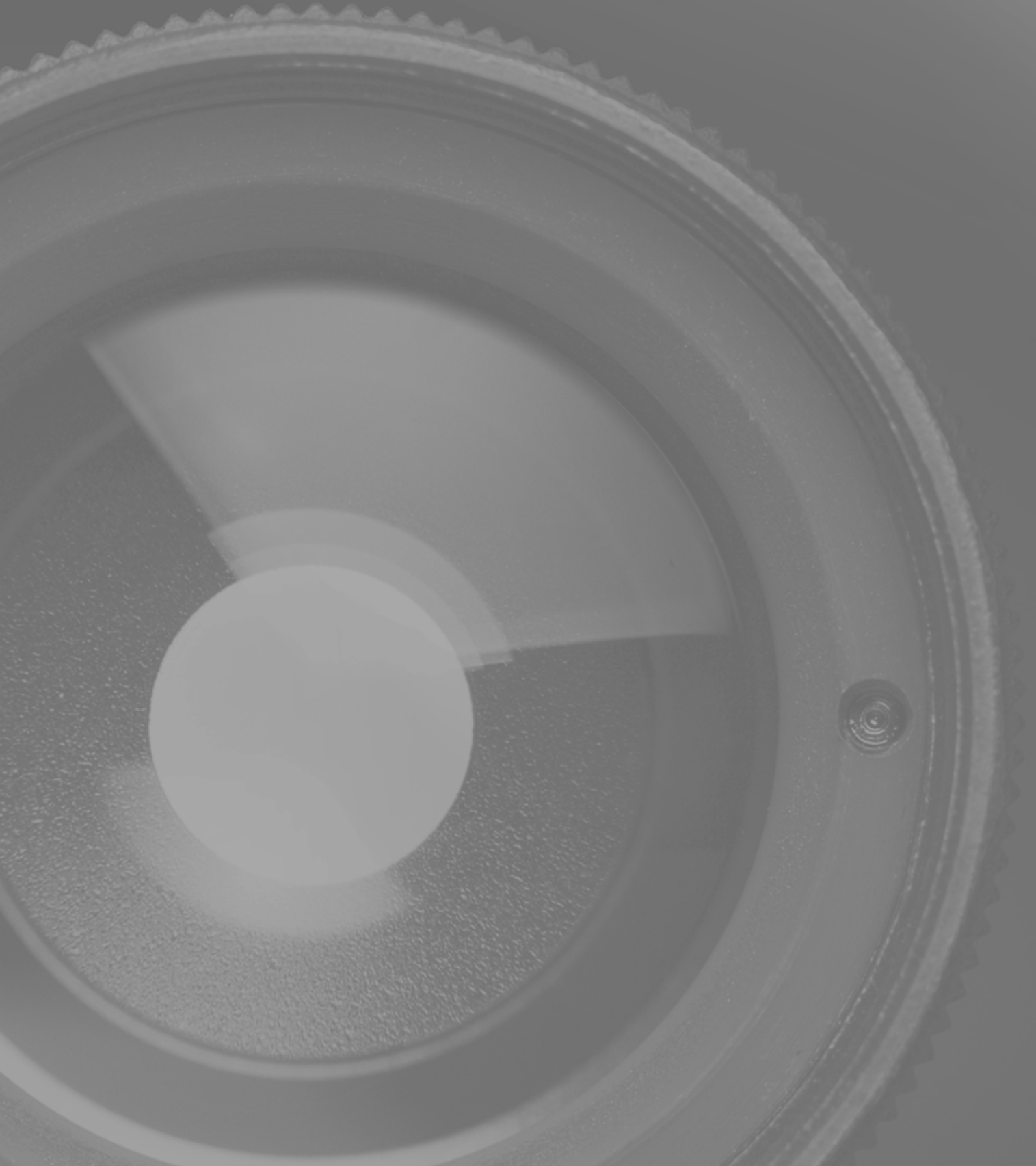


# SISU SYSTEMS



## sisuCHEMA *Chemical Imaging Workstation*

SisuCHEMA is a complete chemical imaging system, characterized by speed, simplicity and superior performance. SisuCHEMA employs a pushbroom imaging technology providing several advantages for the user: high speed, low heat load from illumination and flexibility to most sample shapes and sizes. Applying pushbroom imaging SisuCHEMA is also first step towards on-line process control.



