

Headwall is the proud recipient of these honors and more...



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**Headwall**

# Hyperspec<sup>®</sup> MV.X<sup>™</sup>

## Real-Time Hyperspectral Classification for Advanced Machine Vision



### FEATURES

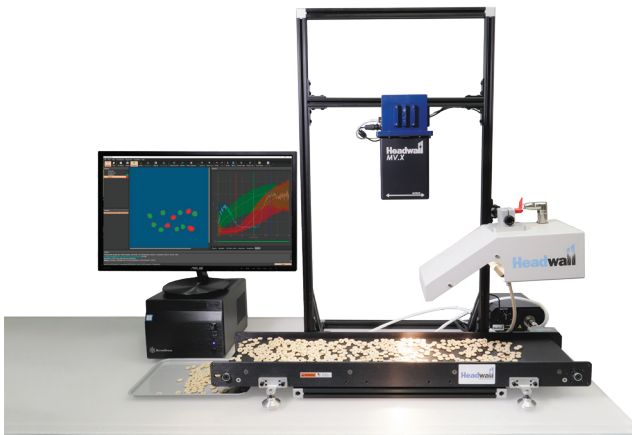
- Powerful Embedded CPU/GPU
- Onboard Spectral Classification
- VNIR Wavelength Range (400 to 1,000 nm)
- IP-66/67 Rated for Industrial Use
- Compatible with perClass Mira<sup>®</sup>
- Integration with Industrial Control Systems

**DATASHEET**

REVISION OCT 2022 REV B

## VISUALIZE VALUE AT THE SPEED OF LIGHT

Packaged in a compact, dust-resistant, and watertight housing, the **Hyperspec® MV.X™** is designed to be used in advanced machine vision, quality monitoring, and process analytical applications. This rugged solution can be installed in both inside and outside production environments.



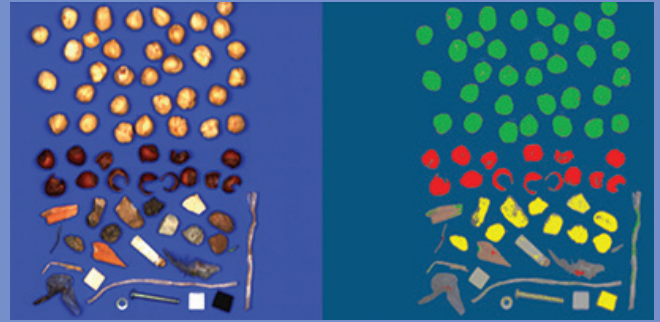
The MV.X system installed over a small conveyor used for offline development of spectral-classification methods and models.

The award-winning **Hyperspec® MV.X™** introduces to the industry a fully integrated hyperspectral imaging (HSI) system that enables users to realize the value of spatial and spectral information in industrial applications like automated sorting, quality inspection, authenticity verification, and process monitoring.

### Actionable Results Made Easy

Hyperspectral imaging (HSI) has been gaining ground as a technique that enables food processors to apply advanced automated sorting and inspection solutions to alleviate some of the most tedious and labor-intensive tasks. Collecting highly resolved spectral information for each pixel in the image enables the detection of slight differences in color or composition to improve sorting and grading decisions.

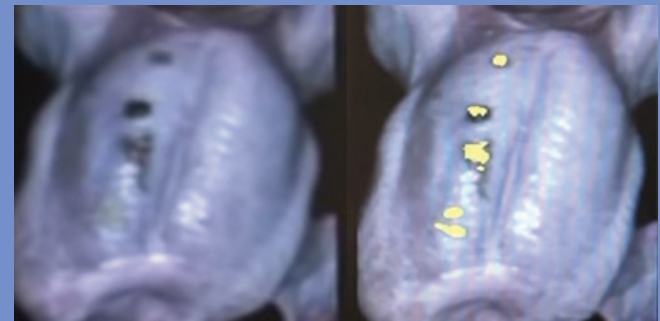
## FOREIGN OBJECT DETECTION



Left: Color image of hazelnuts, shells, and foreign objects. Right: Spectrally classified image showing good product, shells, and two types of foreign objects.

While most foreign objects can be separated during initial screening, objects that are similar in appearance to acceptable-quality product are often very hard to catch. Final sorting of products like tree nuts can benefit from the power of HSI. Processors can both optimize their use of manpower and improve quality by adopting automation powered by hyperspectral-imaging.

