KONICA MINOLTA

SPECIM
A Konica Minolta Company

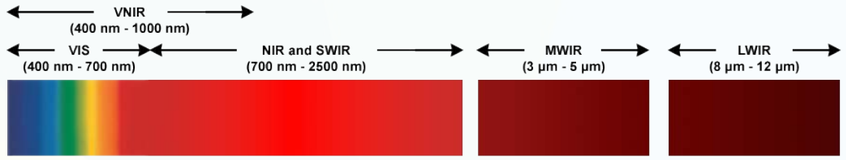
Hyperspectral Imaging Made Easy

Hyperspectral Solutions for Industry, Integrators, Research, and Airborne Applications

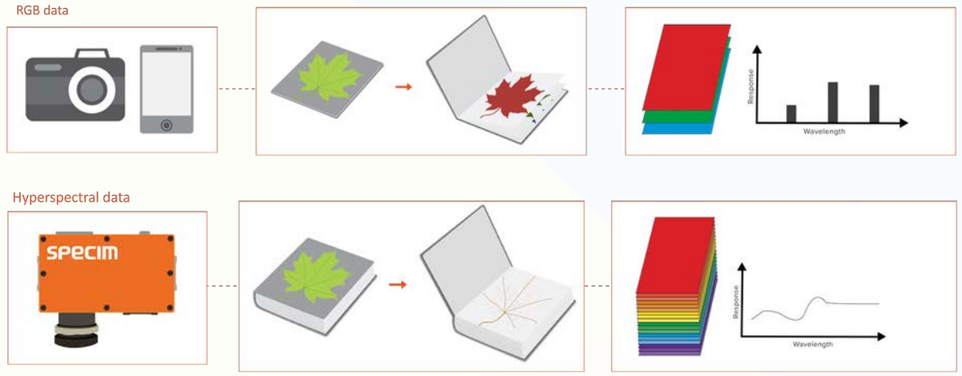
Giving Shape to Ideas

What is Hyperspectral Imaging?

Hyperspectral imaging is the most advanced form of spectral imaging that combines the principles of spectroscopy and digital imaging to collect and process information across the electromagnetic spectrum.

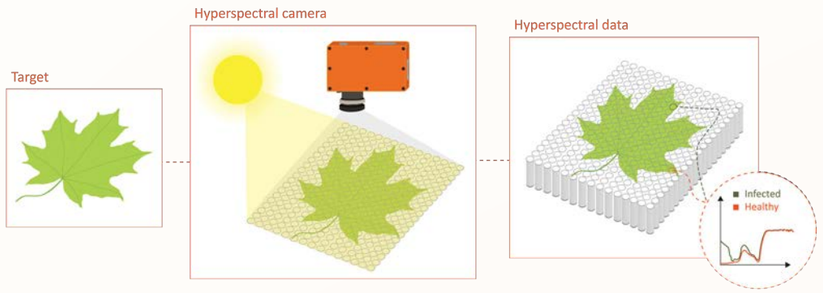


Instead of relying on the three visible light bands (red, green, and blue) like traditional imaging, hyperspectral imaging delves deeper. It explores the interaction between objects and a wide range of bands, spanning from wavelengths beyond the visible light range, such as thermal infrared.

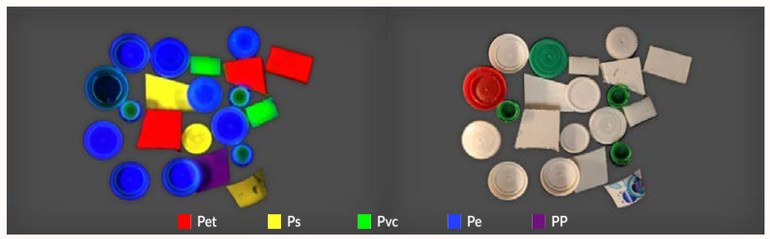


What Information Hyperspectral Imaging Provides?

