



## **Broadcasting and Beyond: Focusing on Enhanced Image Quality for the Security and Medical Industries**

Two industries that have done an excellent job of embracing the use of videography and camera technology are the security and medical sectors. As the needs of the security and medical industries have grown, both have realized the need for more advanced imaging solutions. Whether it is posting sophisticated networked security cameras around a manufacturing plant to identify threats, or the ability of a physician to conduct vital microscopic or endoscopic diagnostic tests for internal cancerous growths with a higher degree of accuracy and certainty, both sectors can benefit from new CMOS-based (complimentary-metal-oxide-semiconductor) high definition (HD) video image quality.

### Harnessing HD Video for Security and Medical Uses

In both cases, the need for high performance, extremely reliable and cost-effective cameras is on the rise so that physical security needs and patient medical care can be conducted at the highest possible standards. What's new and different is the use of CMOS vs. the maturing CCD (charge-coupled device) technology. The use of CMOS imaging sensors in professional camera situations, for commercial TV stations, security cameras or microscopic and endoscopic camera gear allows images to be viewed in HD quality, via smaller, more compact physical camera housing even in very low-light situations.

### Understanding the CMOS Difference

HD video is the new benchmark for digital video quality, displaying clearer and sharper images with more detailed information and accuracy than ever before. Using the same CMOS technology that is being deployed by the professional broadcast market, these benefits can make a real difference in situations such as stepped-up video surveillance to identify an intruder, or making the correct medical diagnosis for a patient with the highest degree of certainty.

CMOS imaging technology offers high-performance HD capture combined with low power consumption at low cost in a compact package. This enables camera manufacturers to continue to design unobtrusive housings while delivering superior image quality and low heat build up in a standalone or networked setting. Commercial broadcast camera gear introduced in 2003 by Ikegami and JVC offer sophisticated high-definition CMOS image sensors that enable pristine, clear and accurate images that are highly sensitive to light, ensuring high quality images at any time and in variety of lighting conditions in both black & white and color. The higher resolution offered by AltaSens' ProCamHD CMOS sensors supports additional advanced features including digital pan, tilt and zoom with fewer artifacts to ensure the most accurate information is received.

## **Image Quality Makes a Significant Difference in Physical Security Monitoring**

- ü High signal-to-noise ratio (SNR) and image sharpness: 12-bit resolution performance yielding SNR of 56dB and higher provides sharp, crisp images in critical security situations. Facial recognition system performance is enhanced and remote security operations relying on digital pan-tilt-zoom preserve better overall image continuity and detail when magnifying a given segment of the image.
- ü High dynamic range: With dynamic range greater than 68dB, CMOS designs provide excellent image detail across the full brightness spectrum making them ideal for challenging locations needing high image quality, such as glass lobby areas with indoor surveillance systems also scanning close proximity outdoor locations, multiple-level open-air parking garages and other locations reliant on ambient lighting conditions.
- ü Ultra-low noise operation: Read noise levels now drop below 10e- at very high-speed operation (75MHz and 2.1 megapixel resolution) and continue to improve. This will contribute significantly to improved SNR performance for continuous high quality image capture in critical homeland security locations such as military installations, petrochemical refineries and energy plants – day and night.
- ü High quantum efficiency and sensitivity: New pixel and microlens designs that improve light gathering at the pixel will increase QE to beyond 70%. This, coupled with noise reduction techniques that simplify the pixel electronics and improve fill factor will yield higher sensitivity, critical for security and surveillance systems that rely on a wide variation of ambient lighting conditions due to weather and darkness.
- ü Low power consumption: Heat, the byproduct of power consumption in electronics, can adversely affect signal processing by injecting extraneous electronic noise. CMOS sensors' lower power consumption means potentially lower cost (no cooling fans, heat sinks, etc.) and better image quality for security/surveillance cameras operating in confined, concealed spaces virtually anywhere in the world.

## **Endoscopy and Minimally Invasive Surgery Move to New Levels with Pro-Cam HD**

Video advancements in surgical applications must meet demands beyond traditional image capture. Surgeons conducting exploratory or other surgical procedures can now rely on high definition video capture using CMOS technology that delivers superior image quality for stereo microscopic and minimally invasive procedures that meets the following critical requirements:

- ü **No Image Latency:** Progressive video frame rates as high as 60 fps for 2 megapixel images provide “real time” video imagery to the surgeon. High resolution, high definition imaging provides a new standard of video enhancement and a new benchmark for technology achievement that reduces risk and minimizing time in the operating room.
  
- ü **High Image Quality:** New CMOS designs with 12-bit dynamic range, high sensitivity and low noise operation deliver a new standard for high image quality across a variety of lighting conditions. In addition, excellent color fidelity enhances the distinctive features of critical organs and tissues to ensure prompt and accurate diagnoses and timely completion of surgical procedures.
  
- ü **Compatibility With Established Operating Standards:** High quality CMOS image capture designed to the standards of high definition television provides an efficient transition to new imaging benefits while remaining compatible with the existing infrastructure of the OR and hospital. This means image capture, transmission, display, storage and retrieval do not require radical departures in procedures or processes that are already established within the medical organization.

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