SWIR VISION SYSTEMS

AFFORDABLE. HIGH DEFINITION. SWIR VISION.

# Acuros™ SWIR Camera

SWIR Vision Systems™ introduces the Acuros™ family of high definition cameras featuring CQD™ Colloidal Quantum Dot technology. Acuros cameras deliver broadband, visible-to-SWIR, high resolution images, at far superior cost points compared to InGaAs SWIR cameras. The cameras are classified as non-ITAR, EAR99 products (no export license required) and are intended for use in applications including machine vision, silicon inspection, surveillance, hyperspectral imaging, and more.

## Applications

**Industrial automation**
- Machine vision
- Silicon inspection
- Process control
- Moisture detection
- Fill level inspection
- Plastics sorting

**Surveillance and security**
- Chemical sensing
- Gas leak detection
- Explosives detection
- IR surveillance

**Agriculture**
- Crop health monitoring
- Water, moisture monitoring
- Food sorting

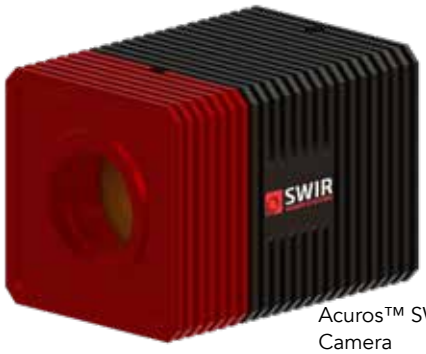
## Innovation: CQD™ Sensor Technology

Tiny semiconductor 'Quantum Dot' crystals are deposited directly onto silicon CMOS circuitry. The result is higher resolution sensors, delivered at lower cost/megapixel than InGaAs sensors.

## High Definition SWIR Cameras

SWIR Vision Systems cameras are built with increasing resolution to provide the needed performance for specific applications.

- Acuros™ VGA SWIR Camera (640 x 512)
- Acuros™ 1MP SWIR Camera (1280 x 1024)
- Acuros™ HD SWIR Camera (1920 x 1080)




Acuros™ SWIR HD Camera

## SWIR Application Images

Pharmaceutical Vials Imaging

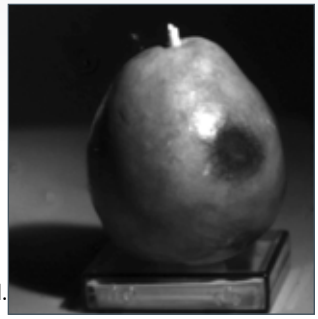
a.

b.

Imaging liquid fill level in pharmaceutical vials with
(a) CMOS Camera Image
(b) SWIR Camera Image

Food Sorting Imaging

c.



d.

Imaging sub-surface bruising of fruit:
(c) CMOS Camera Image
(d) SWIR Camera Image

Maritime Haze Imaging

e.

f.

Maritime imaging across misty inlet:
(e) CMOS camera image
(f) SWIR camera image

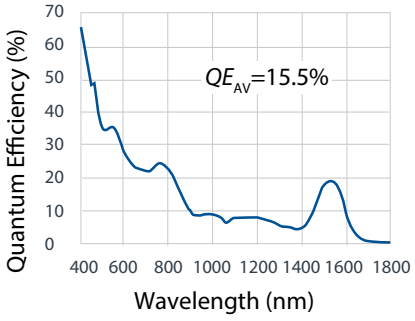
## For More Information

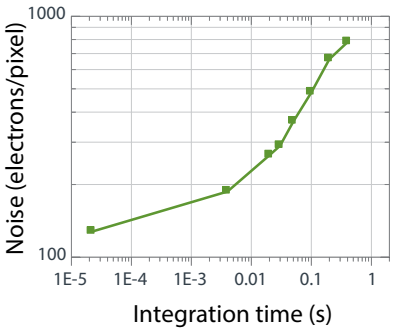
For sales inquiries and pricing information, and to explore co-development and partnership opportunities, contact us at:

**info@swirvisionsystems.com**
**+1 919.248.0032**

Ideal in daylight or artificially lit environments, Acuros cameras provide the superior image resolution needed in challenging image sensing environments. With inherently lower cost per megapixel than InGaAs detectors, Acuros SWIR cameras provide excellent value for system integrators.

| SWIR Vision Systems™ Acuros Camera Performance | Acuros™ VGA | Acuros™ 1MP | Acuros™ HD |
|---|---|---|---|
| **Sensor Technology** | CQD™ Quantum Dot | CQD™ Quantum Dot | CQD™ Quantum Dot |
| **Format** | 640 x 512 | 1280 x 1024 | 1920 x 1080 |
| **Resolution** | 0.33 | 1.31 | 2.07 |
| **Sensor Size** | 12.3 mm | 24.6 mm | 33 mm |
| **Spectral Band** | 400-1700 nm | 400-1700 nm | 400-1700 nm |
| **Pixel pitch** | 15 µm | 15 µm | 15 µm |
| **Integration Time** | 10 µsec–30 msec | 10 µsec–30 msec | 10 µsec–30 msec |
| **Max frame rate** | **10 bit:** 380 fps<br>**14 bit:** 190 fps | 95 fps<br>45 fps | 60 fps<br>30 fps |
| **Quantum Efficiency** | 15% average | 15% average | 15% average |
| **Total Noise** | 280 electrons rms,<br>30 ms integration | 280 electrons rms,<br>30 ms integration | 280 electrons rms,<br>30 ms integration |
| **Noise Equivalent Irradiance** | 6 x $10^9$ photons/$cm^2$/s (33 fps at 1550 nm) | | |
| **Operability (typical)** | >99% | >99% | >99% |
| **Dynamic Range** | >2100:1 | >2100:1 | >2100:1 |
| **TEC Cooler** | Q2 2019 | Q2 2019 | Q2 2019 |
| **Non-Uniformity Correction** | 2-point, firmware | 2-point, firmware | 2-point, firmware |
| **Binning Arrays** | 2x2, 4x4 | 2x2, 4x4 | 2x2, 4x4 |
| **Windowing/Region of Interest (ROI)** | Max frame rate scales with ROI. Array centered. | | |
| **Exposure Control** | Global Shutter | Global Shutter | Global Shutter |
| **External Trigger** | Hirose 12-pin | Hirose 12-pin | Hirose 12-pin |
| **Data interface** | USB3 Vision or<br>GigE Vision | USB3 Vision or<br>GigE Vision | USB3 Vision or<br>GigE Vision |
| **Lens mount** | C-mount | C-mount, F-mount | F-mount |
| **Supply Voltage** | 6–12 V | 6–12 V | 6–12 V |
| **Power (typical)** | 5.75W at 25C | 5.75W at 25C | 5.75W at 25C |
| **Physical Dimensions** | (H) 6.1 cm<br>(W) 6.1 cm<br>(L) 9.9 cm | (H) 6.1 cm<br>(W) 6.1 cm<br>(L) 9.9 cm or 13.0 cm | (H) 6.1 cm<br>(W) 6.1 cm<br>(L) 13.0 cm |
| **Weight** | 407g | 407g (C-mount)<br>532g (F-mount) | 532g |
| **Software Development Kit** | Pleora SDK | Pleora SDK | Pleora SDK |




(Left) Plot of the FPA spectral QE. QE shown is the mean response for the array under monochromatic illumination. The FPA exhibited an average QE of 15% across the spectral range shown. (Right) Total per pixel RMS noise electrons as a function of integration time.