

## About Us / Capabilities

Raptor develops, manufactures and markets a range of high-quality CCD, EMCCD and InGaAs cameras targeting the global Scientific and Surveillance imaging markets, specifically for OEMs and instrumentation manufacturers. We design and build a range of custom solutions for OEMs and National Laboratories around the world. Fusing advanced material science with the latest sensor technologies we deliver high performance camera designs with unsurpassed performance and reliability.



## Accessories

Raptor offers a full range of accessories to ensure that you get your camera successfully running. This includes:

- Power bricks and leads
- Mini-PC with embedded card / software
- Interface cables and cards
- A selection of lenses
- 3rd party software
- Filters
- Chillers and circulators
- Feedthroughs

## Interfaces

Most of Raptor's off the shelf products use Camera Link to communicate with the processor. However, we appreciate that OEMs need a range of options so we can also deliver in HD-SDI ,GigE, USB2/3 as well as custom digital output options, including Raptor's direct bus, enabling direct data from our camera to your system.



## Software

Raptor designs and builds cameras, but we understand that we also need to deliver solutions that integrate with relevant software for the capture and analysis of images. We have developed drivers to enable users to control the camera for the following software platforms:



- **EPIX XCAP / XCLIB** – This is the software provided by Epix Inc., a US based manufacturer of CameraLink cards. <http://www.epixinc.com/>



- **MicroManager** – a complete image acquisition and microscope control package that runs as a plugin to ImageJ. It is an open-source platform (<https://micro-manager.org/>)



- **Labview / C++** - Raptor provides a range of .ICD files to enable customers to write their own software

For any questions on software or for any support issues, please contact [sales@raptrophotonics.com](mailto:sales@raptrophotonics.com)

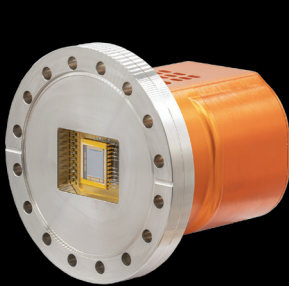
## Quality Compliance and Sourcing

All components used in Raptor cameras are reputedly sourced from approved ISO9001:2015 suppliers offering full traceability. We appreciate that our cameras end up in mission critical equipment, in both medical and surveillance applications where reliability and quality are paramount. We are 100% committed to preventing the use of any grey / counterfeit goods as components within our products. All suppliers are continuously monitored for compliance with RoHS, REACH and the Conflict Minerals rule, section 1502 of the Dodd-Frank Act (2010) using our Raptor Certified Supply Chain.

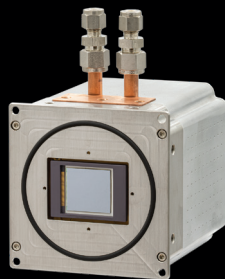


## OEM and Custom Options

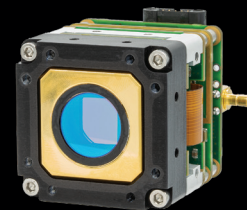
Raptor offers a range of custom options for OEMs and customers with high-end projects. This includes optical, electronic, mechanical layout and interface. Contact us to discuss your requirements in more detail.



*A selection of custom Raptor X-Ray cameras both Open Front and In-vacuum*



*OEM Spectroscopy CCD*



*OEM Board level CCD design*

## Customer Support

Raptor offers the highest levels of aftersales service and support with a team of engineers and application specialist staff to help address any questions or issues you may have. We also have excellent support from our partners and distributors around the world.

