

# NVG-4040 Night-Vision Radiometer

## PRODUCT SUMMARY

The Gamma Scientific NVG-4040 is an advanced spot radiometer for night-vision device measurement. Unique to the NVG-4040 is its ability to perform NVIS-A, NVIS-B and NVIS-C radiance measurements (competing systems measure only NVIS-A and NVIS-B radiance). In addition, the NVG-4040 is optimized for a full range of photopic measurements. Lightweight, portable and cost-effective, this feature-rich unit conforms to MIL-L-85762A and MIL-STD-3009, and is ideally suited for measuring displays and instrument panels used with night-vision goggles.

Features include six user-adjustable measurement apertures (5°, 2°, 1°, 0.5°, 0.33° and 0.1°) an NVIS-compatible touch screen, a fully automated USB interface for remote computer control and an internal calibration source. The instrument comes standard with a 50-mm f/1.4 lens with extension rings for macro measurements; a full range of optional lenses is available.

The NVG-4040 takes night-vision spot-radiometer performance to a new level. The state-of-the-art technology and electronics are based on our flagship TIA-3000 detector laboratory standards. The TIA-3000 was developed under special contract and is the highest performance primary-standard available today.



## FEATURES

- Exceeds MIL-L-85762A and MIL-STD-3009 specifications
- Touch screen ANVIS compatible display
- USB interface
- Radiance and Irradiance measurements with accessories
- Six different measurement field-of-views (5°, 2°, 1°, 0.5°, 0.33° and 0.1°)
- Automated gain control
- Internal Calibration Source
- NVIS-A, NVIS-B, NVIS-C (leaky green), and Photopic measurement filters
- Two automated filter wheels
- USB interface
- Battery operated
- Field portable



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## SPECIFICATIONS

<b>Analog to Digital Resolution</b>	24 bit (1 part in 16,777,216)
<b>Local control</b>	Programmed controls on touch screen interface
<b>Display</b>	1/4 VGA, 320 x240 pixel Super twist LCD with blue Night Vision Imaging System compatible backlight (12 levels of backlighting including "NVG" off position)
<b>Measuring Field Aperture</b>	Automated 5, 2, 1, 1/2, 1/3, 1/10 degree (Angular subtense calculated with 50 mm focal length lens focused at infinity, see separate chart for spot sizes at finite working distances)
<b>Field-of-view</b>	8 degrees
<b>Optics</b>	Standard 50 mm f/1.4 lens with extension tube set [Optional lenses and/or cosine receptor (CR-4040 diffuser), available upon special request]
<b>Filter Turrets</b>	1 <sup>st</sup> filter turret, four position filter; 2 <sup>nd</sup> filter turret, four Neutral Density positions.
<b>Spectral Response, Standard Filters</b>	NVIS A, NVIS B, NVIS C, CIE S 010/E:2004 Standard Photometric Observer
<b>Standard Neutral Density Filters</b>	Open, ND2, ND4, ND6
<b>Internal Calibration Source</b>	Automatic implementation
<b>Computer Control</b>	USB
<b>Photometric Accuracy</b>	+/-2% of reading (NIST traceable 2856° K source, 500 ±100 cd/m <sup>2</sup> at 25 ±2°C)
<b>AR Accuracy</b>	10% NVIS class A, 15% NVIS class B, 17% NVIS class C (using Gamma Scientific class C digital relative spectral responsivity data) from RS-12 standard values
<b>Sensitivity</b>	see chart below for specific aperture filter combinations
<b>Measurement Capabilities</b>	Luminance, NVIS A, NVIS B, NVIS C [Illuminance option available upon special request.]
<b>Size</b>	10.5" L x 5.75" W x 7.5" H (26.5 cm L x 14.5 cm W x 10 cm H)
<b>Weight</b>	11.8 lbs. (5.4kg) with internal battery
<b>Power</b>	Internal Li-Ion battery, 90 to 250 Volts AC, 50/60 Hz

### NVG4040 Measuring field coverage

			Aperture Size in Degrees					
Collection Optics	Working Distance	Total View	5	2	1	0.5	0.3	0.1
50mm lens	13 inches	2.3						
	inches		1.137	0.454	0.227	0.113	0.070	0.023
	317.2 mm	58.4	27.75	11.08	5.54	2.77	1.72	0.55
50mm lens + 12mm extension	7 inches	1.24						
	inches		0.612	0.244	0.122	0.061	0.038	0.012
	170.8 mm	31.5	14.94	5.96	2.98	1.49	0.92	0.30
50mm lens + 20mm extension	4 inches	0.7						
	inches		0.350	0.140	0.070	0.035	0.022	0.007
	97.6 mm	17.8	8.54	3.41	1.70	0.85	0.53	0.17
50mm lens + 36mm extension	2.5 inches	0.45						
	inches		0.219	0.087	0.044	0.022	0.014	0.004
	61 mm	11.4	5.34	2.13	1.06	0.53	0.33	0.11
50mm lens + 12mm, 20mm & 36mm extension	1.37 inches	0.26						
	inches		0.118	0.047	0.024	0.012	0.007	0.002
	34 mm	6.6	2.88	1.15	0.58	0.29	0.18	0.06

### NVG4040 Sensitivity

			Aperture Size in Degrees					
Collection Optics Condition	Measurement Units		5	2	1	0.5	0.33	0.1
50mm lens Photometric Filter	fL	Max	1.22E+05	7.50E+05	3.06E+06	1.24E+07	2.75E+07	3.19E+08
		Min	8.12E-06	5.00E-05	2.04E-04	8.24E-04	1.83E-03	2.13E-02
	cd/m <sup>2</sup>	Max	4.17E+05	2.57E+06	1.05E+07	4.24E+07	9.43E+07	1.09E+09
		Min	2.78E-05	1.71E-04	6.98E-04	2.82E-03	6.28E-03	7.29E-02
50mm lens NVG Class A Filter	NRA	Min	1.21E-12	7.24E-12	3.00E-11	1.22E-10	2.72E-10	3.13E-09
50mm lens NVG Class B Filter	NRB	Min	4.02E-12	2.41E-11	1.00E-10	4.06E-10	9.05E-10	1.04E-08
50mm lens NVG Class C Filter	NRC	Min	2.41E-11	1.45E-10	6.00E-10	2.44E-09	5.43E-09	6.27E-08



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