BAYSPEC
Pervasive Spectroscopy

Nunavut™ Deep Cooled InGaAs Camera

900nm to 1700nm Wavelength Range

Nunavut™ series Deep-Cooled InGaAs cameras are designed to meet real-world challenges for best-in-class performance, long-term reliability, compact size and low powecr consumption. Benefiting from experience manufacturing high-volume optical devices for the telecommunications industry, BaySpec's InGaAs cameras utilize low-cost field proven components. For the first time in instrumentation history an affordable, accurate and ruggedized spectral detector is a reality.

The ***Nunavut***™ Series employs the latest in opto-electrical components to bring you the very best capability at a very affordable price. When matched to the *Nunavut*™ Raman spectrograph or photoluminescence spectrograph you have a light weight, very high performance, cost effective instrument. Each camera is calibrated in the factory after extensive thermal cycling. The control electronics read out the processed digital signal to extract required information. Both the raw data and the processed data are available to the host.

Applications:

- Raman Spectroscopy
- Fluorescence Spectroscopy
- NIR Spectroscopy
- Pharmaceuticals
- Medical Diagnostics

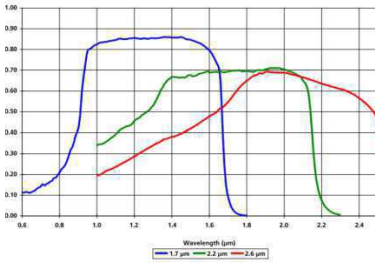
Key Features:

- Real-time spectral data acquisition
- Hermetic/Vacuum-sealing ensures reliable operation over time
- Air Deep-Cooling to -55°C.
- Covers wavelength ranges: 900-1700nm
- Water cooling optional
- Single 12 volt power supply design
- High sensitive (HS) and High dynamic (HD) modes
- USB2.0 output

Confocal Raman Microscope equipped with the Nunavut™ InGaAs Detector

Ramspec-1064-HR™
High Resolution 1064nm Raman spectrometer with *Nunavut*™ Deep-Cooled InGaAs Detectors

Quantum Efficiency (%)



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BAYSPEC
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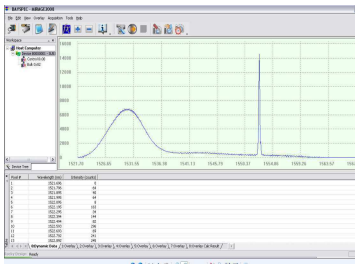
Nunavut™ Deep Cooled InGaAs Camera

900nm to 1700nm Wavelength Range

Parameter	Specification
PERFORMANCE	
Wavelength Range	900-1700nm, customizable
Integration Time	20 µs to 75 (HS) or 600 (HD) s
Dimensions	118 x 118 x 162 mm^3
OPTICS	
Window	single window design
DETECTOR SPECS	
Detector Array	256 X 50µ, 512 x 25µ or 1024 x 25µ
Quantum Eff. @λpk Typ.	85%
Resp. Non-uniformity, Max	±10%
Dark Noise	16 Counts RMS
Saturation Charge (Typical)	5 (HS) or 130 (HD) X 10^6 electrons
Detector Gain (Typical)	400 (HS) or 15.4 (HD) nV/electron
Detector	InGaAs
Cooling	4 stage TEC (water optional)
A/D Converter	16bit
Power	3.5 A@12 V
COMPUTER	
Data Ports	USB 2.0
Software	BaySpec "Spec 20/20" GUI package
Operating System	Windows 2000 or later
OPERATION & STORAGE	
Operating Temperature	0 to 40°C
Relative Humidity	75% (non condensing)
Storage Temperature	-25 to 60°C

