WHITE PAPER
Perimeter and intruder security for educational establishments

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Keeping students, teachers, visitors and educational facilities safe from criminal activity is a task which must be taken seriously. GJD and LILIN Americas have created this white paper to provide recommendations on how intrusion detection technology, combined with IP video surveillance systems, integrate to provide versatile security solutions for educational buildings.

An integrated security system including perimeter detection devices, advanced lighting solutions and video surveillance is a key factor in protecting staff, students, visitors and property from intruders and to help alleviate criminal activities.

Facts

>> In 2015, there were 27,500 criminal incidents against persons and property on campus at public and private 2-year and 4-year post secondary institutions that were reported to police and security agencies, representing a 2 percent increase from 2014, when 26,900 criminal incidents were reported. The number of on-campus crimes[1] per 10,000 full-time-equivalent (FTE) students also increased, from 18.0 in 2014 to 18.5 in 2015.

>> Among the various types of on-campus crimes reported in 2015, there were 12,300 burglaries[2], constituting 45 percent of all criminal incidents. Other commonly reported crimes included forcible sex offenses (8,000 incidents, or 29 percent of crimes) and motor vehicle theft (3,300 incidents, or 12 percent of crimes). In addition, 2,300 aggravated assaults and 1,000 robberies[3] were reported. These estimates translate to 8.3 burglaries, 5.4 forcible sex offenses, 2.2 motor vehicle thefts, 1.5 aggravated assaults, and 0.7 robberies per 10,000 FTE students.

1 Includes other reported crimes not separately shown.
2 Unlawful entry of a structure to commit a felony or theft.
3 Theft from a property, person or vehicle.

Source: https://nces.ed.gov/fastfacts/display.asp?id=804

>> According to an FBI study of 160 active shooter incidents between 2000 and 2013, nearly a quarter occurred in educational settings, and more than half of those were at junior or secondary schools.

Source: https://www.fbi.gov/file-repository/active-shooter-study-2000-2013-1.pdf/view

Layered Detection

Private and state educational institutions of all sizes do their best to protect and secure people and valuable assets. Preparing for possible acts of crime will greatly reduce the risk in schools/colleges. When thinking of perimeter protection, people are most likely to imagine physical barriers. However, when used alone a physical approach will not offer complete protection as an intruder can climb over a wall; which will then make the site vulnerable to criminal activities.

For an effective security solution, a layered system of physical and electronic perimeter security offers a reliable and effective approach. With electronic detectors, the user will be informed of the intrusion as soon as it has happened and can take relevant action.

One of the benefits of external perimeter protection is the early warning of potential problems. Detectors provide an alert and illuminators light up the area when the intruder is at the boundary, rather than alerting the user when the threat is already inside the building.

Network (IP Solutions)

External IP detectors and LED illuminators are advanced devices designed for use with professional video surveillance systems. IP devices use Power-over-Ethernet or traditional power to connect and send IP signals over the network to integrate with most major Video Management Systems (VMS) and IP cameras. This creates powerful security solutions where recording starts automatically, the cameras are directed to the location of intrusion and guards are alerted with detailed alarm information. Alarm signals via IP to the VMS is perfect for large installations that need to monitor all cameras.

IP detectors provide direct IP surveillance, alarm signals travel peer-to-peer to directly communicate and control cameras, the detector provides an alert for the guards and through the surveillance system send an email. This type of security provides detector triggered video surveillance recording and automated illumination.

IP perimeter security offers low installation and maintenance costs, quick deployment and remote access to view real-time recordings on PCs, Macs, tablets and mobile devices.

Applications

The type of electronic detection will depend on the site requirements, for example the size and shape of the area. Choices include external wired and wireless PIR detectors, active IR detectors, long range laser sensors, Infra-Red LED illuminators, White-Light LED illuminators and video surveillance.

External PIR detectors have a long life, are low maintenance and can be integrated with smart technology for enhanced value. For example, they also measure outdoor light level and ambient temperature.