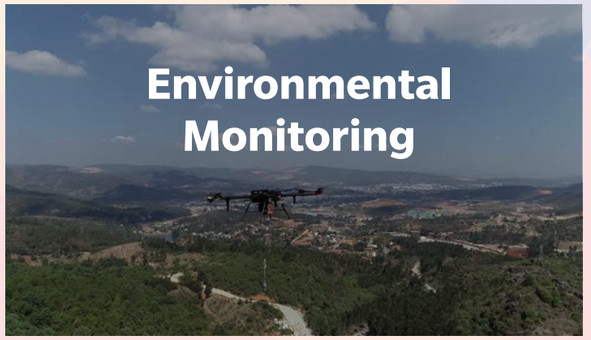
Hyperspectral imaging captures a scene's light using a hyperspectral camera that separates it into individual wavelengths or spectral bands. The resulting hyperspectral data comprise a two-dimensional image, conveying spatial information, where each pixel within the image includes a complete and unique spectrum.



Each pixel's spectrum can be likened to a unique fingerprint, as every material reacts with light differently, and therefore, their spectral signatures are different. By analyzing the spectral information, we can discern the physical and chemical properties of different materials present in the scene, enabling easy identification and classification.



Hyperspectral imaging is an increasingly used technique in many industry, research, and remote sensing applications



SPECIM FX | For Industrial Needs

A trio of line-scan (pushbroom) hyperspectral imaging cameras specifically engineered to fulfill the demands of industrial machine vision.

Specim FX10 (VNIR) | Specim FX17 (NIR) | Specim FX50 (MWIR)

- **High Spatial Resolution**
- **High Frame Rate**

Suitable for Industrial and Laboratory Applications

Specim LabScanner 40x20 (Optional)

- Compact scanner designed for small samples in everyday laboratory routines.
- Consists of a camera mount, halogen illumination, a 40 x 20 cm sample tray, and optional camera height adjustment.

Non-Contact and Non-Destructive Optical Method for Comprehensive Imaging Coverage

Robust and compact design for flexible installation

Installing Specim FX cameras on existing and new sorting lines is a straightforward process. These cameras seamlessly integrate with commercial machine vision systems using a standard interface, ensuring compatibility and ease of use.

Unified Spectral Calibration

The factory-loaded unified wavelength calibration of Specim FX cameras ensures data comparability across similar models. Seamlessly integrate multiple camera units into a single system with effortless setup and no need for calibration.

Multiple Region of Interest (MROI) Capability

The MROI feature enables targeted focus on specific areas, effectively reducing recorded data. The flexibility to select and modify MROI areas allows for customization based on application requirements.

						
Specim FX10 (400–1000 nm)	Specim FX17 (900–1700 nm)	Specim FX50 (2700 – 5300 nm)	Specim GX17 (950–1700 nm)	Specim SWIR (1000-2500 nm)	Specim AFX10 (400-1000 nm)	Specim AFX17 (900-1700 nm)
Vegetation & agriculture, phenotyping, color & density in printing, display & light source inspection, food quality inspection, forensics, pharmaceutical inspection	Food & feed quality inspection, pharmaceutical inspection, waste sorting, plastic recycling, moisture measurement, chemical imaging, threat detection	Black plastic sorting, geology & mining, metal industry	Food sorting & inspection, waste sorting, plastic recycling	Chemical & material sorting, pharmaceutical manufacturing, recycling & waste management, mineral mapping, food & agriculture, moisture content distribution, art research and archiving	Vegetation classification & species identification, water quality analysis, wetlands monitoring, wildlife population study	Moisture, nutrition & fertilizer analysis from the soil, advanced vegetation species identification, plant health & stress studies, forest fires detection

SPECIM GX17 | For Real-Time Machine Vision

Next-generation high speed NIR line-scan hyperspectral imaging camera for inline sorting, inspection, and quality control.

High performance-to-cost ratio to meet industrial requirements

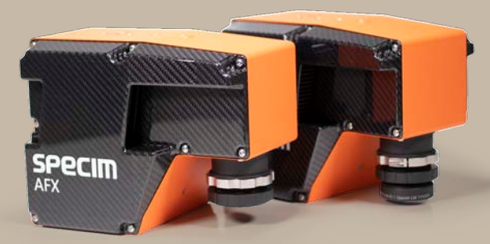
- **High frame rate of 800 Hz**
- **More spatial pixel (480 px) than conventional QVGA sensor-based hyperspectral cameras**
- **f/1.7 optics**
- **GenCP-compliant Cameralink interface (GigE Vision with SpecimCUBE)**

SPECIM SWIR | High-Speed SWIR Imaging

High-speed SWIR hyperspectral imaging camera to meet challenging near-infrared Imaging applications.