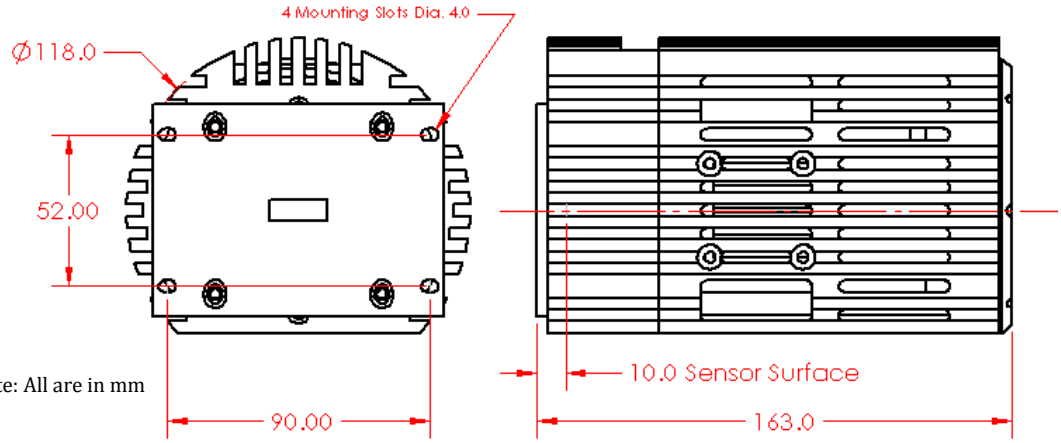
Specifications are subject to change without notice

"Spec 2020" Software



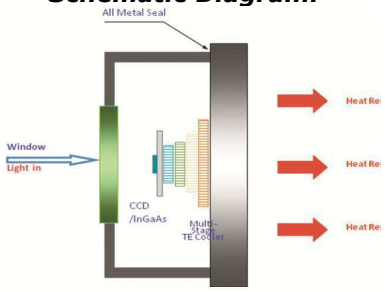
BaySpec's *"Spec 2020"* software included, a Windows-based package with flexible data acquisition, processing and output functionality

BaySpec SDK, a software development kit for new applications development and integration into to your host software systems.



Note: All are in mm

Schematic Diagram:



Part Number Selection:

NCAM - □□ - □□□□ □□□□

Code	Pixel Size
Please specify the Pixel counts i.e.:	
02	256
05	512
10	1024
xx	Custom

Code	Starting λ
Please specify the starting wavelength i.e. :	
0900	900 nm
xxxx	customer specify

Code	Ending λ
Please specify the ending wavelength i.e. :	
1700	1700 nm
yyyy	customer specify

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Nunavut™ Deep Cooled InGaAs Camera

1100nm to 2200nm Wavelength Range

***Nunavut*™** series Deep-Cooled InGaAs cameras are designed to meet real-world challenges for best-in-class performance, long-term reliability, compact size and low powecr consumption. Benefiting from experience manufacturing high-volume optical devices for the telecommunications industry, BaySpec's InGaAs cameras utilize low-cost field proven components. For the first time in instrumentation history an affordable, accurate and ruggedized spectral detector is a reality.

The ***Nunavut*™** Series employs the latest in opto-electrical components to bring you the very best capability at a very affordable price. When matched to the *Nunavut*™ Raman spectrograph or photoluminescence spectrograph you have a light weight, very high performance, cost effective instrument. Each camera is calibrated in the factory after extensive thermal cycling. The control electronics read out the processed digital signal to extract required information. Both the raw data and the processed data are available to the host.

Applications:

- Raman Spectroscopy
- Fluorescence Spectroscopy
- NIR Spectroscopy
- Pharmaceuticals
- Medical Diagnostics

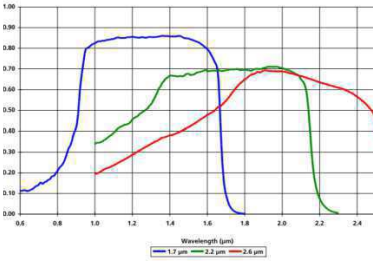
OEM Spectral Engine with *Nunavut*™ Deep-Cooled NIR Camera

Turn-key NIR spectrometer with *Nunavut*™ Deep-Cooled InGaAs Detector

Key Features:

