High resolution/high definition video

There is an increase in demand for high-definition video surveillance. This is very much 'in sync' with the growing global demand for HDTV.

ANALOG VS HD-CCTV **4**

Until recently the leader of this fast-growing, high-definition, surveillance market was the megapixel IP camera. The recent introduction of **HD-CCTV offers intuitive system design, installation, operation and maintenance, all of which are similar to analog CCTV systems.** Besides, it provides the benefit of non-compressed video transmission.
 IP cameras have attained a market share of around 30 percent. It may not take long for HD-CCTV to reach that market share.

HD-CCTV

HD stands for High Definition, and SDI stands for Serial Digital Interface – a family of standardized, broadcast quality digital interfaces using BNC connectors. The standard was adopted by the SMPTE (Society of Motion Picture and Television Engineers). **HD-SDI transmits full-HD video through the coaxial cable without video compression – this is a defining feature of HD video.** With the availability of low-cost, main, chipset solutions, HD-SDI technology was introduced to the CCTV market in 2009, and the technology began appearing in products in 2011.
With HD-SDI, full-HD video is converted to a 1.5 GBps serial digital signal at the camera. This signal is transmitted to the DVR through the coaxial cable and finally displayed on the monitor or recorded onto a hard disk. **Because of its origins in broadcast, the definition and picture quality of HD-SDI footage is noticeably higher than a standard analogue signal.** The technology has now been adopted by the CCTV sector. **Because it has been designed with the sole purpose of providing Megapixel, High Definition footage over standard co-axial cable, it is perfectly suited to CCTV, where the majority of existing systems use co-axial cable.**

HD-SDI is significantly easier for experienced CCTV installers to get to grips with and can easily be used in tandem with existing analogue cameras. Compared with IP, installers can install HD-SDI straight away with next to no training. The system design and operation is similar to conventional analog CCTV. As a result there is very little risk of getting in to complications when installing it, as long as the installer is experienced in installing analogue CCTV.

HD-CCTV Compared to IP Camera

The primary requirement of high definition video surveillance is the highest possible video resolution and quality. This cannot be achieved by an analog video system. **As HD-CCTV uses a non-compressed video source, it provides this highest video quality.**
IP cameras also provide full-HD (1920x1080) or higher resolution, but IP camera based systems share the same network for multiple cameras, so the camera side needs to perform video compression to reduce the size of the video signal. This results in a degree of degradation in video quality.

	CCTV-700 High Resolution	**HD-SDI** HD Over Coax	**HD-IP** HD Network & IP
Maximum Camera Resolution	700TV Lines	HD 1080p	HD 1080p
Maximum Recording Resolution	Full D1	HD 1080p	HD 1080p
Cable Type	Coax	Coax	Cat 5 & 6
Installation Difficulty	Low	Low	Medium
Technical Difficulty	Low	Low	Medium
Cost	Low	Medium	High
Wireless Options	No	No	Yes

HD-CCTV system's HD-SDI transmission uses one-to-one cable between a camera and DVR, hence there is no question of interference among video channels. Besides, HD-CCTV does not need encoding / video compression at the camera side nor the video decoding at the DVR side. **Video delay does not occur through the whole path.**

HD-CCTV products conform to several standards of SMPTE (Society of Motion Picture and Television Engineers). The HD-SDI transmission method is one of the SMPTE standards used for broadcasting

equipment. **The HD-CCTV Alliance updated some of SMPTE's standards, like transmission distance, making it more suitable for the CCTV market. This results in the best compatibility among HD-CCTV products.**

HD-CCTV has almost the same system design and installation method as an analog CCTV system.

This similarity provides an opportunity for experts of analog CCTV to easily adapt to HD-CCTV. This also implies that existing analog CCTV systems can easily be upgraded to HD-CCTV systems without the need for deep knowledge of the latest technology. **This plug and play feature is an important factor for a new technology to be rapidly accepted and adapted by the market.**

HD-CCTV provides easy installation and operation through real plug and play. Even though IP camera installation methods have improved, when designing a system, it is important to consider the network load and countermeasures for network related issues including security.

