

SWIR 1000 – 2500 nm HYPERSPECTRAL CAMERA

Middleton Research offers a high-speed short-wave infrared hyperspectral camera from Specim Ltd covering the wavelength range of 1000-2500 nm. For the NIR range (900-1700 nm), please refer to the NIR hyperspectral camera section. The SWIR camera is one of the most versatile hyperspectral cameras offering an extended wavelength range. The SWIR camera is an excellent solution for chemical imaging applications including pharmaceutical quality monitoring, plastics sorting, and food analysis. The hyperspectral camera is an integration of an imaging spectrograph (ImSpector N25E) and a four-stage cooled mercury-cadmium-telluride (MCT) focal plane array camera. The optical elements and transmission diffraction grating are designed for a high quality image on the detector. The MCT detector is thermoelectrically cooled to minimize the dark current and provides high sensitivity and stability. The temperature stability and rugged housing enable the camera to be used in outdoor and process applications.

Features

- Non-uniformity correction at different camera integration times to account for the possible pixel-to-pixel differences of the actual FPA camera component
- Wavelength calibration to achieve best wavelength accuracy across the entire wavelength range
- Compatibility with optional SpectralDAQ camera driver and data collection software

SWIR Camera Package

- Controller Module to drive the thermoelectric cooling, control the built-in shutter and to communicate with the camera
- Power supply for both the camera and controller
- Cables
 - LVDS data cable to connect the camera and the frame grabber
 - USB to connect the computer and the Controller
 - Serial cable for camera control
 - Controller Cable to connect the Controller and the SWIR camera
- National Instruments (NI) LVDS frame grabber with NI Image Acquisition software
- Power cord set
- Calibration files and calibration report
- Software CD



SWIR camera controller module

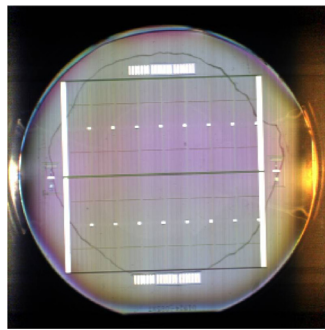


Applications

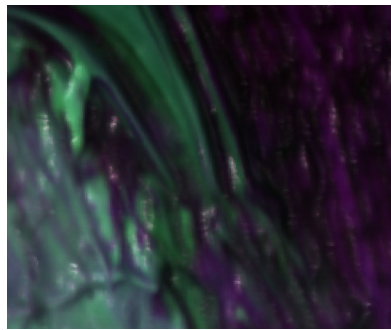
- Chemical imaging for research and development
- Process Analytical Technology applications
- Pharmaceutical manufacturing monitoring
- Plastics sorting
- Mineral mapping
- Food and agricultural product analysis
- Moisture content distribution
- Semiconductor quality monitoring



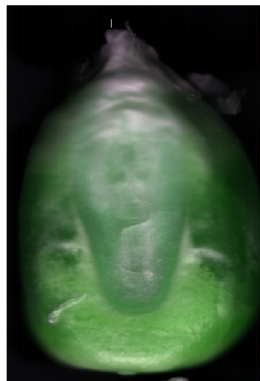
SWIR camera mounted for industrial monitoring



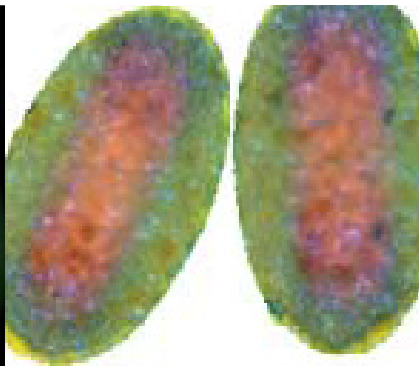
Semi-conductors / Solar cells



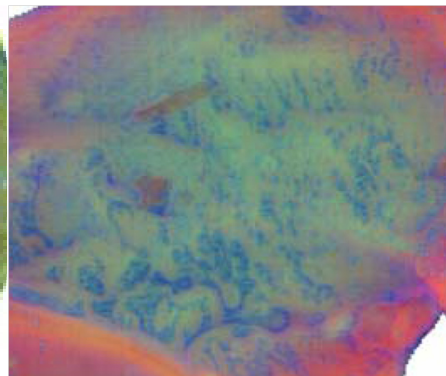
Art



Bio-tech



Pharmaceuticals



Dairy

SWIR 1000 – 2500 nm HYPERSPPECTRAL CAMERA

SWIR Camera Specifications

Optical Characteristics	SWIR-LVDS-100-N25E
Range (nm)	1000-2500
Resolution (spatial x spectral)	320 x 256 (240 active)
Spectrograph	ImSpector N25E
Spectral Resolution	10 nm (30 µm slit)
Spectral Sampling	6.3 nm/pixel
Spatial Resolution	RMS spot diameter < 30 µm
Aberrations	Insignificant astigmatism, smile or keystone < 5 µm
Numerical Aperture	F/2.0
Slit Width, default	30 µm (50 or 80 µm available on request)
Effective Slit Length	9.6 mm
Total Efficiency (typical)	> 50 %, independent of polarization
Stray Light	< 0.5 % (halogen lamp, 1400 nm notch filter)