- Telephone, email support, online chat and secure screen sharing services
- On-site training, where applicable and permissible
- Comprehensive User Guides and detailed Instruction Manuals
- One-2-one training videos and product demonstrations
- Comprehensive RMA / returns service inside warranty period
- We will provide a full diagnostic and quote for any repairs falling outside standard warranty period



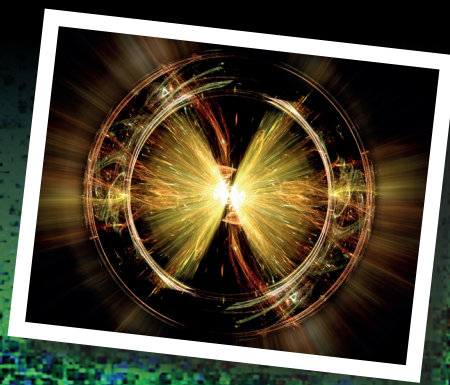
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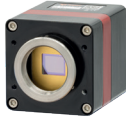



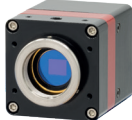
# Leaders in digital camera solutions

SWIR CCD EMCCD X-RAY



SCIENTIFIC 2021

	SWIR	
	Owl 640 S	Ninox 640 SU <b>NEW</b>
		
Sensor	InGaAs	InGaAs
Sensor Type	2/3" InGaAs	2/3" InGaAs
Sensor Size	0.32MP	0.32MP
Array Size (pixels)	640 x 512	640 x 512
Pixel Pitch (µm)	15 x 15	15 x 15
Active Area (mm)	9.6 x 7.68	9.6 x 7.68
Full Well Depth LG = Low Gain HG = High Gain	LG: >110e- HG: >35e-	LG: >110ke- HG: >35ke-
Digitization (bits)	12	16
Typical Readout Noise (RMS) LG = Low Gain HG = High Gain	HG: <30e-	LG: <85e- HG: <50e-
Max. Full Resolution Frame Rate (Hz)	300	100
Peak Quantum Efficiency	80% @ 1.5µm	80% @ 1.5µm
Spectral Response (nm)	900 - 1700	900 - 1700
TE Cooling	15°C	-80°C
Typical Dark Current (e/p/s)	<30fA	<300e-
Dynamic Range (Typical Value) LG = Low Gain HG = High Gain	LG: 62dB HG: 57dB	LG: 62dB HG: 56dB
Lens Mount	C mount	C mount
Dimensions (mm)	74 x 50 x 50	121 x 140 x 113
Weight (g)	260	<1.9k

	Owl 320 HS
	
Sensor	InGaAs
Sensor Type	2/3" InGaAs
Sensor Size	0.08MP
Array Size (pixels)	320 x 256
Pixel Pitch (µm)	30 x 30
Active Area (mm)	9.6 x 7.68
Full Well Depth LG = Low Gain HG = High Gain	HG: 170ke-
Digitization (bits)	14
Typical Readout Noise (RMS) LG = Low Gain HG = High Gain	HG: 202e-
Max. Full Resolution Frame Rate (Hz)	349
Peak Quantum Efficiency	>90% @ 1.3µm
Spectral Response (nm)	600 - 1700
TE Cooling	15°C
Typical Dark Current (e/p/s)	<200,000
Dynamic Range (Typical Value) LG = Low Gain HG = High Gain	HG: 59dB
Lens Mount	C mount
Dimensions (mm)	75 x 50 x 50
Weight (g)	250

All specifications are typical and correct at time of print. More detailed specifications can be found in datasheets for each product on [www.raptorphotonics.com](http://www.raptorphotonics.com). All standard cameras

## SWIR Technology Overview

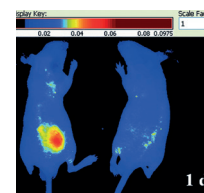
The infrared (IR) part of the spectrum is defined as electromagnetic radiation with wavelengths longer than visible light but shorter than radio waves. Short Wave Infrared Radiation can only be detected by dedicated sensors, such as InGaAs. Although light in the shortwave infrared region is not visible to the eye, this light interacts with objects in a similar manner as visible wavelengths. Therefore, images from an InGaAs camera are comparable to visible images in resolution and detail.

## Features and Benefits

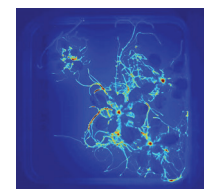
Raptor leads the way in SWIR camera design offering a range of sensors, cooling options and firmware enhancements making our cameras some of the most sensitive on the market for surveillance, scientific and industrial applications. Our cameras are compact, rugged and very reliable. As well as “off the shelf” cameras, we offer OEM solutions as well.

