Physical Surveillance With SEL Tough Computers

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INTRODUCTION

Physical surveillance is a critical part of any physical security program. The North American Electric Reliability Corporation (NERC) physical security standard (CIP-006-1) outlines the minimum set of required controls to physically protect critical cyberassets. Physical access controls can also include physical surveillance.

Physical surveillance is often required at remote field sites, such as utility substations, refineries, warehouses, parking lots, vacant buildings, dams, and docks. Modern physical detection systems, such as the system shown in Figure 1, no longer require a human operator to monitor videos at all times and are now integrated into supervisory control and data acquisition (SCADA) and other event notification services. SEL equipment provides a reliable and robust physical surveillance system, which is critical to ensure proper protection of critical cyberassets in harsh environmental conditions, electrical surges, and other normal or abnormal operating conditions.
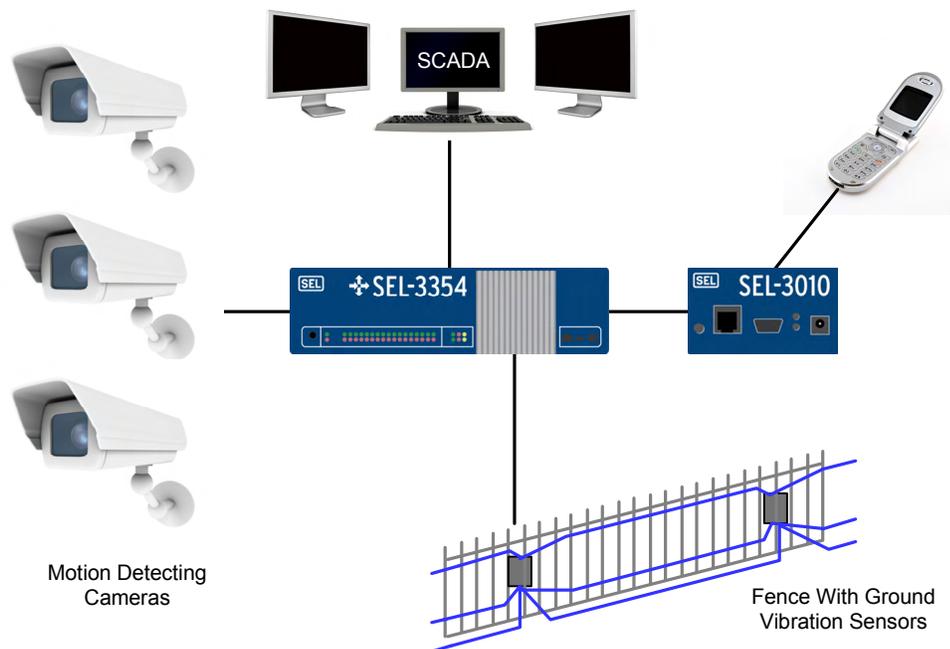

Figure 1   Physical Surveillance System

SEL tough computers are the hardware platform of choice for these types of physical surveillance systems. Using surveillance software, the SEL computer captures, compresses, and stores video. Motion detection and trigger mechanisms notify SCADA or, using an event messenger, send event notification to a cell phone. As shown in Figure 2, underground sensors inside the perimeter fence are used to identify digging threats and surface pressure threats, such as from a person's footsteps.