» NEAR INFRARED CHEMICAL IMAGING IN FEW SECONDS «

SisuCHEMA combines NIR spectroscopy with high resolution imaging. It provides detailed information on the chemical components, their quantities and distributions within the sample. It is invaluable information for the characterization and quality assurance of advanced materials, where the functionality of the material is dependent on its chemical and physical structure.

### HOW SISUCHEMA WORKS

SisuCHEMA is a complete chemical imaging workstation. User places samples into specially designed sample trays, then using the ChemaDAQ data acquisition software, the spectral image is acquired and saved in seconds. Each SisuCHEMA workstation is preinstalled with the UmBio Evince hyperspectral image analysis software. This allows users instant application processing, chemical calibrations and predictions directly within the SisuCHEMA system.

### TWO SIZES, UNLIMITED NUMBER OF SAMPLES

SisuCHEMA is available in two different sizes. The smaller scale SisuCHEMA is ideal for pharmaceutical applications where high spatial resolution is required and samples are small. In this version the maximum sample size is 100x100x40 mm. In the larger scale SisuCHEMA XL the maximum sample size is 200x300x45 mm. This is useful in many food and agricultural applications. Both systems can image samples of 10 mm or smaller at a very high pixel resolution of 30 microns, and offer flexible setting to coarser resolutions.

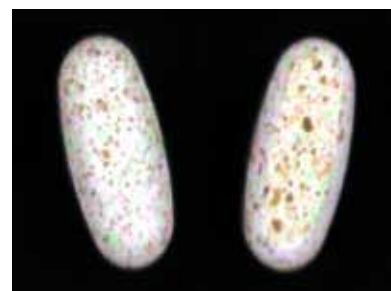
SisuCHEMA employs pushbroom imaging, acquiring the image one line at a time while scanning the sample on a moving sample tray. Each line has a 320 pixel field of view. In the scanning dimension the number of lines is dependent on the selected scanning length. The variable scanning length allows the user to

## Applications

- Tablet analysis
- Blister package inspection
- Blend uniformity
- Granule Size and Size Distribution
- Food and Dairy
- Agricultural Material Screening
- Forensics
- Life Sciences



Blister package inspection. Red indicates empty blister, Green indicates normal blister and Blue indicates false product.



False color visualization of tablets showing differences in active ingredient distribution. The full hyperspectral image (data cube) with 320 x 430 spatial pixels and 256 spectral bands in 1000 - 2500nm was acquired in less than 6 seconds.

image longer samples, or multiple sequential samples, in a single linear scan. The maximum scanning length in the two systems is 100 and 300 mm, respectively.

### PERFORMANCE, EFFICIENCY AND EASE OF USE

SisuCHEMA is based on SPECIM's Spectral Cameras operating in the near infrared range with high spectral resolution. Light throughput is 10 to 20 times higher than in similar instruments that implement tunable filters. The result is considerably faster imaging under similar illumination conditions. Furthermore, push-broom imaging only requires line illumination on the sample, which significantly reduces the heat load on the sample. SPECIM's unique line illumination technique optimizes the imaging of various surfaces and textures. SisuCHEMA is a stand-alone instrument, which is user friendly and easy to set up and maintain. SisuCHEMA is operated with pre-installed ChemaDAQ data acquisition software and UmBio Evince hyperspectral image analysis software.

### FROM LAB TO PROCESS

SPECIM's SisuCHEMA is the only chemical imaging technique offering a direct application path from laboratory to real-time process. Using a push-broom hyperspectral camera, SisuCHEMA works like a high speed linescan camera. It acquires and builds the spectral image of a moving sample line by line, and simultaneously acquires all wavelengths for each line. This imaging technique is ideal

