

# SpectralView



The visualization and analysis functions described in this document are available in the standard version of SpectralView. The software is also available customized to a specific application based on data cube format, source or type of target, and background information. Contact Signature Research for more information about customization options.

## Overview

SpectralView is a PC-based application for visualizing and analyzing multi- and hyperspectral images. It is engineered to read data cubes consisting of raw pixel counts, and perform necessary conversion to engineering units. SpectralView provides a number of simple tools for plotting and presenting data, and complex and powerful tools for analyzing principal components and data clustering.

## Features

### • Spectral Paging

The spectral paging feature allows the user to either page through the various spectra individually with a click of a button, or view an animation of the entire hyperspectral data set.

### • Colorimetry

SpectralView can generate RGB images and perform spectrum-to-CIE coordinate and xyY-to-RGB conversion from spectra in the input data. CIE color coordinates for the pixel under the cursor are plotted in real-time, including a marker for the spectral position of the view. SpectralView also allows the user to view color differences based on a user-defined AOI.

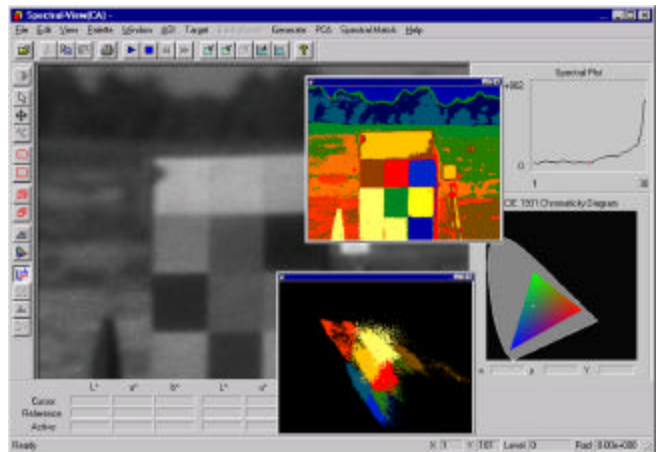
### • Spectral Angle Matching

SpectralView displays binary or gray scale threshold images based on the L2 inner product between a target spectra and a hypercube.

### • Principal Components Analysis

SpectralView can find the projection of the hypercube data onto the principal axes using spectral decomposition. The user can then view the resulting images, which are linear combinations of the original hypercube images, with the first representing the image with the maximal statistical variance. This tool acts as a data compression technique and allows the user to perceive the geometric distribution of the original multi-dimensional data.

## Hyperspectral Image Analysis



### • Data Clustering

The data clustering tool allows the user to view the inherent spectral anomalies between scene elements. It automatically partitions the data into clusters whose spectra are fundamentally similar. SpectralView allows the user to either choose from one of three methods of initialization, or let SpectralView find a clustering configuration based on a principal components analysis. Once a set of clusters is generated, the user can view the clusters either in the original image or as a two-dimensional scatter plot corresponding to the first two principal axes.

### • AOI Capabilities

In many research applications, it is important to define and analyze discrete regions of the image – Areas of Interest (AOIs) – very precisely. SpectralView has unique AOI drawing, editing, and storage functions. The editing function allows the user to graphically add or delete nodes and to move the nodes independently on an enlarged view of the image. A group move function simultaneously aligns all of the AOIs while maintaining the relative positions. The user can also name and store each AOI for later use.

### • Data Export

The data export feature allows the user to export to an MS Excel-compatible file the colorimetric information for AOIs within the RGB images generated. Individual image data occupies one line in the file to facilitate processing multiple images.



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#### System Requirements

- ✓ Windows 95, 98, 2000, Me, or NT
- ✓ 200MHz Processor or higher
- ✓ 64 MB RAM
- ✓ 7 MB free on hard drive
- ✓ VGA or higher resolution video adapter (256 colors recommended)