

**Fayetteville Public Works Commission deploys a Systems With Intelligence video monitoring solution to reduce the threat of theft and increase reliability at their substations.**



**About Fayetteville PWC**

The electric service division of Fayetteville Public Works Commission (PWC) has been servicing its customers since 1905. Today, Fayetteville PWC is responsible for delivering power to over 80,000 industrial and residential customers across Cumberland County in North Carolina. They are a generation and distribution utility featuring 32 substations at 69kV and 230kV and a peak load of 490MW.

**Monitoring Requirements**

The growing threat of theft and vandalism across electric utility substations concerned Fayetteville PWC. With its large number of unmanned substations, Fayetteville PWC sought to improve the safety and reliability for their employees and customers. The answer was 24/7 monitoring, but finding the right monitoring solution presented its own challenges.

The monitoring system had to survive environmental conditions with minimal

maintenance. Monitoring remote substations is a challenge for utilities with limited personnel who are also responsible for operating the substation. An alarm security system is also insufficient because utilities want to avoid responding to alarms triggered by authorized substation technicians.

**The Solution**

To eliminate the need for continuous monitor video feeds from various substations, Fayetteville PWC employed video analytics that automatically detect unauthorized access to restricted areas and send alarms through DNP3 IP to SCADA. Dispatchers receive real-time data and alerts from the video monitoring system on the same HMI so managing the power system with integrated video is simplified. The dispatchers can check the incoming alarm to see a live video feed of the event that triggered it.

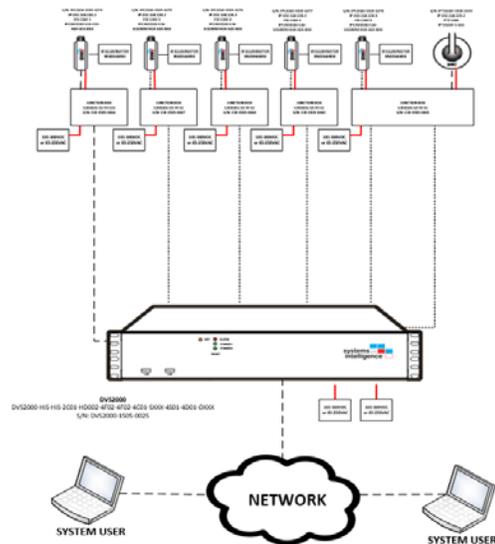


Figure 1. – Network connections

### Systems With Intelligence - The Right Choice

“A couple of things that Systems with Intelligence does well are processing video pixels in their analytics engine to determine people moving in the substation and having substation hardened equipment that meets both IEEE 1613 and IEC 61850,” said Joel Valley, Manager, Substations & Electric Support Services for Fayetteville PWC. “The digital video system has the ability to talk DNP3 directly into our SCADA system. Alarms get generated right on the dispatcher’s screen from the camera system.” Alarms get generated right on the dispatcher’s screen from the camera system and the live video feed of the event that triggered it on their SCADA screen, was the real reason for choosing SWI” said Valley.

Each substation deploys a system consisting fixed IP connected cameras to monitor the perimeter and Pan/Tilt/Zoom, (PTZ), cameras to cover the inside and provide additional focus and coverage. Fiber was run to cameras to eliminate packet loss caused by EMI in the substation. The cameras have integrated infrared illuminators to allow continuous day and night monitoring. The PTZ cameras can be programmed to automatically scan interior positions but also allow manual control from the control center. The PTZ camera allows the operations team to visually scan the substation equipment and surroundings without having to physically be there. The Digital Video Server, (DVS), was installed and programmed with the substation analytics and provided the on-site storage of video and alarms. The video records could be downloaded on scheduled off-peak hours to a network storage device in the control center.

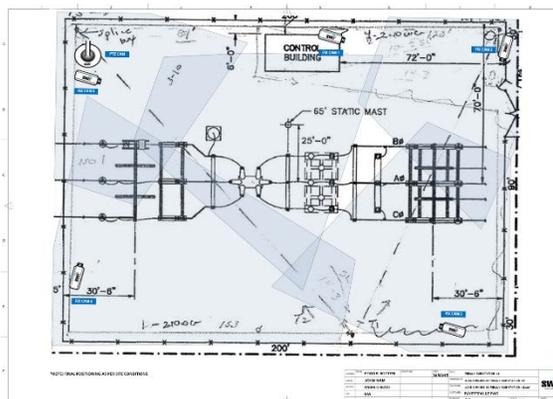


Figure 2. – Sight layout camera locations

Since each substation has a unique design, a sight layout plan was developed for each installation to optimize the position and focus of each camera. The analytics were programmed on the DVS for each substation to minimize the traffic over the wide area connections.

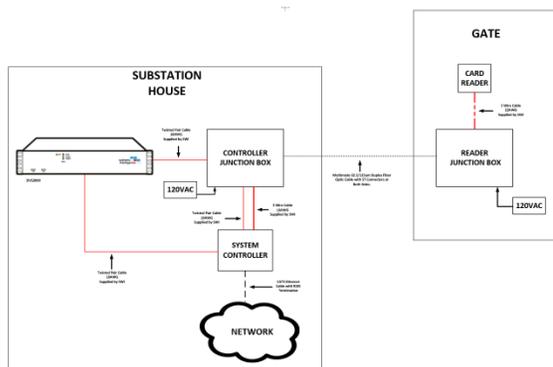


Figure 3. – Integrated access control system

Fayetteville PWC service technicians regularly visit the substations for maintenance and the operations center did not want to respond to alarms that authorized personnel triggered. Systems With Intelligence developed a solution based on an access control solution. When the authorized person enters the substation they swipe a key card to gain access. The key card system is connected to the DVS to disable the system analytics and prevent alarms from being

sent to the control center. The analytics are re-enabled either when the service technician swiped the key card again on exit or after a pre-configured time-out period. The key card system also allows Fayetteville PWC to track who is entering and exiting the substations.

### **Conclusions**

The Systems With Intelligence system met all the requirements that Fayetteville PWC was looking for in an integrated monitoring solution. The initial substation was installed and commissioned in 2015 and five additional substations have subsequently been installed. The initial systems have proven successful and the rollouts will continue through 2016 and 2017.