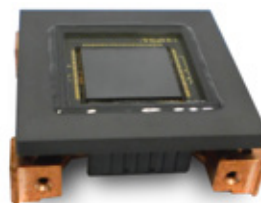


NV-CMOS™ Next-Generation Night Vision Imager

Traditionally, daylight and night vision imaging systems require separate sensors in separate cameras. A new SRI Sarnoff sensor will capture images over the full range of illumination from bright sunlight to overcast starlight. The low-light Night Vision Complementary Metal Oxide Semiconductor (NV-CMOS™) image sensor will provide the sensitivity—that was once the exclusive domain of image intensifier tubes—together with the low-cost, ruggedness, flexibility, and convenience of a digital CMOS imager chip.

SRI's low-light CMOS sensor will deliver enhanced sensitivity across the entire visible and near-infrared spectrum, enabling completely new possibilities. For example, in goggles the NV-CMOS imager could work with a thermal weapon sight to superimpose the reticle onto reference video showing where the weapon is aimed—day or night. Unlike conventional image intensifiers, the SRI sensor will output a digital signal for efficiently recording or sharing video.



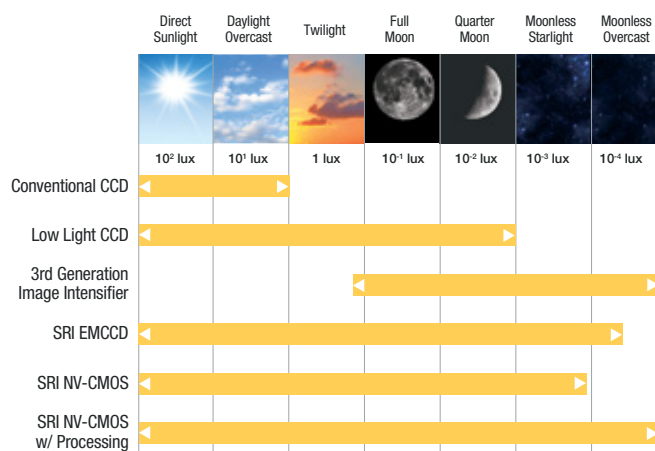
NV-CMOS™ HD imager

A single camera equipped with this sensor will replace separate cameras for day and night use. The result is a substantial reduction in size, weight, and power (SWaP), ideal for applications such as

unmanned aerial vehicles and mobile operations. With built-in processing, the NV-CMOS imager will accommodate the entire range of intelligence, surveillance, and reconnaissance lighting conditions.

Day and Night Situational Awareness from a Single Sensor

This current work in low-light CMOS imaging reflects more than five decades of expertise. SRI Sarnoff is a pioneer in the development of CMOS processes tailored to low-light applications including backside illumination. In addition, the company has developed highly efficient methods of image processing to further improve operation across a wide range of lighting conditions from the lowest light levels to bright sunlight, providing unprecedented dynamic range.



The NV-CMOS imager is designed to accommodate the entire range of lighting conditions.

Applications

- Soldier-borne devices
- Day/night cameras for passive surveillance and security
- High-resolution cameras for manned and unmanned vehicle day/night pilotage and targeting
- Day/night intelligence, surveillance, and reconnaissance (ISR)
- Covert surveillance systems

Specifications

Number of active pixels	1920 (H) x 1200 (V)
Pixel size	8 μm x 8 μm
Imager active area	16.3 mm x 9.6 mm
Frame rate	60 FPS
Resolution at Nyquist	> 50% MTF at 650 nm
Temporal noise	< 2 e ⁻
QE	> 90% peak; > 50% at 850 nm
Power consumption	400 mW



NV-CMOS HD demonstration camera

Benefits

- Persistent, unified day/night operation; one camera for continuous situational awareness from bright sunlight to below starlight
- Higher contrast, better SWaP efficiency, and longer operating life compared to traditional image intensifiers; no halo; no blooming
- High resolution and low noise, even at video frame rates
- Built-in non-uniformity correction and defect correction for exceptional consistency
- Extended dynamic range (XDR) processing to handle huge variations in intra-scene brightness levels
- Video frame rates to capture fast motion; minimal latency
- Digital output for processing, recording, or sharing with remote systems
- Solid-state reliability reduces maintenance costs, compared to image intensifier tubes
- Low-cost wafer-scale manufacturing for high-volume production

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Preliminary—All statements and claims are design goals, pending the result of testing