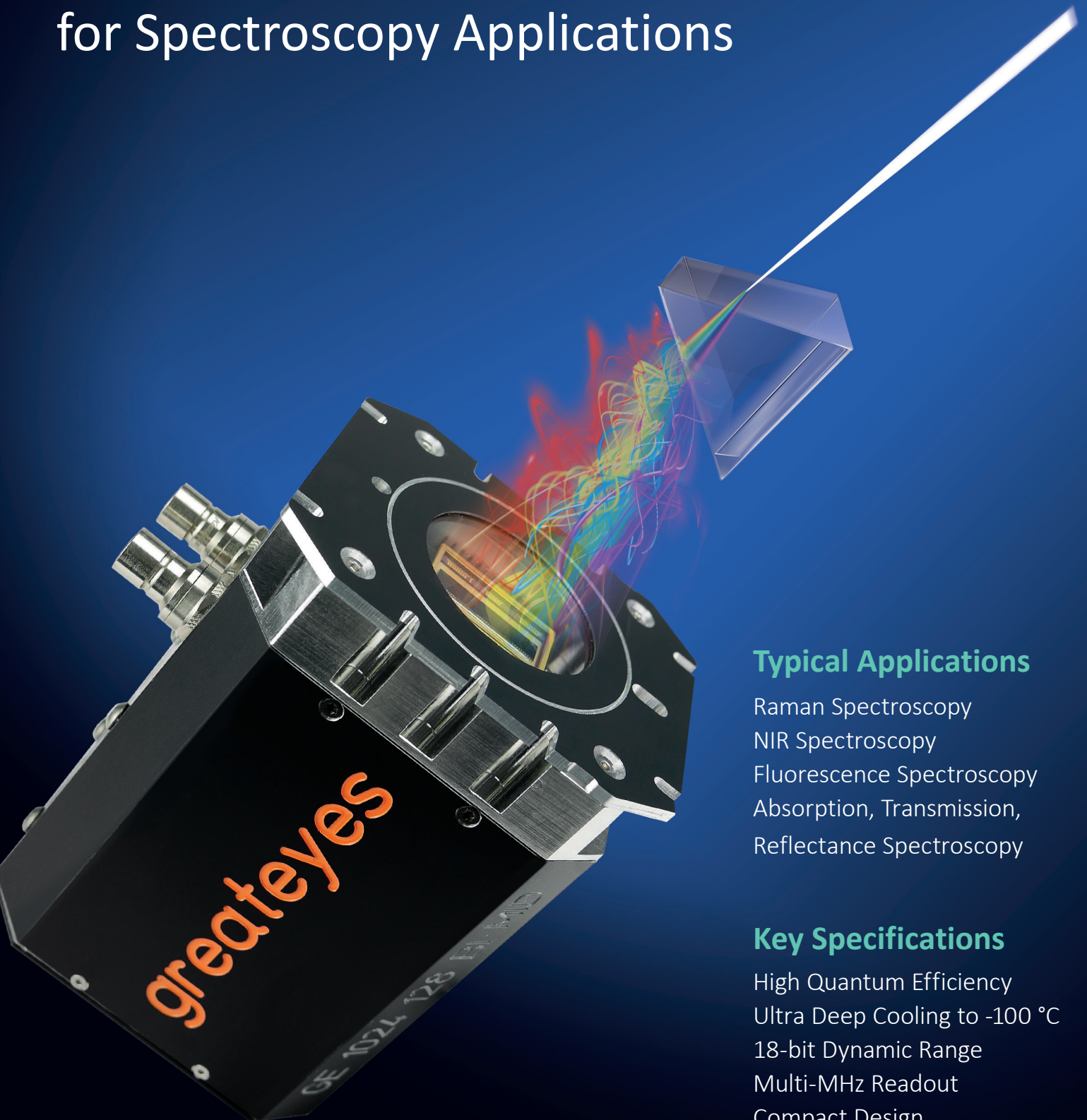


# ELSE-s

# greateyes

DISCOVER WHAT  
THE EYE CAN'T SEE

## Full-Frame Deep Cooling Scientific CCD Camera for Spectroscopy Applications



### Typical Applications

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

### Key Specifications

High Quantum Efficiency  
Ultra Deep Cooling to  $-100\text{ }^{\circ}\text{C}$   
18-bit Dynamic Range  
Multi-MHz Readout  
Compact Design

## THE GOLDEN CHILD OF LOW NOISE CCD CAMERAS



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.