IP Megapixel cameras deliver a much higher resolution. They are designed to allow either the ability to zoom in to recorded video or use one camera to cover a greater area without losing quality. Many MP cameras are made with CMOS chipsets that require more light than analog cameras to produce a good picture. The biggest drawback to MP (or IP in general) is the maintenance of the system. MP is a great option for enterprise level systems and companies with in-house IT personnel. The average consumer is still is not comfortable with the concepts of bandwidth requirements, port forwarding, and storage arrays.

High definition CCTV promises to deliver the best of both worlds. **The HD picture will allow the user the same capabilities as megapixel cameras. The cameras and recorders transmit this higher resolution picture over coaxial cable. This implies that a system can be upgraded without running a single new wire. To upgrade from analog to MP would mean running an entire new infrastructure for the data.** For new systems, HD CCTV will deliver the same plug and play simplicity that analog cameras have delivered for decades. This simplicity will allow the S.M.E. and SOHO segment to have a high quality system without the headache of networking.

HD –CCTV may still not have as high a resolution as MP cameras, but for the average small business owner it will be the future of CCTV. Good quality, easy installation, and ease of use will set it apart from standard analog and MP systems.

Summary

- Unlike IP video cameras, HD-CCTV is a point-to-point system that uses coax cable rather than Category-5e or -6 UTP cable. The video feed is therefore sent directly from the camera to the recording device or DVR without the use of packets, compression, encoders or an existing network. The camera can be plugged into any compatible receiving device and will display video without latency or configuration.
- HD-CCTV is easy of install. Because HD-CCTV is point-to-point, no additional training or networking expertise is required to make the system work. There is no need to configure or program each device or deal with IP addresses; you just plug it in and it works. This implies lower costs - the easier something is to install, the less expensive it is to implement.
- HD-CCTV uses the same cabling infrastructure as most traditional analog systems. This technology allows organizations an easy, economical way to upgrade a legacy analog system to achieve some of the benefits of megapixel cameras.
- The video feed travels on its own cable with no compression. HD-CCTV delivers megapixel quality video without requiring IT network bandwidth, dropping packets, or reduced resolution from compression. There is no latency, meaning that the video runs smoothly without any jitteriness or skipping and there is no delay between when commands are sent to a Pan-Tilt-Zoom camera and when the camera responds.
- The resolution capabilities of HD-CCTV are far surpassed by IP-based cameras widely available on the market today. With a maximum resolution of 2.1 megapixels, and a growing demand for higher quality video in a single camera, HD-CCTV will continue to be outclassed by IP-based video in terms of quality. This limits the usability of HD-CCTV in many applications that require high-end HD products.
- Analytics at the edge with a HD-CCTV solution is also not possible.
- HD-CCTV solutions do not integrate with other IP-based technologies. HD-CCTV tends to be incompatible with integration to access control or intrusion systems. They do not communicate with or tie in to building management systems, either. With integration being the number one method for improving the value of a solution to the organization, this is a significant challenge to overcome.
- While using existing coax cabling is an advantage when upgrading a legacy system it is not a suitable option for a new construction. Coaxial cable in such a case is not the most efficient or effective cable to use.

Conclusion

- **Will HD-CCTV replace IP-based video in the market? Absolutely not. Security in an organization is continuing to evolve to the point where it supports the organization in ways that go beyond traditional security. Organizations expect that the security systems also add value to the organization (Refer March issue of Industrial Safety Review).**
- **HD-CCTV has its uses and will continue to evolve its capabilities and overcome some of the challenges it faces. Many organizations will find HD-CCTV useful when upgrading their legacy analog systems.**

- **Applications that need more than 2.1MP (the maximum for HDTV today) and do not need high frame rates should choose non-HD megapixel cameras. HD cameras will be best suited for applications that must have higher frame rates and high image quality .**

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