



The motorized 8-filter wheel.

MULTISPECTRAL INFRARED CAMERAS.

The MS-IR infrared camera allows the scene to be split into eight different spectral bands rather than only one broadband image, thus enabling spectral signature analysis. The filter wheel is a fast-rotating mechanism designed to maximize the cameras' frame rate. Rotating speed is adjustable up to 100 Hz per filter, allowing a frame rate up to 800 fps in a synchronised mode.

KEY BENEFITS

MULTISPECTRAL CAPABILITIES

Performs 8-channel multispectral analysis using a high-speed filter wheel. In fast-rotating mode, the image acquisition is synchronised so that one image per filter is acquired. The filter wheel can also be used in static mode.

HIGH DYNAMIC RANGE

Unique Telops proprietary non-linearity correction and exposure time independent calibration algorithms ensure observation of scene targets with the highest possible contrast and accuracy.

In addition, optional fast automated attenuation filter mechanisms can be added to measure scenes with extreme temperature variations.

ADVANCED CALIBRATION

Real-time processing of infrared images including NUC, radiometric temperature, in-band radiance, automated exposure control (AEC) and enhanced high dynamic range imaging (EHDMI). With these unique features, scientists benefit from ease of use and operation flexibility while getting accurate measurements over the entire camera's operation range.

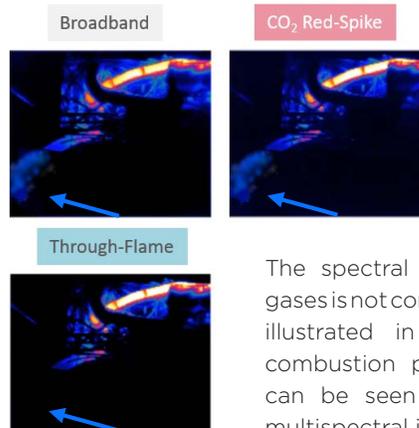
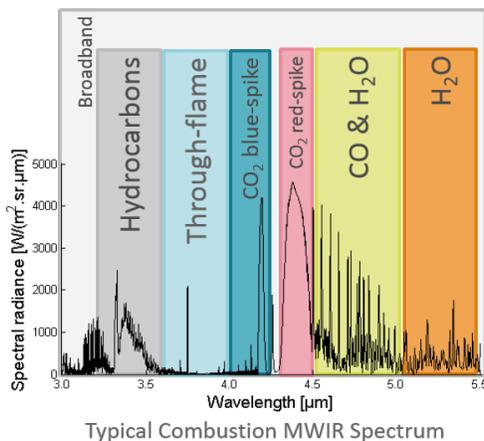
ACCURATE MEASUREMENT

Radiometric temperature accuracy of $\pm 1^\circ\text{C}$ or $\pm 1\%$ over the entire range.

HIGH SENSITIVITY

Temperature differences as small as 20 mK are detectable.

EXAMPLE OF A TYPICAL USE



The spectral emissivity of typical combustion gases is not constant as a function of wavelength as illustrated in the MWIR spectra of typical combustion products. These spectral features can be seen in real time with time-resolved multispectral imaging.

| MIDWAVE SERIES | | | |
|--|--------------------------------------|--------------------------------------|--------------------------------------|
| DETECTOR SPECIFICATIONS | MS M2k | MS M100k | MS M350 |
| DETECTOR TYPE | InSb | MCT | InSb |
| SPECTRAL RANGE | 3 μm to 5.4 μm | 3 μm to 4.9 μm | 3 μm to 5 μm |
| SPATIAL RESOLUTION | 320 \times 256 pixels | 640 \times 512 pixels | 640 \times 512 pixels |
| DETECTOR PITCH | 30 μm | 16 μm | 15 μm |
| APERTURE SIZE | F/2.5 | F/4 | F/3 |
| TYPICAL PERFORMANCES | | | |
| FRAME RATE | 2 000 Hz | 115 Hz | 350 Hz |
| MAXIMUM FRAME RATE (STATIC FILTER WHEEL MODE) | 90 000 Hz @ 64 \times 4 | 120 000 Hz @ 64 \times 2 | 4 900 Hz @ 132 \times 2 |
| TYPICAL NETD | 25 mK | 17 mK | 20 mK |
| ELECTRONIC SPECIFICATIONS | | | |
| EXPOSURE TIME | 1 μs to full frame rate | 0.2 μs to full frame rate | 0.5 μs to full frame rate |
| CAMERA CONSTRUCTION | | | |
| LENS MOUNT | Bayonet interface | Bayonet interface | Bayonet interface |

