GST 105: Introduction to Remote Sensing Lab Series

Lab 3.1c: Image Mosaic

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Introduction

This lab will walk you through the steps to generate an image mosaic. An image mosaic may be useful in order to put a number of neighboring or adjacent images together to make a larger image. An image mosaic may be useful as an image background or for other subsequent processing. A mosaic dataset can be created and used to manage many related image datasets, even if the individual images are not adjacent to one another. A mosaic dataset is an efficient means of managing large image datasets.

Your instructor may require that you provide screen captures, exported files and/or responses to review exercises. The review exercises included throughout the lab can also be found in the Review Exercises section. Please check with your instructor for the requirements specific to your class.

Objective: Create an Image Mosaic

This lab will walk through the steps to generate a simple image mosaic. In particular, this will illustrate how to use the Image Analysis window to merge adjacent images from the same sensor with the same number of bands. For large image mosaics where a large number of individual images will be merged into a single image file or database it is recommended that the student read and research the ArcGIS methods for using the Mosaic Datasets and Raster Datasets tools in ArcToolbox. These can be found in the **Data Management Tools** toolbox in the **Raster** toolset. In addition, for those students interested in loading many adjacent images into an enterprise database such as Oracle, SQL Server, or Postgres, search the ArcGIS Help on *Raster Datasets* and *Importing individual image files into a relational database.*

This lab includes the following tasks:

1. Create an image mosaic using the Image Analysis window.
2. Create an image mosaic using a mosaic dataset.

Students will become familiar with changing image band combinations and saving new image datasets to an image file.

Lab Settings

Required Virtual Machines and Applications

Windows Machine User Account	Train
Windows Machine User Password	Train1ng$

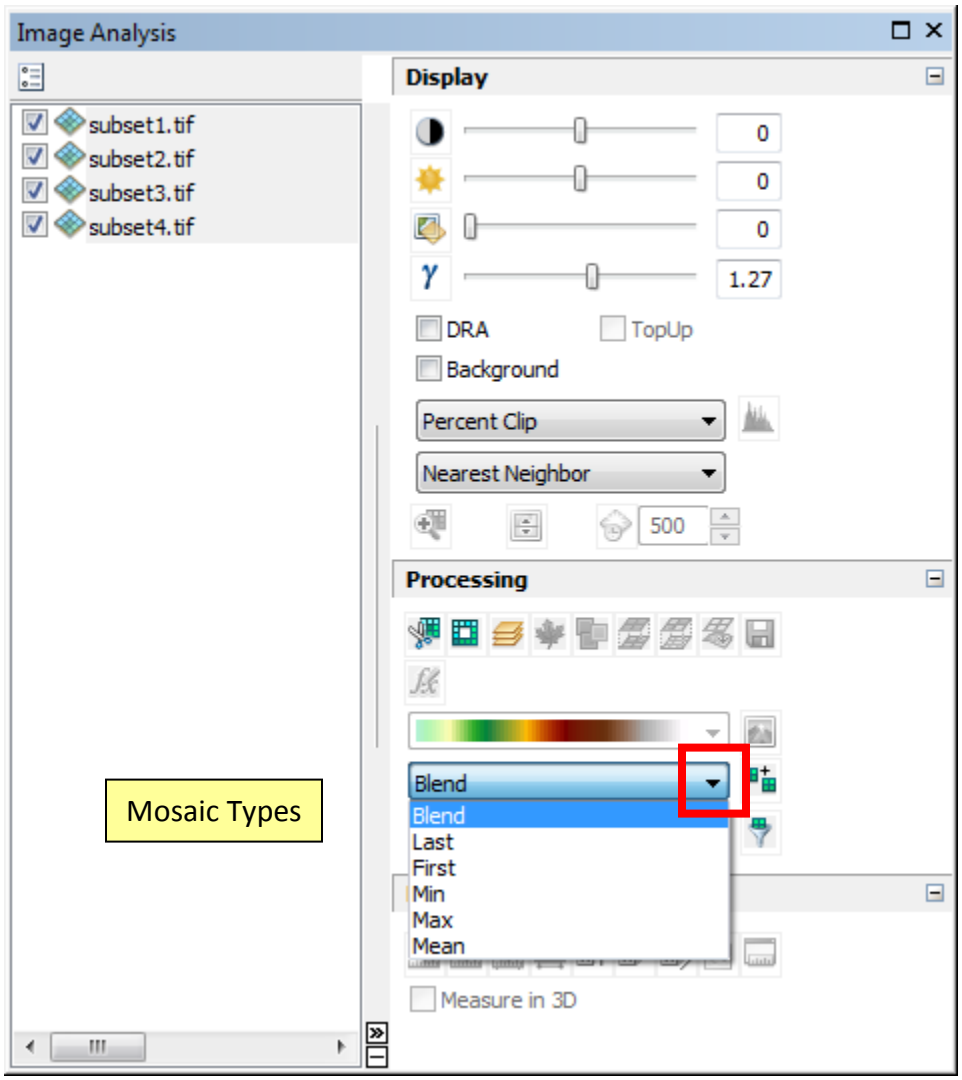
1 Create an Image Mosaic using the Image Analysis Window

