H.265 compression set to make a mark on IP Video Surveillance

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H.265/HEVC coding format will bring major benefits to IP video cameras offering a new level of video quality at an economic price

The emergence last year of a new format for High Efficiency Video Coding (HEVC) is poised to have a huge impact on IP video surveillance cameras over the next few years. Among the benefits of the new H.265/HEVC coding format over the legacy H.264/MPEG-4 is a 40 percent or more bit rate reduction at the same visual quality. Therefore, a camera could provide either better visual quality than H.264 with existing network and storage requirements, or it could provide the same visual quality with 40 percent less network and storage needs. H.265/HEVC could enable IP cameras with even larger megapixel counts – 20 megapixel cameras, for example – to operate more efficiently without overwhelming network infrastructures. H.265/HEVC also brings improvements in noise levels, color spaces and, most importantly for surveillance, an enhanced dynamic range.

H.265 implementation inevitable but some years away

Implementation of the new standard in most IP video cameras, however, is still years away. As with
other video standards, the security market inherits the H.265/HEVC format from the much larger consumer electronics market. Typically, after standards are developed, it takes several years for their use to make its way into various markets, starting with the consumer video market and later into security and other smaller markets.

Currently, the leading video coding format is H.264/MPEG-4, which was initially developed in 1999 and has only recently become the de facto standard in the security/surveillance market, more than a decade after it was approved. Mainstream application of H.265/HEVC is also likely to take several years.

Jack Cabasso, Managing Director of Aventura Technologies, Hauppauge, N.Y., says implementation of the new format in video surveillance is “inevitable.” He adds, however, that industry research and development takes time. He predicts the first prototypes from major camera manufacturers will emerge around the ISC West 2015 trade show, with products rolling out the following year. Aventura focuses on the higher-end market, and image processing has been one of the company’s core competencies throughout its 15-year history. Cabasso describes the company’s business as “project-based.” The supplier deals with large enterprise customers and city-wide surveillance systems, and doesn’t sell through general distribution.

"The first prototypes from major camera manufacturers will emerge around the ISC West 2015 trade show, with products rolling out the following year", says Jack Cabasso, Managing Director of Aventura Technologies

Aventura’s large customers are eager to take advantage of any new developments, a preference that has driven Aventura’s early entry into the H.265/HEVC arena. It’s not surprising that the company introduced its first H.265/HEVC camera and recorder at the 2013 ASIS International show, just months after the standard was approved.

“The people on large enterprise projects want to be on the front of the cycle,” he says. “They want to be technologically current.”
says Cabasso as the company has been deploying the cameras since the fourth quarter of 2013. They have already seen “several large shipments to existing customers adding onto existing larger projects.”

Despite the company’s early entry in the market, Cabasso predicts widespread implementation of H.265/HEVC in the surveillance market will come later. Although some consumer electronics are already using H.265/HEVC, most security products that embrace the new format won’t be introduced until 2015 or after.

Benefits of H.265 will vary on manner of implementation

The benefits of the new video compression format will be realized in how it is implemented by each manufacturer, Cabasso says. “Just because you adopt a standard, it doesn’t mean you can produce something useful with it.” He compares the new format to the raw food ingredients that might be used by several chefs – the resulting meal will be very different based on each chef’s cooking techniques. “Just because you use a particular technology doesn’t mean you can deploy it successfully,” he says.

Although IP cameras employ video standards, each manufacturer deploys a standard in its own proprietary video encoding system. Therefore, each camera has to be used with a network video recorder that features a compatible decoding system, or else IP camera manufacturers can share their software and interfaces with recording software and hardware companies seeking to interoperate with their cameras.

Better quality surveillance video, more economically

Although H.265/HEVC is more “computationally expensive” than H.264, the computer chips inside most current cameras are more than up to its needs, says Cabasso. In general, the processing power inside IP cameras is increasing anyway (as chip prices go down and capabilities go up), so processing power should not be an impediment to embracing the new format.

H.265/HEVC could help the industry offer a new level of video quality at an economic price. In
addition to standard definition and high definition (HD), a new standard called UHDTV (Ultra-High Definition TV, including 8.3 megapixel or 33.2 megapixel images) could become more common. H.265/HEVC can also support up to 300 frames per second (fps), which is helpful for some machine vision applications. However, in the security market, Cabasso says 60 fps is more than enough for effective license plate recognition.

Today many cameras are dual-stream and incorporate both Motion JPEG and H.264. Cabasso expects cameras over time to transition to dual-stream (Motion JPEG and H.265/HEVC), with a few models embracing triple streams – Motion JPEG, H.264/MPEG-4, and H.265/HEVC.

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