

Introduction to the ENVI software suite

Pre-Lab: September 13, 2023

I. Introduction

- This is the first "unofficial" laboratory exercise. It is **not** submitted, nor will it be graded. Rather, it is designed to give you a basic introduction to the *Environment for Visualizing Images* (ENVI) image processing software and working with real actual remote sensing data. Follow the instructions and fill in the questions in the blank spaces below. Keep this as a guide for your later labs and ask questions as you work through it. Good luck!

II. Logging in:

- In order to use the Remote Sensing Teaching Lab, you will need to log on to the laboratory PC's using your Pitt user ID and password
- **To login:** press Ctrl-Alt-Delete to call up a dialog box
 - Type in your Pitt user name, password, and press <return>
 - *NOTE: Case matters*
- Create a new directory (i.e., a new folder) on the desktop and name it using your last name. *Hint: use a right click on the desktop to do that*
 - If you're working with a partner, create a combined directory with both names
 - Remember, anything saved into this directory will only be accessible to the student who logged in using their Pitt ID!
- If you have any issues with this process, please let the TA know and she will assist you

III. The ENVI image processing software:

- Go to the desktop and start the ENVI software by double-clicking on the "**ENVI Classic**" icon
- After it starts, you should see a main menu bar at the top of the screen
 - list some of the main menu items you see on the bar:

- **Note: the “Help” menu is at the far right – use this if you need help with ENVI now or on future labs, because it contains a lot of useful information!**
- Go to the “File” menu bar and click on *Open Image File*
 - Use the directory window that opens and navigate to the GEOL-1460 folder on the desktop. In there you will find a folder called **pre-lab** and in that folder a file called **TM-reflectance.dat**
 - Double-click on the file and describe what happens next in the ENVI software:
- What are the numbers in parentheses after the band names in the 'Available Bands List' window telling you? (*don't just list them*)
- Now go the main menu bar in ENVI and click on *File* → *Edit ENVI Header* and click on the **TM-reflectance.dat** file in the Available Bands List
- **Do NOT** click on OK, but rather just describe the file information appears in that window
- You should now be able to identify which sensor collected the image and where in the world the image is located
- Click OK to close
- Next, load TM Band 4 as a gray scale image by double-clicking on it in the Available Bands List
 - Describe what happens and what appears – what are the different windows showing?

- Now load Band 7 as a gray scale image and describe the changes in the image
 - *Hint: double-click back and forth between the two bands in the Available Bands List window to see the changes*

- Double-click in the larger image window to call up the Cursor Location / Value window and scroll the cursor around the image describing what is changing in the Cursor window
 - *Is the image geo-located (in other words, are there real geographic locations associated with each pixel or just DN values)?*

- Re-load Band 4 and maneuver the zoom window (red box) over the large white circle in the center of the image (*hint: you can just click on the circle*)
 - Can you tell what it is?
 - What are the average pixel values of it compared to the surrounding darker pixels?

- Right-click on the larger image window to bring up a menu and then click on: *Z Profile (Spectrum)*
 - Describe what happens and what is being shown. What are the units of the x and y axes?

- Now, click the cursor on the large bright circle and describe the spectral shape
 - Does it look familiar to any information in the first lectures?
 - Based on the spectrum, why is the circle so bright (*high DN values*) in Band 4?

- How does that spectral shape change when you click the cursor over the darker gray regions next to the circle?
 - Describe why these areas are darker in Band 4?

- Close the Profile (Spectrum) window, go back to the Available Bands window, click on RGB Color button, and load Bands 3,2,1 in R,G,B by clicking on each successively and then click on the *Load RGB* button
 - Would this image be called **true color** or **false color**? *Hint, look at the wavelengths for each band!*

 - On the menu bar for the **image** window, click *Enhance* → *[Scroll] Linear 2%* and describe any changes before and after the enhancement

 - Now click *Enhance* → *[Scroll] Gaussian* and describe the changes in color seen in the circle after this stretch. What could be causing this?

 - Can you describe the possible climate of the region based on what you see (*or don't see*)?

- Now, load Bands 3,4,1 in R,G,B and once again, click *Enhance* → *[Scroll] Linear* on the menu bar for the image window
 - What changes from the last color combination and would this image be called **true color** or **false color**? Why?

- Save this image out as a .JPEG file by going to the File menu on the **Image** window
 - Click on *Save Image As* → *Image File ...* on the *Output Display to Image File* window that appears
 - Make sure the resolution pull-down menu is set to: **24-bit Color (BSQ)**
 - Change *Output File Type* pull-down menu to: **JPEG**
 - Change the Compression Factor term to **1.0**
 - *these verify that you are saving a color image in JPEG format with no compression (which can save disk space, but also can degrade the quality of your image)*
 - Then make sure the filename is being saved into the desktop directory that you created in the first part of this pre-lab
 - Before hitting ok, next change the size of the image by clicking on the **Spatial Subset** button
 - On the next window (*Select Spatial Subset*) that appears, click on the *Image* button, select a 400 by 400 subset, and center that over the green circle
 - Click OK
 - *this enables you to save only part of an image rather than the entire thing*
 - Then click OK again on the *Select Spatial Subset* window
 - Use the **Choose** button on the *Output Display to Image File* window to navigate to the folder you created in Part I and name the file
 - Finally, click OK again on the *Output Display to Image File* window to save the JPEG file into your new directory
 - ***Now using Windows, navigate to your new directory to make sure the new JPEG file is there! You should be able to double-click on it to make sure it opens with the default Windows picture viewer***
 - For future assignments, you can save any files you need to a flash drive or OneDrive in order to incorporate these into your written reports
- Lastly, click Cancel and exit ENVI by clicking on *File* → *Exit* on the main menu bar
- Then, log off the computer