Laser based detectors offer precise and accurate presence detection as they deliver virtual curtains, walls and surveillance security zones. Laser detection operates with the highest levels of precision for reliable intrusion detection.

External protection consisting of detectors, illuminators and cameras are a great intruder deterrent, providing peace of mind to the user.

Video Surveillance

Video surveillance systems for schools and universities generally require distributed remote video monitoring at multiple sites, a centralized PoE power management, installation, and clear night vision provided by an IR camera solution. Covering all these bases provides a more complete video surveillance solution for educational establishments.

External motion detectors and LED illuminators are crucial components for a security system. By integrating these separate technologies with video surveillance cameras, the site will benefit from one powerful security solution with versatile advantages.

Benefits

» Operation and maintenance costs reduced as programming can be made over the network resulting in fewer site visits

» Devices can be used in a variety of applications. For example activate lighting, trigger video surveillance systems, alert monitoring station, warn security guards and initiate video capture

» Monitoring access points to detect intruders before they enter the property which helps enable the security guards to be more effective

» Integrated security and lighting control to create bespoke solutions to suit specific campus requirements

» Minimize false alarms

IP detectors

» Send automatic intruder notifications to alert the monitoring station or communication device

» Trigger/control both internal and external lighting, as well as internal and external sounders

» Control and start video surveillance, providing alarms and camera movement, or place a marker on the system log

» Deter against unlawful access on campus, as well as provide early warning of an intruder

» Can be installed as a standalone device, or easily interfaced with an existing IP system

IP illuminators

Infra-Red

» Covert lighting at night for surveillance systems
» Provides a black and white image at night
» Longer range coverage than most integral IR
» Can be installed as a standalone device, or easily interfaced with the existing IP system

Without IR on   With IR on

White-Light

» Provide true color camera images at night
» Deterrent/security lighting
» Courtesy lighting
» Can be installed as a standalone device, or easily interfaced with the existing IP system

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Video Surveillance Solution

Many schools have an Ethernet network already installed. A fully digital IP video surveillance system provides the option to use existing Ethernet infrastructure to stream and view camera footage to the NVR, while some facilities will choose to update to a more robust 10/1000 network. The size and scope of the system requirements will be key to determining the recording solution. In addition, PoE switches can provide centralized power management for the edge PoE cameras. An end-to-end solution with the ability to scale should be a requirement when designing and choosing a video surveillance solution.

Distributed remote video monitoring is a very important component of school and university campus projects. Video decoders connected to a HDMI monitor provide remote monitoring for IP cameras without the need of a power-consuming PC, as well as being able to decode live video remotely from the NVR and still being able to perform remote playback and back up.

Vandal resistant cameras are a smart choice for campus projects due to the unpredictable lifestyle of the students on and around the facility. Tamper detection, a setting within the IP camera that alerts when the camera is being tampered, can also provide extra awareness for the surveillance unit. Additionally, embedded intelligent video surveillance allows for motion and audio detection, specifically for use in classroom applications at night or on the weekend. This intelligent detection can notify the NVR with alarm snapshots for instant playback.

IR solutions that provide clear video at night are one of the most important features required for school projects. At night IR cameras and illuminators provide clear video allowing for full surveillance which would be impossible for the naked eye. IR illuminators act as an additional light source for large open fields and areas. IR cameras can also be installed in classrooms and the IR illuminator can then be used as additional support at nighttime.

Gate control for automobile access and parking lot management will help limit and manage access to campuses. License Plate Recognition (LPR) utilized through the camera can allow or deny access to the school or university and log date and time information.

School & university video surveillance systems can be physically set up in a variety of ways. NVRs can be stored in a rack cabinet in secure locations at each building and networked to a central location for viewing all properties with a single interface or operate individually through a monitor. In addition, create a TV wall display for distributed remote monitoring, backup and playback.

Benefits of IP security systems for educational establishments
IP detectors, IP illuminators and IP video surveillance has become increasingly popular at educational facilities. IP technology ensures the site is future proofed for further integration, for example enabling the installer to easily add more cameras or additional detectors over the network. By combining GJD's external IP technology with LILIN's video surveillance equipment, security officers will receive real-time alerts; which will enable them more time to react to various situations on campus.

