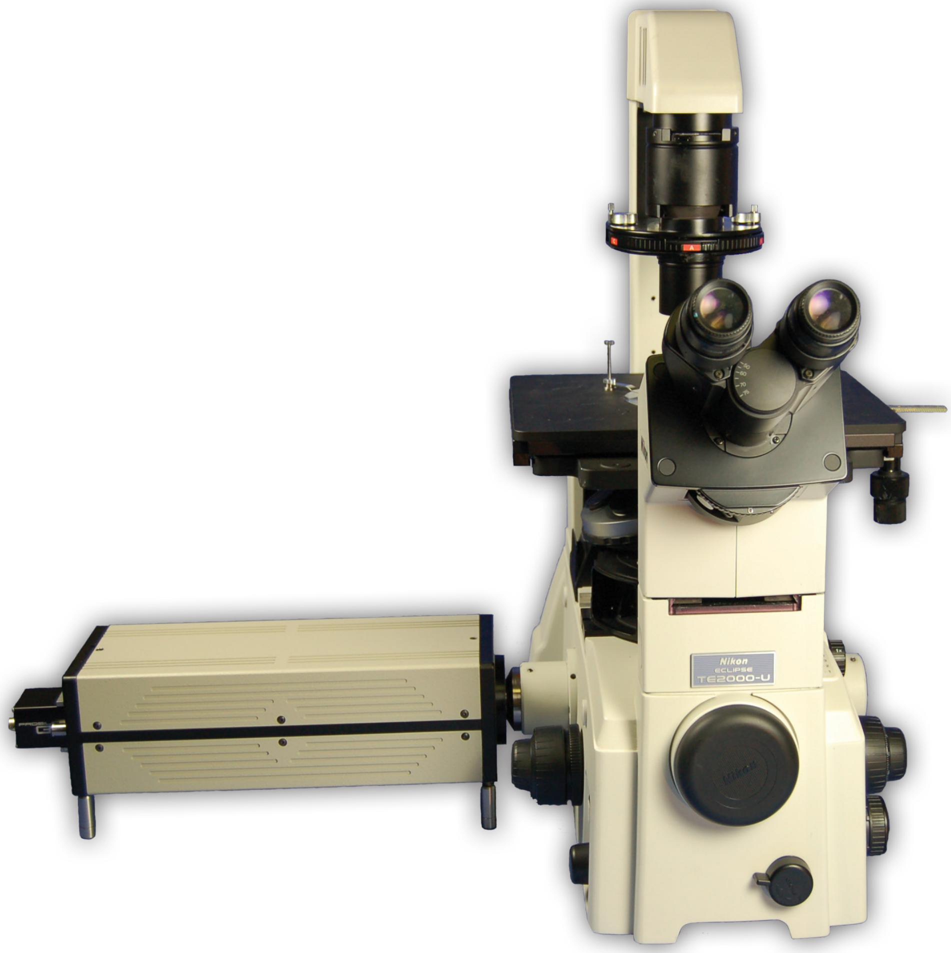
Gooch & Housego

HSI-440C HYPERSPECTRAL IMAGING SYSTEM



The HSi-440C can image and analyze multiple signals in fixed and living cells at video rates. Powered by its unique tunable filter that can switch wavelengths within microseconds, the new system acquires multi-wavelength high-spatial and spectral resolution image datasets, and can compute and display quantitative signal-specific images in near real-time. It's ideal for wide-field brightfield and fluorescence microscopy, as well as standoff detection applications.

Get in Touch

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FEATURES

Gooch and Housego's patented acousto-optic tunable filter (AOTF) imaging module fulfills the promise of multispectral and hyperspectral imaging through unmatched spectral flexibility and switching speed.

The performance capabilities of this technology make it ideally suited for high-content, high-throughput fluorescence studies as well as spectral transmission and reflectance imaging. Potential applications range from live cell and whole animal studies to stand off detection.

Multispectral and Hyperspectral Imaging

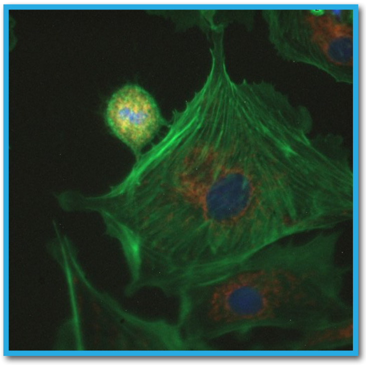
In multispectral and hyperspectral imaging, a series of images of an object are acquired at many different wavelengths so that the complete spectrum of each pixel is available, which is represented as an image cube. Coupled with transmission and fluorescence microscopy techniques, hyperspectral imaging enables fast and quantitative image analysis.

