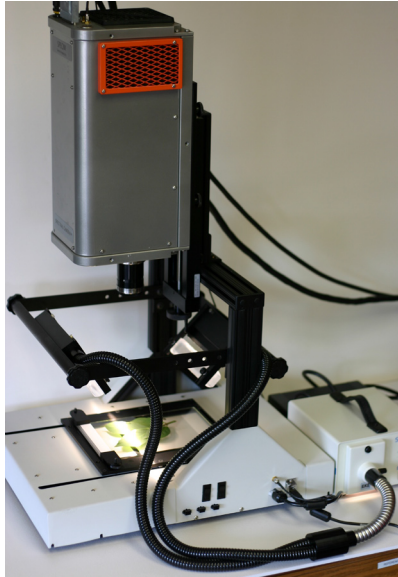


Via-Spec™ Hyperspectral Systems



Overview

Via-Spec™ is a family of new hyperspectral imaging systems offered by Middleton Research providing flexible magnification and illumination options for transmission and, optionally, reflectance configurations. There are many samples for which a transmission configuration works better for optical analysis than reflectance. Some of these examples may include strips or patches used as pharmaceutical formulations, tissue slices, and artificial tissue samples (treated and untreated) used in biomedical studies. In addition, any thin material which is at least semi-transparent in the near-infrared wavelength range can be sampled in a transmission configuration.

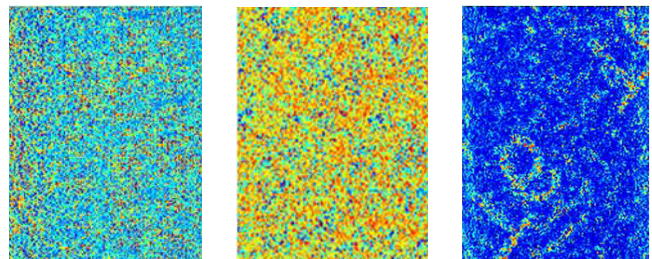
Pharmaceutical Applications

Shown here is an example of a thin strip with medicine applied to a dissolvable transparent strip meant to be applied to the tongue. Several strips were overlapped to show the difference in the amount of light making its way through the samples in the transmission configuration. Medicinal strips such as these could be measured during production to check for uniformity and component concentration.



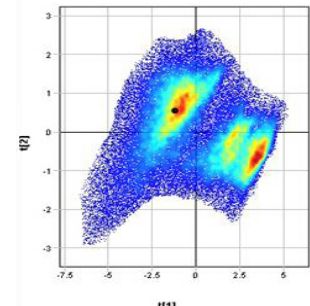
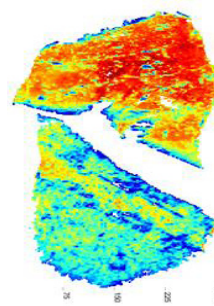
One, two, and three layers of Benadryl™ Quick Dissolve Strips scanned in transmittance.

Several of these medicinal strips were scanned with the Via-Spec system and then analyzed with Evince™ image software to compute principal component models. These spectral images show the many components of the strips and the level of heterogeneity present that may not be detectable to the human eye.



Biological Tissue Samples

Many different types of tissues can be examined. The samples below were human cartilage tissue. Thin samples of treated and untreated tissues were measured in transmission in the 1000-2500 nm wavelength range. The hypercube was evaluated using Evince™ hyperspectral image analysis software and clear differences were found between the samples.



Via-Spec Complete Systems

The Via-Spec complete systems include:

- VNIR or SWIR hyperspectral camera
- Diffuse fiber optic illumination (for VNIR) for transmission or reflectance
- Halogen illumination (for SWIR) for transmission or reflectance
- Computerized sample stage which sends a synchronizing signal to the camera
- Software to control the camera, collect and save the hyperspectral data
- Adjustable white reference and focus grid (for reflectance configuration)

The CCD-based VNIR camera (MRC-303-002-02) has a built-in spectrograph for the 400-1000 nm range. The MCT-based SWIR camera (MRC-303-005-01) covers the 1000-2500 nm range.

Other combinations of the frame, cameras (and required adaptor plates), and illumination types are offered as modular components. These components are described below. The transmission configuration is standard, and the reflectance configuration may be added.

Frame and Stage

The Via-Spec frame has a glass stage which is 5 inches wide by 8 inches long. As an alternative to the glass stage, we offer a black stage that the customer (or Middleton Research, by request) can modify for different sizes and shapes of samples, such as seeds, tablets, etc. Adaptor plates are available for mounting different cameras or spectrographs to the Via-Spec frame.

