

spectral camera **LWIR**

SPECIM presents its thermal hyperspectral cameras in the LWIR region 8 to 12  $\mu\text{m}$ . Two camera models have been specially designed to meet diverse requirements in industrial, research and security applications.



Spectral Camera LWIR HS with uncooled detector

SPECIM's LWIR Spectral Cameras are push-broom type line scan cameras that provide full, contiguous hyperspectral data for each pixel along the imaged line. To respond to a wide range of applications and requirements, SPECIM has developed 2 models of LWIR Spectral Cameras: HS (with uncooled detectors), and C (with cooled detector).



2010

**HS MODEL**

Spectral Cameras LWIR HS integrates an uncooled detector and optics. It is a compact (only 3.5kg) and versatile tool for a wide variety of applications.

HS (high sensitivity model) covers the spectral range 8-12  $\mu\text{m}$ . It has 30 spectral bands and spectral sampling of 200 nm. With a good sensitivity and moderate spectral resolution, HS is suitable for many industrial and Chemical Imaging applications.

**C MODEL**

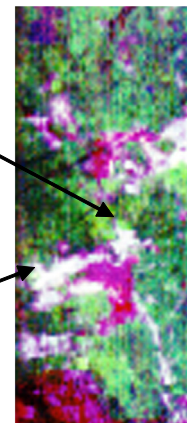
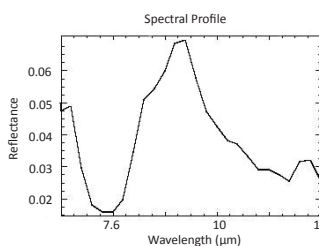
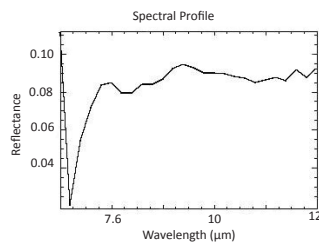
For the most demanding ground-based remote sensing and security applications, SPECIM has integrated a state-of-the-art temperature stabilized LWIR imaging spectrograph with the highest sensitivity cooled MCT detector. Spectral Camera LWIR C covers the spectral range 8 to 12  $\mu\text{m}$  with high spectral selectivity of 84 bands (sampling of 48 nm) and extensive speed of up to 100 images/s.



Spectral Camera LWIR C with cryo-cooled MCT detector

**Applications**

- Geological mapping
- Mineral classification
- Volcanology
- Water temperature
- Camouflage detection
- Gas detection
- Flame analysis
- Land cover type recognition



Mineral sample scanned with Spectral Camera LWIR HS. The plots show examples of reflectance spectra.

## Performance Specifications

SPECTRAL CAMERA LWIR	C	HS
<b>Optical characteristics</b>		
Spectral range	8 - 12 $\mu\text{m}$	8 - 12 $\mu\text{m}$
Spectral bands	84	30
Spectral resolution	100 nm**	400 nm
Spectral sampling/band	48 nm	150 nm
Spatial pixels	384 pixels	
Field of view	With fore lens L43***: 24° With fore lens L32***: 32.2°	With fore lens L41*** 32.2°
Spatial sampling	L43 0.063° / L32 0.084°	0.084°
Aberrations	Insignificant astigmatism, smile or keystone < 0.1 pixels	
Optics temperature	Stabilized	Uncooled
<b>Electrical characteristics</b>		
Detector	MCT	LWIR uncooled microbolometers
Numerical aperture	F/2.0	F/1.0
Pixel size	24 x 24 $\mu\text{m}$	25 x 25 $\mu\text{m}$
Cooling	Stirling-cycle cooler	Uncooled
Camera output	14-bit LVDS	GigE Pleora
Frame grabber	NI-PCI 1422 or 1424 National Instruments	-
Frame rate	up to 100 fps	60 fps
Shutter/internal calibration	Yes / Optional	Yes / Optional
Power consumption	< 200 W + 400 W (calibrator)	3 - 5 W
SNR	Target 300 K * 8 $\mu\text{m}$ 450 * 10 $\mu\text{m}$ 580 * 12 $\mu\text{m}$ 230	Target 400 K * 8 $\mu\text{m}$ 240 * 10 $\mu\text{m}$ 210 * 12 $\mu\text{m}$ 180
NESR (mW/m <sup>2</sup> sr $\mu\text{m}$ )	* 8 $\mu\text{m}$ 21 * 10 $\mu\text{m}$ 18 * 12 $\mu\text{m}$ 40	* 8 $\mu\text{m}$ 270 * 10 $\mu\text{m}$ 310 * 12 $\mu\text{m}$ 800
NETD/ spectral pixel	0.2K	1K
<b>Mechanical characteristics</b>		
Size (mm)	255 x 285 x 223	100 x 143 x 185
Weight (kg)	13.1.	3.5
Body	Anodized aluminium and painted steel	
<b>Environmental characteristics</b>		
Storage	- 20 ... +50 °C	
Operating	+ 5 ... +40 °C, non-condensing	

\* x 2 software binning

Specifications subject to change without prior notice

\*\* Diffraction limited

\*\*\* Other fore lenses available upon request. Fore lenses can be replaced by the customer.