- **384 spatial pixels**
- **Up to 400 frames per second (CameraLink connection)**
- **Weather-proof IP54 casing**
- **Temperature-stabilized optics**

SPECIM AFX | For Hyperspectral Remote Sensing



Specim AFX10 (VNIR) | Specim AFX17 (NIR)

Compact hyperspectral imaging cameras with powerful onboard microcomputer and high-end GNSS/IMU unit.

Suitable for a variety of drones: fixed-wing or multirotor, with or without gimbal.

Compact all-in-one solutions: camera, computer uDPU, GNSS/IMU, tinySCP board, with minimal calbling

Equipped with f/1.7 optics and multiple regions of interest (MROI) feature that allows data acquisition from relevant regions.

SPECIM IQ

Hyperspectral
Goes
Mobile

A portable hyperspectral camera that contains features needed for hyperspectral data capturing, data processing, and result visualization.

Camera-Like Usability

1. Go to target
2. Illuminate
3. Adjust intergration time and focus
4. Shoot
5. View the results

Versatile for a Wide Range of Applications

Tailor your camera usage and the way you handle hyperspectral data to meet your specific application needs. This includes customizing processing, analysis, storage, and visualization methods.

On-Site Fast Identification and Analysis

Designed for seamless operation in both indoor and outdoor settings. Its intuitive user interface, displayed directly on the camera, provides step-by-step guidance for capturing high-quality hyperspectral images and ensures data validation.

Specim IQ Studio Software

The Specim IQ Studio PC software included with the camera allows you to develop applications and load them onto the camera. It also enables viewing, importing, exporting, and managing hyperspectral data, camera settings, and creating models and reference spectra.

USB and Wi-Fi Connectivity With Built-In GPS

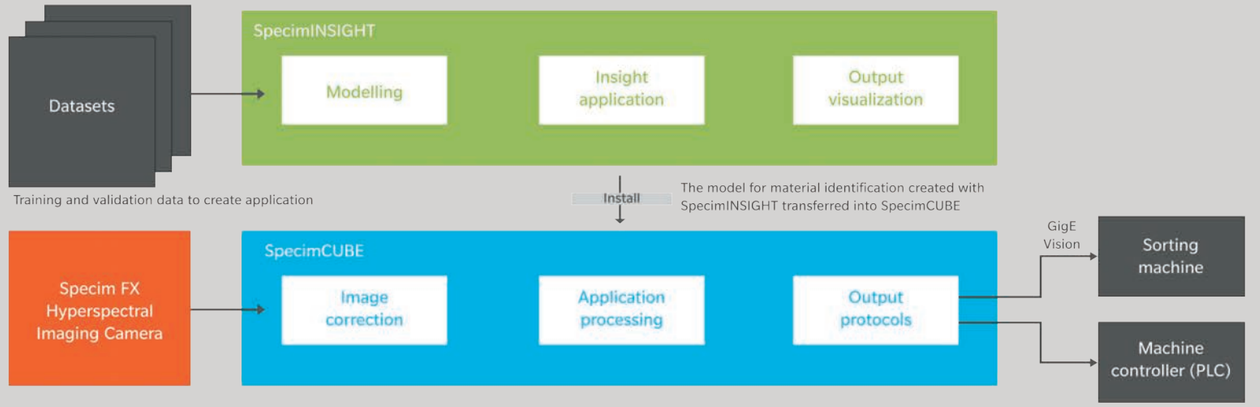
Utilize the built-in GPS to pinpoint and add your measurement location. Seamlessly establish a remote connection through USB or WiFi to control the Specim IQ cameras from Specim IQ Studio to collect, analyze, and import data.

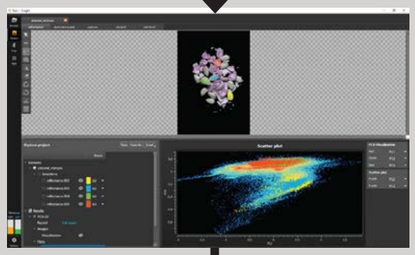
SPECIM ONE

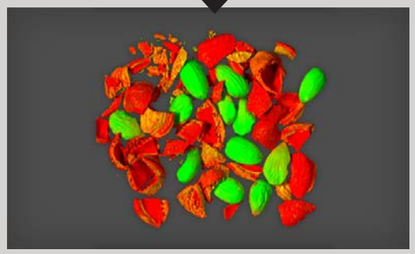
Spectral
Imaging
Platform

A comprehensive spectral imaging platform designed to simplify the process of creating and implementing industrial sorting and inspection applications for machine builders, vision systems integrators, and OEMs.

