**MultiSpec Exercise**

Combining Separate Image Files into a Single Multispectral Image File

Requirements: MultiSpec application and folder of individual band images.

One can use the "Logically Linking" capability in MultiSpec to link several image files together to be treated as one image file in an image window and/or create a new image file that incorporates all of the separate images. For example many times one will receive Landsat images from the EROS Data Center on a CD or DVD that contains one file for each of the 7 bands. This task will illustrate how to do this.

1.1   Open the first multispectral image as one normally would using the 'File - Open Image' menu item. The "Display Multispectral Image" dialog box will be presented to allow one to display the selected image. One may display the image or just cancel the dialog box. A blank multispectral image window will continue to be display. This will become that "active" image window that represents the first image file that will be used in the next steps.

1.2   To link an additional image disk file to the active image window, use the 'File - Open Image' menu item again. This time the 'Link to active image window' option is displayed in the lower-left portion of the dialog box. Check this box and select the 2nd image file (such as band 2 illustrated in the figure below) to be linked to the active image window.
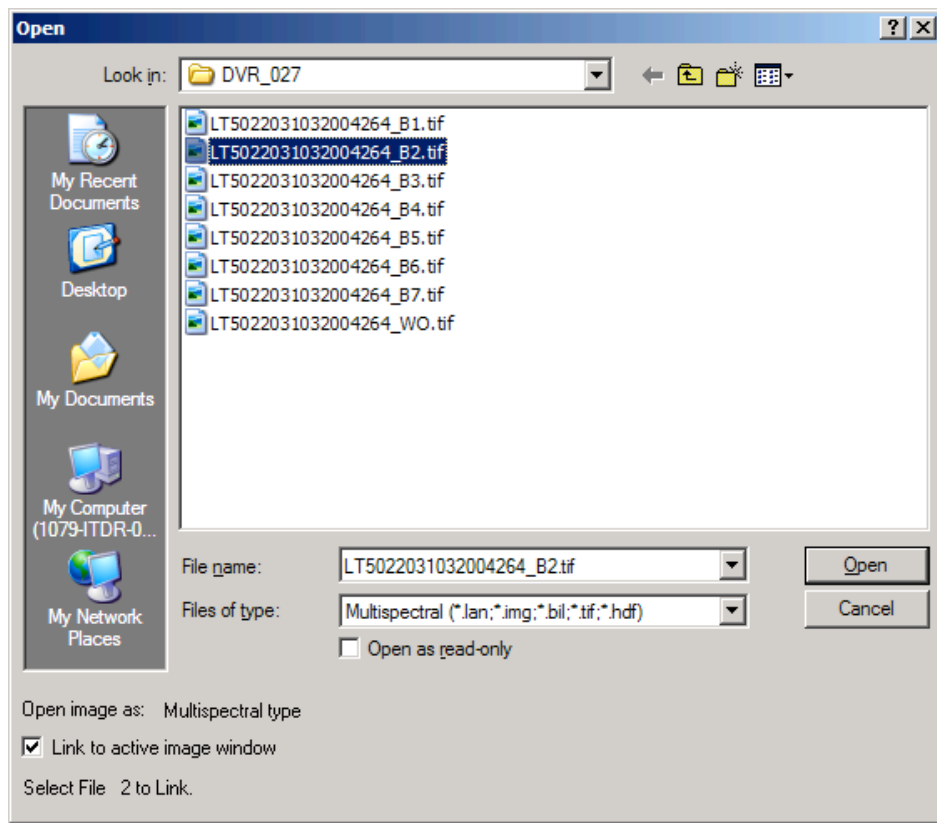
As long as the 'Link to active image window' box is checked and Cancel is not selected, the open image dialog box will automatically be displayed to allow the user to add additional image files to the active image window. The title for the open image dialog box will indicate the number of files that will be linked with the selection to be made. Also the name of the image window is prefaced with 'Ln-' where n is the number of files that are linked for that image window.

1.3   Select 'Cancel' after all desired image files have been linked. Note that one wants to link them in the order that you want the channels to be treated. For example, many times Landsat TM data is in the order of bands 1 thru 7. However, if you would like for the channels to be in wavelength order, then select in order of bands 1, 2, 3, 4, 5, 7, 6.