| MIDWAVE <i>hd</i> SERIES | | |
|--|------------------------------------|--|
| DETECTOR SPECIFICATIONS | MS M200 <i>hd</i> | MS M100 <i>hd</i> |
| DETECTOR TYPE | InSb | MCT |
| SPECTRAL RANGE | 3 μm to 5 μm | 3.7 μm to 4.8 μm |
| SPATIAL RESOLUTION | 1280 \times 1024 pixels | 1280 \times 1024 pixels |
| DETECTOR PITCH | 10 μm | 15 μm |
| APERTURE SIZE | F/3 | F/3 |
| TYPICAL PERFORMANCES | | |
| FRAME RATE | 170 | 118 |
| MAXIMUM FRAME RATE (STATIC FILTER WHEEL MODE) | 4 700 Hz @ 1280 \times 2 | 26 700 Hz @ 256 \times 2 |
| TYPICAL NETD | 25 mK | 25 mK |
| ELECTRONIC SPECIFICATIONS | | |
| EXPOSURE TIME | 1 μs to full frame rate | 16 μs to full frame rate |
| CAMERA CONSTRUCTION | | |
| LENS MOUNT | Bayonet interface | Bayonet interface |

VERY LONG WAVE SERIES

| DETECTOR SPECIFICATIONS | MS V350 | MS V300 |
|--|---|---|
| DETECTOR TYPE | SLS | MCT |
| SPECTRAL RANGE | 7.5 μm to 12 μm (other ranges available) | 7.7 μm to 11.8 μm |
| SPATIAL RESOLUTION | 320 \times 256 pixels | 320 \times 256 pixels |
| DETECTOR PITCH | 30 μm | 30 μm |
| APERTURE SIZE | F/2 | F/2 |
| TYPICAL PERFORMANCES | | |
| FRAME RATE | 344 Hz | 300 Hz |
| MAXIMUM FRAME RATE (STATIC FILTER WHEEL MODE) | 12 000 Hz @ 128 \times 8 | 79 000 Hz @ 64 \times 2 |
| TYPICAL NETD | 25 mK | 25 mK |
| ELECTRONIC SPECIFICATIONS | | |
| EXPOSURE TIME | 0.5 μs to full frame rate | 0.5 μs to full frame rate |
| CAMERA CONSTRUCTION | | |
| LENS MOUNT | Threaded interface | Threaded interface |

Specifications are subject to change without notice. Other configurations are available upon request.

COMMON SPECS

| | |
|----------------------------------|---|
| SENSOR COOLING | Rotary-stirling closed cycle |
| STANDARD SCENE TEMPERATURE RANGE | Up to 1500 °C Other ranges available. |
| DYNAMIC RANGE | 16 bits |
| MEASUREMENT ACCURACY | 1 K or 1% (°C) from -15°C to 150°C |
| MULTISPECTRAL FILTER WHEEL | 8 \times 1" filters; static or fast-rotating mode |
| SIZE W/O LENS | 13.8" \times 8.5" \times 9.3" 352 mm \times 216 mm \times 236 mm |
| WEIGHT W/O LENS | < 13 kg |



FOR MORE INFORMATION | TELOPS.COM

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ABOUT US

Telops is a leading supplier of high-performance scientific infrared cameras for the defence, academic, industrial, and environmental research industries. Telops also offers R&D services for optical systems technology development.

Since its beginning in 2000, Telops has distinguished itself with the quality of its technical personnel and its innovative approach to many technological challenges in the optics field. Today, the expertise of its scientists, engineers and technologists and the performances of its infrared cameras and hyperspectral imagers are internationally recognized.



Quebec City's Château Frontenac in infrared

FEATURES & OPTIONS



OUR INFRARED CAMERAS' KEY FEATURES

All our infrared cameras offer advanced features to address the most demanding research applications. They include:

- Blackbody-free permanent calibration
- Calibration up to 2500 °C (optional)
- High-speed internal memory buffer: up to 16 GB
- Gig-E
- Camera Link
- Trigger In, Trigger Out
- SDI, GPS, IRIG-B, RS232 and thermistor ports
- Lock-In (optional)
- Automatic exposure control (AEC)
- Enhanced high-dynamic-range imaging (EHDMI)

OUR INFRARED CAMERAS' LENS OPTIONS

Telops offers a variety of lens options depending on your camera configuration using either a flanged, threaded, or bayonet mount interface.

Customized optics are available, as well as many accessories such as telescopes and microscopes.