### Features & Benefits

- **Ultra deep TE cooling 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

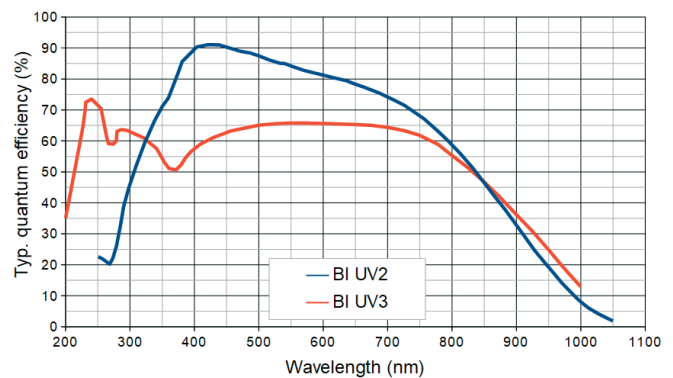
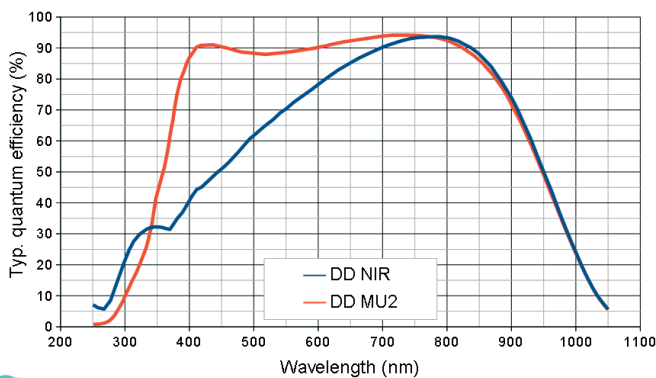
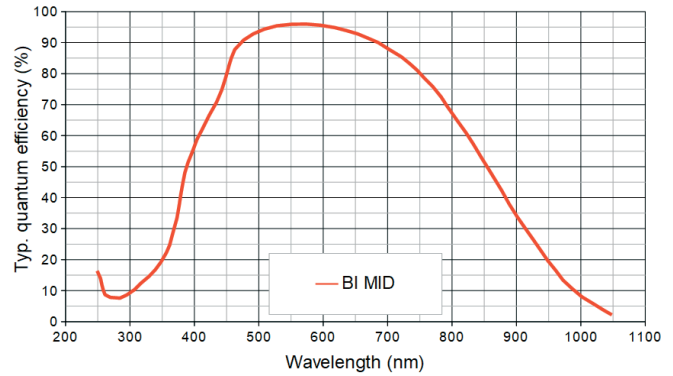
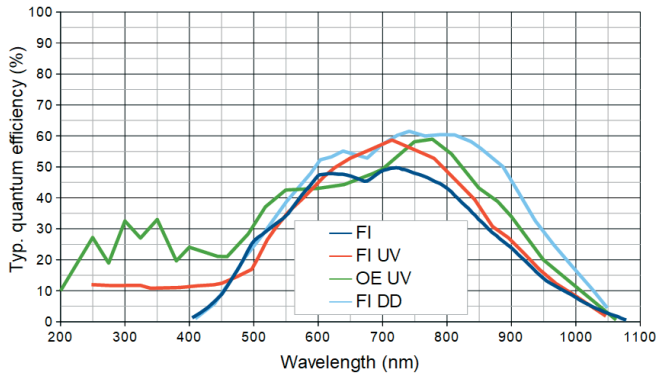


