

sisu CHEMA

SisuCHEMA employs a pushbroom imaging technology providing several outstanding advantages for the user: highest speed, lowest heat load from illumination and no limitations to sample shape. Series of samples can also be imaged in a single linear scan. SisuCHEMA brings simplicity and speed combined with superior performance. The system is modularly designed complete chemical imaging solution.



SisuCHEMA is a complete chemical imaging workstation with user friendly workflow to follow. Samples are placed into specially designed sample trays. With these trays and using the ChemaDAQ data acquisition software the spectral image is acquired and saved in real-time. Each sisuCHEMA workstation is pre-installed with the Evince hyperspectral image analysis software that applies the latest chemometrics tools. This allows instant application processing, chemical calibrations and predictions directly within the sisuCHEMA system.

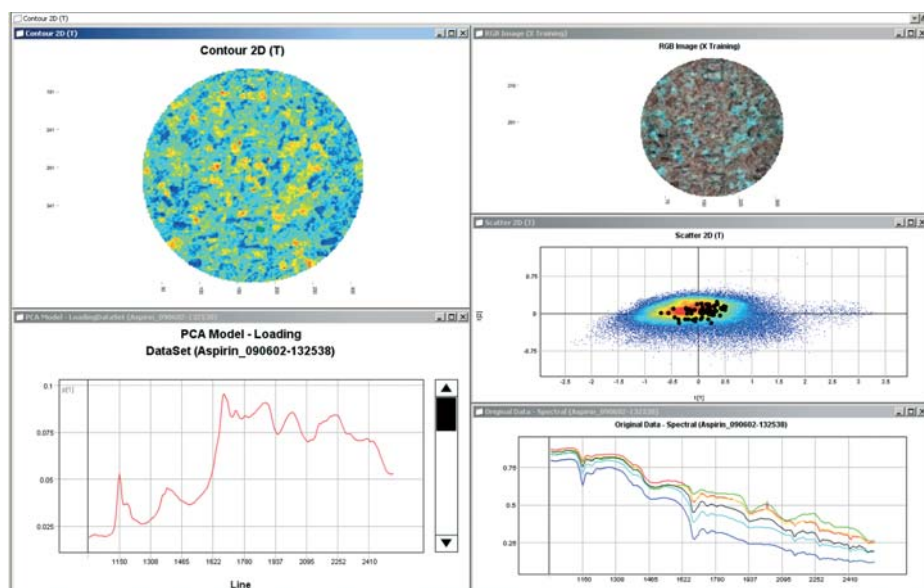
Designed as a modular system, users can easily adapt the configuration of SisuCHEMA for a variety of sample sizes. Different samples trays (10, 50, and 100mm) make sample handling easy. The system can image samples of 10 mm or smaller at a very high spatial resolution of 30 microns. In the case of larger samples the sample area can be increased

up to 100 mm, providing 300 micron resolution and faster image acquisition. SisuCHEMA can also scan the samples up to 40 mm in thickness. SisuCHEMA forms the images like commonly used line scan cameras; line by line applying sample motion. Each line has a 320-pixel field of view. In the scanning dimension, the number of pixels is dependent on the selected scanning length. The variable scanning length allows the user to image longer samples, or multiple sequential samples (like tablets), in one single linear scan.

First time in the chemical imaging instrumentation one can use the same hardware in laboratory and real-time process. This line by line pushbroom approach is the key factor when one is creating prediction models in laboratory and has the intention to apply this work later near line or real time. With conventional wavelength scanning this is impossible in continuous processes.

