
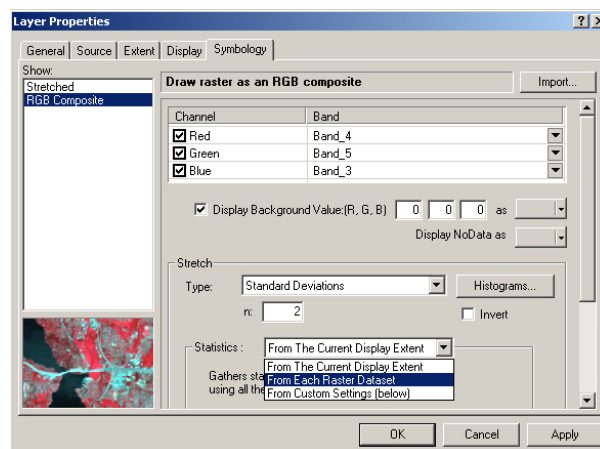


Loading and enhancing Landsat images in common geospatial software

There are several GIS and Remote Sensing software packages that are commercially available. Each of these programs is capable of loading and enhancing satellite images, but there are differences in the way that these images are handled. Below are some practical guides to loading and enhancing Landsat imagery in three commonly used, commercially available GIS and Remote Sensing software packages.

ArcMap


1. In an open ArcMap project, use the *Add Data* button  to locate and add an image. Highlight the file name and click the Add button. Double-clicking the file enables you to access individual bands within a single file. ArcMap can read satellite imagery in .tif, .img, and grid formats.
2. ArcMap should already have applied some default enhancements to the image. To access these options, double-click the file name in the table of contents to the left, or right click the file and choose Properties. Choose the Symbology tab at the top of the Layer properties dialog.

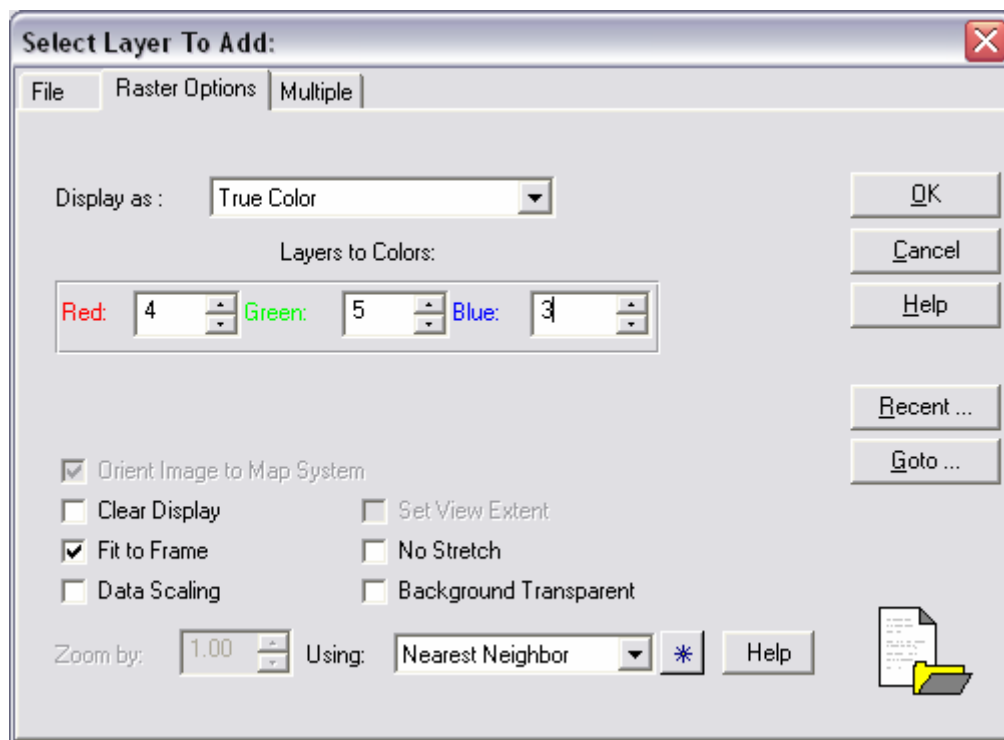


3. In this menu, you can choose an RGB band combination, and clear the black background color by checking the appropriate box. ArcMap is able to apply several common enhancements to make the image easier to interpret. The most common enhancement is a standard deviation stretch, but you may experiment to find the best fit. These enhancements affect the way the image is viewed on screen, but the data values remain unchanged. New as of version 9.0 is the ability to use the extent of the display to determine the enhancement statistics. This is very handy to bring out certain features when zoomed in to a particular area.

