autodesk®	White Paper

Displaying Multispectral Data in Autodesk Raster Design

An important new feature of Autodesk® Raster Design 2005 is its ability to handle multispectral data in Landsat and other common formats, including the display of data bands outside the visible spectrum. Remote-sensing data from satellites and aircraft is readily available and highly useful for facility design, construction, and maintenance. This multispectral data covers large areas of the world with resolution levels that can display infrastructure in context and support a range of site analysis tasks. Such data is usually available to show a region of interest at different seasons of the year, through the phases of a project, or before and after a crucial event. Finally, the cost of multispectral data is quite affordable for most commercial users.

Autodesk Raster Design can process multispectral data in the following ways:

- Display thermal, ultraviolet, and other data from outside the visible spectrum

- Combine several data bands with appropriate color assignments for analysis such as highlighting the display of minerals or vegetation

These enhancements to Autodesk Raster Design are especially important if you have been relying on outside agencies or applications to prepare multispectral imagery. By learning a few new skills, you can process your own multispectral data and explore new ways to use it. This paper explains some of the basic concepts and shows some examples of how you can use this data.

Using Color Maps

Autodesk Raster Design provides a series of *color maps* that are optimized for typical requirements such as the display of aerial photos or thermal imagery. In many cases, Raster Design can automatically recognize the data type in your file and assign a default color map for you to start with.

Learning how to select and adjust color maps is the key to unlocking the real analytic potential of multispectral imagery. After you create a preferred set of color maps, you can save them outside the image and drawing in which they were created. When you need to reuse them for other images, you simply import them.

Displaying Single-Band Images

The simplest use of multispectral data is to display aerial photos from the visible bands. The display format is typically grayscale (two, four, or eight bit) or color (eight bit). Figure 1 shows an example of this type of use.

Figure 1: Raw panchromatic image

After deciding whether to display a photo in color or black and white, you can refine the color map for a variety of purposes. You may want to reduce the byte size of the file for easier handling, in which case you can adopt a color map with fewer bands and lower resolution, such as going from 24-bit color to 8-bit color. You can also adjust the image contrast, brightness, and fade values to get the right display intensity for your needs.

To display data from outside the visible spectrum, you need to map the range of values to the 256 values available in a visible band, either grayscale or color. For color display, you can specify whether to use the red, blue, or green color channel. Figure 2 shows a typical example to demonstrate land use. This image demonstrates three bands and is composed so the redder the area, the more vegetation it has; deep blue denotes wetlands and the gray-to-pale-green areas are paved, mostly urban areas. Open water looks black in this image.
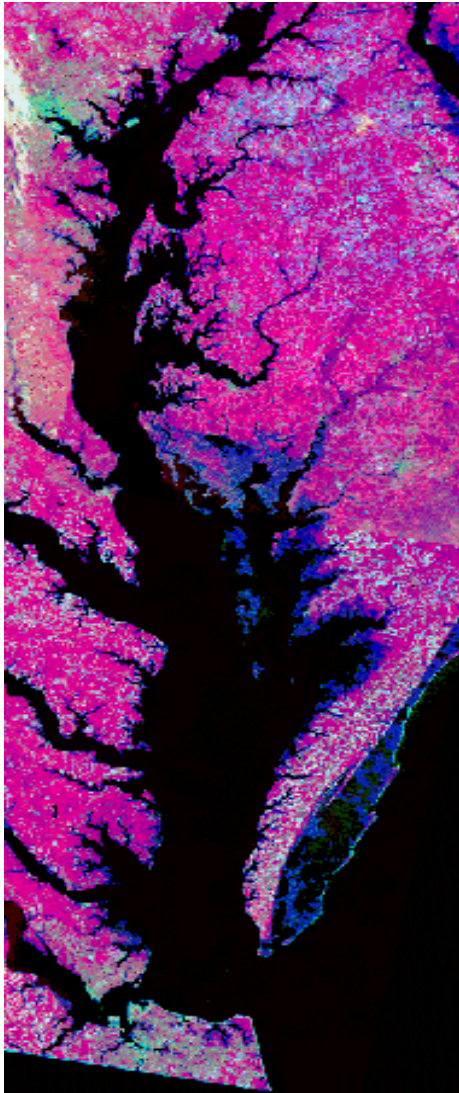
Figure 2: Combining multispectral bands to show land use

Combining Multiple Bands

The most popular multispectral data format, Landsat, is available in nine separate bands; other formats have varying numbers of bands. By carefully selecting the bands to display and the color channel for each band, you can meet a wide variety of special purposes. For example, Figure 3 shows a false color image that highlights areas of vegetation in red.
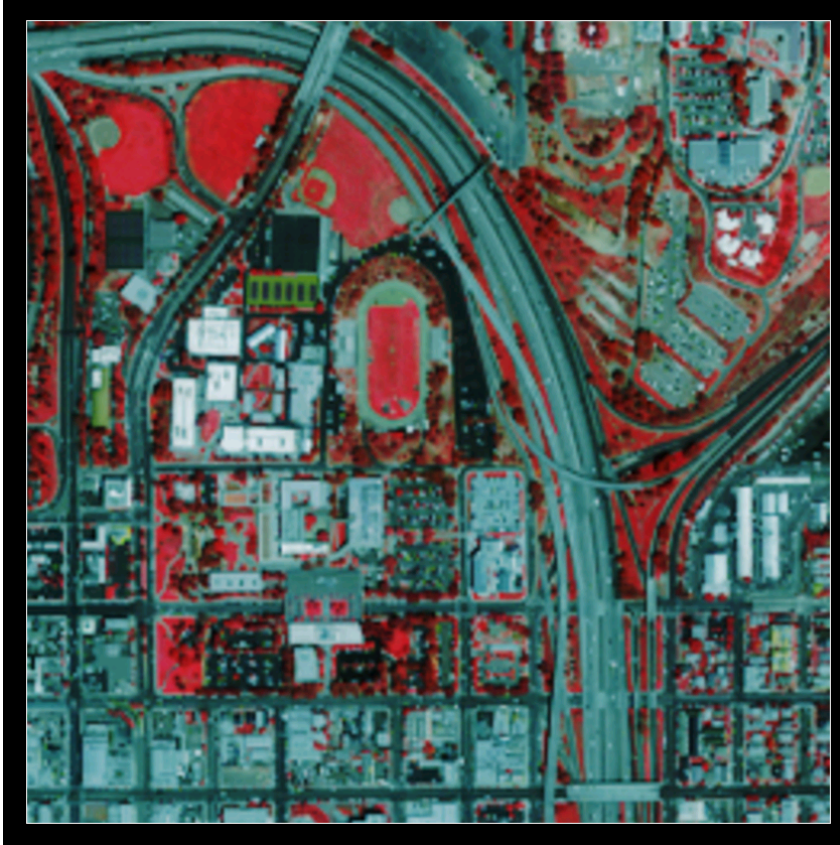
Figure 3: Image with patches of vegetation (red) and contrasting ground surfaces.

This color map can be especially useful in analyzing forested or agricultural areas. Other color maps can be created to differentiate types of plants or to show healthy forests in a color different from that used for diseased forests.

Conclusion

Autodesk Raster Design users can create color maps that convey a range of useful information about roads, land use, geology, climate, or other aspects of the land in their study area. Autodesk Raster Design 2005 offers powerful tools for rendering multispectral data within the Autodesk® Civil Design workspace. The resulting images can be imported into Autodesk® Land Desktop and Autodesk® Civil 3D™ software applications for use with multiple layers of raster and vector design data. Because the tools are easy to use, Autodesk Raster Design supports your effort to find new ways to combine and analyze raster data.

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