

NEUTRINO® ISR SERIES

MWIR Detector Module + CZ Lens + Advanced Camera Electronics



NDA compliant and ITAR free, the Neutrino Ground ISR series provides turnkey solutions for integrators developing intelligence, surveillance, and reconnaissance (ISR) systems. The cameras combine Teledyne FLIR OEM's world-class mid-wavelength infrared (MWIR) camera modules and continuous zoom (CZ) lenses with market-leading image processing and control electronics from InVeo Designs LLC. Each camera offers high-performance imaging, a reliable long-life linear cooler, and a low switching cost to upgrade existing systems. The factory-integrated and optimized MWIR imaging systems from a single source provide market-leading performance while reducing development risk, cost, and time to market.

They incorporate multiple focal plane array (FPA) resolutions and CZ lens options with industry standard image processing and interface electronics, allowing for differing detection recognition and identification (DRI) requirements and affordability. With four configurations today and more coming soon, the ITAR-free cameras provide the imaging performance required for short, mid, and long-range ISR, perimeter surveillance, border surveillance, and counter-UAS (CUAS) applications.

All Neutrino Ground ISR cameras can run Teledyne FLIR OEM's Prism™ AI detection, tracking, and classification models and Prism ISP libraries for super-resolution, turbulence mitigation, contrast enhancement, and more.



DRIVES HIGH SYSTEM-LEVEL PERFORMANCE

The right focal lengths, MWIR HD or SD cameras with long-life linear coolers and fully integrated CZ optics maximize DRI

- MWIR VGA (640x512) or SXGA (1280x1024) pixel sensors provide optimal thermal sensitivity
- Optimized through-zoom focus and boresight retention enable superior autofocus and focus to range
- Compatible with Prism AI models and ISP libraries
- Near diffraction-limited performance over range with image quality optimized from -40 °C to 71 °C



DESIGNED FOR INTEGRATORS

Industry-adopted AgileCore™ imaging electronics with integrated MWIR camera and CZ lens offer optimum performance and compatibility

- Industry standard camera and lens control interface by InVeo Designs LLC
- Common camera interfaces with 30Hz Camera Link or Gigabit Ethernet and 1080P30 HD-SDI, 720P60 HD-SDI, NTSC, or PAL video
- Comprehensive integration documentation
- Dedicated application engineering and technical support team



TELEDYNE FLIR QUALITY, VALUE, AND REPUTATION

The performance, reliability, and support expected from Teledyne FLIR and the industry's most versatile HD MWIR camera portfolio

- Long-life Linear Stirling cooler with a mean time to failure (MTTF) >27,000 hours
- Industrial-leading two-year warranty from a single source
- Fully vertically integrated CZ lenses developed by Teledyne FLIR, formerly New England Optical Systems
- NDA compliant and classified under US Department of Commerce jurisdiction as EAR 6A003.b.4.a - ITAR Free

For more information visit:
oem.flir.com/neutrino

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Neutrino SX8 ISR 15-300



Neutrino LC ISR 20-420



Neutrino SX8 ISR 35-700



Neutrino SX12 ISR 1200

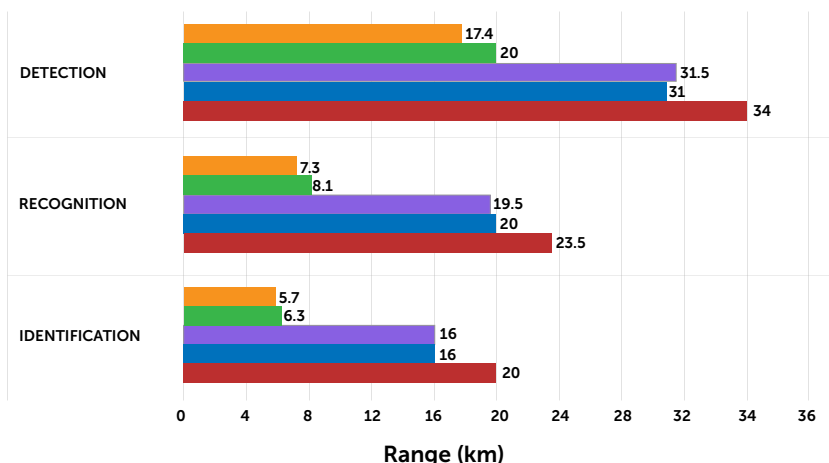


Neutrino SX8 ISR 50-1000



Performance modeled using industry standard NV-IPM software and associated parameters for thermal imaging of tracked vehicles

DRI of Vehicle Sized Targets (50% Probability)



