

Exercises in Digital Image Processing

Exercise 1

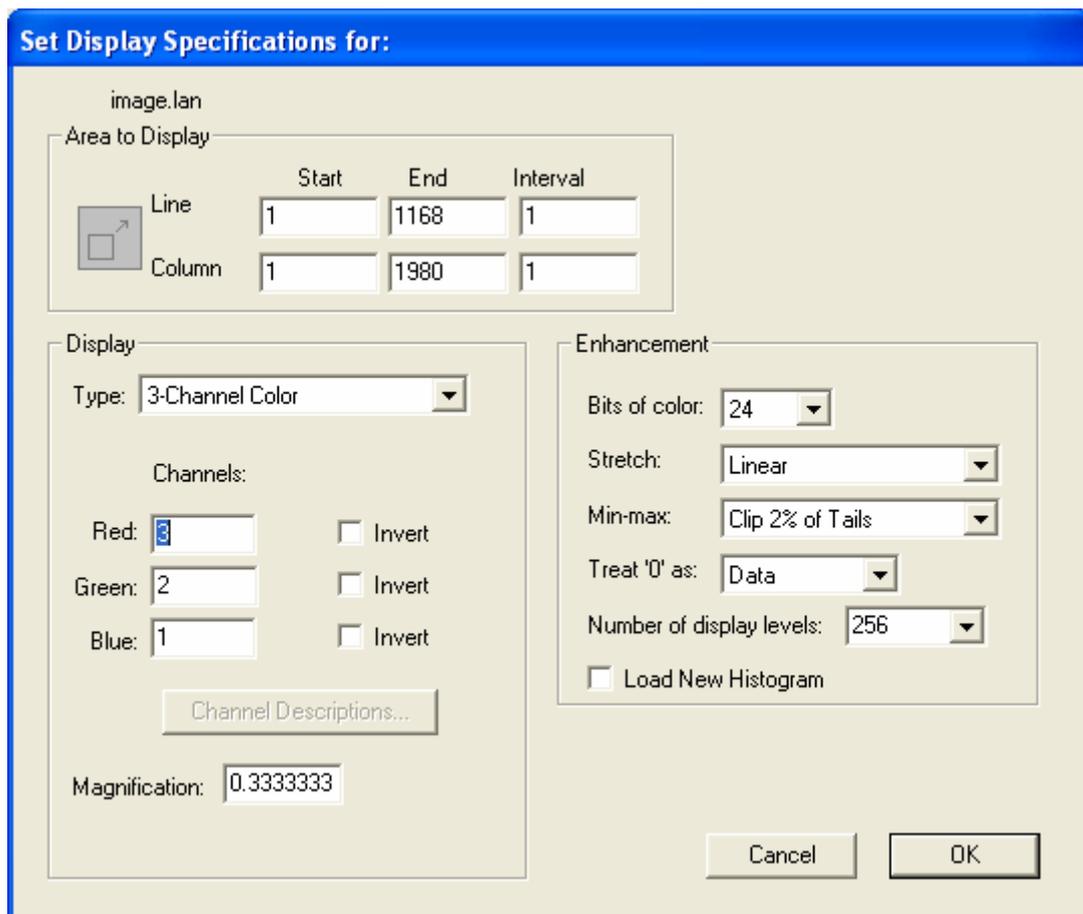
Display and Inspection of Image Data

Requirements: MultiSpec application and image titled “aligarh.lan”.

In this exercise, you will display a multispectral image of the Aligarh city and surrounding areas and view the data in several ways using MultiSpec. This is a segment (1168 lines x 1980 columns of pixels) of a 3-channel image of the area gathered on Oct 22, 1999.

- 1.1 Start MultiSpec using the icon on the desktop or from MultiSpec in the Startup Menu.
- 1.2 From the **File** menu choose **Open Image...** A dialog box will open to allow you to select the data file you wish to use.
- 1.3 Select aligarh.lan in the D:\data folder and **Open**, or simply double-click on aligarh.lan

A dialog box will appear to allow you to choose from various options for the image display.



Note that by default, the area designated for display is the whole scene and the **3-Channel Color** Display Type is selected. The default settings call for the Red screen color to be derived from band 3, Green from band 2 and Blue from band 1.

