sales@pembrokeinstruments.com

greateyes
EXPAND YOUR VISION

HIGH PERFORMANCE
SPECTROSCOPY CAMERAS

ELSEs

KEY SPECIFICATIONS

- High Quantum Efficiency
- Ultra Deep Cooling to -100°C
- 18-bit Dynamic Range
- Multi-MHz Readout
- Compact Design

Full-Frame Deep Cooling Scientific CCD Camera for Spectroscopy Applications

HIGH RESOLUTION
UP TO
16.8
MEGAPIXEL
HIGH RESOLUTION

UV
VIS
NIR

Straight out of Berlin comes **ELSE**, greateyes' new platform for your spectroscopy and imaging applications in the UV - VIS - NIR range.

ELSE integrates cutting-edge low-noise electronics and ultra-deep cooling technology while keeping a compact camera design. Multiple readout speeds can be selected supporting pixel rates from 50 kHz up to 5 MHz.

True 18-bit AD conversion allows to exploit the full dynamic range of the CCD sensor for highest performance and SNR. Choose from a wide range of sensors to find the best match with your requirements. **ELSE** is ideally suited for detection of very weak signal intensities where a low-noise floor is paramount.

ELSE offers unprecedented possibilities for your measurements of tomorrow.

TYPICAL APPLICATIONS

- Raman Spectroscopy
- NIR Spectroscopy
- Fluorescence Spectroscopy
- Absorption, Transmission, Reflectance Spectroscopy

ELSEs

The golden child of low noise CCD cameras

The golden statue of Victoria upon the Berlin Victory Column has been given the nickname 'ELSE' by Berliners.

FEATURES & BENEFITS

Ultra deep TE cooling down to -100°C
lowest dark current for better detection limit

Hermetic vacuum seal
low camera maintenance and sensor protection

GigE & USB 3.0 data interface
local or remote network operation – your choice!

Multiple sensor options
UV, VIS, or NIR coatings for different sensor formats

High QE up to 98%
very sensitive sensors for low light applications

User selectable gain
balance your detector for best SNR and dynamic range

Fast readout speeds up to 5 MHz
fast frame rates paired with low-noise electronics

Flexible software options
camera software and SDKs available

COMMON SPECIFICATIONS

Pixel readout frequency	50 kHz, 250 kHz, 1 MHz, 3 MHz (5 MHz for visualisation mode)
AD converter resolution	18-bit
Linearity	Better than 99%
Window material	MgF_2 or UVFS for UV sensitive models, otherwise BK7
Distance flange - focal plane	10.0 mm
CCD sensor cooling	-100°C to 20°C, forced air or liquid cooling
Temperature monitoring	Two thermistors at CCD sensor and thermoelectric cooler (hot side)
Data link	Gigabit Ethernet, USB 3.0
Software	greateyes Vision software for Windows 7 / 10
SDK and drivers	DLL for Windows; LabVIEW, EPICS, Linux, Python, Tango driver (optional)
TTL interface signals	Exposure out, shutter out, 2 external trigger in
Operating conditions	Temperature: 0°C to 35°C ambient, relative humidity <80% (non-condensing)
Power supply	80-264 VAC (115/230 typical), 47-63 Hz (50/60 typical), max. 1.1 A (230 VAC), 1.9 A (115 VAC)
Certification	CE
Dimensions (W x H x L)	8.3 cm x 10.0 cm x 13.1 cm (3.27" x 3.94" x 5.16")
Weight	2.2 kg

Included with your camera

GE-VI01	greateyes Vision software suite for Windows
GE-SDK01	SDK for Windows (C/C++ based)
GE-USB3m3	3m USB 3.0 cable type A to type C
GE-GigE10m	10m Ethernet cable
GE-StoB2m	2m SMB to BNC connection cable x2
GE-POW01	Camera power supply with cabling
GE-ManCam	Camera instruction manual