## Applications

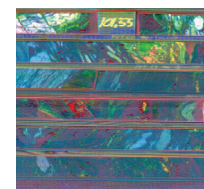
- Telecommunications
- Space applications, environment
- Transportation
- Medical – imaging through tissues / rare earth nanoparticles
- Industrial process monitoring
- Non destructive testing
- Instrumentation



In-Vivo Fluorescence Imaging




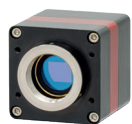

Chemiluminescence



Hyperspectral Imaging



# VIS-SWIR

Owl 640 M	Owl 640 II	Owl 640 N	Owl 640 T <span>NEW</span>	Ninox 640 II	Owl 1280	Ninox 1280
						
InGaAs	InGaAs	InGaAs	InGaAs	InGaAs	InGaAs	InGaAs
2/3" InGaAs	2/3" InGaAs	2/3" InGaAs	1/2" InGaAs	2/3" InGaAs	1" InGaAs	1" InGaAs
0.32MP	0.32MP	0.32MP	0.32MP	0.32MP	1.3MP	1.3MP
640 x 512	640 x 512	640 x 512	640 x 512	640 x 512	1280 x 1024	1280 x 1024
15 x 15	15 x 15	15 x 15	10 x 10	15 x 15	10 x 10	10 x 10
9.6 x 7.68	9.6 x 7.68	9.6 x 7.68	6.4 x 5.12	9.6 x 7.68	12.8 x 10.24	12.8 x 10.24
LG: 650ke- HG: 9ke-	LG: 650ke- HG: 10ke-	LG: 250ke- HG: 10ke-	LG: 450ke- HG: 10ke-	LG: 250ke- HG: 10ke-	LG: 450ke- HG: 10ke-	LG: 450ke- HG: 10ke-
14	14	14	12	14	12	12
LG: 174e- HG: 38e-	LG: 174e- HG: 36e-	LG: 150e- HG: 18e-	LG: 160e- HG: 47e-	LG: 150e- HG: 18e-	LG: 160e- HG: 47e-	LG: 160e- HG: 47e-
120	120	120	60	120	60	60
>90% @ 1.3µm	>90% @ 1.3µm	>90% @ 1.3µm	>90% @ 1.3µm	>90% @ 1.3µm	>90% @ 1.3µm	>90% @ 1.3µm
600 - 1700	600 - 1700	600 - 1700	600 - 1700	600 - 1700	600 - 1700	600 - 1700
None	15°C	15°C	15°C	-15°C	15°C	-15°C
Unspecified	<28,000	<28,000	<19,000	<3,000	<19,000	<4,000
LG: 71dB HG: 49dB	LG: 62dB HG: 49dB	LG: 62dB HG: 55dB	LG: 69dB HG: 47dB	LG: 62dB HG: 55dB	LG: 69dB HG: 47dB	LG: 69dB HG: 47dB
C mount	C mount	C mount	C mount	C mount	C mount	C mount
62 x 42 x 42	70 x 50 x 50	70 x 50 x 50	68 x 50 x 50	87 x 79 x 79	68 x 50 x 50	87 x 79 x 79
170	282	282	247	550	247	550

are monochrome and use Camera Link digital output. For custom options please contact us directly on [sales@raptorphotonics.com](mailto:sales@raptorphotonics.com)

## VIS-SWIR Technology Overview

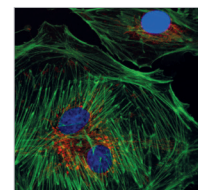
Using a back thinned InGaAs sensor enables both the visible and short-wave infra-red spectrum to be viewed simultaneously from 600nm-1700nm, essentially replacing the need for two cameras. Raptor offers range of VIS-SWIR sensors with different resolutions, pixel pitches and cooling options.

