Thermo Scientific OMNIC™ Atlys™ software integrates data acquisition, spectral processing, and image analysis into a single powerful package for our FT-IR and Raman microspectroscopy and imaging systems. This software provides complete control of the experiment with automated features and unparalleled visualization techniques that get quick results.

OMNIC Atlys Imaging Software
Data acquisition and analysis software for FT-IR and Raman

Fast and comprehensive analysis of the most complex samples is made simple due to this integrated image acquisition, processing and analysis software that is driven through an intuitive graphical user interface. Going beyond the collection and visualization of images, OMNIC Atlys includes analysis tools to help imaging answer real-life analytical problems. Examples include:

- Quantitatively, how much of the measured area is chemically “like” this material?
- Are there any impurities in this area?
- What is the size distribution of chemically different particles?

This suite provides advanced chemometrics, rigorous qualification tools and extensive spectral libraries for getting the most from infrared and Raman data.

OMNIC Atlys Software Offers:

- **Advanced Imaging** – OMNIC Atlys provides advanced tools that allow images to be analyzed for both their qualitative and quantitative content. The identities of components, their distribution and relative concentrations may all be determined. From single frequency images to RGB plots based on principal component analysis, OMNIC Atlys provides the tools needed to visualize the chemistry of your sample. Comprehensive 2D- and 3D- graphical tools present images in intuitive forms. Feature detection and dimensioning functions allow detailed determination of sample morphology.

- **Full Automation** – Data acquisition is fully automated through software control of stage movement, sample focus and aperture dimensions. All experimental details such as collection parameters, defined map region and spatial locations are saved along with your data.

- **Multiple Mapping Options** – Easily create images, discrete point maps, and line maps. A virtual depiction of the stage is linked to the video image, enabling you to easily locate a region of interest. Depth profiling is possible with the Thermo Scientific Nicolet Almega™ dispersive Raman microscope.
OMNIC Atlas Imaging Software

**Powerful Spectral Processing Tools**

Comprehensive spectral processing capabilities allow you to focus on the chemistry of your sample. Because few specimens are optically perfect, the image is often a composite of chemical as well as physical differences. Processing functions, such as derivative calculations, allow you to produce images based on chemical differences alone. Derivative images can be linked to original spectra such that a clear, noise-free image can be observed while the spectra are presented in their conventional, readily interpreted form.

**Real-Time Acquisition Tools**

The acquisition window shows a Raman system automatically collecting several points and the resulting spectra. Spectra, video and chemical profile are dynamically updated in real-time. Images, line profiles and discrete point maps can be easily defined using graphical tools.

**Flexible Navigation Tools**

OMNIC Atlas software displays stage navigation with mosaic and live video. A mosaic is a composite image built up from many smaller tiles. The left side navigation pane shows a graphical representation of the stage with a large mosaic showing navigation markers, a background point, and an area map being moved into position. To the right of the moveable border is the live video showing the video field of view, and calibration selection tool for different objective magnifications.

**Nicolet Continuum Microscope with Thermo Scientific Nicolet 6700 FT-IR Spectrometer and OMNIC Atlas Software**
Graphical User Environment

The graphical user environment created for OMNIC Atlūs allows you to explore every aspect of your data with the mouse alone. You can simultaneously view the video image and false-color chemical images in 2 and 3-dimensions, chemical profiles and spectra. Interact with any view and see the related panes update dynamically. Click on the video or chemical image and see the spectrum at that point. Select a spectrum and see the false color images instantly reflect the intensity at the chosen wavelength. Use the interactive color bar to dynamically enhance image contrast. Navigation panes allow you to zoom in on the smallest detail without ever losing your orientation. Reporting data is made simple as the contents of any pane can be copied to other Microsoft® Windows® applications. The graphical interaction of OMNIC Atlūs saves time and maintains a permanent record of the experiment.

Powerful Image Analysis Tools

OMNIC Atlūs allows quantitative data to be readily extracted from images. Multiple filtering techniques isolate discrete particles and other features from their surroundings enabling sizing and counting of the features. Interactive tools provide optimization of the binarization.

The huge amount of data present in an image allows robust statistical analyses to reveal information unobtainable from traditional single point spectroscopy. Principal Component Analysis (PCA) greatly simplifies interpretation by describing only the most significant variations in the data. Multivariate Curve Resolution takes this a step further by extracting the spectra of the pure components that make up your sample. This greatly facilitates understanding the chemistry behind the image.
Data Acquisition
• Integrated selection of microscope and spectrometer collection parameters.
• Map sequence with all experimental parameters can be defined, saved, then retrieved for quick automation of repetitive analysis.
• Graphical display shows navigation pane with stage x, y location and Mosaic image and live video pane with complete tool palette for selection of sample position, background position, aperture size and type of map. The panes are sizable for best use of display area.
• Sample can be quickly positioned by selecting a point on the navigation pane or the live video.
• Stage travel can be limited to the sample area for use with slides, well plates, or specially designed sample holders. A home setting provides coordinates relative to a user-specified location.
• Spectra can be collected as area maps, line maps, discrete point location maps, or groups of single points. All can be defined by and linked to the video image.
• Complete tool palette for optional automation features of autofocus, auto ATR contact and automated stage positioning.
• Real time display of video image, stage position, sample position, spectrum and profile image during data collection.
• Unique video calibration feature ensures accurate relationship between video image, mosaic, stage and objective magnification.
• Multiple calibrations, matched to each objective, can be created and switched with the click of a button, allowing full utilization of available magnification choices.

