

The **Boundless Security System™** puts you there. There are many commercial and government applications. It is ideal for chains.



Gas Stations,
Convenience Stores,
Restaurants, Retail
Stores

Office Buildings,
Municipal Buildings,
Military Bases



Factories,
Warehouses,
Storage Terminals

Banks, Armored
Trucks, Delivery
Vehicles



Schools, Public
Transportation

Hospitals,
Retirement Homes,
Continuous Care
Facilities



Call us **NOW** if you need:

- To remotely monitor the safety and operation of multiple facilities
- To *instantly* provide visual notification of suspicious activity
- Improved recorded image quality
- A system that is easy to operate
- To avoid network interference with core enterprise applications
- Longer online storage duration
- Continuous video recording to avoid missing any events
- Easy and economical retrofit of existing CCTV video systems
- Reduction of installation cost
- The ability to easily place wireless network cameras where needed to monitor troublespots
- Onsite video monitoring @ 30 fps without a video matrix switch
- To view multiple video streams at high frame rate via slow connections to the Internet
- Video access for first-responders enroute via portable devices
- Scalability, accessibility and large storage capacity of an IP-based video system with the familiarity of digital video recorders
- To display many live and/or recorded video streams at once
- Extensive motion-searching
- Non-proprietary hardware throughout to avoid sole-source supply, maintenance & expansion problems

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Boundless Security Systems
sharper images, better access, easier installation

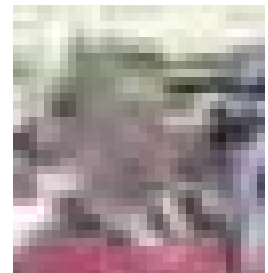
Recording Systems, Not Cameras, Limit Image Quality in Video Surveillance Systems



If a video camera gives this live image...



Wouldn't you rather
record sharp images
?



Instead of blurry,
blocky images ?

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Recording Systems, Not Cameras, Limit Image Quality in Video Surveillance Systems

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We have all seen such poor images from bank and convenience store cameras that it is hard to tell if a subject is even *human*, let alone a man or woman. The common perception is that Closed Circuit TV (CCTV) cameras are the cause of the low quality of recorded surveillance images.

The public perception is wrong !

Let's examine this misconception in the context of the large image on the front cover. We'll focus on the man in a red shirt. A white box has been drawn around him. We chose this image because a subject is often far from the camera and occupies only a small fraction of the camera's field of view, hence the subject's image must be enlarged.

One uses image editing software on a computer to digitally zoom in on a small portion of the recorded image in the hopes of obtaining a usable image of a distant suspect or object. But all too often, a seemingly good image, when viewed small, produces a poor or worthless image when magnified.

Why?

The reality is that the #1 cause of poor video surveillance images is the recording system not the camera. The video images from high quality CCTV cameras, even those that are five to ten years old, are often excellent. The problem is that the vast majority of the video information available from each camera is thrown away by many (most?) video recording systems.

Don't get me wrong... There's a limit to the ultimate image quality from a Standard Definition TV camera. It has only a tiny fraction of the resolving power of 35 mm film, and a small fraction of that of many digital still cameras. I'm just talking about getting the best possible images from the millions of CCTV cameras that are already in use everywhere. And I'm talking about getting the best use of the latest "high resolution" CCTV cameras that are being installed widely, only to have most of their image quality wasted by most digital video recording systems.

The popular transition from time-lapse, analog video recording systems to digital video recording systems does not automatically cure the problem. In fact, the new, digital video recording systems often make the life of police video forensics teams more difficult because the digital compression that the new systems use corrupts images in ways that the old analog systems did not.

Digitally recording video from large numbers of cameras with high resolution, clarity and frame rate is difficult, especially when recording for a prolonged period of time is required. As a result, most digital video surveillance systems sacrifice image quality to reduce cost, to reduce the amount of computation required for video compression, and to reduce the amount of disk space required.

The primary causes of poor image quality in most digital video surveillance systems are:

Low Resolution: Often, only 25% of the resolution of a CCTV camera is recorded, producing the same low resolution (320 pixels/line x 240 lines/frame) as a child's toy *web cam*.

Excessive Quantization: Each frame is compressed too much, causing blockiness or blurring.

Low Frame Rate: Only 25% or fewer of the frames per second from each camera are recorded, reducing the chance a human subject is video-photographed facing the camera.

Inadequate Compression Technology: Simple, JPEG and wavelet compression do not remove similarities in successive frames, wasting data. More complex, MPEG-4 compression removes redundancies, generally giving a 3:1 to 5:1 reduction in the amount of data for a given image quality for moderate motion, and a much bigger improvement when there is little or no motion.

The images on the cover show how many digital video recording systems can ruin image quality. Enlargement of the man in the red shirt yields the blurry, blocky image on the lower right when the video is captured at "standard resolution" and compressed excessively. The much clearer image results when the video is captured with full camera resolution and compressed moderately.

Conclusion

The #1 cause of poor image quality in most digital video surveillance systems is the recording system not the camera. The *Boundless Security System™* from Boundless Security Systems, Inc., in Newtown, CT, not only avoids these problems but also provides increased storage duration, improved survivability, and less expensive installation. Its very low data rates improve remote access, and avoid interfering with core enterprise applications.