For diagnostic healthcare applications, hyperspectral sensing provides a highly resolved means of imaging tissues at either macroscopic or cellular levels. Headwall's technology provides accurate spectral information relating to the patient, a tissue sample, or a disease condition, all non-invasively.

A key advantage of the Hyperspec® imaging sensor is its ability to non-invasively scan tissues or samples in vivo or in vitro with exceptional spectral and spatial resolution. The size of the area or size of the sample scanned is based on the required field of view (FOV) and the spectral/spatial resolution needed (IFOV, instantaneous field of view) by the application. These parameters can be modified to achieve the necessary diagnostic or investigatory imaging performance.

Key advantages of hyperspectral imaging for healthcare applications include the ability to:

• Derive the spectral signature for every point within the field of view for material classification

• Color render the image scene based on an established library of known spectral signatures or disease conditions

• For high-throughput patient screening and non-invasive diagnosis, generate wavelength-specific criteria for disease conditions based on spectral features

Optimized for a number of broad spectral ranges, Hyperspec® imaging sensors are available as integrated instruments, supplied with the Hyperspec® Starter Kit, or available in point & stare configurations for stationary patient or sample scanning.
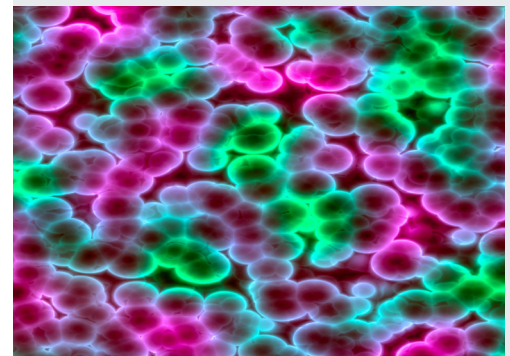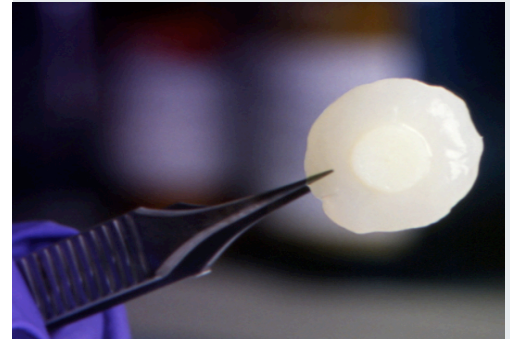
• **Microscopy**

• **Cellular Spectroscopy**

• **Diagnostic Imaging**

• **Optical Biopsy**

• **Tissue Demarcation**

• **Therapeutic Analysis**

Headwall is the world's leading manufacturer of hyperspectral imagers (Hyperspec®) for a wide range of industries including remote sensing, advanced machine vision, precision agriculture, and others. The Company also manufactures OEM spectrographs and spectral engines that are exceptionally precise with respect to high spectral and spatial resolution and signal throughput.

The core technology fundamental to these products is the holographic diffraction grating, which Headwall manufactures to exacting dimensions and tolerances and to customer specificati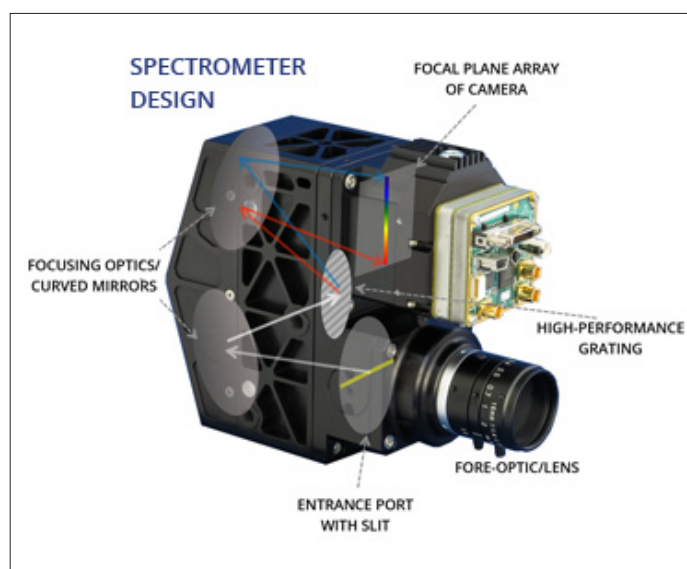on. This allows for small and rugged optical imaging instruments that deliver aberration-corrected performance and a very wide field-of-view. Used in Headwall's *concentric-style* imagers along with mirrors, the designs are simple yet elegant and feature no moving parts.

In addition to hyperspectral, Headwall also manufactures Raman imaging instruments that are available in a wide range of laser excitation wavelengths. Raman Explorer and Raman Discovery are very well suited for chemical imaging applications as well as biotechnology and medical applications.

Hyperspectral Ranges	
UV-VIS	250-825nm
VNIR	380-1000nm
Extended VNIR	550-1700nm
NIR	900-1700nm
SWIR	950-2500nm
MWIR*	3-5 microns
LWIR*	8-12 microns
*MWIR and LWIR available upon request	

SLIT

HIGH-PERFORMANCE DIFFRACTION GRATING

CONCAVE MIRROR

CAMERA FOCAL PLANE
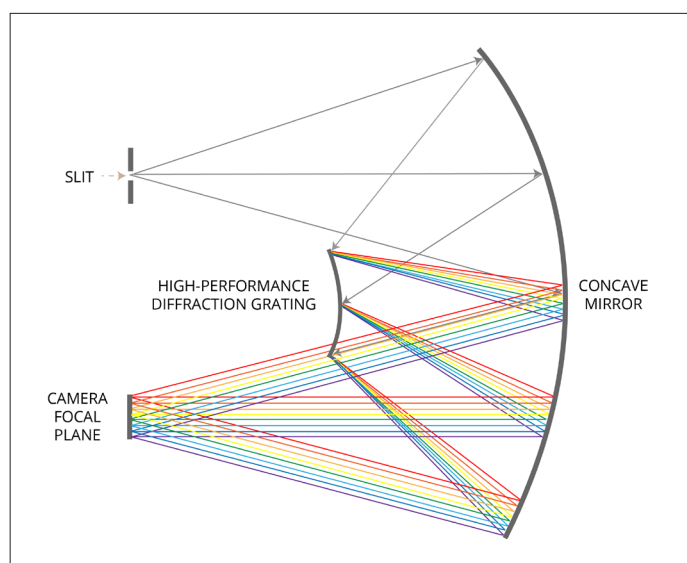
Raman Explorer	
248nm	single input
355nm	single input
532nm	single input
532nm/658nm	dual input
642nm	single input
785nm	single input
785nm	dual input
830nm	single input
Raman Discovery	
532nm	dual input

SPECTROMETER DESIGN

FOCAL PLANE ARRAY OF CAMERA

FOCUSING OPTICS/ CURVED MIRRORS

HIGH-PERFORMANCE GRATING

FORE-OPTIC/LENS

ENTRANCE PORT WITH SLIT

About Headwall Photonics: Headwall is the leading designer and manufacturer of imaging spectrometers and spectral instrumentation for industrial, commercial, and government markets. Headwall's high performance spectrometers, spectral engines, and holographic diffraction gratings have been selected by OEM and end-user customers around the world for use in critical application environments. As a pioneer in advanced, patented optics technology, Headwall enjoys a market-leading position through the design and manufacture of spectral instrumentation that is customized for application-specific performance.

Headwall