IP surveillance for VMS systems
IP detectors and IP illuminators connect through a server allowing remote control of video surveillance systems. This creates powerful security solutions where recording starts automatically, the cameras are directed to the location of intrusion and guards are alerted with detailed alarm information.

>> Supports most VMS and IP cameras
>> Cost effective maintenance
>> Remote access via web based interface to view real-time recordings on PCs, Macs, tablets and mobile devices
>> Alarm signals go via IP to the VMS, which trigger cameras, alert guards and automatically send emails
>> Perfect for large installations that need to keep track of all cameras
>> Use VMS e-mapping to insert an image of a facility with camera placement. Easily switch to live view of any situation by camera location using e-mapping features

Direct IP surveillance
IP detectors and IP illuminators connect directly via a PoE hub or switch, allowing detector triggered video surveillance recording and automated illumination. Advanced signal processing and unique optical systems provide accurate alarm capture along with IP data transmission.

>> Alarm signals travel peer-to-peer to directly communicate and control cameras, LED illuminators, alert guards and automatically send emails
>> Remote access via web based interface to view real-time recordings on PCs, Macs, tablets and mobile devices
>> Low installation costs
>> Low maintenance costs
>> Quick deployment

Quick and easy installation
The benefits of an IP based security system go beyond being able to program and make changes to devices over the network.

There are many advantages to the Systems Integrator including significantly reduced physical site visits and minimized false alarms; which ultimately improves the Integrators bottom line.

Setting up GJD's IP detectors and IP illuminators is intuitive and made easy by using the web browser and digital test buttons linked to each event. This ensures each action is setup and performs correctly.

How to do it

Use IP addressing instead of traditional alarm wires to easily link alarms using HTTP commands.

It is extremely simple to integrate GJD's advanced IP PIR detectors with LILIN video surveillance cameras.

On the GJD IP detector web browser interface, you can simply create events to communicate with other devices. As shown on the images below, you choose "LILIN Cameras" from the dropdown list when creating an event and giving it an action. Then, you insert the cameras IP address, port, username and password. This allows the GJD device to communicate with the LILIN device.
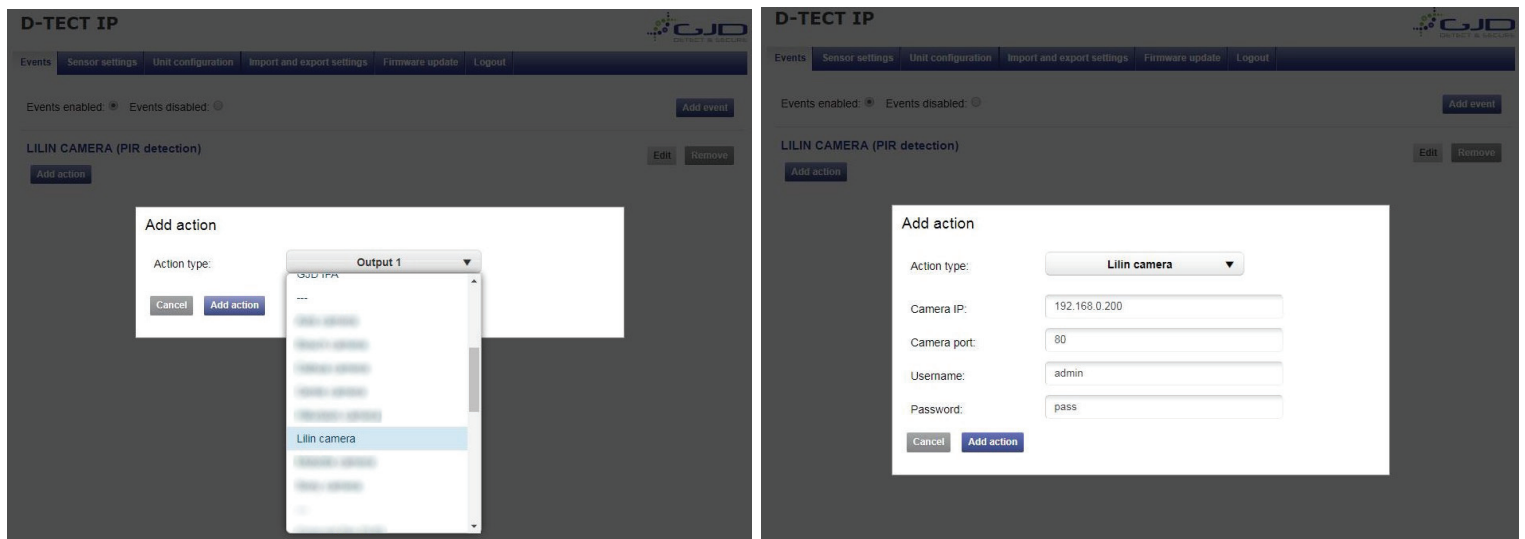
Finally, to allow the LILIN camera to receive information from the GJD detector, you need to enable the Alarm Notification in the camera settings. This can be found by going to Advanced Mode, Event and then Alarm Detection. Once you are in the Alarm Detection settings you simply check the box to enable Alarm Notification as shown in the image below.

