Defining Different Formats

Different high-resolution formats among analog, digital, megapixel and HD have created some confusion on the market, making it difficult for users to choose the right solution. *A&S* looks into the classification system.

BY ROSA CHEN

Megapixel cameras, including HD, have more than 1,000,000 pixels compared to analog and standard network cameras, which have less than 400,000 pixels, said Mark Wilson, VP of Marketing at Infinova.

From the broadcast industry come HD formats and specifications. Technically, an HD camera is a megapixel camera at a specific resolution, compression (H.264) and aspect ratio. Frame rates and scanning techniques can vary and are specified after the resolution. For example, a camera that is H.264 1080p25 uses H.264 compression, is roughly 2-megapixel, uses progressive scanning and transfers video at 25 fps.

Megapixel cameras in the security industry are beginning to appear under the label "HD," which attracts attention because many end users are already familiar with HDTV formats. Clear distinctions among the different types of megapixel cameras and systems deployed must be made to further industry growth.

ANALOG INFRASTRUCTURE

HDcctv utilizes the broadcast standard, serial digital interface, as the basic transport mechanism, said Todd Rockoff, Executive Director of HDcctv Alliance. Digital signals are transmitted uncompressed over 100 meters of coaxial cable. As a result, video can be displayed without latency, a problem that megapixel network cameras often face, Wilson said. Existing analog installations, such as those used in retail, can be upgraded with one to two HD cameras and a DVR capture card (for PC-based only), without uprooting the entire system.

Network cameras have to compress images before sending them over sometimes unreliable networks, which means that signals are often delayed before live view. "Before anyone can see a frame of video, many frames of video have already happened," Rockoff said. "If you try to monitor public areas with PTZ cameras, tracking is fundamentally difficult because video lags and can be badly distorted when compression drops or loses packets. This is not a problem with HDcctv."

Distance and storage, however, are two areas that have come under scrutiny for HDcctv. With analog infrastructure, scalability has always been an issue. Upgrading and expanding the system demands more cables inlaid, which is time-consuming and costly. Most proponents for IP-based systems use scalability as their winning argument against analog systems, and HD is no different. However, analog systems still account for the majority of the video surveillance market, and those who do not wish to uproot their systems but require high resolution will be able to take advantage of this structure.

Looking at storage, traditional DVRs must be switched out in favor

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of an HD DVR. These are more expensive than regular DVRs, but if manufacturers are clever about design, they can share compression chips, rather than add a chip to every HD channel, Rockoff said.

"With IP, you have to get onto the network and put it throughout the building. Not everyone has technicians who can do this. Everyone has technicians who can plug in a camera and run a wire. Using an RG-6, I can run a camera 800 feet with an HD signal," said Sonny Roberts, VP of Sales at Gnisec, in a prepared statement.

Mark Wilson, VP of Marketing at Infinova

Todd Rockoff, Executive Director of HDcctv Alliance

Hardy Mehl, Director of IP Business at Basler Vision

HIGH-RESOLUTION DIGITAL SYSTEMS

Moving into the IP space, megapixel and HD are becoming two distinct categories, with increasingly separate markets, although HD cameras are essentially megapixel. "HD cameras are megapixel cameras with a specific format; therefore, there is no great difference except that HD has the advantage of synchronized camera and monitor resolutions," said Hardy Mehl, Director of IP Business at Basler Vision Technologies.

There is some confusion in the marketplace now, since manufacturers of megapixel cameras have begun marketing products as "HD," in order to capitalize on the

familiarity of HDTV in the consumer marketplace, said James Mihaychuk, Product Manager for Surveillance and IP Cameras, Lumenera.

HD

By definition, HD means anything higher than a D1 resolution, said Paul Bodell, CMO of IQinVision. "By this measure, every megapixel camera is also, in fact, an HD camera. There are different formats of HD that exist, like 720p, 720i, 1080p and 1080i, as well as different frame rates, but not one of these is 'the HD standard.'"

HD has specified dimensions for video format and aspect ratio, but its market reach is still limited due to cost and storage limitations, said Patrick Lim, Director of Sales and Marketing at Ademco. Only a few big players currently drive HD cameras, which means that they are among the most expensive cameras in the market.

The HD format specification is well-documented; so even when cameras are manufactured by different brands, the products are still very similar. "This is a plus. It allows customers to get the same output from all HD cameras," Lim said.

However, in terms of projects, there is still little demand for HDTV. "It's very new, and we only have one or two projects that use it, with less than 20 units installed. Demand from customers to integrate HD cameras into their systems is low, and many VMS providers are in no hurry to integrate HDTV capabilities," Lim continued.

In a nutshell, HD has two video formats — 720 and 1080. Both can use progressive or interlaced scanning, though progressive is superior. The aspect ratio is fixed — 16:9, compared to 5:4 or 4:3 in other surveillance cameras, said John Honovich, founder of *IPVideoMarket.info*, in a prepared statement. Frame rate is usually 25 or 30, which is high and used for real-time surveillance.

With specifications come more requirements. HD cameras are only part of an HD video surveillance system; users need to be able to capture and playback high-quality images. Therefore NVRs, and 16:9 HD monitors are also necessary.

Patrick Lim, Director of Sales and Marketing at Ademco

John Honovich, founder of *IPVideoMarket.info*

MEGAPIXEL

While HD is generally viewed as adhering to fixed formats, megapixel cameras have been criticized for lack of uniformity. "Manufacturers tend to use different resolutions, compression techniques, video codecs, frame rates, aspect ratios and so on; so, you have mixed quality among the cameras available," Lim said.

These cameras have been marketed as suitable for niche applications demanding more resolution and higher quality images. "Units can range from 1.3- to 5-megapixel and even higher," Wilson said. Ultrahigh-resolution megapixel cameras — 10, 12, 16 and even 21 — are aimed at special applications, for scientific research or wide-area surveillance such as border control, which require more bandwidth, storage and do not operate at high frame rates.

For most applications, however, the work horse is the 1.3-megapixel camera. There are more of these than any others installed, Wilson said.

Low frame rate is still a major concern. While users can actually send up to 15 megabits for a megapixel camera, experts have said that 6 to 8 megabits are optimum.

As with HD, when megapixel cameras are added to the equation, other components of the system are strained. "You need high-performance processors and encoders, and every link in the system requires higher bitrate and additional hardware to decode the footage," said Neeraj Purandare, Product Manager for Physical Security Business Unit at Cisco Systems.

Because of these constraints, applications that need more than 2 megapixels and do not need high frame rates (25 to 30 fps) should consider non-HD megapixel cameras, whereas those that require high frame rates and HD output should choose HD cameras, Honovich said.

Essentially, megapixel and HD cameras are moving toward two different markets. HD formats are poised to become mainstream network cameras in the short term, whereas higher megapixel resolution cameras will be used for niche applications and can gain more importance in the long run, Mehl said. a&s