Graphical Display
• Integrated graphical display shows any combination of video, flat view, 3D view, spectrum x and y projection.
• Interlinking OMNIC Atlas display links video image, sample and stage position, spectrum and the chemical image in flat view or 3D view. The corresponding spectrum and location is updated by selecting any point in either the video or chemical image.
• Any chemical image can be presented in flat view (false color or contour) or 3D projection (false color or wire mesh).
• Available color schemes can be selected as gray scale, rainbow, or blue to red.
• Chemical images can be displayed with three levels of resolution and two types of interpolation.
• Color bar shows the scale of absorbance or the intensity range of the chemical image and can be dynamically adjusted to improve contrast.
• Sizable window panes provide flexible use of display.
• Video mosaic shows a fully integrated preview of the mapped area to assist in properly selecting areas of interest.
• Chemical image and video can be overlaid to relate spectral features to visual ones.
• Animation function provides a slide show of chemical images as a function of frequency. The speed of movement can be controlled by user.
• Waterfall display for line and extracted line maps shows compositional changes as a function of position.
• 3D chemical image of the sample is fully rotatable with solid or wire grid display.

Processing
• All typical spectral conversions (e.g. absorbance to % transmittance, % reflectance, log(1/R), Kubelka-Munk) are provided.
• Advanced OMNIC Atlas processing options include auto-baseline correction, advanced ATR correction, dispersion correction, subtract, region blanking and truncation, atmospheric correction and reprocess are applied to the entire data set.
• Interactive first and second derivatives calculated using point-difference, Savitsky-Golay and Norris functions.
• Derivative images can be linked to original spectra.
• Interactive Savitsky-Golay smoothing function reduces spectral noise.
• Change data spacing feature interpolates or deresolves spatial and spectral data spacing.
• Extensive spectral math functions, including mean centering and variance scaling.

Chemical Image Profiles
• Can be created by
  – Peak Heights, peak areas, peak ratios, chemigrams, functional group regions, or correlation.
  – TD Analyst Quantitative Methods, such as: Beer’s law, Classical Least Squares, Stepwise Multiple Linear Regression, Partial Least Squares, Augmented Classical Least Squares, and Principal Component Regression.
  – Classification methods include similarity match, distance match, discriminant analysis, search standards, and QC compare search.
• The profiles are interlinked to spectra and video.

Image Analysis
• Principal Component Analysis creates score images and factors that concentrate the chemical differences into a few images. Can select preprocessing functions of mean-centering, and variance scaling. An area of interest can be masked or excluded.
• RGB display combines 2 or 3 user-selectable principal components into a single, false-color image.
• Multivariate Curve Resolution determines the pure component spectra that comprise the image. MCR may be unsupervised if there is not prior knowledge of the sample composition. If a component is known, then its spectrum may be used as an input for supervised MCR.
• Multiple filters, including Sobel edge detection, are provided for contrast enhancement, image binarization and particle detection; functional on both video and chemical imaging.
• Particle sizing tool functional on video and chemical image.
• Particle size distribution histogram display.

Report Generation and Archiving
• Spectra, video images, processed map, profile, all data collection parameters and spatial information are automatically stored into a single map file for archiving and further analysis.
• Spectra can be extracted as a group, individually, or by drawing a line across the image.
• Spectra, images and color bar can be printed or copied to other Microsoft Windows applications.
• Each map spectrum contains permanent record of all data collection parameters, including spatial position and aperture size.
• Images can be saved in bitmap, tif, or jpeg formats.
• Maps can be imported or exported to ENVI® for use with most graphical programs.

Video Display
• Compatible with all available microscopic contrast enhancement options.
• Real time display of sample.
• Video control for superior visual quality: Brightness, Contrast, Hue, and Tint.
• Tool palette provides user specified video image annotation.
• Video images are fully Microsoft Windows compatible and scalable.
• Video images can be printed or copied to other Microsoft Windows applications.
• Video images can be saved in bmp, tif, or jpeg formats; for use with most image analysis software.
• Mosaic feature, which provides composite video images of large sample areas, can also be saved in bitmap, tif or jpeg formats.

System Requirements
• Compatible with Nicolet Continuum, Thermo Scientific Nicolet Centaurus™, FT-Raman View Stage, and Nicolet Almega XR Dispersive Raman.
• Microscope operation requires motorized stage.
• OMNIC Atlas autofocus requires optional equipment on Nicolet Centaurus and Nicolet Continuum.
• Automated aperture control works only with Nicolet Continuum.

Computer Requirements
• PC processor with 1 GHz clock speed.
• 256 megabytes of RAM.
• 4X CD-ROM drive.
• 16 megabytes 4X AGB Video RAM.
• Windows 2000 or XP Professional.
• Some spectrometer features may require additional computer capabilities. Consult the sales or service representative for more information.