Erdas Imagine

Unlike ArcMap which is a GIS software package, Erdas Imagine is software specifically designed to handle remote sensing. With this in mind, there are many applications available in this software that may be used to enhance, manipulate and utilize satellite imagery. Below are the steps to simply load and view and enhance an image with Imagine.

1. In an open viewer window, click the *Open Layer* button  to select an image to view. Investigate the *Files of type* option to view the many different types of files that can be loaded. Choose *All File-based Raster Formats* to select any available file type. Click **once** on an image file, and then select the *Raster Options* tab at the top. Here you may choose a band combination and other options before viewing the image. Choose *OK* to load the image to the viewer.



2. Once loaded, you can browse the image using the *zoom* and *pan* tools. To change the band combination after an image has been loaded, choose *Raster > Band combinations...* to make the desired change.

3. To access the enhancements menu, choose *Raster > Contrast > General Contrast...* Here you can choose the enhancement method, and whether or not to use the entire image, or just the viewer extent or AOI for the histogram source. Choosing the viewer extent is useful for enhancing areas of interest that are different from the majority of the image, such as an island, surrounded by water.

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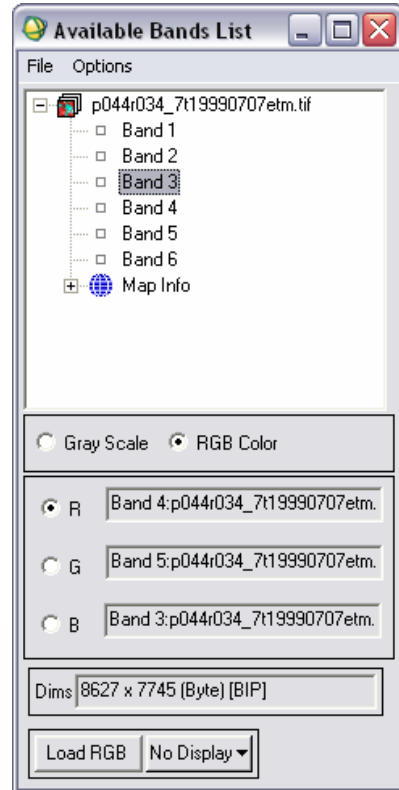
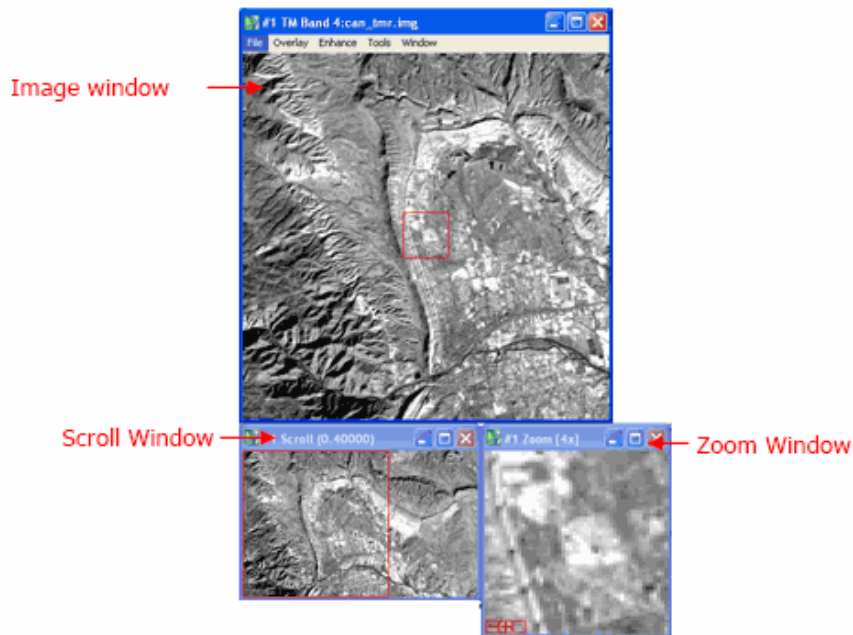
ENVI

ENVI is another application that is specifically designed for use in Remote Sensing, and can it can be used to quickly view and analyze satellite image data. In order to view an image in ENVI:

1. From the main menu bar, select *File > Open Image File*. Navigate to the appropriate directory and select an image to open. ENVI can also open dozens of file types, and is particularly good at reading HDF format data, and increasing popular format that is distributed by USGS.

2. Click on the RGB radio button, and then click three bands to correspond with the Red, Green, and Blue color fields. When complete, click *Load RGB* to load the image to the viewer.

3. ENVI displays data in what is called a “display group” which (by default) consists of three windows at three different resolutions and viewing extents. The “zoom box” within both the Scroll and Image windows can be used to pan around the image.



4. Different enhancements can be made to the image through the Enhance drop-down menu in the Image Window. These enhancements can be applied using the data from any of the three windows, enabling you to highlight different features within the image.

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