### Common specifications

Pixel readout frequency	50 kHz, 250 kHz, 1 MHz, 3 MHz (5 MHz for visualization mode)
AD converter resolution	18-bit
Linearity	Better than 99%
Window material	MgF <sub>2</sub> 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 VAC typical), 47-63 Hz (50/60 Hz typical), max. 1.1 A (230 VAC), 1.9 A (115 VAC)
Certification	CE
Dimensions	8.3 cm (3.27") × 10.0 cm (3.94") × 13.1 cm (5.16") (W × H × L)
Weight	2.2 kg

# ELSE-s

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



## Step 1: Choose your camera model

ELSE-s series	ELSE-s 1k128	ELSE-s 1k256	ELSE-s 2k256	ELSE-s 2k512
Enhanced UV sensitivity		OE UV BI UV2, BI UV3		FI UV BI UV2, BI UV3
Enhanced VIS sensitivity	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 <sup>-</sup> (OE UV) / 500 ke <sup>-</sup> / 700 ke <sup>-</sup> (DD)		75 ke <sup>-</sup>	100 ke <sup>-</sup>
Register well capacity	1 000 ke <sup>-</sup> / 1 400 ke <sup>-</sup> (DD)		650 ke <sup>-</sup>	400 ke <sup>-</sup>
Dark current @ -100°C	0.0004 e <sup>-</sup> /pixel/s 0.005 e <sup>-</sup> /pixel/s (DD)		0.0006 e <sup>-</sup> /pixel/s	0.00025 e <sup>-</sup> /pixel/s
Typ. read noise (e <sup>-</sup> )		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
User selectable gain:				
Standard mode	0.4 counts/e <sup>-</sup>		1.5 counts/e <sup>-</sup>	1 counts/e <sup>-</sup>
High capacity mode	-		-	0.34 counts/e <sup>-</sup>
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: <a href="https://www.greateyes.de/en/glossar.html">https://www.greateyes.de/en/glossar.html</a>			



## Step 2: Choose your accessories and software

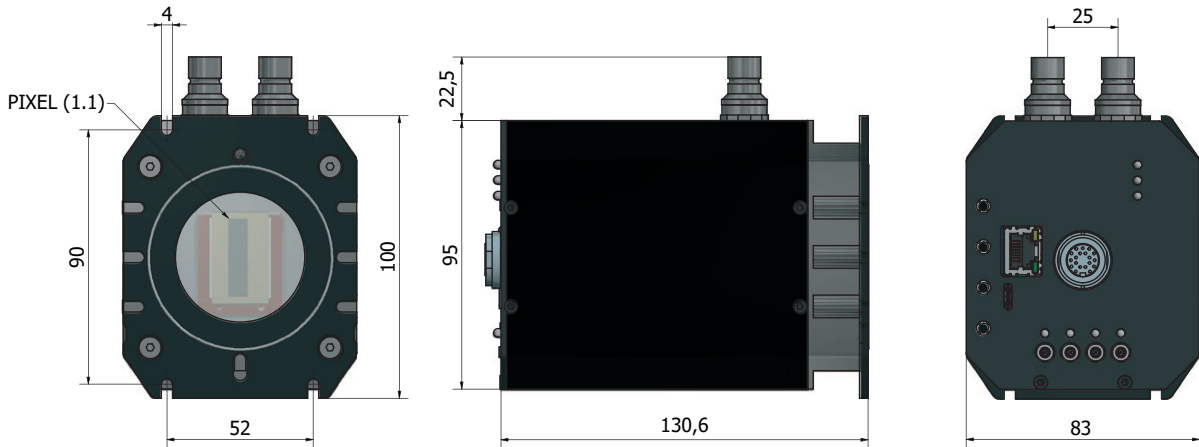
Order code	Description
<i>A) Accessories for imaging purposes</i>	
GE-M4202	M42 lens adapter (integrated filter holder optional)
GE-FM02	F-mount lens adapter (integrated filter holder optional)
GE-SR35	35mm shutter, including shutter driver module
<i>B) Accessories for enhanced cooling performance</i>	
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
<i>C) Software development kit (SDK) and drivers</i>	
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



### Items 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 x 2
GE-POW01	Camera power supply with cabling
GE-ManCam	Camera instruction manual



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