## CONTAMINATION DETECTION



Headwall customer images of fecal contamination and skin tumors detected in poultry with hyperspectral imaging classification techniques.

From a regulatory perspective, few industries depend on rigorous inspection more than poultry and meat processing. Use of HSI to inspect poultry for wholesomeness, detection of fecal contamination, septicemia, and skin tumors early in the process can help save significant processing costs and reduce the risk of recalls. When processing livestock, the technique helps accurately pinpoint areas on a carcass that require attention.

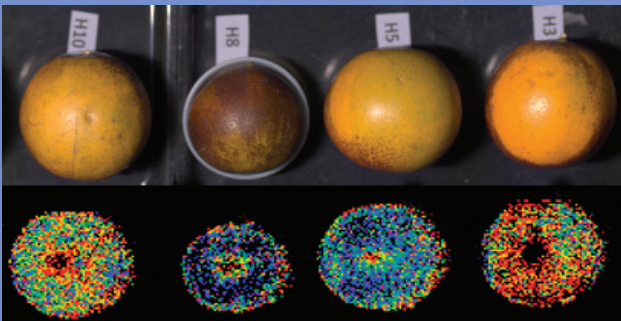
## SORTING & GRADING



Headwall hyperspectral imaging (HSI) system with line-lights deployed over multiple almond processing lines. Automated nut sorting and foreign-object removal systems rely on HSI for fast, real-time detection and classification.

The repeatability of digital HSI helps automate tasks that previously could only be performed manually. The MV.X solves these challenging problems and enables development and deployment of automation to reduce costs, improve quality, and increase consistency of grading for tree nuts, berries, and a variety of other food and non-food products.

## PROCESS ANALYTICS



Brix, a commonly used measurement of dissolved solids in liquid, is often used to determine sugar content in citrus fruit.

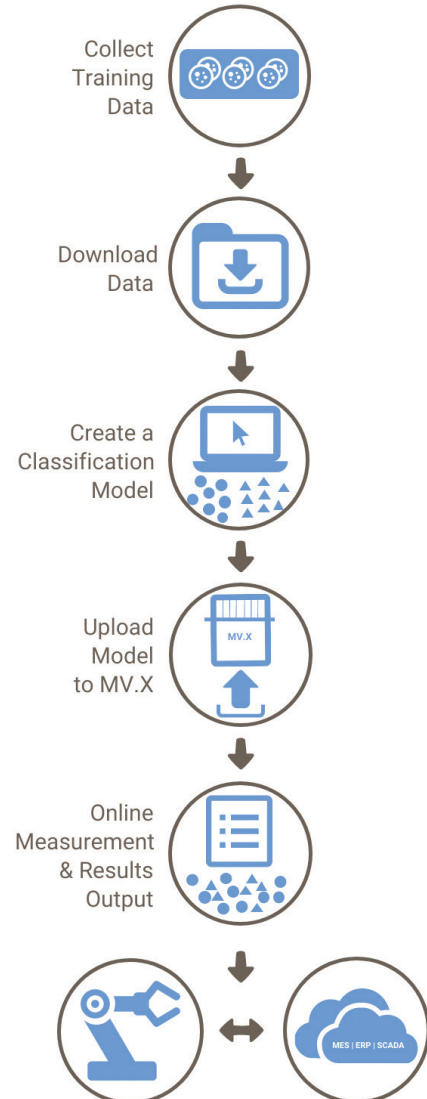
Deployment of process analytical technologies (PAT) in food and pharmaceuticals is accelerated by the growing adoption of Industry 4.0 concepts. The MV.X can be networked directly into plant controls. It can serve as a non-contact, real-time analytical solution for prediction of product characteristics, including sweetness, pH, intramuscular fat content, histamine levels, and other critical attributes that traditionally require sampling and laboratory testing.

Spectral data collected in the near-infrared helps detect or quantify features that traditional vision techniques cannot see.

Hyperspectral systems have historically faced significant hurdles in industrial deployment due to the need to handle vast amounts of raw data as well as cope with the complexity of model development.