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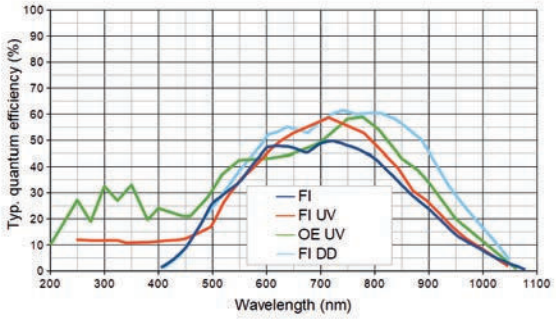
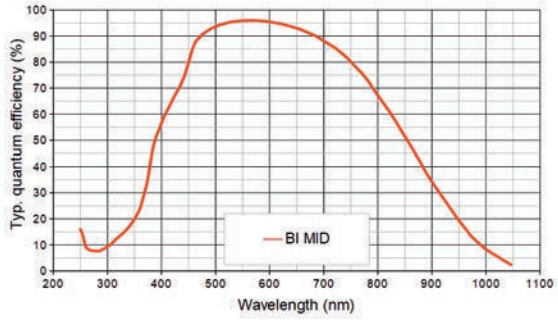
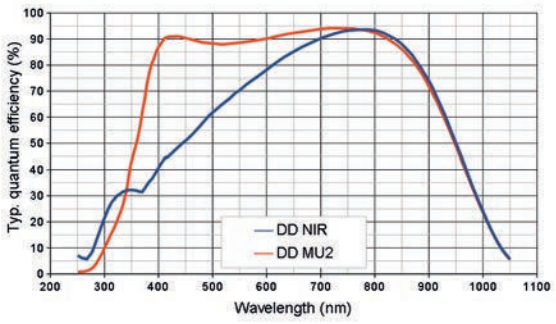
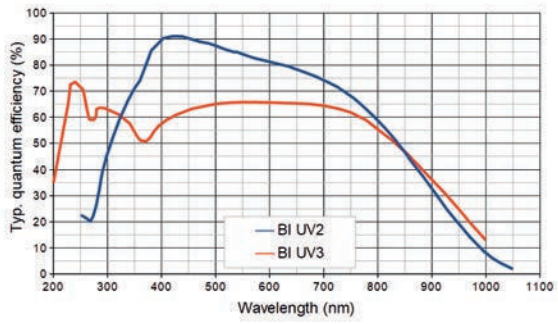
ELSEs

HIGH PERFORMANCE SPECTROSCOPY CAMERAS









STEP 1: Choose your camera model

ELSEs Series	ELSEs 1k128	ELSEs 1k256			ELSEs 2k256	ELSEs 2k512
Enhanced UV sensitivity		**OE UV BI UV2 BI UV3**				**FI UV BI UV2 BI UV3**
Enhanced VIS sensitivity	**FI BI MID**	**FI BI MID**			**FI**	**FI BI MID**
Enhanced NIR sensitivity	**DD NIR**	**FI DD DD NIR DD MU2**			**DD NIR**	
Usable pixels (columns x rows)	1024 x 127	1024 x 255			2048 x 264	2048 x 515
Active image area	26.6 mm x 3.3 mm	26.6 mm x 6.7 mm			30.7 mm x 3.9 mm	27.6 mm x 6.9 mm
Pixel size	26 µm x 26 µm				15 µm x 15 µm	13.5 µm x 13.5 µm
Full well capacity	300 ke⁻ (OE UV) / 500 ke⁻ / 700 ke⁻ (DD)				75 ke⁻	100 ke⁻
Register well capacity	1 000 ke⁻ / 1 400 ke⁻ (DD)				650 ke⁻	400 ke⁻
Dark Current @ -100°C	0.0004 e⁻/pixels/s 0.005 e⁻/pixels/s (DD)				0.0006 e⁻/pixels/s⁻	0.00025 e⁻/pixels/s
Typical read noise (e⁻)		**FI**	**BI**	**DD**		
@ 50 kHz	5.5	4.2	6.0	5.4	3.7	3.5
@ 1 MHz	12.5	12.0	13.1	12.3	7.0	6.8
@ 3 MHz	26.0	25.0	26.0	25.0	12.1	10.7
Gain:						
Standard Mode	0.4 counts/e⁻	0.4 counts/e⁻			1.5 counts/e⁻	1 counts/e⁻
High Capacity Mode	-	-			-	0.34 counts/e⁻
CCD sensor type	Front-illuminated (FI), Back-illuminated (BI), Deep depletion fringe suppression (DD), Open-electrode (OE)					
Antireflective coating	UV (UV2, UV3), midband (MID), multiband (MU2), near-infrared (NIR)					
Blemish specifications	Grade 0 or Grade 1 (standard) as specified by sensor manufacturer. For more information please see: www.greateyes.de/en/glossar.html					