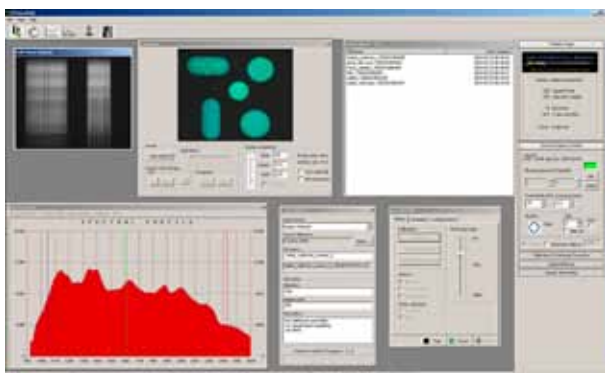
## SisuCHEMA performance specifications

Optical and technical characteristics	SWIR	NIR
Operation mode	High speed push-broom hyperspectral	
Spectral range	1000 - 2500 nm	900 - 1700 nm
Spectral sampling/ pixel	6.3 nm	4 nm
Spectral resolution	10 nm	6 nm
# spatial pixels/ line	320	
Pixel size on sample	sisuCHEMA: Scalable from 30 to 300 microns	
	sisuCHEMA XL: Scalable from 30 to 600 microns	
Field of view on sample	sisuCHEMA: Scalable from 10 to 100 mm	
	sisuCHEMA XL: Scalable from 10 to 200 mm	
Maximum sample size	sisuCHEMA: 100 x 100 x 40 mm (WxLxT)	
	sisuCHEMA XL: 200 x 300 x 45 mm (WxLxT)	
Scanning rate	100 hyperspectral line images/ s (max), corresponding to - 3 mm/s with 30 micron pixel - 30 mm/s with 300 micron pixel - 60 mm/s with 600 micron pixel	
Typical scanning time	< 7 s for single 320x320 pixel image capture with 256 spectral bands	
Illumination	SPECIM's diffuse line illumination unit	
Data format	BIL file format, Evince and ENVI compatible	
Instrument calibration	Instrument is delivered with spectral calibration. Image data is automatically calibrated to reflectance by measuring an internal standard reference target before each sample scan.	

solution for on-line process monitoring, where samples are in continuous motion. This provides another significant advantage to the SisuCHEMA user. The applications that are developed for sample analysis in laboratory and near production lines can be directly transferred to the real time world of on-line process and quality control. There is no need to adapt and invest in different technologies for online monitoring.

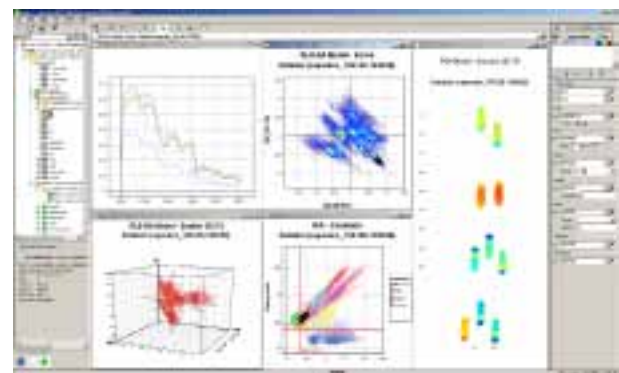
### UMBIO EVINCE SOFTWARE - ANALYSING THE IMAGE

UmBio Evince is used for the exploration of hyperspectral image data created collected by ChemaDAQ. Using Evince's powerful multivariate analysis methods, the user can efficiently extract relevant information from the data cubes. Numerous visualizations are available and immediate indications of changes in the data make the exploration fast and effective.



### ChemaDAQ

This combined user interface and data acquisition tool is delivered with SisuCHEMA.



### UmBio Evince

For chemometric analysis of hyperspectral image data. \*) For more information, or to download a full featured trial version, visit [www.umbio.com](http://www.umbio.com).

Disclaimer: specifications are subject to change without prior notice. Any errors and omissions are unintentional.

SPECIM IS A WORLD LEADING COMPANY for hyperspectral imaging instruments, from UV through VNIR and SWIR up to LWIR (long wave infrared).

We provide ImSpector imaging spectrographs, Spectral Cameras and hyperspectral imaging solutions to a rapidly increasing number of industrial OEM customers and a large scientific clientele. SPECIM'S AISA FAMILY of airborne hyperspectral sensors provides market leading solutions for remote sensing, from small UAV systems to full featured commercial, research and military remote sensing tools.

Our hyperspectral products are known for the highest performance at the lowest budget in the market. They are used in an increasing range of demanding applications like color, Process Analytical Technology (PAT), life sciences, chemical imaging, military and security.



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