Electrical Characteristics

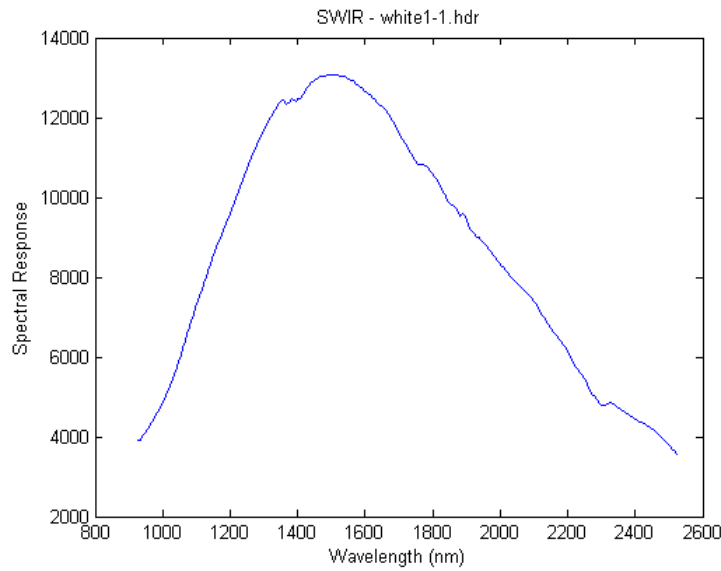
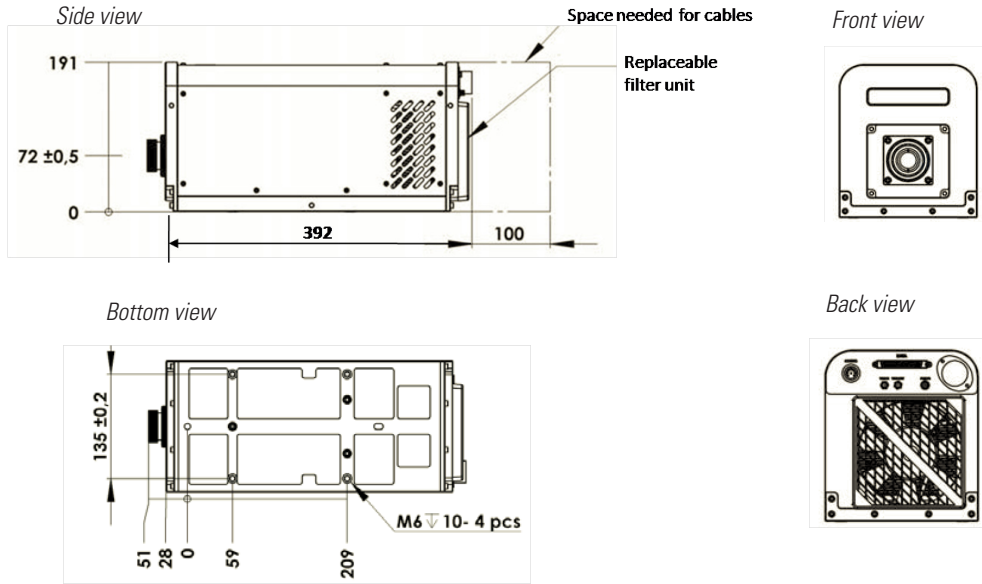
Sensor	MCT camera
Interface	LVDS
Camera Output	14-bit LVDS
Frame rate (full / binning)	100 Hz
Cooling	4-stage Peltier for detector array, additional Peltier for active cooling of the detector package
Frame Grabber	NI-PCI 1422
Pixel Size	30 x 30 µm (pixel size)
Camera Control	Serial Port
Exposure Time Range	0.1 - 20 ms
Power Consumption	< 200 W
Input Voltage	24 V
Signal-to-noise ratio	800:1 (at max. signal level)
Data cable	length: 5 m

Environmental Characteristics

Storage	-20 to 50 C
Operating	5 to 40 C, non-condensing

Mechanical Characteristics

Size (LxWxH)	Sensor: 329 x 170 x 151 mm Power supply: 120 x 240 x 70 mm Control module: 260 x 260 x 95 mm
Weight	Sensor: 8.5 kg, Power supply: 1.9 kg, Control box: 3.4 kg
Body	Anodized Al and painted steel w/mounting screw holes
Lens Mount	Standard C-mount
User Adjustments	No
Shutter	Yes



Spectral response of SWIR camera with spectral flattening filter

SWIR Cased Camera Ordering Information		
Part Number	Description	Product Name
MRC-303-005-01	SWIR Spectral Camera with Enhanced Spectrograph. 100Hz MCT LVDS frame grabber and cable included	SWIR-LVDS-100-N25E