

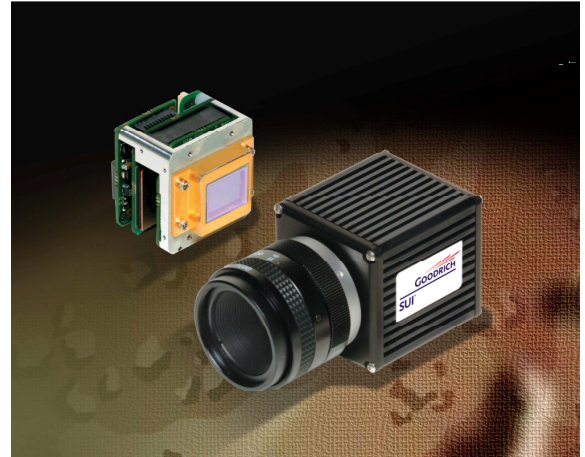
# SU640HSX-1.7RT

Preliminary

## Mil-Rugged High Sensitivity InGaAs SWIR Camera with Advanced Dynamic Range Enhancements



The compact **SU640HSX-1.7RT** is a Mil-Rugged InGaAs video camera featuring high-sensitivity and wide operating temperature range. It provides real-time daylight to low-light imaging in the Short Wave Infrared (SWIR) wavelength spectrum for persistent surveillance, laser detection, and penetration through fog, dust, and smoke. In addition, the camera employs on-board Automatic Gain Control (AGC), proprietary dynamic-range enhancement technology, and built-in non-uniformity corrections (NUCs), allowing it to address the challenges of urban night imaging **without blooming**. Simultaneous RS170 analog and Camera Link® digital output provide a means for plug-and-play video and high quality 12-bit images for image processing or transmission. The light-weight, compact size, and low power consumption enables easy integration into surveillance systems, whether hand-held, mobile, or aerial. Optional **NIR/SWIR technology** is available to extend the sensitivity of Goodrich cameras down to 0.7  $\mu\text{m}$ , offering the advantage of both Near Infrared (NIR) and Short Wave Infrared wavelength response.

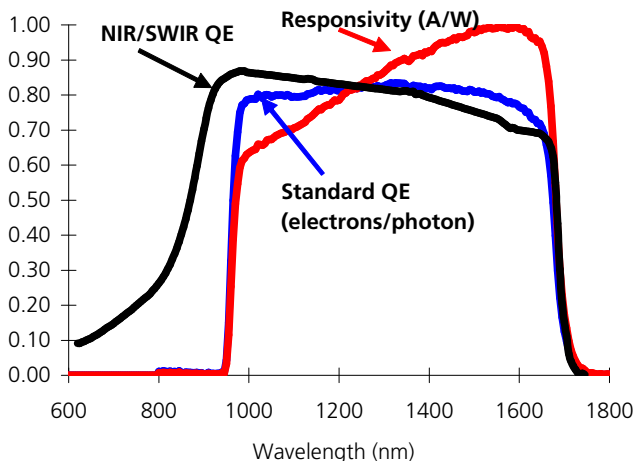


### APPLICATIONS

- Low-light level imaging
- Covert surveillance with passive 24 hr/7 day operation
- Driver Vision Enhancement (DVE)
- Imaging through atmospheric obscurants
- OEM version for easy integration into UAVs, handheld, or robotic systems
- Laser spotting and tracking

### FEATURES

- Highest sensitivity available in 0.9 to 1.7  $\mu\text{m}$  spectrum; NIR/SWIR, from 0.7 to 1.7  $\mu\text{m}$
- Images from partial starlight to direct sun illumination
- 640 x 512 pixel format, 25  $\mu\text{m}$  pitch
- Compact OEM module size < 3.8 in<sup>3</sup>
- Enclosed module size < 9.5 in<sup>3</sup>
- Low power, < 2.7 W at 20 °C
- All solid-state InGaAs imager
- On-board non-uniformity corrections
- Simultaneous digital & analog outputs
- Advanced Automatic Gain Control (AGC)
- Selectable contrast enhancement modes
- Region of Interest (ROI) windowing mode
- FCC CE and MIL-461F certified
- MIL-STD-810G certified
- Operation from -40 °C to 70 °C
- Environmental Stress Screening