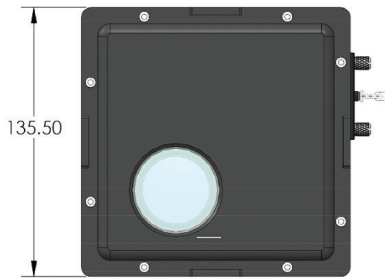
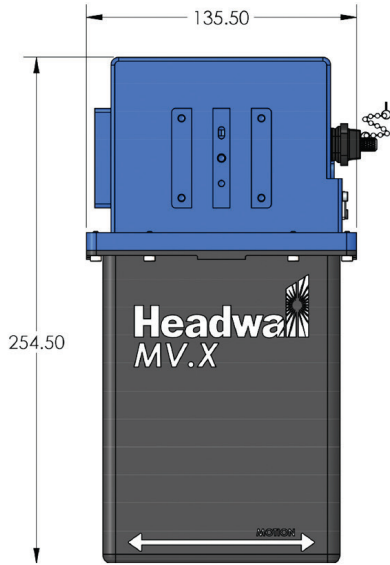
Headwall's MV.X platform overcomes these obstacles by combining a high-performance spectrometer with powerful embedded computing to extract actionable results in real time.

### Streamlined MV.X Workflow

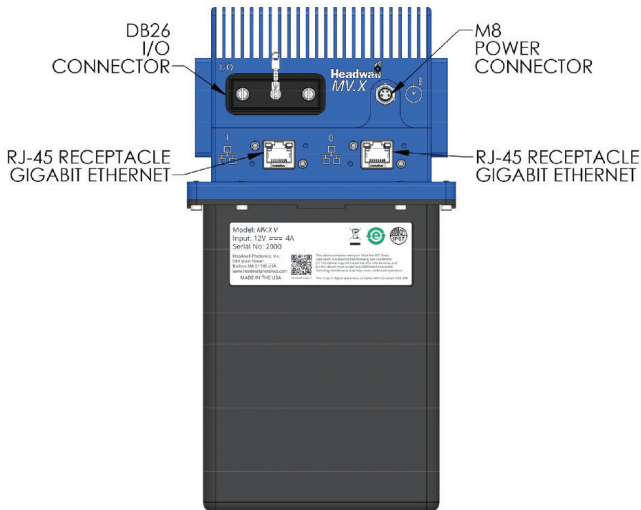


# DATASHEET

## Hyperspec® MV.X™ Real-Time Hyperspectral Machine Vision



Dimensions are in millimeters.



SPECIFICATIONS	
Wavelength Range	400 – 1,000 nm
Spectral Bands	301
Spatial Pixels	1020
Camera Technology	CMOS
Ingress-Protection Rating	IP66 / IP67
Spectral Sampling	2.0 nm/pixel
Spectral FWHM	6 nm
Aperture	f/2.5
Bit Depth	12-bits
Interfaces	<ul style="list-style-type: none"> <li>GenICam, WebSocket</li> <li>MQTT, RS-232/422, and 5V TTL in development</li> </ul>
Data Output	<ul style="list-style-type: none"> <li>GenICam &amp; WebSocket: Classified Image (Class ID/Color/Grayscale), Object Metadata, Hyperspectral</li> <li>MQTT: Object Metadata, Process Variables</li> <li>ENVI: Hyperspectral Data on local SSD</li> </ul>
Ports	RJ45 (GigE) x2, D-Sub 26-Pin (GPIO)
Software	<ul style="list-style-type: none"> <li>Web User Interface for configuration and control</li> <li>On-board classification modules available</li> </ul>
Embedded Processing	CPU/GPU
Memory, Storage	8GB RAM, 128GB SSD
CE Certified	Yes
Weight (with 24-mm lens)	3 kg / 6.6 lbs
Dimensions (L x W x H)	255 x 136 x 136 mm / 10.0 x 5.4 x 5.4 in
Input Voltage	12–30 VDC
Max PWR Consumption	< 42 W
Operational Temp Range	0 – 50 °C / 32 – 122 °F
Storage Temp Range	-10 – 60 °C / 14 – 140 °F

Part Number	Description
Includes perClass Mira® GUI license & runtime classification software	
1007A-10535-12-MG	MV.X with perClass Mira and run-time, 12-mm lens
1007A-10535-16-MG	MV.X with perClass Mira and run-time, 16-mm lens
1007A-10535-24-MG	MV.X with perClass Mira and run-time, 24-mm lens
Includes perClass Mira® runtime classification software only	
1007A-10535-12-MR	MV.X with perClass Mira run-time mod, 12-mm lens
1007A-10535-16-MR	MV.X with perClass Mira run-time mod, 16-mm lens
1007A-10535-24-MR	MV.X with perClass Mira run-time mod, 24-mm lens

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