Geog. 580 Lab Assignment #1: Satellite Remote Sensing Images

The purpose of this lab exercise is to let students get familiar with major types of satellite remote sensing images, especially those widely used in the land applications. In addition, this exercise will also let students get familiar with Web-based geoprocessing service system, GeoBrain. The system was developed by the Center for Spatial Information Science and Systems (CSISS) specifically for broadening the application of satellite remote sensing data by using latest geospatial interoperability and cyber-infrastructure technology. More detail information about GeoBrain project can be found at http://geobrain.laits.gmu.edu. If you have any technical questions about this lab assignment, please send e-mail to ldi@gmu.edu

Please note: You can use any Internet connected computer with either IE or Firefox browser to finish the exercise.

1. Start the GeoBrain system
   Go to the website http://geobrain.laits.gmu.edu/OnAS/
   A new window entitled "GeoBrain Online Analysis System (GeOnAS)" will pop up. Waiting for all components to be loaded from the server, and clicking "Close" button in "Tip" dialog, GeOnAS portal is ready for use.

2. Define a new project
   You will define the name, the geographic area of interest, and the map project of your project in this step.
   Select File->New Project, a new dialog window "New Project" will appear, as shown below. You can zoom in and select the area of interest from the map, or select the state and county, or enter the bounding box of the area of interest.
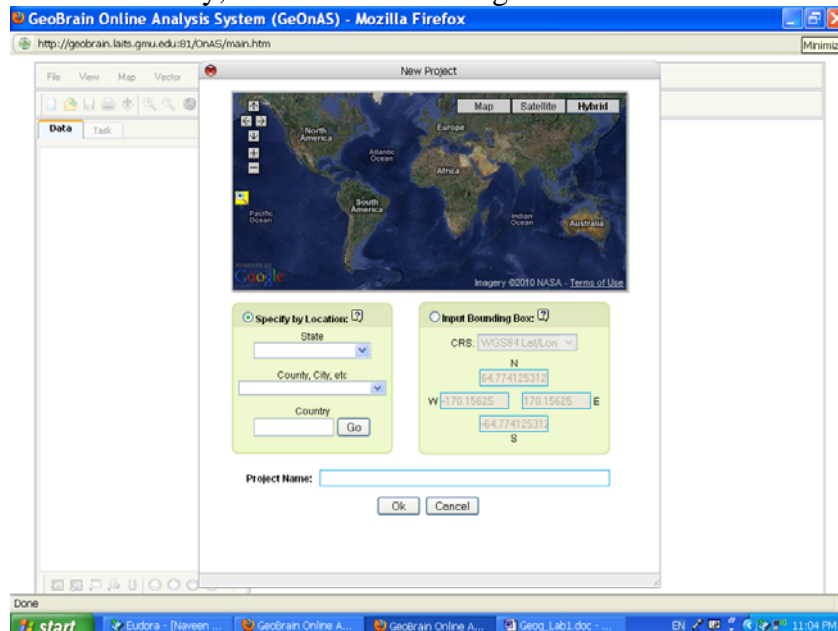
   For this assignment, select District of Columbia from the state list and name the project as you wish in the "project name" text box, and then click "OK".

3. Data Discovery and Access

   Click button at top of the window, a popup window "GeoSpatial Data Selection" shows up. Select "Raster" and click "submit", then a "Raster Window Selection" window pops up. Deselect the NASA ECHO from the catalog services, and in the "Sensor Name" menu, select "LandSat ETM" , then click "Query", you will see the search result shown as in the following figure.

   The small blue box in the preview image is the area of interest you defined. Click "Data Customization" for Band 2, Band 3, band 4, and Band 8 (which is in the next page), and select the check box in the "data customization" pop up window. Then click "Finish Selection". Then, another window for data customization pops up, just click "submit" for the all pop-up windows.

   Then the GeoBrain system will subset the data for the area of interest from the data archive and display the result at your computer.

4. Examine each band of the data
   The current display shows the top checked data layer. So you can uncheck/check layer to view each layer.

5. Color composite
   In the menu "Raster", select "RGB Composite" to create a standard color composite on which NIR band is shown as Red, and red band shown as green, and green band shown as blue. Please follow the instruction in the window on how to input each band.