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ELSEs

USB 3.0 Gigabit Ethernet spec EPICS Linux python powered

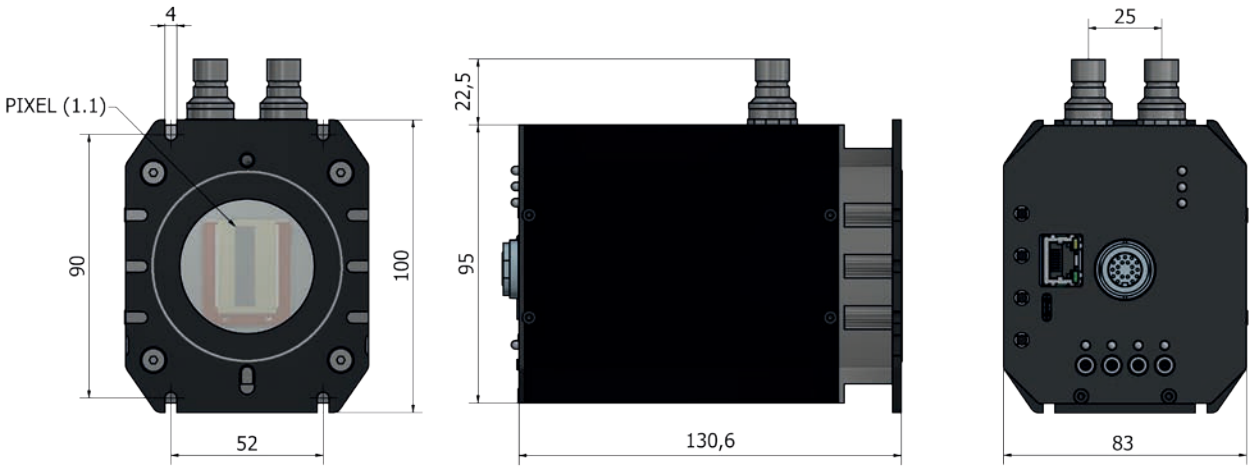
STEP 2: Choose your accessories and software

Order Code	Description
Accessories for Imaging Purposes	
GE-M4202	M42 lens adaptor (integrated filter holder optional)
GE-FM02	F-mount lens adaptor (integrated filter holder optional)
GE-SR35	35mm shutter, including shutter driver module
Accessories for Enhanced Cooling Performance	
GE-CR01	Compact liquid cooling, circulating the coolant at room temperature for deep camera cooling
GE-CR02	Recirculating water chiller, PID control with temp. from -5°C to 30°C for ultra-deep camera cooling
Software Development Kit (SDK) and Drivers	
GE-LX01	SDK for Linux (C/C++ based)
GE-PYT01	Python driver
GE-LAB01	LabVIEW driver
GE-EP	EPICS driver
GE-TAN	Tango driver

STEP 3: Flexible customisation service

With direct and fast response, we provide various customisations and OEM services. For example, the alteration of sensor position/tilt, the modification of camera housing or cooling system, etc. Let us know what **ELSE** you require.

TECHNICAL DRAWINGS



Pembroke Instruments, LLC
San Francisco, California
sales@pembrokeinstruments.com
https://pembrokeinstruments.com
Tel. 650-550-8618

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