## Features and Benefits

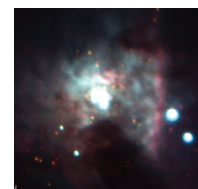
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## Applications

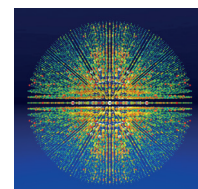
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- Instrumentation




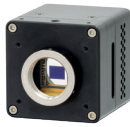


Live Cell Imaging



Astronomy



X-Ray Diffraction

	UV, VIS, NIR				
	Falcon III	Kestrel	Hawk 252	Eagle 42-40	Eagle 47-10
					
Sensor	CCD-351	CCD-60	CCD-252	CCD42-40	CCD47-40
Sensor Type	1" EMCCD	1/8" EMCCD	1" EMCCD	Front and Back illuminated	
Sensor size	1MP	0.16MP	1.3MP	4MP	1MP
Array Size (pixels)	1024 x 1024	128 x 128	1280 x 1024	2048 x 2048	1024 x 1024
Pixel Pitch (µm)	10 x 10	24 x 24	8 x 8	13.5 x 13.5	13 x 13
Active Area (mm)	10.2 x 10.2	3.1 x 3.1	10.24 x 8.19	27.65 x 27.65	13.3 x 13.3
Full Well Capacity	>29ke-	>160ke-	>20ke-	>100ke-	>100ke-
Shift Register Well Depth	200ke-	800ke-	120ke-	150ke-	150ke-
Digitization (bit)	16	16	12	16	16
Typical Readout Noise (RMS)	EM Gain ON: <1e- EM Gain OFF: <60e-	EM Gain ON: <1e- EM Gain OFF: <60e-	EM Gain ON: <1e- EM Gain OFF: <60e-	2.3e- @ 75kHz 9.0e- @ 2MHz	2.3e- @ 75kHz 9.0e- @ 2MHz
Max. Full Resolution Frame Rate (Hz)	31	500	25	0.42	1.45
Peak Quantum Efficiency	95% @ 575nm	95% @ 600nm	95% @ 600nm	>90% @ 550nm	>90% @ 550nm
Spectral Response (nm)	200 - 1100	350 - 1100	300 - 1100	300 - 1100	
TE Cooling	-70°C	-20°C	15°C	-90°C	-90°C
Typical Dark Current (e/p/s)	0.001	0.01	TBC	<0.0001	<0.0001
Typical Dynamic Range (dB)	89	>90	55	93	93
Lens Mount	C mount	C mount	C mount	F mount	F mount
Dimensions (mm)	121 x 140 x 113	121 x 140 x 113	73 x 62 x 62	155 x 141 x 110	155 x 141 x 110
Weight	<1.5kg	<1.5kg	350g	3.0kg	3.0kg

## UV-VIS-NIR Technology Overview

An EMCCD is an Electron Multiplying Charge Coupled Device. (Also referred to as an L3CCD or an Impactron CCD). In an ordinary CCD device light incident on the device is converted to electrons through photonic processes. EMCCDs employ a unique architecture that enables the device to greatly multiply (>1000 times) the number of resulting electrons produced by the incident light. This feature gives the EMCCD a far superior advantage over existing CCD technology in low light conditions.

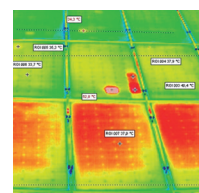
## Features and Benefits

Raptor Photonics offers a range of cameras for the detection of photons and high energy particles. Using high performance CCD and EMCCD sensors, photon (or particle) energies from 1.2eV up to 20keV can be detected directly within the silicon. Higher energies are detected indirectly, by coupling a phosphor or scintillator screen onto the CCD sensor.

Please consult with our X-ray & High-Energy brochure to see our full range of open-front and in-vacuum cameras and detectors.

## Applications

- Adaptive Optics and Astronomy
- Calcium signaling
- Fluorescence imaging / spectroscopy
- Flow cytometry
- FRET / FRAP / TIRF
- Genome sequencing
- High content screening
- High resolution fluorescence imaging
- Hyperspectral imaging
- Live Cell Imaging
- Single molecule detection
- Solar Cell Inspection
- X-ray tomography



Solar Cell Inspection



Spectroscopy



Earth Observation (CubeSat)