Now the GJD IP detector and LILIN IP camera have been set up to communicate to each other, you can use the motion detector to send alarm notification through HTTP commands directly over the network.

GATE

LPR Camera

PARKING LOT

COLLEGE BUILDING

COLLEGE BUILDING

COLLEGE BUILDING

ZONE 1

ZONE 2

ZONE 3

HALLS OF RESIDENCE

COLLEGE BUILDING

COLLEGE BUILDING

RACE TRACK

PLAYING FIELD
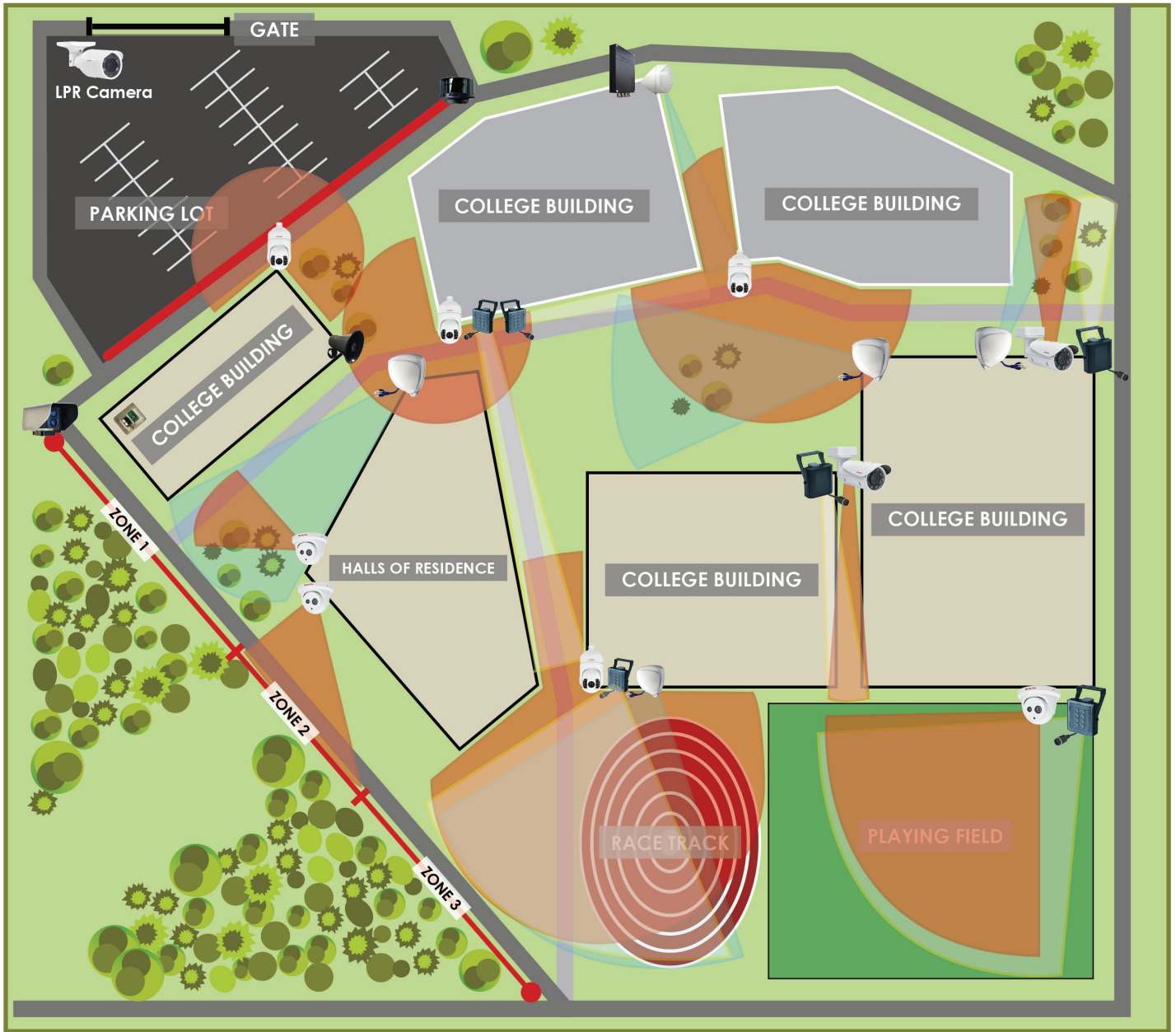
Key

D-TECT IP	Clarius IP	Turret Camera
Laser-Watch	IPAnything	Bullet Camera
D-TECT Laser	Multispeech & Hornspeaker	PTZ Camera
ELITE		LPR Camera

Advanced Perimeter Detection

Using perimeter detection solutions will enable the school to receive early perimeter alerts before an intruder enters the campus. The Laser-Watch detector can detect up to 1600ft with the ability to program 20 independent alarm zones. The solution on the campus map shows zone 1 of the Laser-Watch triggering a pre-set position on a PTZ camera, zone 2 alerting a Turret camera and zone 3 triggering a pre-set position on another PTZ camera. This allows you to capture video surveillance footage in real-time and at the precise location that the intruder is attempting to enter the campus.

You can also use the Laser-Watch to trigger lighting for the cameras to see clearly at night or to act as a security deterrent.

Area Lighting

Sufficient lighting for pathways around campus is extremely important from a safety and security aspect. Using White-Light LED illuminators that are activated by advanced PIR sensors allows pathways to be lit up when a person has triggered the sensor. This is also a very good energy saving solution as the lights aren't required to be constantly on.

Intruders are most likely to commit criminal activities such as vandalism, use of illegal substances or violent behavior in dark areas where it is more difficult to be detected or noticed. Using White-Light or Infra-Red LED illuminators will light up the view for the camera at dark hours either in full color or black and white. White-Light also acts as a great security deterrent with features such as strobing to scare off the intruders.

Vehicle Monitoring

Using license plate recognition (LPR) technology for campus parking is a great security solution to help prevent any unwanted visitors entering. With the ability to create an approve/deny list of all student and teacher license plate numbers allows you to precisely monitor who is entering the campus parking. Once a student or teacher on the approved list pulls up to the gate, the LPR camera recognizes the license plate and the gate opens. If a visitor or any other person pulls up to the gate and the camera doesn't recognize the license plate then the campus security guard located at the gate will be alerted and take relevant actions.

