greateyes
EXPAND YOUR VISION

HIGH PERFORMANCE
IMAGING CAMERAS



ELSEi

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 Imaging Applications

HIGH RESOLUTION
UP TO
16.8
MEGAPIXEL
HIGH RESOLUTION

UV
VIS
NIR

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

ELSE integrates cutting-edge low-noise electronics and ultra-deep cooling technology whilst 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 users 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

- In-vivo Fluorescence Bioimaging
- Astronomy
- LIBS Spectroscopy
- Neutron Tomography
- EL / PL Imaging
- Ultracold Quantum Studies

www.greateyes.de

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ELSEi





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; up to 20 MHz with multi-output)
Readout modes	2 output nodes for 1k1k & 2k2k cameras, 4 output nodes for 2k2k plus & 4k4k cameras
AD converter resolution	18-bit
Linearity	Better than 99%
Window material	MgF_2 or UVFS for UV sensitive models, otherwise BK7
Flange - focal plane	10.0 mm (1k1k, 2k2k plus & 4k4k cameras); 9mm (2k2k camera)
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 11
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	1k1k & 2k2k: 80-264 VAC (typ. 115/230), 47-63 Hz (typ. 50/60), max. 1.1 A (230 V) / 1.9 A (115 V) 2k2k plus & 4k4k: 85-264 VAC (typ. 115/230), 47-63 Hz (typ. 50/60), max. 1.9 A (230 V) / 3.8 A (115 V)
Certification	CE
Dimensions (W x H x L)	1k1k & 2k2k Camera body: 8.3 cm x 10.0 cm x 13.1 cm (3.27″ x 3.94″ x 5.16″) 2k2k plus & 4k4k Camera body: 13.7 cm x 13.7 cm x 17.1 cm (5.39″ x 5.39″ x 6.71″)
Weight	2.2 kg (1k1k & 2k2k); 5.4kg (1k1k & 4k4k)

Included with your camera

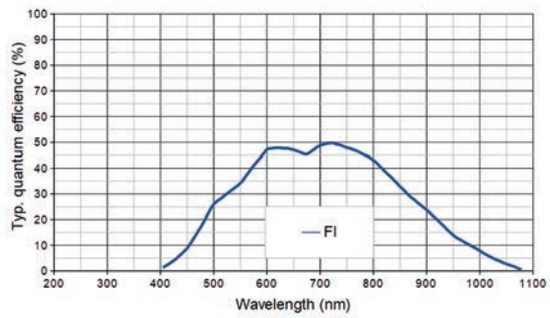
GE-VI01	greateyes Vision software suite for Windows		
GE-SDK01	SDK for Windows (C/C++ based)	GE-StoB2m	2m SMB to BNC connection cable x2
GE-USB3m3	3m USB 3.0 cable type A to type C	GE-POW01	Camera power supply with cabling
GE-GigE10m	10m Ethernet cable	GE-ManCam	Camera instruction manual

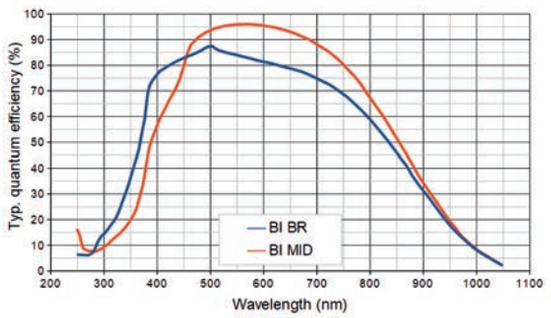
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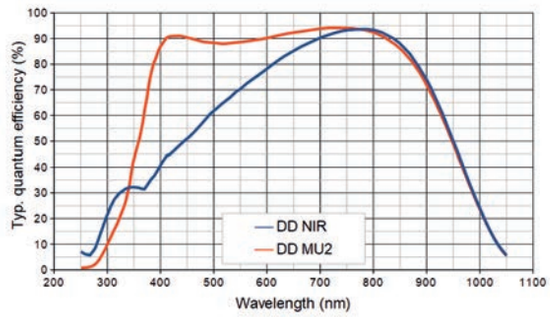
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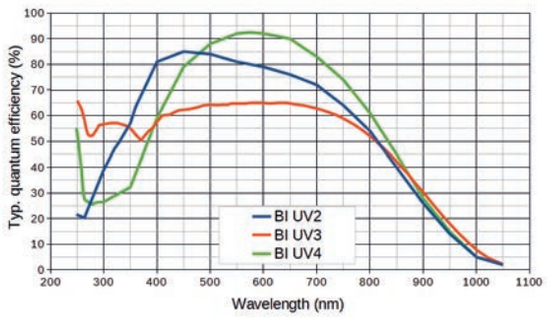
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STEP 1: Choose your camera model