Please set the all "level" fields to 256 but keep other fields as is. Your color composite should look like this.
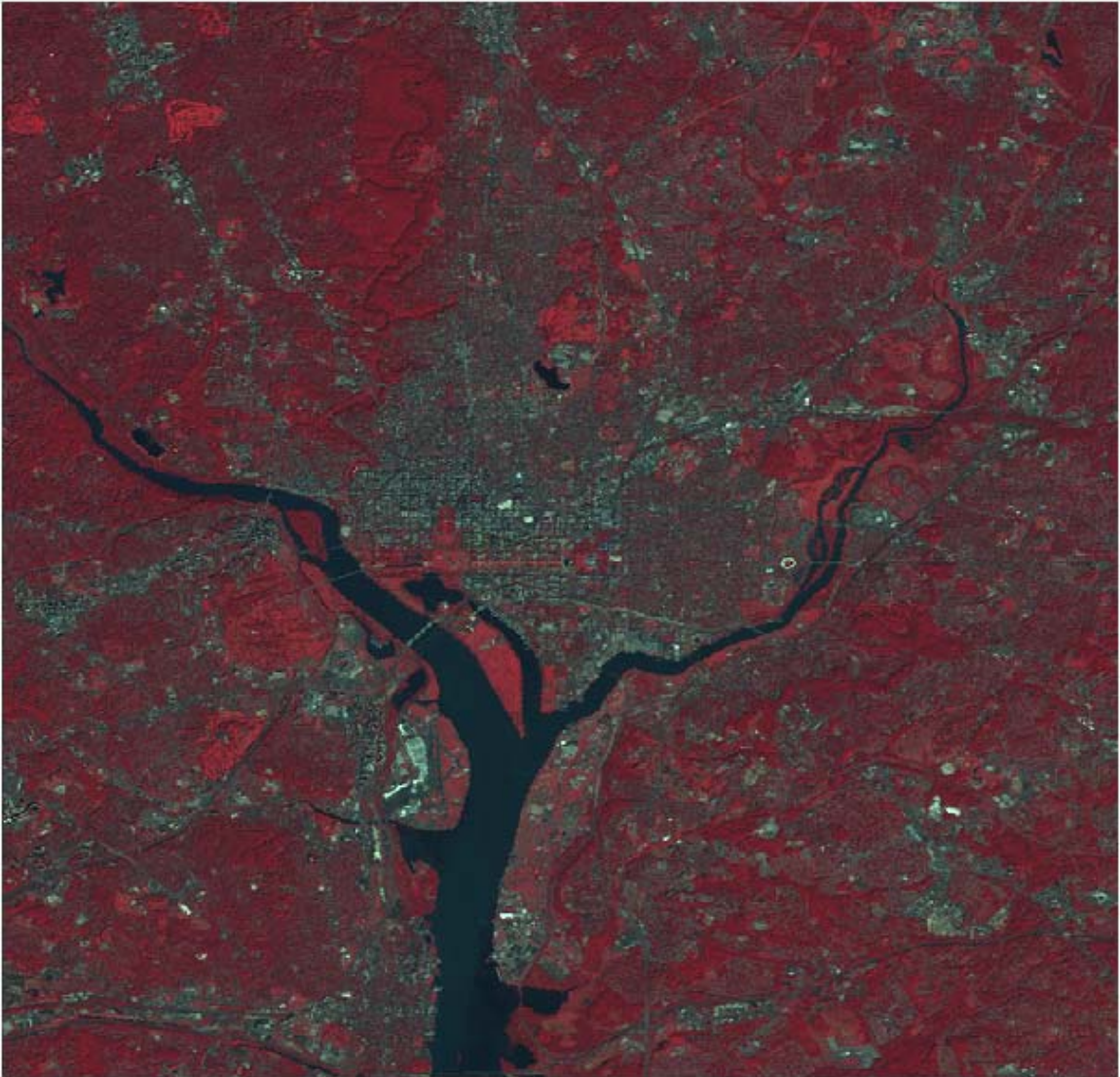
6. Repeat step 3, 4, 5 for TM data.

7. Repeat step 3, 4, 5 for MSS data
   Currently MSS data are cataloged at NASA ECHO, so please select NASA ECHO when you search for MSS data. Select the first image in the search result, which was acquired in 1972.

8. Start a new project
   the area of interest should be Korea (include both North and South Korea). Please use the map selection/Zoom tools in the top panel of the project definition window.
   Search the data in GMU CSW (not NASA ECHO) and sensor name "DMSP". Select

the second dataset in the search result. This is DMSP high resolution night light image.

9. Exam the DMSP image and identify any features in the images.

10. You also can explore other types of images or for other areas in the system if you wish

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Your Lab Assignment Report should answer the following questions:

1. Describe the difference between ETM and TM, and between TM and MSS data, as you have discovered from the images of D.C. area
2. What is the ground object types of the red area and the dark area in the color composite images and why
3. By comparing MSS, TM, and ETM color composites, can you describe any changes in land use/cover for the DC area in the twenty years (1972-2001).
4. In the color composite, why we set the levels to 256?
5. Please describe any significant features and phenomena you can find on the DMSP night light image of Korea.
6. (Optional) Any suggestions on the improvement of GeOnAS portal

Please write the report in Word and send it to me as E-mail attachment to ldi@gmu.edu Please attach the color composite image of ETM, TM, MSS, as well as night light image of Korea in the report. You can use print Screen key in you keyboard to capture the images and paste the images in your report.

You should send the report to me no later than 4:30pm on March 3. If you cannot finish the report by then, please notice me in advance. My E-mail address is ldi@gmu.edu