Live Event Tracking

It is important to be able to act quickly when a potential intruder is on campus. Using e-mapping technology allows you to precisely follow the intruder's movements on campus in real time. When a camera is alerted of a potential intruder the e-mapping software will flash that exact camera on a virtual map of the campus. This can be done using PTZ auto tracking or other cameras activated by advanced PIR sensors. The security personnel monitoring the e-mapping software can then click on the flashing camera and see a live view of what has alerted the camera, if it is confirmed as an intruder then relevant actions may be taken.

CONCLUSION

Every year the vast majority of educational establishments experience some sort of security issue. With the range of violence and threats increasing, there is a critical need for every establishment to install self-sufficient security technology, which will enable security personnel to prevent and quickly respond to incidents on site.

With an integrated security system consisting of physical and electronic security, schools and colleges will be able to meet the evolving requirements in order to detect and help prevent criminal activities from occurring.

Smart electronic devices are used to create a strong perimeter boundary. IP products can be easily interfaced with existing building management systems, or installed as standalone intelligent IP devices, allowing the user to create smart customized actions to suit specific requirements.

IP devices can easily be added onto the network, which enables institutions to future proof the site for further security integration. It is also easy and convenient for the Integrator to adjust and configure the settings over the network, resulting in fewer site visits, saving time and money.

To prevent crime from happening in schools and colleges it is imperative that the security devices integrate and communicate with each other. Intruder detection, LED illumination and video surveillance monitoring can be integrated to provide an 'all-in-one' cost effective solution.

GJD and LILIN Americas have embraced the Internet of Things (IoT) and have developed unified security surveillance solutions that are reliable, accurate and versatile. For example, a motion sensor can be used for lighting control, intrusion detection and video surveillance monitoring. Security guards can receive instant notifications on their cell phone, then view the video surveillance on-site, or remotely via a monitoring center at any time, including out of hours when crime is most likely to happen.

A high quality security system adds an extra layer of defence to potentially reduce the risk of criminal activity, which provides schools and colleges with a safer environment.

For more information please call GJD at **+1 (855) 241 2264** or visit **http://www.gjdusa.com** or call LILIN at **(626) 739 1850** or visit **http://www.meritlilin.com/en/solution/education**

Types of motion detectors

>> IP detector - Internet Protocol detector; which integrates with third party VMS providers and video surveillance systems

>> Passive Infra-Red detector (PIR) - Detector which measures infrared energy radiated from objects that generate heat

>> Microwave detector - Detector which sends out microwave pulses and measures the reflection off a moving object

>> Dual Technology motion detector - Combined motion sensor to reduce false alarms. For example a PIR could be combined with a microwave detector

>> Wired detector - Hard wired detector installed using cables

>> Wireless detector - Battery powered detector wirelessly communicating to a receiver

>> Laser detector - Surveillance sensor which uses pulsed infrared light and time of flight measurements to very accurately measure changes in a specified area

>> Voice enunciator - Speech enunciator module designed for intruder monitoring, access control, welcoming, advising or warning

Types of LED illuminators

>> Infra-Red LED illumination - Infra-Red LED Illuminators allow video surveillance cameras to deliver outstanding black and white images at night

>> White-Light LED illumination - White-Light LED illuminators provide ambient light for passers by and act as a visible deterrent to intruders, as well as providing even light for color video surveillance recordings

>> IP LED illuminator - Infra-Red and White-Light Internet Protocol LED illuminators able to integrate with third party VMS providers and video surveillance systems

Video Surveillance Terminology

>> LPR - License Plate Recognition (LPR), specifically at an edge device like a camera, is a technology that recognizes numbers and characters of a vehicle registration plate. Remote actions and automation with live video can be performed from LPR cameras, such as opening a gate or triggering an alarm

>> PTZ - A Pan-Tilt-Zoom (PTZ) camera is capable of remote directional and zoom control. The pan, tilt and zoom reflect the movement options of the camera

>> NVR - Network Video Recorder (NVR) is a dedicated device that records surveillance video to dedicated hard drive(s)

>> Vandal Resistant - For cameras, this typically refers to the ability of a device to withstand impacts and be physically tampered

>> Remote Auto Focus - Using software to remotely control the camera and easily adjust the camera's focal point

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