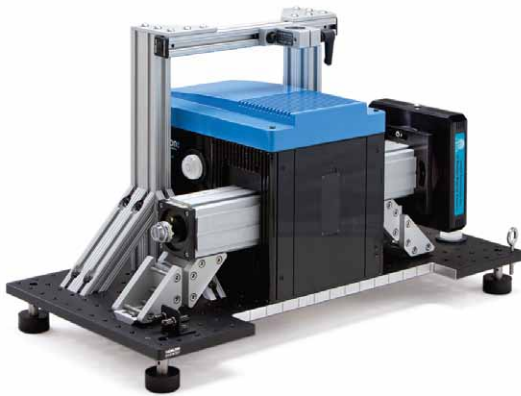


# V-EOS™ HYPER SPECTRAL CAMERA



STANDARD PRODUCTS	Spectral Range (nm)	Bandwidth (FWHM) (nm)
V-EOS	400-1000	2

## GLOBAL IMAGING, NON-DISPERSIVE

Giving complete information on your target with full resolution images at any wavelength, our widefield hyperspectral imager will change your view of spectral analysis. V-EOS™ delivers a series of monochromatic images, and the optimized hyperspectral cube allows for spectral analysis of each and every pixel of a full resolution image, meaning no more fastidious x-y or line scanning. Besides increasing efficiency, V-EOS™ provides data on both spectral and spatial content, allowing you to perform new analyses to push the boundaries of your most demanding applications.

PERFORMANCE	
Spectral Resolution	< 2 nm
Spectral Range	400 to 1000 nm
Spectral Channels	Continuously tunable
Spatial Resolution	2 mm at 1.20 m with a FOV of 1.85 m x 1.35 m
Spectral Image Rate	3 fps
Standard Field of View (customizable)	72° Horizontal, 50° Vertical
Calibration	Automatic
Wavelength Absolute Accuracy	< 0.4 nm
Entrance Slit Size	No slit / Full field of view measured for each wavelength
Spectral Width Sampling	≥ 0.1 nm programmable
Pixel Size	6.45 μm x 6.45 μm
Dynamic Range (digitization)	14 bit
CCD Frame Rate	13.5 fps
Smile Distortion	≤ 0.5 nm
Keystone Distortion	No
Barrel Distortion	≤ 2% due to widefield entrance optics
Noise level	6e <sup>-</sup> @ 10 MHz
Camera Type	Interline
Camera Acquisition (linear or matrix)	Matrix
Lens Mount Standard	C-Mount (option for CS-Mount)
Camera Interface	Firewire
Frame Grabber Needed	No
Exposure Control	PHySpec™ software controlled
Binning	1x1; 1x2; 2x1 ; 2x2
Detector Type	CCD
Focus	Motorized for Chromatism Correction
SOFTWARE & DATA PROCESSING	
Operating System	Windows Vista, 7 (64 bit)
Acquisition	PHySpec™ Software
Preprocessing	Image stabilization, spatial filtering, statical tools, spectrum extraction, data normalization, spectral calibration
Hyperspectral Data Format	FITS, HDF5
Single Image Data Format	FITS, PNG, TIFF, JPG
Spectrum Data Format	JPG, PNG, TIFF, CSV, PDF, SGV
Option	C++ SDK plugin interface included
DIMENSIONS, WEIGHT & POWER	
Footprint	305 mm x 610 mm x 270 mm
Weight	20kg
Power Consumption	≤ 20 W (including detector)
PORTABILITY	
Mounting	305 mm x 610 mm optical breadboard; 1/4 imperial threaded
Tripod	Optional
ENVIRONMENTAL CONDITION	
Operation Temperature	10°C to 40°C
Storage Temperature	0°C to 50°C
ACCESSORIES	
Computer	Not included
Objective Lens	Included
Reference Panels	Reflectance standard and calibration lamp

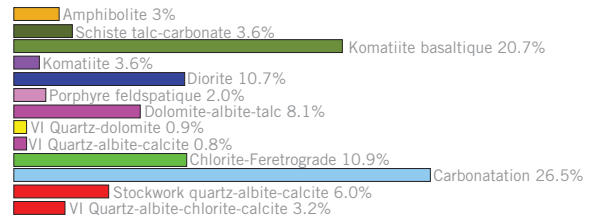
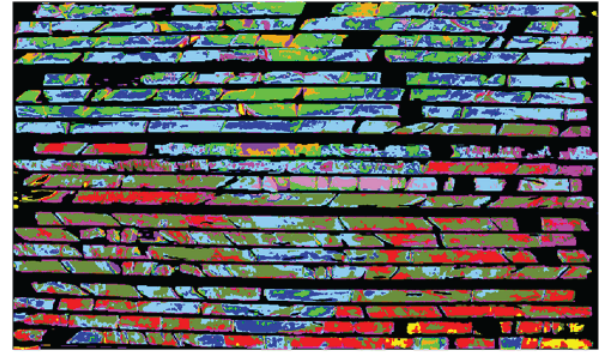
# APPLICATIONS

## MINING, OIL & GAS OPERATIONS

Hyperspectral Imaging responds to the increasing demand of the mining industry for better exploration tools. Instant mineral identification is done by spectral signature analysis of improved underground exploration or by drill core characterization. Our technology offers fast mineralogy mapping.