Overview	LC ISR 20-420	SX8 ISR 15-300	SX8 ISR 35-700
Size (L x W x H)	Length: 20.3 cm (8 in.) Lens Diameter: 8.9 cm (3.5 in.)	Length: 20.3 cm (8 in.) Lens Diameter: 9.65 cm (3.8 in.)	Length: 47.5 cm (18.70 in.) Lens Diameter: 21.72 cm (8.55 in.)
Weight	1.2 kg (2.65 lb)	1.5 kg (3.31 lb)	8.55 kg (18.85 lb)
Spectral Band	3.4 to 5.1 μm Standard	3.4 to 5.1 μm Standard	3.4 to 5.1 μm Standard
Resolution	640 x 512	1280 x 1024	1280 x 1024
Pixel Pitch	15 μm	8 μm	8 μm
Lens Specifications			
Lens Type	21x Continuous Zoom Maintain Focus Through Zoom	20x Continuous Zoom Maintain Focus Through Zoom	20x Continuous Zoom Maintain Focus Through Zoom
Focal Length	20-420 mm, HFOV 27.50° to 1.30°	15-300 mm, HFOV 39.1° to 2.0°	35-700mm, HFOV 16.65° to 0.84°
Zoom and Focus Controls	Motorized, Zoom to Specified Angle, Preset FOV (Infinity Focus)		
F-number	f/5.5	f/4.0	f/4.0
Focus	Motorized, Focus to Specified Distance, Focus to Infinity, Commanded / Continuous Autofocus		
Shutter	Integrated Shutter for 1-Point Flat Field Correction (FFC)		
Connections & Communications			
Communication	RS-422 UART COM, up to 921,600 Baud		
Dual Simultaneous Outputs	Camera Link (Base) Output (14-bit NUC Corrected at Full Frame Format): 30 Hz, Optional Gigabit Ethernet		
	Display Output Options (10-bit (14 optional) fully processed video) - NTSC - PAL	Display Output Options (10-bit (14 optional) fully processed video) 720p60 HD-SDI (SMPTE) 1080p30 HD-SDI (SMPTE)	
Electrical & Mechanical			
Input Voltage	12.5 VDC a@ 0.7 A nominal, 1.1 A peak at cooldown		
Environmental & Approvals			
Operating Temperature Range	-40 °C to +71 °C (-40 °F to 160 °F)		
Storage Temperature Range	-57 °C to +80 °C (-65 °F to 176 °F)		
Imaging & Optical			
Sensor Material	HOT MWIR		
Cooler	Teledyne FLIR FL-100 Linear Stirling		
Cooler MTTF	Up to 27,000 Hours		
FPA Full Frame Rate	30 Hz		
Boresight Drift Through Zoom	<0.15 mm		
Min to Max Zoom Time	<2 Seconds		
Non Uniformity Correction [NUC]	Factory Calibrations: - Two point (gain/offset) - One-point update (optimizes offset) - Defective / noisy pixel detection 8 Op Modes with 2 NUC tables each Operational (Run-Time) Calibrations: One-point refresh		



Overview		SX8 ISR 50-1000	SX12 ISR 1200
Size (L x W x H)	Length: 48.18 cm (18.97 in.) Lens diameter: 30.48 cm (12 in.)		Length: 63.75 cm (25.1 in.) Lens Diameter: 29 cm (11.4 in.)
Weight	12.2 kg (26.90 lb)		14.51 kg (32 lb)
Spectral Band	3.4 to 5.1 μm Standard		3.4 to 5.0 μm
Resolution	1280 x 1024		1280 x 1024
Pixel Pitch	8 μm		12 μm
Lens Specifications			
Lens Type	20x Continuous Zoom Maintain Focus Through Zoom		10x Continuous Zoom Maintain Focus Through Zoom
Focal Length	50-1000 mm, HFOV 11.69° to 0.59°		120-1200 mm, HFOV 7.2° to 0.72°
Zoom and Focus Controls	Motorized, Zoom and Focus		
F-number	f/4.0		f/5.0
Focus	Motorized, Focus to Specified Distance, Focus to Infinity, Commanded / Continuous Autofocus		
Shutter	Integrated Shutter for 1-Point Flat Field Correction (FFC)		
Connections & Communications			
Communication	RS-422 UART COM, up to 921,600 Baud		
Dual Simultaneous Outputs	Camera Link (Base) Output (14-bit NUC Corrected at Full Frame Format): 30 Hz, Optional Gigabit Ethernet		
	Display Output Options (10-bit (14 optional) fully processed video) (Select One): 720P60 HD-SDI (SMPTE) 1080P30 HD-SDI (SMPTE)		
Electrical & Mechanical			
Input Voltage	12.5 VDC a@ 0.7 A nominal, 1.1 A peak at cooldown		24 VDC @0.8 A nominal. 2.2 A peak at cooldown, 23 °C
Environmental & Approvals			
Operating Temperature Range	-40 °C to +71 °C (-40 °F to 160 °F)		-30 °C to +70 °C (-22 °F to 158 °F)
Storage Temperature Range	-57 °C to +80 °C (-65 °F to 176 °F)		-
Imaging & Optical			
Sensor Material	HOT MWIR		InSb
Cooler	Teledyne FLIR FL-100 Linear Stirling		Cobham Carleton LC1062 Linear Stirling
Cooler MTTF	Up to 27,000 Hours		Up to 25,000 Hours
FPA Full Frame Rate	30 Hz		
Boresight Drift Through Zoom	<0.10 mm Radially from Co-Boresight Location		9 Pixels (0.10 mm) + plus alignment tolerance of 10 Pixels
Min to Max Zoom Time	<2 Seconds		4 Seconds
Non Uniformity Correction [NUC]	Factory Calibrations: - Two point (gain/offset) - One-point update (optimizes offset) - Defective / noisy pixel detection 8 Op Modes with 2 NUC tables each Operational (Run-Time) Calibrations: One-point refresh		