- Real-time spectral data acquisition
- Hermetic/Vacuum-sealing ensures reliable operation over time
- Air Deep-Cooling to -55°C (optional water cooling to -100°C)
- Covers wavelength ranges: 1100-2200nm
- Water cooling optional
- Single 12 volt power supply design
- High sensitive (HS) and High dynamic (HD) modes
- USB2.0 output

Quantum Efficiency (%)



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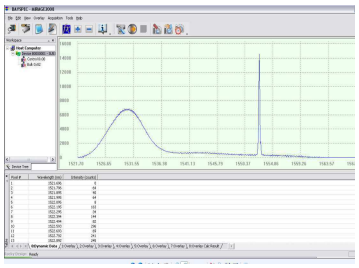
Nunavut™ Deep Cooled InGaAs Camera

1100nm to 2200nm Wavelength Range

Parameter	Specification
PERFORMANCE	
Wavelength Range	1100-2200nm, customizable
Integration Time	20 µs to 50 (HS) or 1500 (HD) ms
Dimensions	118 x 118 x 162 mm^3
OPTICS	
Window	single window design, AR coated
DETECTOR SPECS	
Detector Array	256 X 50µ, 512 x 25µ
Quantum Eff. @λpk Typ.	70%
Resp. Non-uniformity, Max	±10%
Dark Noise	16 Counts RMS
Saturation Charge (Typical)	5 (HS) or 130 (HD) X 10^6 electrons
Detector Gain (Typical)	400 (HS) or 15.4 (HD) nV/electron
Detector	InGaAs
Cooling	4 stage TEC (water optional)
A/D Converter	16bit
Power	3.5 A@12 V
COMPUTER	
Data Ports	USB 2.0
Software	BaySpec "Spec 20/20" GUI package
Operating System	Windows 2000 or later
OPERATION & STORAGE	
Operating Temperature	0 to 40°C
Relative Humidity	75% (non condensing)
Storage Temperature	-25 to 60°C

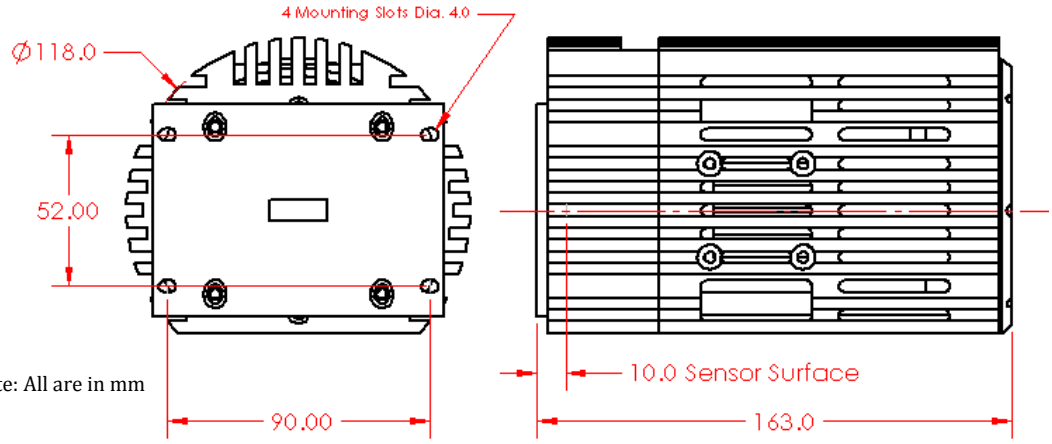
Specifications are subject to change without notice

"Spec 2020" Software



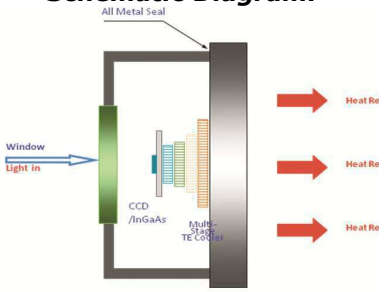
BaySpec's *"Spec 2020"* software included, a Windows-based package with flexible data acquisition, processing and output functionality

BaySpec SDK, a software development kit for new applications development and integration into to your host software systems.



