CHALLENGE
Arizona’s Kyrene School District required superior coverage of each school’s campus and documentation of anyone who approached a building, parking area or playground structure.

SOLUTION
The deployment includes 1,800 cameras, 33 NVRs and 418 terabytes of storage. Each network camera ties into an NVR, and principals have access to video from their school’s cameras via Web browser.

RESULTS
The high-quality video images enable school administrators to clearly monitor all activity, review school procedures and help ensure a safe and secure environment.
New Surveillance System Makes Kyrene School District a Safer Environment

Panasonic’s i-PRO Network Cameras Provide a “Virtual Video Fence” at 25 Schools and District Offices

Security is very important to the Kyrene School District in Arizona. The scope of the district’s new video surveillance system reflects just how important: A total of 1,800 Panasonic network video cameras provide a 360-degree “virtual video fence” to protect each of the district’s 25 schools as well as the district office facilities.

In 2004, the Kyrene School District created a strategic improvement plan, and in 2005, fundraising from a capital bond allowed many of the planned projects to be implemented. The plan included a goal “to provide high-quality, safe facilities that support healthy student learning environments for students, staff, buildings and equipment.” Merrill Technology Architects, Mesa, AZ, led by Alan Merrill, was hired to develop a comprehensive integrated security system design for all campuses, which would include video surveillance, access control and intrusion alarm.

The objective of implementing the extensive new surveillance system was to provide full coverage of each school’s campus and record anyone who approached a building, parking area or playground structure. Cameras would also be installed to watch entrances, exits and multi-purpose rooms used by outside groups on the weekends. To help control vandalism, cameras would be positioned outside student restrooms to watch which students entered and exited.

“It was critical that we deliver and implement a system that was long lasting and would work without question,” said Mark Share, Kyrene School District’s Director of Technology. In 2009, a request for proposal (RFP) was issued and in July of that year, Amer-X was chosen as the integrator from among several companies who bid on the project. Amer-X, a Scottsdale, Arizona-based dealer/integrator and provider of card access, video and intrusion systems, also operates a UL-listed monitoring service. For over a decade the integrator’s primary video surveillance equipment line has been Panasonic.

“Dependability was one major benefit of using Panasonic for the Kyrene School District,” said Eric Peloquin, Vice President of Amer-X. “Panasonic has always had high-quality and reliable product, which is essential for security monitoring. We have never had constant maintenance issues nor have we had to go back three or four years later to replace equipment.”

“When planning the system, we were happy to hear a familiar brand name with a reputation for high-quality products,” said John Diehl, Network Engineering and System Coordinator for the Kyrene School District. “As part of the bid process, we required demonstrations of the cameras and after we saw firsthand the capabilities of Panasonic Network Cameras we knew they would offer a superior surveillance solution for the school district.”

LARGE SYSTEM BY ANY MEASURE

Kyrene is a K-8 school district that serves parts of Tempe, Chandler, Guadalupe and Phoenix, Arizona, as well as portions of the Gila River Indian Community within Maricopa County. The district has 19 elementary schools and six middle schools with a total student population of about 18,000. The district office, the Ben Furlong Education Center, is located in Tempe.

Before the new system was installed, the schools had a hodgepodge of intrusion alarm systems in various states of operation. Most schools had intrusion detection with motion detection, although some systems were older and no longer operational. If an alarm sounded, a caretaker living on campus would be alerted and call the police. One limited video system—analog cameras tied to a VCR—was operating at one of the middle schools where there had been a history of vandalism.

Work began on the new system in September 2009, and all the elementary and middle school installations were completed by August 2011. The installation was a large system by almost any measure, including 1,800 cameras, 33 network video recorders (NVRs) and 418 terabytes of storage. Each elementary school uses between 55 and 64 network cameras and each ties into an NVR. Principals have access to video from their school’s cameras using an easy-to-use Web browser that connects to the NVR at their location. The system is used mostly “after the fact” rather than for real-time monitoring, typically to investigate an event from over the weekend or the night before. At each of the middle schools, video from more than 100 cameras is recorded onto two NVRs.

