more information on DRS Technologies and the WatchMaster® family of thermal security systems visit www.drsinfrared.com/WatchMaster or call 855.230.2372 to speak to a DRS representative today.

electrical impulses associated with the incoming infrared signals. These electrical impulses are then sent to a sophisticated imaging processor that outputs them in a video format for viewing on a display or into data that is interpreted by a video analytics engine.

In conditions where glare from external lighting renders visible cameras obsolete, warmer targets among obscurants are distinguished. With improved detection capabilities through smoke, haze, dust, light fog or the darkest night, thermal imaging offers the ideal for 24-hour reliable surveillance in the most challenging of conditions.

DRS Technologies' WatchMaster® family of thermal camera systems are answering the call for more robust and trust-worthy security and surveillance at major utility sites worldwide. The WatchMaster® product line is offered in fixed mount, or pan-and-tilt models with flexible lens options to allow for the tailored field of view configurations that are necessary for each site. Engineered with both analog and IP connectivity, low Power-over-Ethernet (PoE), and ONVIF™ Profile S standards compliance, WatchMaster® camera systems are easily integrated with existing new or security infrastructures.

The most vital task for any security system, especially those systems that



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