Based on Photon etc's V-EOS™, Photonic Knowledge's Core Mapper™ delivers a series of monochromatic images at user-specified wavelengths, offering instant in situ mineral identification. V-EOS™ simultaneously analyses five drill core boxes with a spatial resolution of 1mm<sup>2</sup> and a field of view of 1.5m<sup>2</sup>. Spatial resolution is then 900 times better, and field of view is 1666 times wider than any currently available hand-held mineral spectrometer. It can provide fast mineralogy fields mapping services, as high as 1500 drill core meters per day with one system.

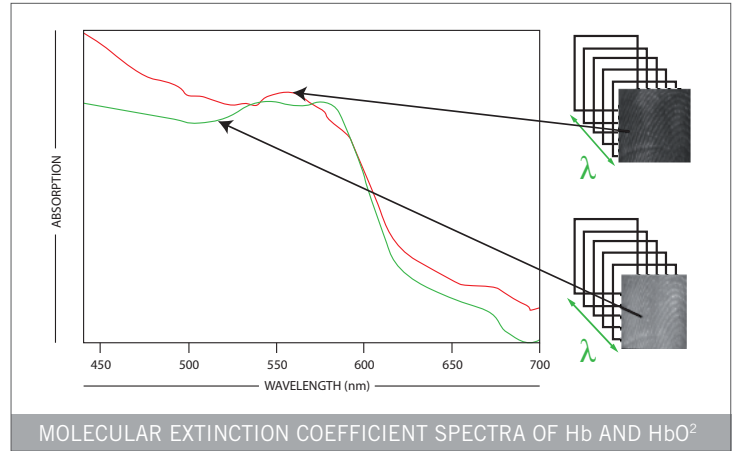
For example, by using an optimized V-EOS™ designed specifically for minerals identification, Photonic Knowledge demonstrated the unique precision of the Core Mapper™ to a mine site in the Rouyn-Noranda region (figure 1).



## DERMATOLOGY

Research and diagnosis in dermatology deals with a large range of diseases and related molecules and tissue transformations (e.g. color, erythema, pigmentation, etc.). Working with an industrial partner, Photon etc. has developed a software plug-in rendering oxygen, hemoglobin, deoxyhemoglobin and melanin maps intended for use in dermatological clinical studies.

The acquisition of a hyperspectral data cube from 400 to 1000 nm was done using a 2 nm bandwidth (FWHM) filter with images being taken every 1 nm. At this resolution, the acquisition time is approximately five minutes, although this may be lowered by reducing the size of the imaged area or increasing the wavelength spacing of the acquired images.

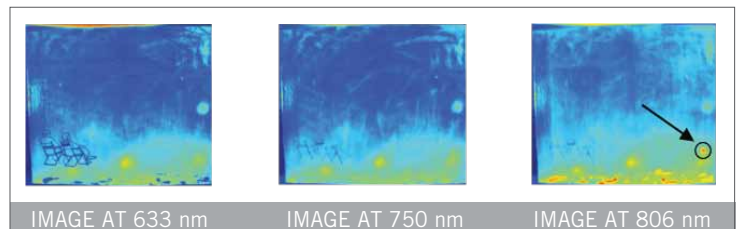


Photon etc's patented non-scanning technology provides images with an unmatched combined spectral/spatial resolution. Moreover, since V-EOS™ takes complete images one at a time, the inevitable small movements of a subject during data acquisition can be easily compensated for, unlike with other techniques.

## ART AUTHENTICATION & RESTORATION

Hyperspectral imaging is a common and powerful tool for the authentication of art works since the spectral analysis of various artefacts provides information on their chemical composition.

Since each material has its own spectral signature, imaging an object at different wavelengths allows the identification of any kind of ink, paint, paper, or other materials. The correlation between the spectral signature observed and a database of spectra from known historic materials allows the origins of an artwork to be determined in both time and space.



Photon etc's V-EOS™, with its large spectral range and very narrow bandwidth, pushes the accuracy of such methods further.