Application Note

Food Safety & Quality
Hyperspectral Imaging

The utilization of hyperspectral imaging for in-line inspection of poultry, fruits, vegetables, and specialty crops holds exceptional potential for increasing the quality and safety of the foods we eat. The technology also offers a significant financial return for food processors by increasing throughput and yield at their facilities.

While machine vision technology has been a standard approach to many food inspection and safety applications, hyperspectral imaging offers the incremental benefit of analyzing the chemical composition of food products. Hyperspectral imaging solutions can be deployed at different process-points, including in-line inspection and in the laboratory. With the overall objective being significant increases in production yields and quality, food products can be analyzed with hyperspectral sensing for disease conditions, ripeness, tenderness, grading, or contamination.

When Hyperspec® imaging sensors are deployed early in the inspection process, food products can be segregated and sorted according to pre-established criteria and routed efficiently along the production line. Optimized for in-line processing, Hyperspec® Inspector is fully-capable of processing at very high speeds based on spectral regions and wavelengths of interest.

Key advantages of hyperspectral imaging for equipment manufacturers & food producers include:

- Derive the spectral signature for every point within the field of view for material classification
- Color-render the image within the field of view based on an established library of known spectral signatures
- For high volume production, generate wavelength-specific criteria for high speed quality control over the production process line.

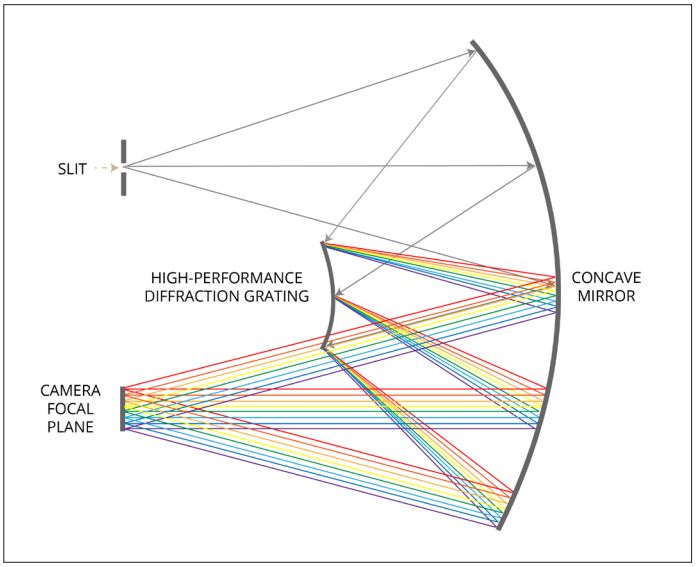
Headwall Photonics is a US Department of Agriculture CRADA research and development partner.

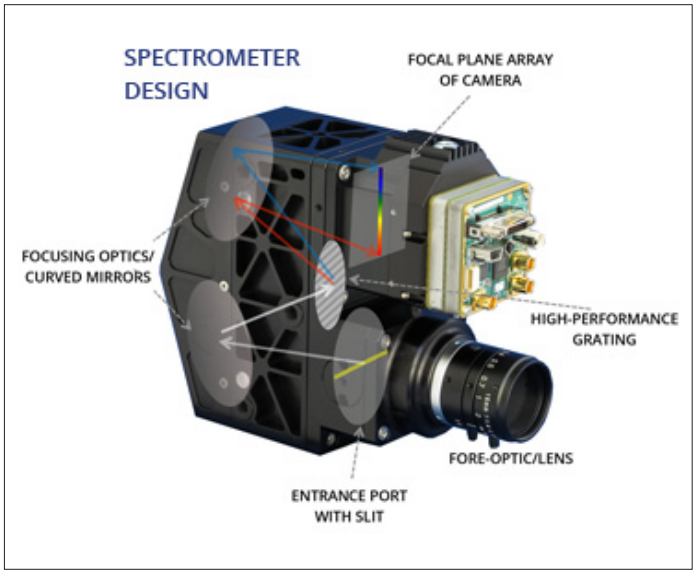
- Agricultural Research
- Crop Management
- Disease Detection
- In-Line Inspection
- Advanced Machine Vision
- Precision Agriculture

Inspecting food products such as poultry, nuts/grains, specialty fruit, meats, and seafood demands a 'new set of eyes' to grade product accurately and to spot and remove foreign material. Headwall's Hyperspec® family of hyperspectral imaging sensors are perfect for this type of application because they provide a level of discrimination and specificity that extends far beyond normal RGB systems.

Headwall's applications engineering teams help you determine the best spectral range of interest based on what you need to inspect. This can be UV-VIS, VNIR, Extended VNIR or SWIR. In all cases, the sensors are able to deliver very high spatial and spectral resolution across many bands and across a wide field of view. You'll see what you've been missing, which means more wholesome food products and higher consumer preference. The fast-frame-rate capabilities of hyperspectral imaging allow the sensors to perfectly complement your high-speed lines.

The fundamental technology supporting Headwall's hyperspectral imaging sensors is based on a simple, robust and elegant design using diffraction gratings and





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.

© 2016 Headwall Photonics, Inc. • 601 River Street, Fitchburg, Massachusetts USA 01420
U.S. tel: 978.353.4100 • e-mail: information@headwallphotonics.com