1. Log into the computer, using the information provided in the Lab Settings section.
2. From the *Shared Drive**GST 105**Lab3**Data* folder, **Add** the following 4 image band files listed in the table below into **ArcMap**.

Image Band Files
subset1.tif
subset2.tif
subset3.tif
subset4.tif

3. Turn each image on and off to see the extent of each image.
4. Briefly review each image to make sure they each have 6 bands.
5. Bring up the **Image Analysis** window.
6. Select the 4 images in the Image Analysis window.

7. Choose the **Mosaic** tool. Optionally, the analyst can change the type of mosaic method from the dropdown list. The different mosaic types determine how overlapping areas from adjacent images will be implemented. The options are a blend of the overlap areas, the minimum or maximum, the first image will be used, the last image will be used, or the mean value in the overlap area will be used.



8. The merged image appears in the Table of Contents. Turn the individual image files off to make sure the mosaic data set is the only one that appears.

Exercise A: *What are the number of bands, rows, and columns for the mosaic dataset?*

2 Create an Image Mosaic using a Mosaic Dataset

The mosaic dataset option is a relatively new function of ArcGIS, available in ArcMap 10.1. This option is only available for the ArcGIS Standard (formerly ArcEdit) and ArcGIS Advanced (formerly ArcInfo). This option is disabled with ArcGIS Basic (formerly ArcView).

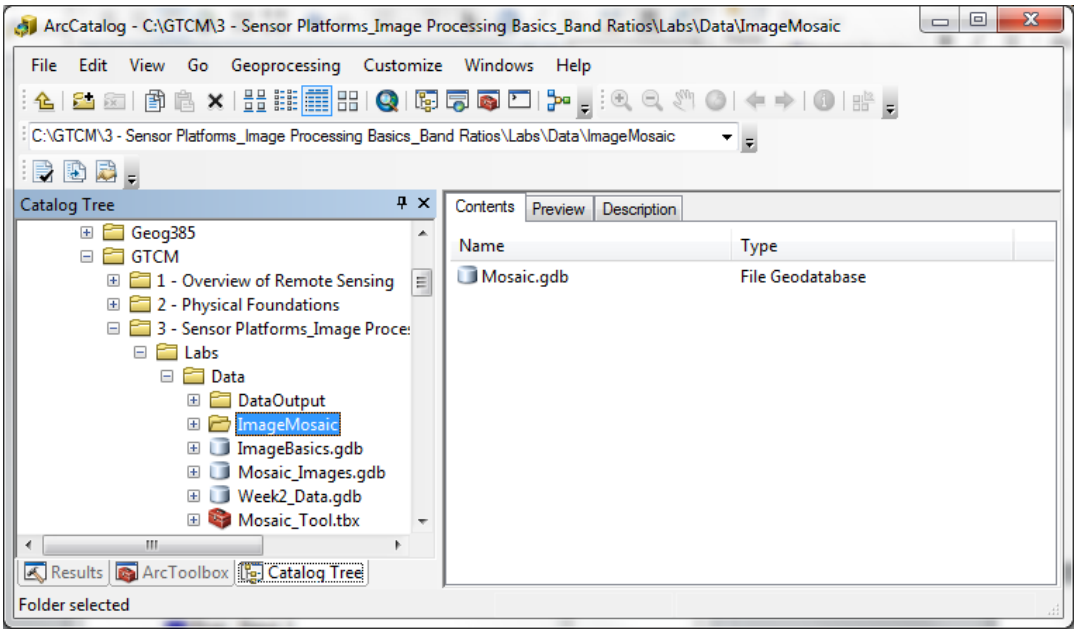
A mosaic dataset provides the ability to rapidly add, update, and use a large number of image source files as well as large geographic extents. Mosaic datasets are set up so that parts or all of the image data that make up the mosaic can be changed and used for some image processing tasks and for use on the web and mobile devices. This portion of the lab will illustrate the basic concepts of creating a mosaic dataset and adding images to it. In practice, creating a mosaic dataset and adding images is typically more involved. ArcGIS Help should be consulted and reviewed when performing these activities in real situations.