Note: All are in mm

Schematic Diagram:



Part Number Selection:

NCAM - □□ - □□□□ □□□□

Code	Resolution
Please specify the Pixel counts i.e.:	
02	256
05	512
xx	Custom

Code	Starting λ
Please specify the starting wavelength i.e.:	
1100	1100 nm
xxxx	customer specify

Code	Ending λ
Please specify the ending wavelength i.e. :	
2200	2200 nm
yyyy	customer specify

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Nunavut™ Deep Cooled InGaAs Camera

1250nm to 2500nm Wavelength Range

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Applications:

- Fluorescence Spectroscopy
- NIR Spectroscopy
- Pharmaceuticals
- Medical Diagnostics

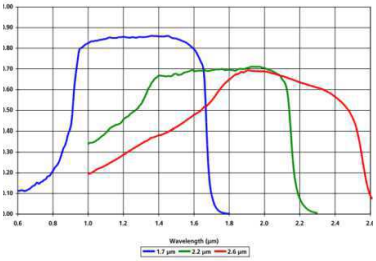
Key Features:

- Real-time spectral data acquisition
- Hermetic/Vacuum-sealing ensures reliable operation over time
- Air Deep-Cooling to -55°C (optional water cooling to -100°C)
- Covers wavelength ranges: 1250-2500nm
- Water cooling optional
- Single 12 volt power supply design
- USB2.0 output

OEM Spectral Engine with *Nunavut*™ Deep-Cooled NIR Camera

Nunavut™ Deep-Cooled InGaAs Detector with water cooled to -100°C

Quantum Efficiency (%)



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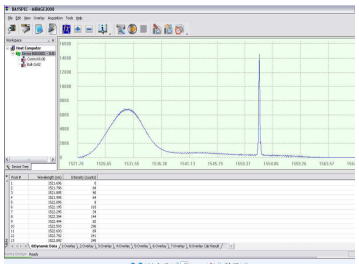
Nunavut™ Deep Cooled InGaAs Camera

1250nm to 2500nm Wavelength Range

Parameter	Specification
PERFORMANCE	
Wavelength Range	1250-2500nm, customizable
Integration Time	20 µs to 400 ms
Dimensions	118 x 118 x 162 mm^3
OPTICS	
Window	single window design, AR coated
DETECTOR SPECS	
Detector Array	256 X 50µ
Quantum Eff. @λpk Typ.	70%
Resp. Non-uniformity, Max	±5%
Dark Noise	60 Counts RMS
Saturation Charge (Typical)	187.5 X 10^6 electrons
Detector Gain (Typical)	16 nV/electron
Detector	InGaAs
Cooling	4 stage TEC (water optional)
A/D Converter	16bit
Power	3.5 A@12 V
COMPUTER	
Data Ports	USB 2.0
Software	BaySpec "Spec 20/20" GUI package
Operating System	Windows 2000 or later
OPERATION & STORAGE	
Operating Temperature	0 to 40°C
Relative Humidity	75% (non condensing)
Storage Temperature	-25 to 60°C