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## MECHANICAL SPECIFICATIONS

Model:	Enclosed	OEM
Module dimensions Width x Height x Depth	2.1 x 2.1 x 2.55 inches 52.1 x 52.1 x 64.7 mm (with I/O connectors, no lens or mount)	1.64 x 1.5 x 1.6 inches 42 x 38 x 41 mm
Weight (no lens)	< 270 g	< 90 g (analog out)
Lens Mount	C-mount adapter in M42x1 mount	M42x1 mount bracket
Included Lens	f/1.4, 50 mm, 18° FOV width, M42x1-mount	none
Camera Link Connector	3M SDR26 Connector	none
I/O Connector	3M SDR14 Connector	none
Interface Connector	Not applicable	Harwin Datamate M80-5020805
Pixel Pitch	25 µm	
Focal Plane Array Format	640 x 512 pixels	
Active Area	16 mm x 12.8 mm x 20.5 mm diagonal	

## ENVIRONMENTAL & POWER SPECIFICATIONS

Operating Case Temperature	-40 °C to 70 °C
Storage Temperature	-54 °C to 85 °C
Humidity	100 % Non-condensing
Power Requirements:	
AC Adapter Supplied	100-240 VAC, 47-63 Hz
DC Voltage	+9-16 V
Typical Power	<2.7 W at 20 °C ambient, <4 W @ 40 °C
Functional Shock, Thermal Shock, Random Vibration, Storage Temperature, Temperature/Altitude Combine, Humidity, Transportability	MIL-STD-810G compliant
Conducted & Radiated Emissions	CE FCC Part 15, MIL-STD-461F
Mean Time Between Failure	>10,000 hours, MIL-HDBK-217F N2
Fungus-Inert Material	MIL-HDBK-454B

## ELECTRICAL SPECIFICATIONS

Optical Fill Factor	100 %
Spectral Response	Standard, 0.9 µm to 1.7 µm NIR/SWIR, 0.7 µm to 1.7 µm
Quantum Efficiency	Standard, > 65 % from 1 µm to 1.6 µm NIR/SWIR, > 65 % from 0.9 µm to 1.6 µm
Mean Detectivity, $D^*$ <sup>1</sup>	> $3.51 \times 10^{13}$ cm <sup>2</sup> /Hz/W
Noise Equivalent Irradiance <sup>1</sup>	< $3.46 \times 10^8$ photons/cm <sup>2</sup> ·s
Noise (RMS) <sup>1</sup>	< 50 electrons
Full Well (Typical) In OPRO	$12 \times 10^6$ electrons
Dynamic Range (Typical) <sup>4</sup>	> 3000:1
Operability <sup>2</sup>	> 99 %
Exposure Times <sup>3</sup>	60 µs to 33 ms in 12 steps
Image Correction	2-point (offset and gain) pixel by pixel, user selectable
Digital Output Format	12 bit Camera Link® (SDR connector for enclosed version, ribbon for OEM version)
Analog Output Format	Buffered EIA170 compatible video, 30 fps (both versions)
Digital Output Frame Rate	30 fps (faster frame rates in windowed operation)
Scan Mode	Continuous, or 4 externally triggered modes, or ROI windowing mode

<sup>1</sup>  $\lambda = 1.55 \mu\text{m}$ , exposure time = 33.2 ms, Highest Sensitivity OPR setting, no lens, x1 digital gain with enhancement, AGC, and correction off.

<sup>2</sup> The fraction of pixels with responsivity deviation between +/- 35 % from the mean

<sup>3</sup> The 12 pre-configured exposure times include factory stored non-uniformity corrections.

Additional exposure times are programmable via RS-232 commands.

<sup>4</sup> In high dynamic range OPR settings.

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