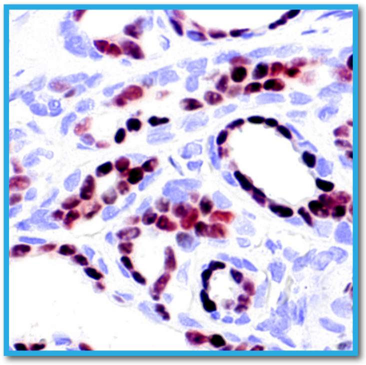
What is an acousto-optic tunable filter (AOTF)?

Our patented AOTF is a high-speed, high-throughput random-access solid-state optical filter with an adjustable optical passband and exceptionally high rejected light levels. Gooch & Housego's proprietary AOTF technology delivers diffraction-limited image quality with variable bandwidth resolution down to within 3.0 nm. Wavelength switching time, including computer control overhead, is a few hundred microseconds.

APPLICATIONS

- Biological Research
- Medical Diagnostics
- Standoff detection of hazardous materials
- Agricultural processing
- Art conservation





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SOFTWARE

Gooch & Housego's newest application software package pairs the fast multispectral image acquisition capabilities of the HSi-440C spectral imaging system with highly functional spectral unmixing and display options and a streamlined user experience. The new interface is easily customizable, allowing users to set up persistent workspace layouts in accordance with their own preferences. In addition, the system's unique ability to capture and process high-resolution multispectral images in near- real-time sets the HSi solution apart from competing technologies. Captured images may be saved out in proprietary or ENVI format to allow for additional processing at a later time.

Along side this powerful application software, an SDK will be provided that will allow the HSi-440C to be easily integrated in to the user's preferred control software. Plug-ins will also be available for Meta Morph 7.7 and μ-Manager, a free and open source application software

Camera Selection

The HSi-440C comes standard with a High-resolution CCD Camera. For information on other options or integrating a different camera with the system, contact the factory.

AOTF versus Other Spectral Imaging Techniques

While liquid crystal tunable filters (LCTFs) have broad tuning capabilities, their bandwidth is fixed and switching times are typically more that 50 milliseconds with significantly lower throughput that AOTFs.

In transform imaging spectroscopy, an interferometer is used to acquire imaging data at a variety of settings, and the resulting data transformed to provide a spectral image set. With FTIS, the choice of wavelengths and bandwidths cannot be changed and all wavelengths have to be captured regardless of application interest, a process that typically takes tens of seconds.

In tomographic imaging, light is bounced off of a diffraction grating, separated, and captured on a single CCD chip for subsequent processing and extraction of the spectral information, a slow and computationally intense procedure with limited imaging resolution.

Unlike these techniques, AOTFs allow wavelength and bandwidth to be changed at will. It takes less than 100 microseconds to change settings, capabilities that are ideal for high-throughput multiprobe imaging.

Applications/ Specifications

Parameter/ technology	Gooch & Housego AOTF	Filter Wheel	Liquid Crystal Tunable Filter	Push-broom Grating
Technique	Solid-state non-linear crystal	Mechanical	Solid-state non-linear crystal	Dispersion and mechanical scanning
Spectral Resolution	Dynamically variable	Fixed and must be defined by filters selected a priority	Fixed and must be defined by design a priority	Fixed but typically high
Data Capture	Variable sequential band-pass with random access	Sequential band-pass	Fixed sequential band-pass with random access	Full spectrum, spatial scan only
Switching Speed	< 100 µs	~ 50 ms	100 - 1500 ms	10 ms - minutes

Specifications

Tuning	450 - 800 nm
Bandwidth	< 3 nm (@ 450 nm), < 6 nm (@ 800 nm) variable at each center wavelength
Wavelength Accuracy	typical ± 1 nm (est, temperature variance ± 5° C)
Repeatability	± 0.5 nm
Optical output polarization	linearly polarized
Switching speed	< 100 µs
Control interface	PC-USB
Application software	Image capture and Hyperspectral Image Analysis Suite
Operating system	Windows XP®, Windows 7
Operating temperature	15°C to 35°C
Weight (optics head)	8.5 lbs (3.63 kg)
Dimensions (w/o Prosilica camera)	3.75 in (W) x 5.0 (H) in x 13.5 in (D) 9.53 cm (W) x 12.7 cm (H) x 34.29 cm (D)
Camera interface	Ethernet
Controller interface	USB
Reliability (est for AO devices in general, based on Q-Switch Devices)	> 100,000 hrs MTBF
Ordering information: HSi-440CM	Includes permanently mountedProsilica camera optimized for microscopy applications

Gooch & Housego

As part of our policy of continuous product improvement, we reserve the right to change specifications at any time

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