- **Consists of a hyperspectral imaging camera (Specim FX), processing hardware (SpecimCube), and software(SpecimINSIGHT).**
- **No coding or extensive knowledge of spectral imaging is required.**
- **Compatible with major industrial machine vision standards.**
- **Easy to integrate with machine vision systems and flexible configuration options, allowing for a wide range of applications.**







Specim FX and GX17

- Several camera options: Specim FX10 (VNIR), Specim FX17 (NIR), Specim GX17 (NIR), and Specim FX50 (MWIR).
- Perform real-time, in-line optical inspection of the entire material stream with a single scan
- Non-contact, non-destructive inspection with close to 100% accuracy.

SpecimINSIGHT

- Offline hyperspectral image processing software for browsing and analyzing hyperspectral data.
- Create and train classification and quantification models.
- Apply the models on SpecimCUBE for real-time data processing.

SpecimCUBE

- High-performance processing hardware to run real-time classification models developed with SpecimINSIGHT on data acquired from Specim FX and GX 17 cameras.
- Flexibility to switch and run different models, catering to your specific needs.

SPECTRAL CAMERAS SPECIFICATIONS

Model	Specim IQ	Specim FX10	Specim FX17	Specim GX17	Specim SWIR	Specim FX50
Spectral Range	400 – 1000 nm	400 – 1000 nm	900 – 1700 nm	950 – 1700 nm	1000 - 2500 nm	2700 – 5300 nm
Spatial Pixels	512	1024	640	480	384	640
Spectral Bands	204	224	224	168	288	154
Spectral Resolution (FWHM)	7 nm	5.5 nm	8 nm	8 nm	12 nm	35 nm
Spectral Sampling/pixel	Approx. 3 nm	2.7nm	3.5 nm	4.7 nm	5.6 nm	8.44 nm
Max Frame Rate	N/A	327 FPS	670 FPS	800 FPS	450 FPS	377 FPS
FOV	31°	12°, 24°, 38° (default), 47°, 51°, 83°	12°, 38° (default), 53°, 66°, 75°, 90°	12°, 38°, 53°, 66°, 75° (C-mount lens), 90° (C-mount lens)	9°, 17°, 60°, 24°	24°, 45°, 60°
F-number	F/1.7	F/1.7	F/1.7	F/1.7	F/2.0	F/2.0
SNR	> 400:1	420:1	1000:1	700:1	1050:1	1300:1 (1.5ms); 1800:1 (0.2ms)
Interface	N/A	GigE Vision, CameraLink	GigE Vision, CameraLink	CameraLink	CameraLink	GigE Vision, Custom ethernet
Dimensions (L x W x H)	207 x 74 x 91 mm	150 x 71 x 85 mm	150 x 75 x 85 mm	202 x 75 x 102 mm	545 x 176 x178 mm	280 x 202 x 169 mm
Weight	1.3 kg	1.3 kg	1.56 kg	1.9 kg	14 kg	7 kg
Storage temperature	-20°C ~ +50°C, Relative humidity: ~95%, non-condensing					
Operating temperature	+5°C ~ +40°C, Relative humidity: ~95%, non-condensing					

Model	Specim AFX10	Specim AFX17
Spectral Range	400 – 1000 nm	900 – 1700 nm
Spatial Pixels	1024	640
Spectral Bands	224	
Spectral Resolution (FWHM)	5.5 nm	8.0 nm
Spectral Sampling/pixel	2.68 nm	3.5 nm
Max Frame Rate	150 FPS	
FOV	38°	
F-number	F/1.7	
SNR	400:1	1200:1
Drone options	Multirotor with gimbal, Multirotor without gimbal, Fixed Wing UAV	
Operating height	15 – 150 m	50 – 150 m
Dimensions (L x W x H)	202 x 131 x 152 mm	
GNSS/IMU	Trimble APX-15	
GPS Antenna	Trimble AV 14	
Weight	2.1 kg (without gimbal) 4.8 kg (with gimbal)	2.4 kg (without gimbal) 5.1 kg (with gimbal)
Storage temperature	-20°C ~ +50°C, Relative humidity: ~90%, non-condensing	
Operating temperature	+5°C ~ +40°C, Relative humidity: ~90%, non-condensing	

- The specifications and appearance shown herein are subject to change without notice.

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