These particular choices will cause the screen image to be in a 3-color format approximating Color Infrared film.

Click **OK**.

- 1.4 This step may not occur for all situations. If the data histogram has not previously been calculated and stored (in a .sta file), another dialog box will be presented allowing the choice of regions to be histogrammed, so that the various channel gray values can be properly assigned to screen colors. The default options built into this dialog box are satisfactory, so Click **OK** to begin the histogramming.

After the histograms of all of the channels have been compiled, a dialog box will be presented allowing them to be stored so that they will not have to be re-compiled when this data set is next used. The default file title is satisfactory, so Click **Save** to store the histogram in the image statistics file, aligarh.sta.

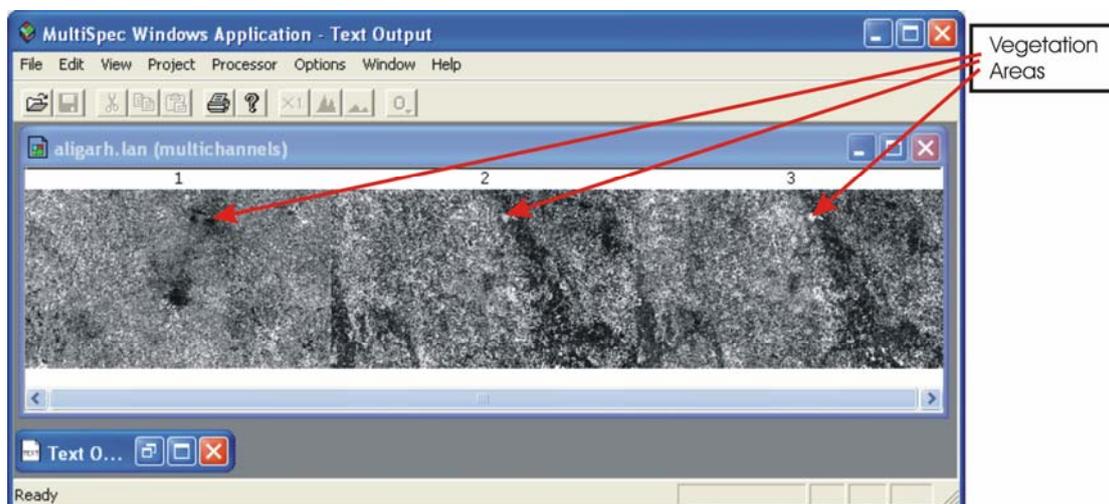
- 1.5 The image represented by this data will now appear. Notice that just above the image window in the toolbar there are two small boxes with large and small “mountains”. These are image zooming buttons allowing you to zoom in (large mountain) or out (small mountain) from the current image scale. Just to the left of the image zooming buttons is another button which shows **X1** in grayed form. This button allows you to go to X1 magnification directly. The current zoom magnification is displayed along the bottom of the MultiSpec application window in the box labeled “Zoom=”.

Some other options are to hold the ‘Ctrl’ key down while zooming to change the zoom step factor to 0.1 instead of 1. In other words, the zoom factor will change from 1.0 to 1.1 to 1.2 etc. instead of 1, 2, 3, etc.

You can make a selection within the image by clicking the left mouse button in the image window and dragging to select a rectangle, and then releasing the left mouse button. If a selected area exists in the image, any zooming will be centered on the selected area if possible.

- 1.6 Next you can view a side-by-side channel display for data quality inspection.

From the **Processor** menu, select **Display Image...** to bring up the display dialog box. Then select Display Type “Side-by-Side Channels”, and click OK to display all three channels in the image side by side.