Illumination Options

The **halogen line light source**, with direct illumination covers the wavelength range 400-2500 nm. It contains three 20-W bulbs and can be mounted in either or all of the three illumination positions (two reflectance, one transmission). The fiber optic line light can be alternatively mounted in these same positions. Two of the three connected sources can be powered at one time.

The glass **fiber optic line light**, offered in single or dual configuration,



covers the wavelength range 400-1700 nm (without the lens). For a higher level, more focused light, a transparent plastic cylindrical lens is available. The lens will limit the wavelength range to 400-1000 nm. The single and dual line lights are 6 inches long and can be mounted in any of the three illumination positions (interchangeable with the halogen lights).

Ordering Information

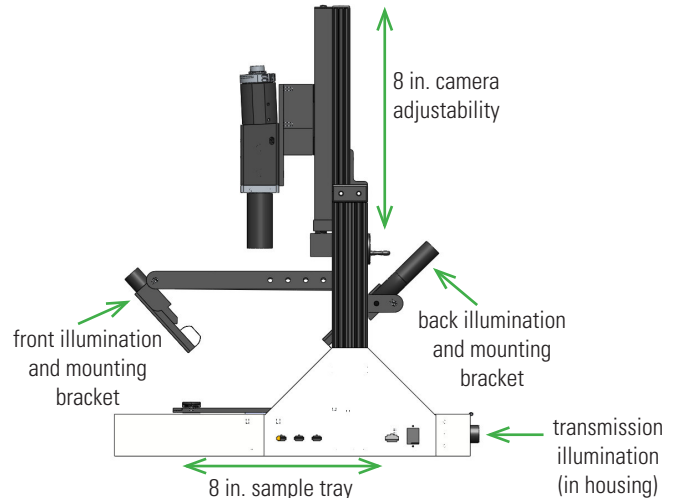
Complete Systems

MRC-920-042	Via-Spec™ II Hyperspectral Transmission System with SWIR Camera
MRC-920-043	Via-Spec™ II Hyperspectral Transmission System with VNIR Camera

Modular Components

MRC-920-044	Via-Spec™ II Hyperspectral Transmission Stage and Frame
MRC-207-003-03	Single 6" Fiber Optic Lightline
MRC-207-003-04	Dual 6" Fiber Optic Lightline
MRC-207-003-05	6" Cylindrical Lightline Lens
MRC-207-002-02	LED Fiber Optic Light Source
MRC-207-002-03	DCR III Fiber Optic Light Source, EKE Halogen

Camera lens options are available for both micro and macro measurements.



Via-Spec shown with spectrograph and optional fiber optic reflectance illumination mounted.

Control and Data Collection Software

The Via-Spec system has a dedicated software utility allowing the user to control the stage, to define the travel limits, display the camera data and save the spectral hypercube in ENVI compatible format. The scanner provides an encoder sync signal to be used for more repeatable measurements. Evince™ hyperspectral image analysis software is optionally included with the systems.

Specifications

Sample tray length	8 inches
Maximum travel distance	+/- 12 inches
Illumination width	6 inches
Transmission viewing width	5 inches
Camera height adjustability*	8 inches

*Adjustability is slightly different for each camera, please call for more details.

MRC-920-045	Via-Spec™ II Halogen Light Source
MRC-920-046	Via-Spec™ II Reflectance Bracket Kit - Rear Mount
MRC-920-047	Via-Spec™ II Reflectance Bracket Kit - Front Mount
MRC-020-075	Via-Spec II SWIR Camera Mounting Plate
MRC-020-076	Via-Spec II V10E Spectrograph Mounting Plate
MRC-020-077	Via-Spec II V10E Spectrograph Spacer Block
MRC-020-078	Via-Spec II NIR Camera Mounting Plate
MRC-020-079	Via-Spec II VNIR Camera Mounting Plate
MRC-020-080	Via-Spec II VIS Camera Mounting Plate
MRC-920-048	Via-Spec™ II Halogen Transmission Mounting Kit
MRC-920-049	Via-Spec™ II Fiber Optic Transmission Mounting Kit
MRC-930-003	Via-Spec-II Control and Data Acquisition Software for SWIR Spectral Camera (MRC-303-005-01)
MRC-930-004	Via-Spec-II Control and Data Acquisition Software for VNIR Spectral Camera (MRC-303-002-02)