An all-new cabling infrastructure was installed for the locations of cameras, which use Power over Ethernet (PoE) and do not require a separate power source. Utilizing PoE provided the district additional flexibility in terms of relocating cameras, eliminating the additional cost for the wiring of new electrical outlets. While the cameras connect to the district’s existing network in the schools, video traffic is segmented from other network traffic on its own virtual local area network (VLAN). Video travels across the LAN only when needed. Bandwidth isn’t an issue: Each school site has a gigabit network, connected to the district office through a district-wide fiber optic infrastructure.
At the district office, DSX access control software is integrated with the system to provide live and recorded images from cameras. The central office can view a video image related to an access control event such as denied access. If anyone clicks on a transaction of any access control report, the system will pull up recorded video associated with that event. In case of a crisis or emergency, the district office uses Panasonic’s i-PRO Management Software, which provides access to live views or recorded video from any camera at any school.

System wide, there are about 418 terabytes of video storage, with each recorder providing 13 to 18 terabytes. The goal is to store video for 30 days (recorded at 5 images per second), enough to cover any school breaks except for the summer. Use of video motion-triggered recording minimizes storage needs, especially in areas with little activity.

Motion detection functionality on the security cameras enables zones to be created within a camera’s view, and motion sensed within the zone will trigger recording. For example, vehicles passing on the street will not trigger video recording since it is not within a camera’s specified zone. Also, the district is respectful of neighbors’ privacy, using the cameras’ privacy masking functionality to block out images of windows or yards. Most of the cameras do not send video to the NVR unless there is movement, which cuts down the need for additional storage space.

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CAMERAS INDOORS AND OUTDOORS
About a dozen vandal-proof network dome cameras are used at each elementary school and between 20 and 30 at each middle school. The cameras’ VGA images provide views of restroom exits and other doorways to help identify who enters or exits, at any door with an access reader. The Super Dynamic feature enables cameras to deal with sudden bright light as the door opens while maintaining image quality. The cameras are also used in kitchens and other interior locations.

Outdoors, Panasonic’s WV-NW502, an H.264 camera, provides 1.3-megapixel images. This vandal-resistant fixed dome network camera had just been introduced to the market as the Kyrene project was being installed, and it quickly became the primary camera used for the exterior of campuses because of its megapixel image quality. The camera is also used in select indoor applications to watch gymnasiums or multi-purpose rooms that are in use on the weekends, and for larger interior areas such as long hallways. In each front office, the camera provides clear images of anyone coming in or out.

To capture license plates of any vehicles passing through driveways or drop-off/pickup areas, the Panasonic i-PRO WV-NP502 box camera is used with a 15-55mm lens. Three or more box cameras are used at each elementary school and up to five at each middle school.

“We made sure we had coverage of the playground structures with exterior cameras,” said Mr. Peloquin. “If someone fell or got hurt, we would have video of the incident. After hours and on weekends we can use those views to prevent vandalism. Cameras also watch basketball courts, which are used by students during school or after hours, again to prevent possible vandalism and monitor any injuries that may occur.”

“For all of the cameras incorporated into the system’s installation, the auto back focus feature assisted technicians fine-tuning the cameras to get the best image quality,” added Mr. Peloquin. “This feature simplified the process while allowing us to see crystal-clear images of what was going on in the school district at any given time.”

In the last several months, cameras have also been installed at the district offices, which include an administration building, a food services warehouse, transportation maintenance, a facilities department (for plumbing and HVAC), grounds maintenance and other departments — about 10 buildings in total, spread across several acres. Cameras provide exterior views and can enable the identification of vehicle license plates as they come and go. Watching the perimeter of the buildings, general views record traffic flows and, if an accident occurs, there is video of it. Cameras also view the fuel pump area where buses and district vehicles gas up and the warehouse/loading dock where products come into the district. Also in range is a parts room that contains expensive parts for vehicle maintenance, and storage areas that house lawn mowers and grounds equipment.