— · — · — Underground Zone
— — — Wire/Palisade Fence Zone
· · · · · · Gate/Door Zone
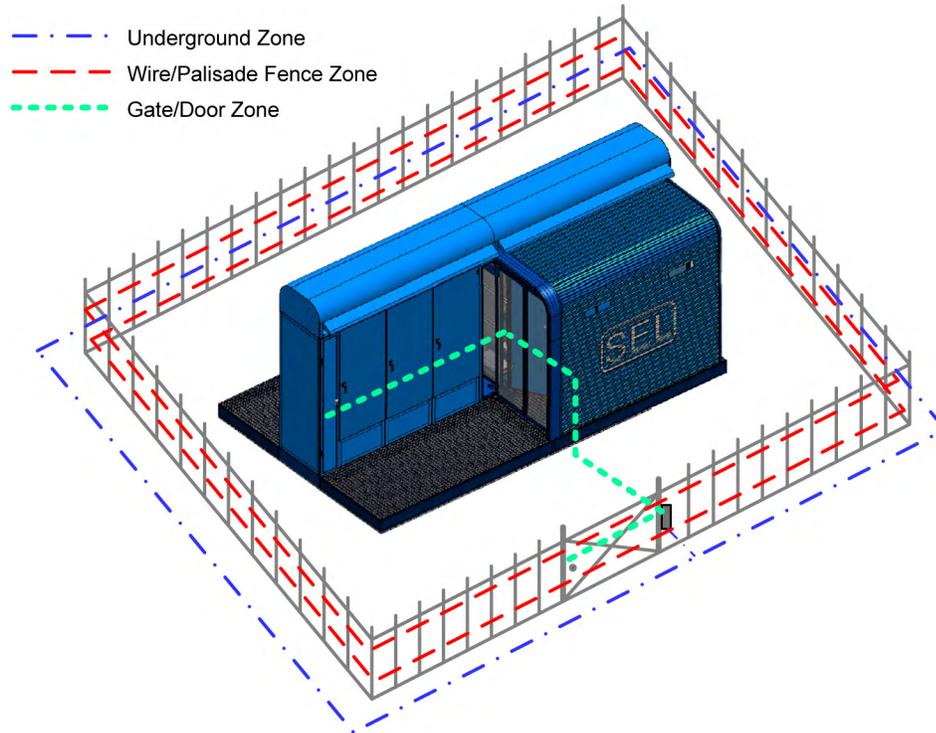
Figure 2   Typical Perimeter Security Monitoring

SEL SURVEILLANCE COMPUTER SOLUTION

There are many off-the-shelf surveillance packages that will run on Windows® 7 or Linux® operating systems. These surveillance packages include software and hardware, such as cameras, vibration sensors for fences or the ground, and computer video input cards, to complete a full physical surveillance monitoring system. The surveillance computer captures, compresses, and forwards surveillance information to SCADA. The surveillance computer is easily deployed using the tough SEL-3354 Embedded Automation Computing Platform.

Software Applications
Surveillance Software
Operating Systems
Windows 7 or Linux
Hardware Platform
SEL-3354
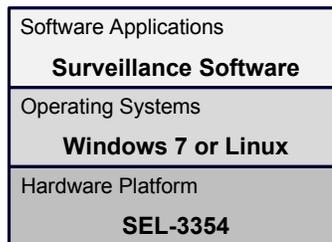
Figure 3   Typical Surveillance Computer

Surveillance Software

Surveillance software, available from many different vendors, includes the ability to time-stamp, archive, detect motion, and control local or remote cameras. Advanced motion detection algorithms and video analytics reliably detect and track moving objects, perform diagnostics, and keep track of metrics (e.g., counting objects or people). Sensitivity points are set to minimize false positives, which can result from animals or rain. Alarm events are configured for tagging and sending to SCADA via Ethernet or modem.

Alarm events include the following:

- Motion detection

- Foreign objects

- Missing objects

- Loss of focus

- Loss of signal

Alarm event responses include the following:

- Recording video with prealarm recording capability

- Displaying video on screen

- Sending alarm notification to SCADA

- Sending alarm notification messages via telephone or email

- Turning on lighting or sirens

Surveillance Hardware

Physical surveillance systems need cameras, detection systems, and input/output devices and are available from many different vendors. Most of the time, it is necessary to have video capture cards installed in the SEL computer. There are many detection sensors that use Ethernet or serial connections. There is an industry move to use surveillance systems based on Internet Protocol (IP) for local monitoring, control, human-machine interface (HMI), and sending to SCADA.

Surveillance hardware includes the following devices:

- IP cameras

- Infrared (IR) cameras

- Wireless IP cameras

- Closed-circuit television (CCTV) cameras

- High-resolution cameras

- Long-range (up to 200 feet) cameras

- License plate identification cameras

- IP video servers

- Video capture cards

- Motion and vibration detection sensors

SEL Tough Computer Hardware Platform

SEL tough computers are the hardware platform of choice for physical surveillance systems. Designed for reliability in harsh environments, SEL tough computers make use of error-correcting memory and other technologies to achieve over ten times the mean time between failures (MTBF) of other typical industrial computers. This removes the need to constantly reboot and replace hardware platforms in the field.

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