1.4   After linking the separate disk files together, one can run the Display Image, Histogram, List Data, Principal Components, and Reformat processors on the "logically linked" image. One cannot use this "logically linked" image as a base image for a Project.

Some additional rules and limitations on Logically Linking are:

- One can only link image files that are being used in multispectral type image windows.

- Image files that can be linked may contain a different number of lines and columns. The resulting linked image will contain the largest number of lines and columns that includes the union of those in the separate image disk files. Also the separate image files may contain a different number of data bytes, a different number of channels and they can be a mixture of band interleaved by line (BIL) and band sequential (BSQ) formats. (Note that band interleaved by sample or pixel (BIS or BIP) formats cannot be used in logically linked image files. One will need to change the BIS formatted file to BIL or BSQ first.)

- All image files will be overlaid by starting with the first line and first column in the disk file. No provision has been provided to overlay the image files using different line and column offsets.

1.5 **Combining Files into a Single New File:** Use the Reformat- Change Image File Format processor to create a new disk file that contains all the channels included in the "logically linked" image files. In the "Change Image File Format Options" dialog box, select "New File" for the Output File selection. Choose other options as desired. For example, if the map projection information is known for the image and included with the input images, the GeoTIFF format is a good header option to use to keep that information with the new image file.
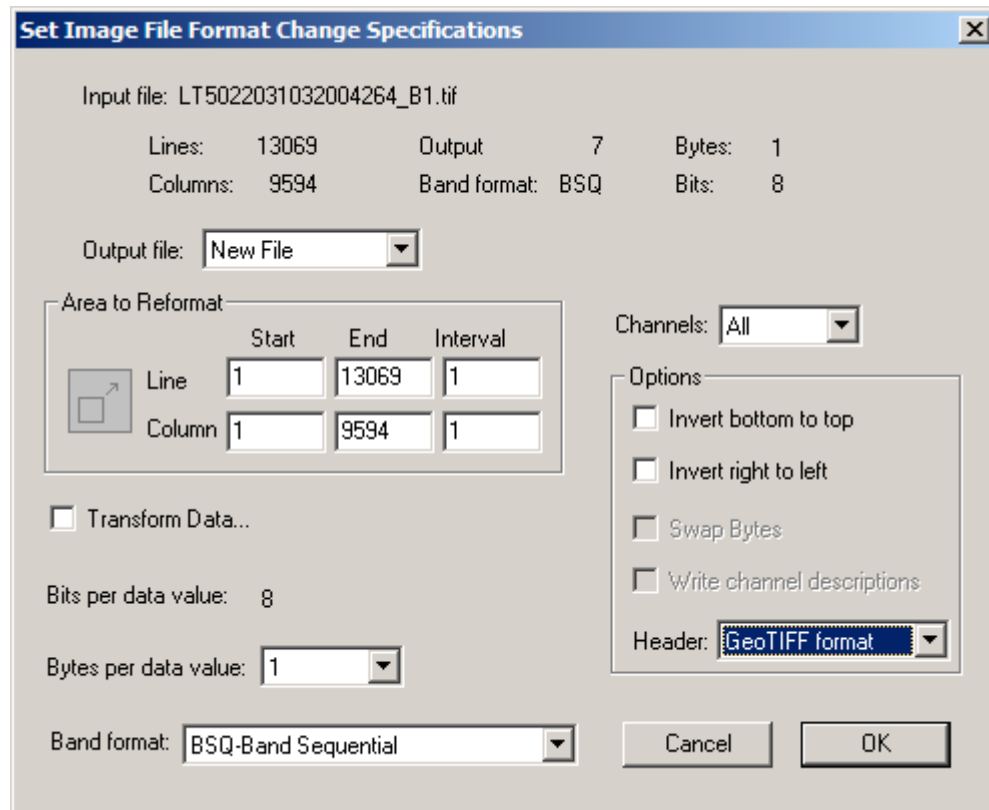

The new file may be named and will be created upon clicking on "OK." This new file can then be used as a base image for a project or for any of the other image file uses.

1.6 **Some Notes:**

- One can also link multiple image files together that represent multitemporal data from the same location, provided that line and column numbers for the given pixel ground locations in the separate image files from each of the times have been made to correspond.