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– Mark Share, Director of Technology, Kyrene School District

Panasonic
How Surveillance is Helpful

The video cameras have already demonstrated their value in several instances. For example, after one weekend a school found that a basketball hoop had been pulled down. The video showed kids hanging onto the rim until it broke. When there was vandalism in a middle school restroom, video showed the guilty students high-fiving each other as they exited. Video has also solved the theft of bicycles from bike racks and, in the parking lot, cameras have captured car accidents.

Video also helps with general maintenance. When a water main broke in front of a school, video showed clearly how and when it happened.

“Surveillance also enables school administrators to reevaluate procedures such as recess, and parent and bus drop-offs. They can see the flow of activities and make changes,” said Mr. Diehl. For example, when students were coming in late, administrators were able to determine that the students were being dropped off at the wrong door and correct the problem by alerting parents to the proper designated drop-off area.

The system was recently helpful during a serious crisis in which an active shooter appeared at a shopping mall near one of the schools. The school went into lockdown, which means no badge can open any door, and the video system enabled administrators to watch the school from the outside and inside until the danger passed. “We could see how teachers and students responded,” said Mr. Share. “We saw that the staff was sitting near glass windows, so we called and asked them to move. Video increased the level of support we could provide to the school during the crisis.”

On another occasion, there was a report of someone driving by the school, rolling down his car window and talking to students. After the incident was reported to the principal and on-site officers, cameras provided multiple clear images of the car, including make and color. The video even showed the suspected predator rolling down the passenger window and leaning over. TV stations publicized the incident, and an arrest was made. “It was very rewarding to get that information to the police,” said Mr. Diehl. “The cameras helped us see the vehicle go by and provided key images which helped the police in apprehending the suspect.”

IP System Advantages

Among the advantages of using an IP-based networked system is the ability to troubleshoot cameras across the network. Panasonic Network Cameras provide built-in notification capabilities to send an email across the network if one or more cameras are down. Also, the network administrator can “ping” a camera to confirm its status. Another advantage of a network solution is the integration between systems; in this case, Panasonic engineers worked to develop an interface with the DSX access control system.

Mr. Share says that using an end-to-end Panasonic system offers an additional level of comfort, eliminating the possibility of finger pointing by suppliers of various system components in case of a problem or failure.

Panasonic coordinated with distributor ScanSource to supply cameras that were preprogrammed with the web address (also listed on the box) to facilitate installation. Installers merely had to match each camera to its location based on the system drawing. “When you’re hanging 1,800 cameras, getting that done at a central location saves a lot of time,” said Mr. Peloquin.

The integrator and end-users also work closely with John Dobradenka of Open Door Inc., Panasonic’s manufacturer’s rep firm, in case technical issues arise. Open Door provides local support for Panasonic’s products. “We got great support from the Panasonic team throughout the United States,” said Mr. Peloquin. During the time it has taken to install the system, the quality of the images has become even better, say the end-users. For example, the newer megapixel cameras provide even better images and get critical close-up shots. Also, higher resolution images enable fewer cameras to be used on some sites to cover the same area.

What Comes Next

The principals and administrators who use the video have suggested a number of additional locations where cameras can be added to view a specific area, subject to NVR capacity. Because the schools are not exactly alike, districtwide standards are used as guidelines to determine the level of surveillance at each school.

Under an ongoing maintenance contract, Amer-X will support the system during a warranty period. One maintenance challenge in the desert is dust collecting on the exterior of camera domes, which can degrade the camera image. Especially during the Arizona monsoon season, the occurrence of dust storms necessitates that cameras be cleaned at least twice a year. Amer-X is working with the schools to develop specialized equipment to clean the domes—configuring a power-sprayer on an extension pole to make it easier to reach the domes. But, Panasonic’s weather-resistant cameras are expected to hold up well even in the harsh outdoor environment.

“We got great support from the Panasonic team”.
— Eric Peloquin, Vice President of Amer-X

Solutions for K-12

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