

# Security News

30 Year Anniversary

JULY 2008

### *VIDEO SYSTEM TECHNOLOGY: by Jim O'Donnell*

Cameras are pretty much everywhere these days, though in most cases that I have examined, they actually do not perform in the way intended or needed. When we *really need* the video to identify a vehicle license plate or a person, we more often than not find that the designer and installer have failed to understand the fundamental reasons for having video in the first place.

Video is used mostly as a forensic tool and is reviewed after the business, home owner or police have discovered that a crime or other suspicious event has occurred. While we used to install tape recorders, we now only install digital video recorders that lay down video onto computer hard drives and once the hard drives are filled, the system goes through an endless cycle of replacing the oldest video with the newest. Depending on the sizes of the hard drives, we can have anywhere from a few days to several months of stored images. Most systems we install today have at least one terabyte (1,000 gigabytes) of storage and many have multiple terabytes with the ability to send the oldest images to a storage device somewhere on the network before they are erased. The methodology behind how we recommend storage sizes and their relationship to storage times is to understand how long the client might need to go before knowing about a crime and then be able to retrieve the video before it is over-written. If that time amount is based on the typical two week vacation then we would recommend that the client have sufficient storage for the period of time they are away from the business or residence plus a few days to identify the need to review video and to start the search process. Often clients tell us that they don't know when something was stolen from their home or business because the suspect(s) are often employees or staff they purposefully let onto the premises. In these cases where there are no alarms to pinpoint a time to look at the video, the process of review can be tedious. New motion analytics are becoming more affordable and they

promise to help in tracking items and make it easier to see when they were removed and who carried them off site.

30 years ago, the first cameras we installed actually had small tubes in them that needed to be replaced every year. These cameras produced high resolution black and white images but the recording systems were not up to the quality of the cameras themselves. There has been a constant see-saw race between the camera and the recording technology manufacturers to capture and store the best images possible. Most systems employed today use digital cameras with 4CIF capability (640x480) which is acceptable video but the DVR manufacturers strip most of the image away and store only a 25 kilo byte image. If you have an inexpensive digital camera, for taking family photos, your camera is at least one megapixel; many digital cameras have upwards of 8 megapixels. A one megapixel camera has 40 times the stored density of most security camera images, which allows you to zoom in on the image at your computer to see greater detail. When we zoom a normal 4CIF image, on a DVR, it becomes pixilated simply because the native image is so small. We have all seen the images on TV of the robbery at the convenience market or other location where the presenter tries to zoom in and the image instantly goes grainy and unusable. This typically is not a camera problem; it is the deficiency of the recording system to fully store all the data the camera is sending it. The net result is grainy video of dubious usefulness and no ability to discern license plates on the getaway vehicle.

To our technological rescue comes new megapixel security cameras along with vastly expanded hard drive capacity which allows us to store the substantial increase in data produced. We are now installing jobs with 5 megapixel day/night cameras which are infrared sensitive and store images with 200 times more usable pixels in a wide angle, dense image format. This

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often means that we can eliminate expensive pan, tilt and zoom cameras by using a fixed, wide angle megapixel camera that has such a dense image that we can digitally zoom in four or five times to get important detail.

Two sets of images are shown below. The first photos were taken with an analog camera and the second were taken with a two megapixel digital security camera. You can see on the left that once we tried to zoom in on the license plate, the image scrambled and has no value, whereas the higher resolution image gives us the ability to connect a perpetrator to a specific vehicle. While we likely will not know who a person is from looking at them on a recorded image, we certainly know what to do with a license plate. In cases of kidnap, theft, homicide or terrorism, the license plate database can be used to recover victims, interrupt criminal activity and protect the public.



**Analog camera images**



**Megapixel images**

Night viewing: We use a variety of different infrared illuminators to see at night. Virtually all of the outdoor cameras we install today have infrared sensitivity so they can benefit from the use of an infrared light operating in the 850 nanometer range to illuminate a scene without bothering the neighbors or ruining a great view of the ocean or sky. This frequency of light is invisible to the human eye, but the cameras see it quite well. Sometimes, we actually get better viewing at night than we do during the day, there may be significant shadowing during morning or evening hours.

Thermal cameras: We have been installing thermal cameras for the past 10 years. Thermal camera costs have dropped by nearly 50% in 1998 dollars while the camera image quality has doubled. Thermal cameras do not need ancillary lighting to operate at night; it sees the heat given off by all things and converts that into a usable image. The FLIR camera image presented here



shows a man next to a pickup truck. His exposed skin is white - hot, cooler or cold items show up darker. The primary usefulness of thermal cameras is that we can employ them with special software to distinguish for human characteristics. The software can alert our remote monitoring staff to take a look at a specific scene of a human in a restricted area or exclude animals from generating motion detection alarms, negating any further action if they present no threat to the residence, business or governmental facility we are protecting.

These two camera shots are of the same location. The FLIR thermal camera image allows us to see a human through haze and obscuration, something that simply cannot be identified in the visible spectrum camera image.



Cameras are changing rapidly and Statewide Security is at the forefront of this technology; bringing you useful, responsive imaging to help protect your family, business or governmental asset. We provide 24 hour video monitoring in addition to digital alarm monitoring, to either confirm human activity on site or to provide early warning of an intrusion.

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