Applications

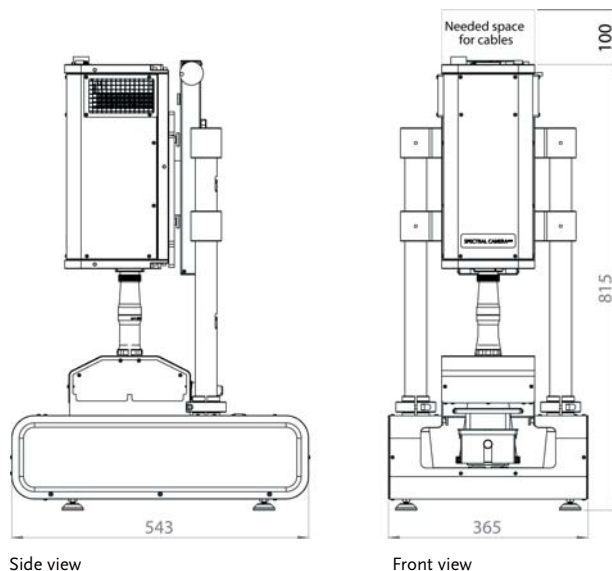
- Process Analytics
- Life Sciences
- Pharmaceutical Process Control and Quality Assurance
- Food and Dairy Process Control
- Fermentation and Coagulation
- Agricultural Material Screening
- Fat Content Measurement
- Granule Size and Size Distribution
- Forensic



Analyzing acetylsalicylic acid tablet; data collected with sisuCHEMA and analyzed with Evince image software. The different chemical substances can be seen clearly.

Performance Specifications

Optical characteristics	SWIR	NIR
Operation mode	High speed push-broom hyperspectral	
Spectral range	970 - 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	Scalable from 30 to 300 microns	
Field of view on sample	Scalable from 10 to 100 mm	
Maximum sample size	100 x 100 x 40 mm (W x L x T)	
Scanning rate	100 hyperspectral line images/s (max), corresponding to - 3 mm/s with 30 micron pixel - 30 mm/s with 300 micron pixel	
Typical scan time	3 to 10 s for an image with 302 x 320 spatial pixels and full 256 spectral bands	
Illumination	Diffused line illumination	
Fore objectives	1:1 macro lens (OLESMacro), 31 mm (OLES30)	
Data format	BIL file format, Evince end ENVI compatible	
Instrument calibration	Instrument is delivered with spectral calibration.	
Electrical characteristics		
Power consumption	sisuCHEMA < 300 W, DAAC < 350 W	
Input voltage	100 - 240 V, 50 - 60 Hz	
Mechanical characteristics		
Size (L x W x H)	543 x 365 x 815 mm	
Weight	sisuCHEMA SWIR 35,6 kg, DAAC + PACE 16,1 kg	
Lens mount	standard C-mount	
Environmental characteristics		
Storage	- 20...+ 85 °C	
Operating	+ 5...+ 30 °C non-condensing	
Functional characteristics		
User adjustments	Sensor height -> FOV, lens change and focusing	
Referencing	Image data is automatically calibrated to reflectance by measuring dark reference and an internal white reference target before sample scans.	
Scanning length	Freely adjustable from DAQ software	



SOFTWARE

ChemaDAQ is optimized data acquisition software which has the roots in Specim's long experience in remote sensing industry. In chemical imaging solution this software is modified to provide as easy as possible data acquisition. Main tool called SisuMOTION is the key to control all the scanning speeds in order to provide data fast with correct aspect ratios. Other module called DAQExplorer guarantees that you data will be recorded as planned and it remains in good order. These features combined with camera controls and metadata tools are proven efficient by our customers.

Evince is used for the exploration of hyperspectral image data. Its graphical user interface allows importing of images created by ChemaDAQ and various other image formats. Using Evince's powerful multivariate analysis methods, the user can efficiently extract relevant information from the data cube. Numerous visualizations are available for both raw and processed data. Immediate visualizations of changes in data and a streamlined workflow make the exploration fast and effective.

AD-ONES

Routine analysis module is the most convenient tool when same predictions models are used on daily basis. This unique tool is additional module for the Evince Image basic software package. The models which are created in Evince Image can be organized in script which can be run directly from data acquisition software. This routine analysis script applies single models like background subtraction and sample classification together with the desired visualization report. All this can be done with a single mouse click.

Envi software is also one option for multivariate analysis. This versatile software package is well-known and widely used in the field of hyperspectral imaging. This power tool has all the function you will need.