



Application Note

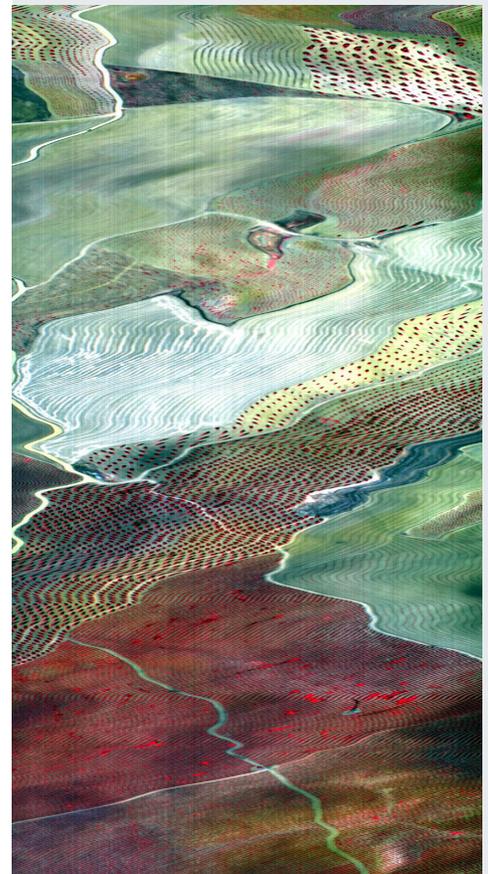
Remote Sensing Hyperspectral Imaging

Hyperspectral imaging, also known as chemical sensing, affords researchers and biologists unique opportunities to conduct both airborne and stationary spectral analysis for remote sensing applications. Airborne hyperspectral imaging represents an established remote sensing technique for capturing important spectral data critical to remote sensing applications.

Within the field of view of the sensor, hyperspectral imaging simultaneously yields precise information for all wavelengths across the complete spectral range available. With the creation of the hyperspectral datacube, a data set that includes all of the spatial and spectral information, researchers are able to generate and analyze in-depth environmental spectral imaging data. Imaging performance is optimized with Headwall's patented, aberration-corrected sensor. Key advantages of hyperspectral imaging for environmental researchers and engineers include:

- Derive the spectral signature for every point within the field of view of the Hyperspec[®] sensor
- Color render the image within the field of view based on an established library of known spectral signatures
- Rapidly scan the scene or interrogate the datacube for specific threshold values for key wavelengths of interest

The utilization of custom-designed diffraction optics within the Hyperspec[®] sensor enables the configuration of highly optimized hyperspectral imagers covering broad spectral regions required by the remote sensing application. With Headwall's Hyperspec[®] imaging product family, remote sensing spectral analysis can be conducted via airborne platforms or from Headwall's stationary "pan & tilt" sensors or "point & stare" configurations.



Environmental Research	Petroleum & Pipelines
Pollution Detection	Forestry Management
Precision Agriculture	Mineral Exploration

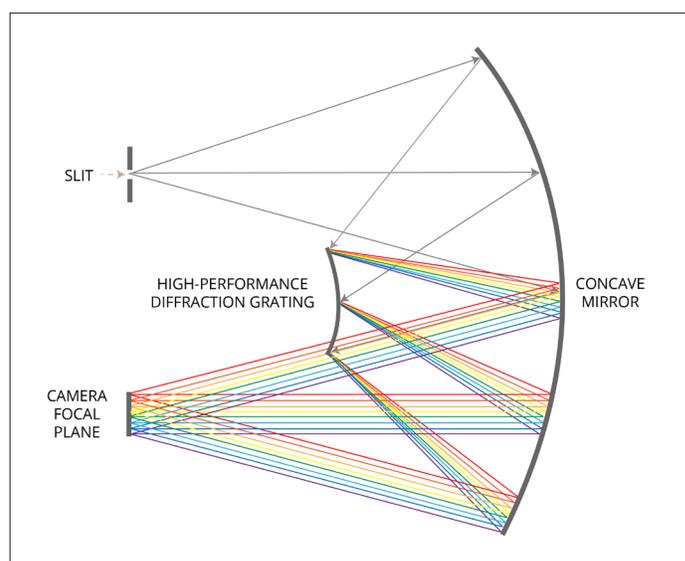
Headwall is the world's leading manufacturer of hyperspectral imagers (Hyperspec®) for a wide range of industries including remote sensing, advanced machine vision, precision agriculture, and others. The Company also manufactures OEM spectrographs and spectral engines that are exceptionally precise with 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 specification. This allows for small and rugged

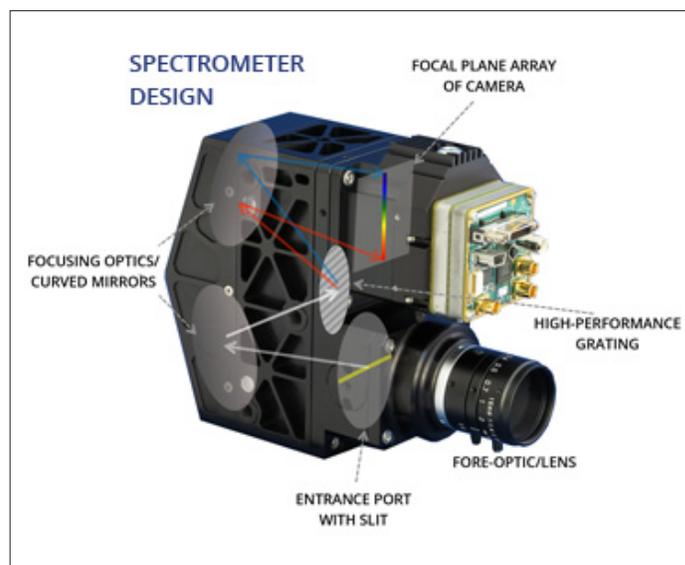
optical imaging instruments that deliver aberration-corrected performance and a very wide field-of-view. Used in Headwall's *concentric-style* imagers along with mirrors, the designs are simple yet elegant and feature no moving parts.

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	



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



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.

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