

Case Study 2015 –The Municipal Electric Authority of Georgia’s (MEAG Power) Success Story of Embedding Security Tools in Substation Monitoring

Between 2005 and 2007, MEAG Power, like many utilities across the country, was experiencing an escalation in the number of break-ins to substations as the price of copper increased. Surveys have shown that costs of the thefts to utilities are many more times the value of the copper due to the labor and materials required to repair the damage done when the theft occurs.

During this time, MEAG Power had multiple break-ins at a number of their high voltage substations. Concerned for the cost, disruption, and potential liability associated with these copper theft related break-ins, MEAG Power began the process of improving security at key substations before they incurred substantially greater costs than they had experienced to-date which was easily running in the thousands of dollars per incident. Additionally destruction of equipment during break-ins can affect electric system reliability and if it occurs at a regional high voltage station the effects could be widespread.

Requirements/Objectives

MEAG Power had two (2) objectives. The primary objective was to deter someone from breaking into a substation rather than having to investigate and track down thieves. Stealing copper wire from a substation is extremely dangerous. There are instances of thieves losing a finger or other body parts, being severely burned – even electrocuted. “The potential liability is too great to ignore,” stated Mike Stanley, MEAG Power’s Manager of Engineering Technical Services. “The simple to use, but sophisticated intelligent system ultimately implemented has features designed to dissuade unauthorized people from entering and to provide monitoring center personnel notification if a threat is imminent.”

The secondary objective was to be able to monitor the new security system using a limited number of MEAG Transmission Monitoring Center (MTMC) staff. The limited number of MTMC administrators share a wide range of duties – including monitoring SCADA alarms in a 24x7x365 environment. As a result, they are not able to specifically focus their time on video screens, so receiving meaningful (and non-nuisance) security alarms within the SCADA system was necessary. As a result, MEAG Power needed a security system that was cost effective, incorporated smart technology to conduct field analysis, and was able to produce meaningful security alarms back to its existing SCADA system.

Initially, standard manually operated equipment was tried. Installing conventional security cameras didn’t create the deterrent sought and did not allow for effective and easy integration into MEAG Power’s existing substation monitoring processes.

A more comprehensive technology assessment was then pursued to identify the technologies that could meet MEAG Power’s objectives and a vendor that would work with them to get them in place. A number of different systems were evaluated. MEAG Power found that Pivotal Vision’s iAlert Intelligent Surveillance System stood out due to its video analytics technology which allows the system to automatically detect human movement (such as copper theft) within the substation. This technology incorporates locational data with motion detection analysis which allows MEAG Power to fine-tune the system to specific areas within each substation. The result is MEAG Power has eliminated nuisance alarms within the MTMC.

In addition, the autonomous PTZ (pan-tilt-zoom) motion detection and tracking capability provides for analyzing the surroundings of large areas both outside the fence protected areas and inside substations. This key feature alone reduced the need for the number of cameras per site which contributed to making Pivotal Vision’s iAlert system a cost effective option.



Pivotal Vision, the developer of iAlert, brought other values to the table. Many of its principals came out of the utility industry with utility operations experience. “Understanding the utility operating environment shows up in the overall design of the system,” says Tommy Scott, MEAG Power’s Supervisor of Transmission Monitoring and Training. “To fit well in utility substation monitoring, the system is structured on a reporting by exception basis which is consistent with how utility SCADA systems are designed.” The architecture of the system also recognizes the need to minimize communication bandwidth requirements (that are usually limited) from substations to the central monitoring center. It also provides for multiple users within MEAG Power to view many cameras and sites simultaneously without affecting system performance. MEAG Power believed it had a technology partner it could work effectively with to achieve their desired results.

The Pivotal Vision iAlert security system that was ultimately selected has been customized to fit MEAG Power’s specific needs for deterring copper theft. MEAG Power’s substation security solution incorporates spot lights, red flashing lights, and sirens that are activated whenever motion is validated (in the PV iAlert system) to deter unauthorized entrance to MEAG Power’s facilities. The system can be activated/deactivated both remotely and locally.

Status

To date, MEAG Power has deployed eight (8) systems including seven (7) permanent installations at substations and one (1) mobile application. The mobile application provides flexibility and quick response. Knowing that repeat break-ins at a site are common, the Pivotal Vision equipped trailer can be deployed to a substation site where a break-in has occurred to deter future ones or to help apprehend the individuals while MEAG Power assesses the value of adding a permanent system at the site. The mobile unit can also be used at construction sites to provide temporary security for construction materials.

On multiple occasions, the PV iAlert system has proven to be effective. For example, video has detected thieves approaching the substation facility (from outside the substation fence) and as soon as the lights and siren came on, the thieves ran away resulting in no damage to the facility. MEAG Power has also provided video clips to local law enforcement to assist in investigating copper theft cases. One of the other added benefits of having high resolution video with PTZ technology at a substation facility is the MEAG Power Operations and Maintenance (O&M) department can use the cameras to view other substation equipment in the substation (such as a switch position or an equipment manufacturer) – which can reduce the need to dispatch someone to the site. Tommy Scott, MEAG Power’s Supervisor of Transmission Monitoring and Training, states that “The Pivotal Vision system is user friendly and easy to operate both for set up and day-to-day use.”

The bottom line is using advanced technology, such as Pivotal Vision provides, can significantly increase substation monitoring capabilities in a cost effective manner for the utility.