- MultiSpec will automatically link all bands in the FAST-L7A formatted group identified in the header if a one selects the header file such as …HRF.FST for reflective data (bands 1-5 & 7) and HTM.FST for thermal data (bands 61 & 61).
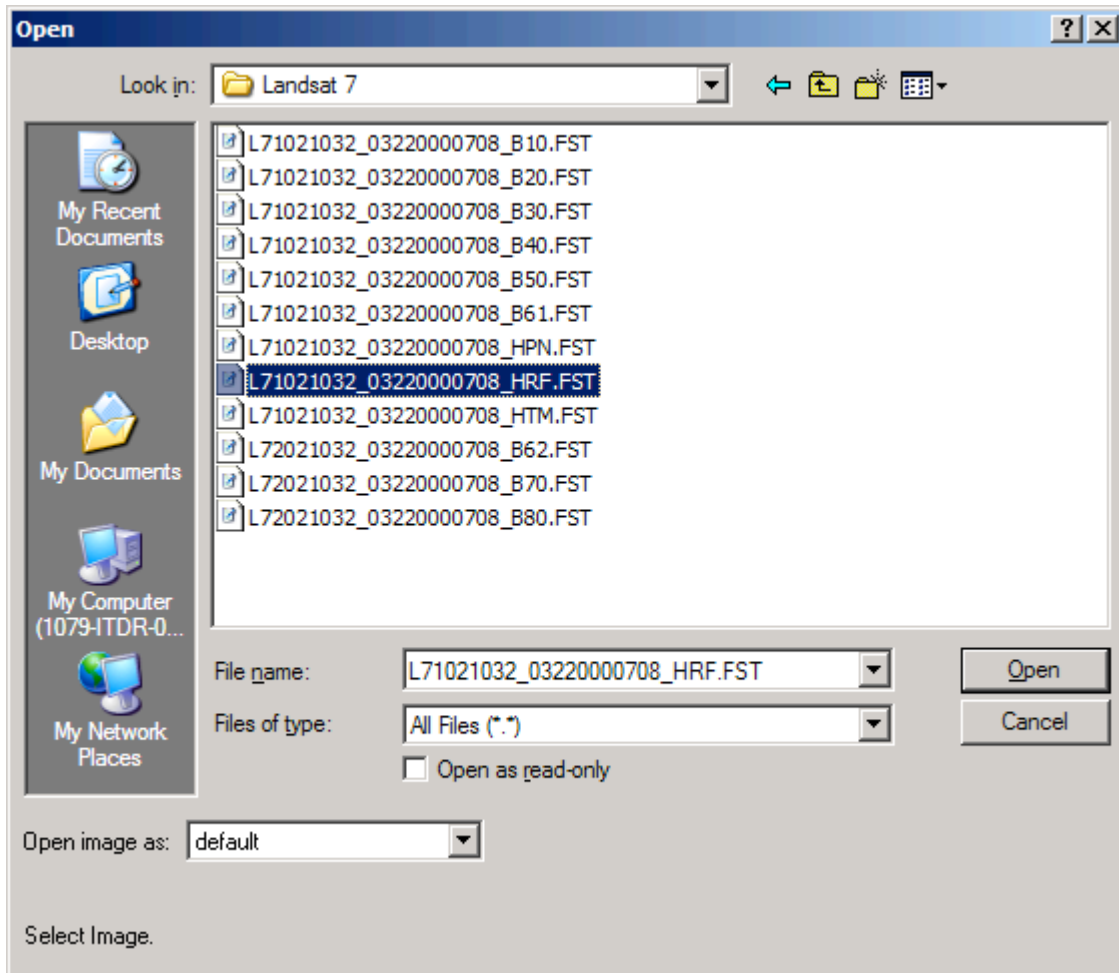
You can then link groups of bands if one wants (and if the images make sense to do that). FAST-L7A is one of the formats used for the Landsat 7 data.

- MultiSpec will automatically link the ASTER channel sets 1, 2 and 3N (VNIR) together if any one of these data sets is selected in the hdf file. The same is true for the SWIR set of channels (4-9) and the TIR set of channels (10-14). See example below.

Concluding Remarks

There are many other operations that one 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/. Or contact Larry Biehl at biehl@purdue.edu with questions.