ELSEi Series	 ELSEi 1k1k	 ELSEi 2k2k	 ELSEi 2k2k plus	 ELSEi 4k4k
Enhanced UV sensitivity	**BI UV3**	**BI UV3**		**BI UV2** **BI UV4**
Enhanced VIS sensitivity	**FI** **BI BR** **BI MID**	**FI** **BI MID**	**BI MID**	**FI** **BI BR** **BI MID**
Enhanced NIR sensitivity	**DD NIR** **DD MU2**	**DD NIR** **DD MU2**		**DD MU2**
Usable pixels (columns x rows)	1024 x 1024 (FI) 1056 x 1027 (others)	2048 x 2052	2048 x 2064	4096 x 4112
Active image area	13.3 mm x 13.3 mm	27.6 mm x 27.6 mm	30.7 mm x 30.7 mm	61.4 mm x 61.4 mm
Pixel size	13 µm x 13 µm	13.5 µm x 13.5 µm	15 µm x 15 µm	15 µm x 15 µm
CCD sensor cooling	-100°C to 20°C	-90°C to 20°C	-90°C to 20°C	-90°C to 20°C
Full well capacity	100 ke⁻ / 120 ke⁻	100 ke⁻ / 150 ke⁻	150 ke⁻	150 ke⁻ / 350 ke⁻
Register well / **Output node**	400 ke⁻ / -	400 ke⁻ / 600 ke⁻ / - -	850 ke⁻ / 900 ke⁻	- / 900 ke⁻ - / 600 ke⁻
Typical read noise (e⁻) @ 50 kHz @ 1 MHz @ 3 MHz	 2.8 6.4 10.9	 3.4 7.0 13.6	 4.6 8.5 17.0	 4.6 8.5 17.0 2.8 5.8 10.4
Dark Current (e⁻/pixels/s)	@ -100°C 0.00015 0.0005	@ -90°C 0.0001 0.001	@ -90°C 0.00008	@ -90°C 0.00008 0.0006
Gain (counts/e⁻): Standard Mode High Capacity Mode	 1 -	 1 0.34	 0.6 0.2	 0.6 0.2 1 0.34
CCD sensor type	Front-illuminated (FI), Back-illuminated (BI), Deep depletion fringe suppression (DD)			
Antireflective coating	UV (UV3), broadband (BR), midband (MID), near-infrared (NIR), multiband (MU2), astro broadband (UV2), astro midband (UV4)			
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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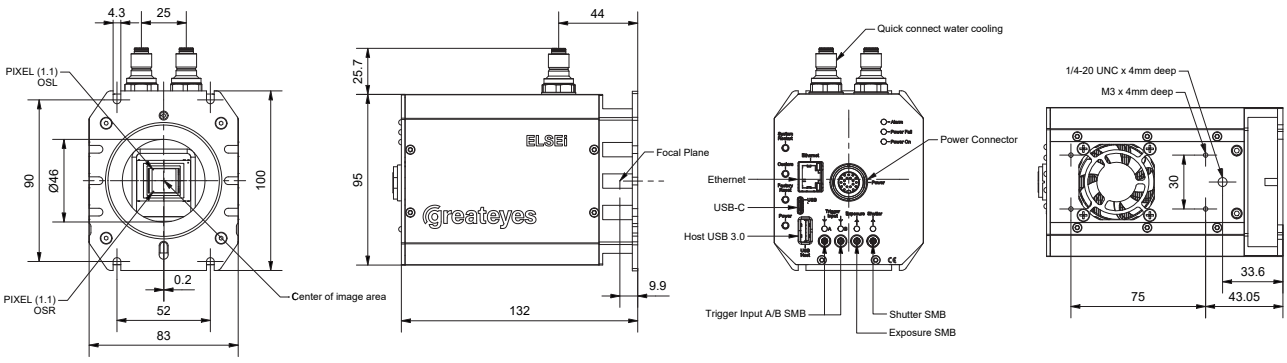
STEP 2: Choose your accessories and software

Order Code	Description
Accessories for Imaging Purposes	
GE-CM02	C-mount lens adaptor for 1k1k camera
GE-M4202	M42 lens adaptor for 1k1k, 2k2k, and 2k2k plus cameras (integrated filter holder optional)
GE-FM02	F-mount lens adaptor for 1k1k, 2k2k, and 2k2k plus cameras (integrated filter holder optional)
EL-SR25	25mm shutter for 1k1k camera, including shutter driver module
EL-SR45	45mm shutter for 2k2k & 2k2k plus cameras, 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



FRONT VIEW | SIDE VIEW | REAR VIEW | BOTTOM VIEW

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