Specifications are subject to change without notice

"Spec 2020" Software



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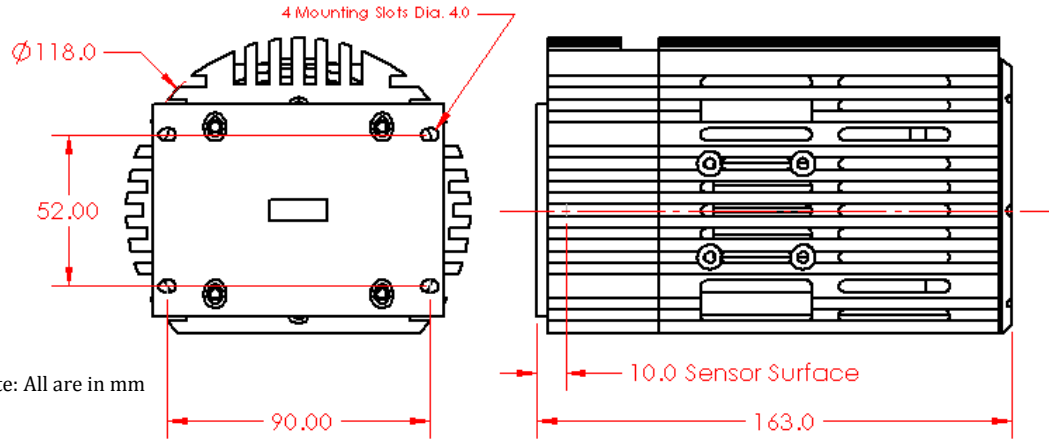
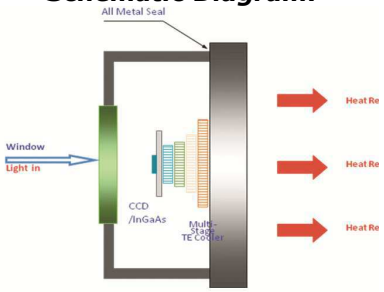


Note: All are in mm

Schematic Diagram:



Part Number Selection:

NCAM - □□ - □□□□ □□□□

Code	Resolution
Please specify the pixel count, i.e.:	
02	256 nm

Code	Starting λ
Please specify the starting wavelength i.e. :	
1250	1250 nm
xxxx	customer specify

Code	Ending λ
Please specify the ending wavelength i.e. :	
2500	2500 nm
yyyy	customer specify

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Nunavut™ Deep Cooled CCD Camera

Back-Thinned, 200nm to 1100nm Wavelength Range

***Nunavut*™** Series Back-Thinned CCD Detector/Cameras are designed to meet real-world challenges for best-in-class performance, long-term reliability, compact size and ultra-low power consumption. Benefiting from experience manufacturing high-volume optical devices for the telecommunications industry, BaySpec's CCD cameras utilize low-cost field proven components. For the first time in instrumentation history an affordable, accurate and ruggedized spectral device is a reality.

The ***Nunavut*™** Series employs the latest in opto-electrical components to bring you the very best capability at a very affordable price. When matched to the *Nunavut*™ Raman spectrograph or photoluminescence spectrograph you have a compact, high performance, cost effective instrument. Each camera is calibrated in the factory after extensive thermal cycling. The control electronics read out the processed digital signal to extract required information. Both the raw data and the processed data are available to the host.

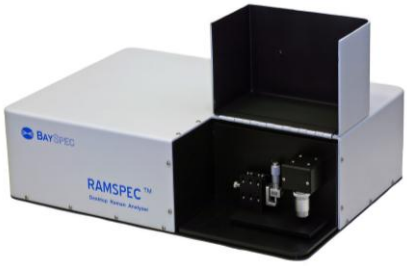
Applications:

- Raman Spectroscopy
- Fluorescence Spectroscopy
- VIS-NIR Spectroscopy
- Low Light Detection
- Pharmaceuticals
- Medical Diagnostics

Confocal Raman Microscope equipped with the Nunavut™ Back-Thinned CCD Detector

Key Features

- Real-time spectral data acquisition
- Design for ultra-low power consumption and improved reliability
- Hermetic-sealing ensures reliable operation in harsh environments
- Deep cooling to -55°C
- Covers wavelength ranges from 200-1100nm



***Ramspec-785*™** Raman Instrument with *Nunavut*™ Deep-Cooled Detectors

A Custom 532nm Raman Spectrometer equipped with the deep cooled CCD detector

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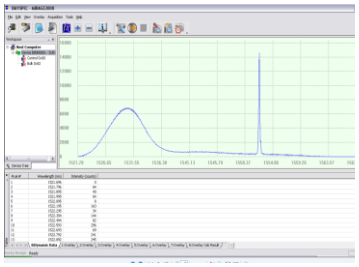
Nunavut™ Deep Cooled CCD Camera