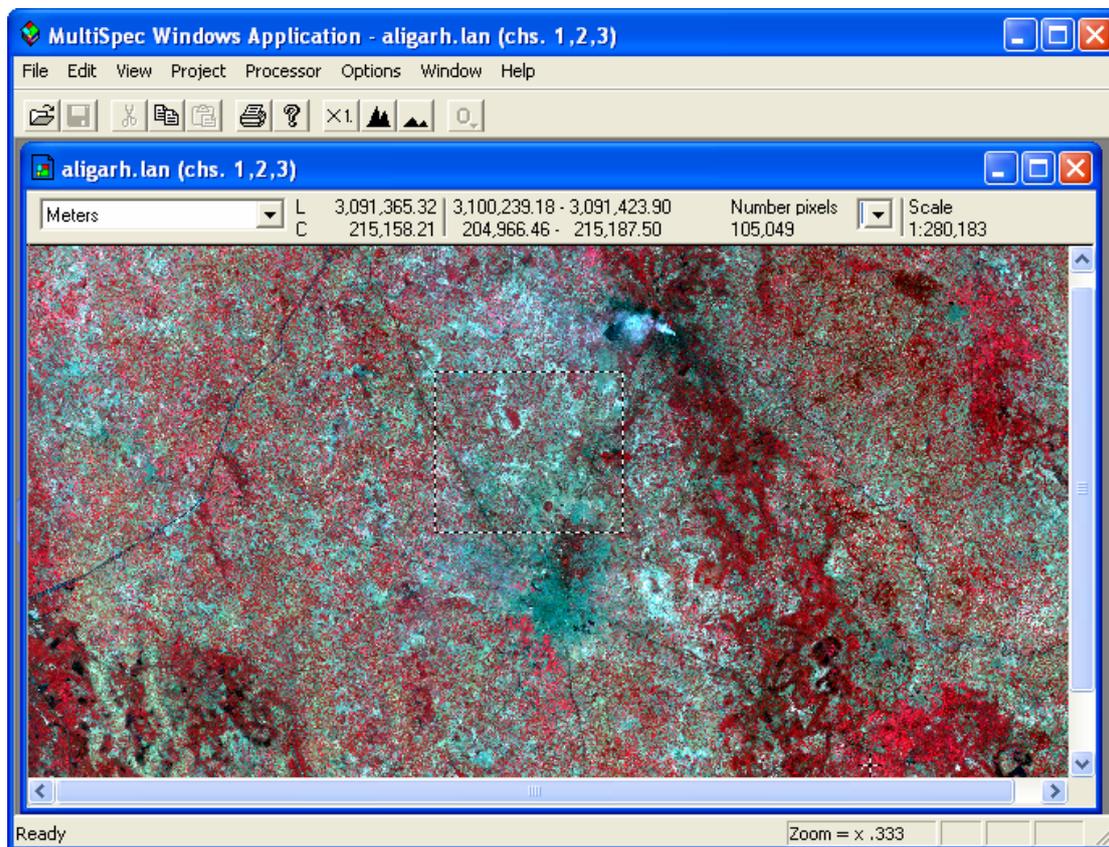


The above image window will be displayed (after zooming out) which shows all three channels displayed side-by-side. Note that the vegetation areas in channel 3 are brighter than the same areas in channels 1 and 2.

The side-by-side channel display is a good way to verify that the channels are registered correctly. In other words, the same location in the image is at the same pixel location in all channels. To do this, select an area in one channel near an intersection. This same selected area will be drawn in all of the channels. You can then verify that the selected area is at the same location in each channel.

Redisplay the 3-channel image with channels 3, 2 and 1 as Red, Green and Blue.

1.7 Coordinate View. One can also display a “coordinate view” along the top of the image to present the cursor (mouse) location and selected areas in the image. To do this, select Coordinate View from the View menu.



If map coordinate information exists for the image, you can display the coordinates as map units. Use the popup menu on the left of the coordinate view to select the map units. The area of the selection can be displayed as the number of pixels or in units of acres, hectares, etc using the popup button to the left of “Scale”. The scale of the image will also be displayed.

For this image, if you select the Edit – Image Map Parameters... menu item and set the UTM Zone to 44 and the Datum to “WGS 84” and then select OK; you can also display the cursor coordinates as latitude-longitude. Note that the format that this image file is stored in (ERDAS *.lan) does not allow for storage of this information. Other image file formats such as GeoTIFF do.

Concluding Remarks: This exercise is adapted from <http://cobweb.ecn.purdue.edu/~biehl/MultiSpec/tutorials>. There are many other

operations that you can do with MultiSpec including several Reformatting processes. See the other exercises or the MultiSpec Introduction at the MultiSpec web site for more information. The MultiSpec web site is:
<http://dynamo.ecn.purdue.edu/~biehl/MultiSpec/>.