Back-Thinned, 200nm to 1100nm Wavelength Range

Parameter	Specification
PERFORMANCE	
Wavelength Range	200-1100nm
Integration Time	10 ms to 1800 seconds
Dimensions	118 x 118 x 162 mm^3
OPTICS	
Window	single window design
DETECTOR SPECS	
Detector Array	1024X64 or 2048X64 - 14μ^2
CCD Node Sensitivity	6.5μV/e^-
Quantum Efficiency @λ_{pk} Min.	75%
Response Non-uniformity	±3% typical, ±10%Max
Readout Noise	6 e^-rms typical, 15 e^-rms Max.
Dark Current	50 e-/pixel/s @ 25°C
Stray Light	0.05%
Detector	4 stage TEC deep cooled CCD
A/D Converter	16bit
Power	3.5 A@12 V
COMPUTER	
Data Ports	USB 2.0
Software	BaySpec "Spec 20/20" GUI package
Operating System	Windows 2000 or later
OPERATION & STORAGE	
Operating Temperature	0 to 40°C
Relative Humidity	75% (non condensing)
Storage Temperature	-25 to 60°C

Specifications are subject to change without notice

"Spec 2020" Software



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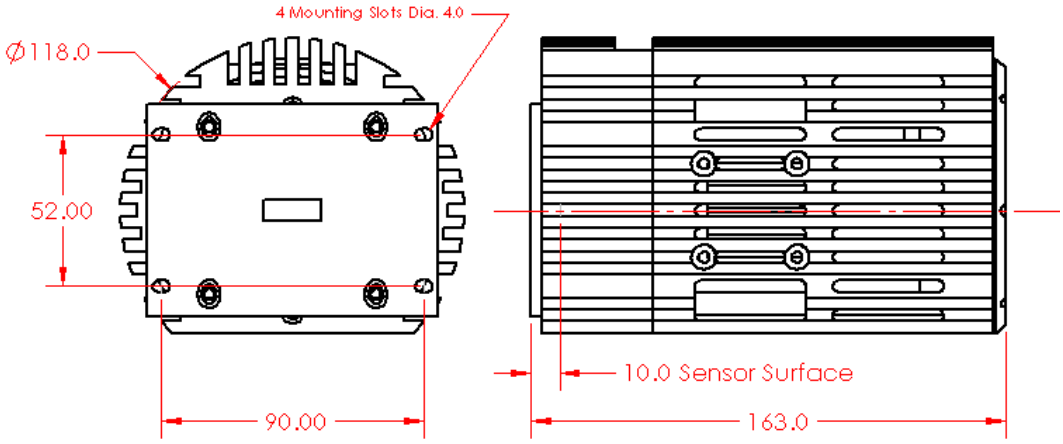
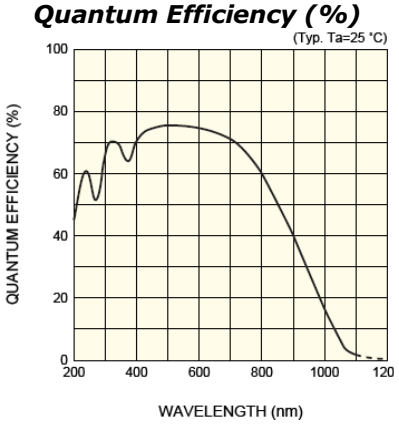


Quantum Efficiency (%)



Part Number Selection:

VCAM - □□ - □□□□ □□□□

Code	Type
10	1024x64μ
20	2048x64μ

Code	Starting λ
Please specify the starting wavelength i.e. :	
200	200 nm
xxxx	customer specify

Code	Ending λ
Please specify the ending wavelength i.e. :	
1100	1100 nm
yyyy	customer specify

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