To work with a mosaic dataset, one first must be created.

1. In **ArcCatalog,** create a new folder named **ImageMosaic** in the *Lab 3**Data* folder. (do not use spaces or dashes)
2. Within your new folder, create an empty file geodatabase named **Mosaic.gdb.**

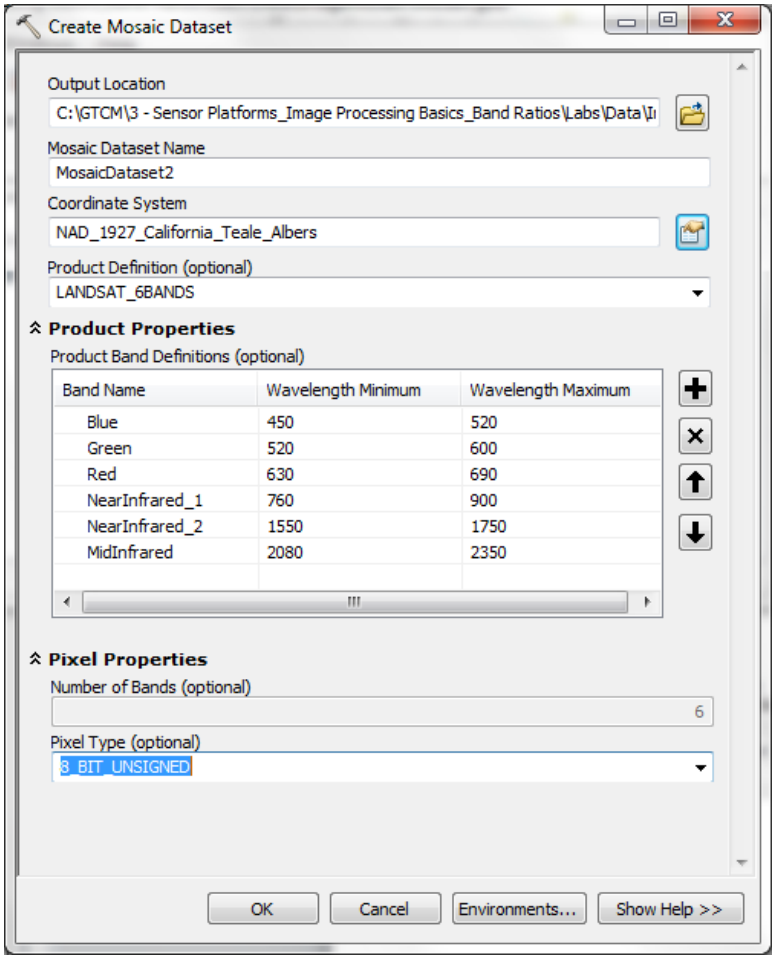
In some cases for organizations, an SDE geodatabase is created

The data structure at this point should look similar to this:

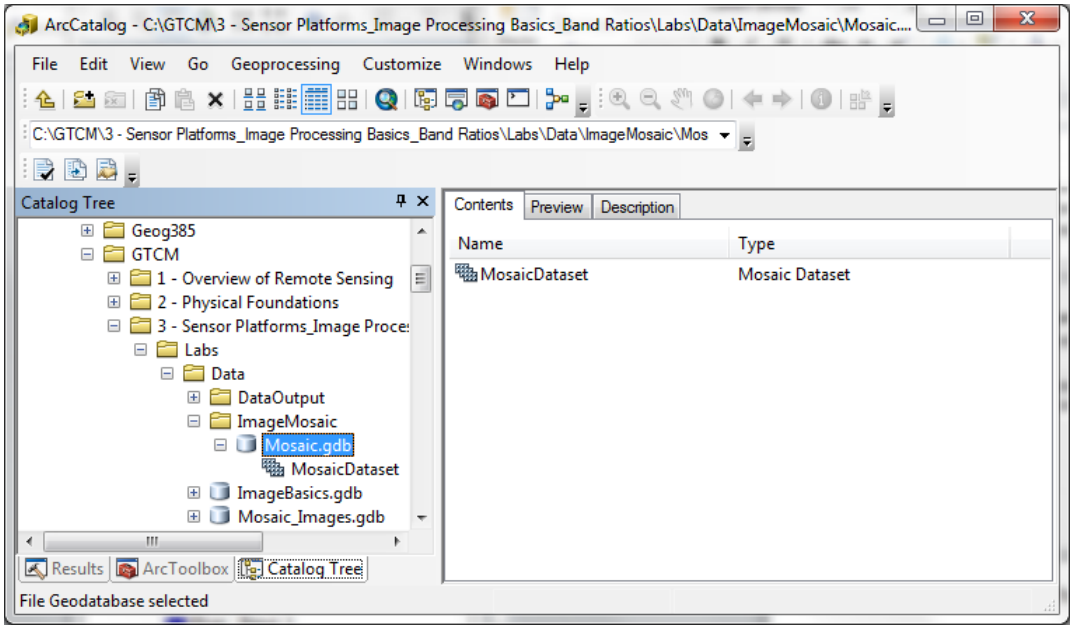


3. Create the Mosaic Dataset. Right-click on the **Mosaic.gdb** geodatabase and choose **New -> Mosaic Dataset**. The dialog box appears (see image below),
    a. Give the mosaic dataset a name (e.g. **MosaicDataset**).
    b. assign the coordinate system. Normally, the coordinate system will be the same as the source imagery. Choose **NAD 1927 California (Teale) Albers (Meters)** from the **Projected > State Systems** coordinate systems. This is the coordinate system for the data used in this lab.
    c. In addition, some product properties can be added. In this case, since the source data is Landsat TM, so the Product Definition can be set to (**LANDSAT_6BANDS**).
    d. The Number of Bands parameter is already set to 6 based on the Product Definition. Expand **Pixel Properties**.
    e. The **8_BIT_UNSIGNED** data type is also added for convenience. Since the input data already has this information, it would have been provided by default if it was not already set in this dialog box.

After filling in all of the parameters, the Create Mosaic Dataset dialog box should look similar to the image below.

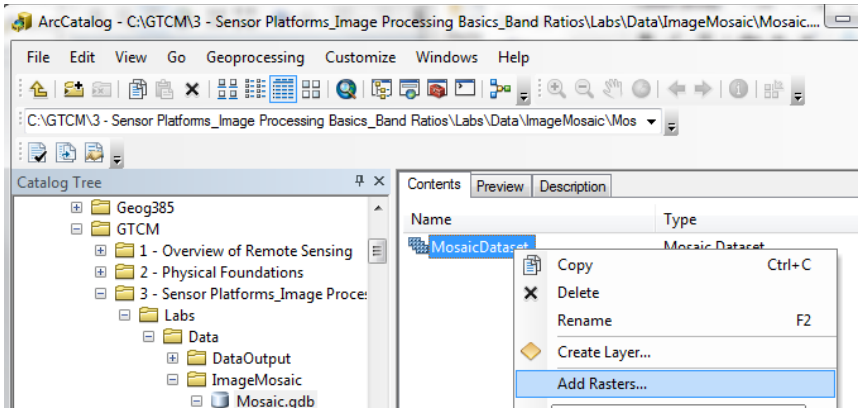


4. Click OK. The **Mosaic** geodatabase will look like this.



At this point individual images can be added.

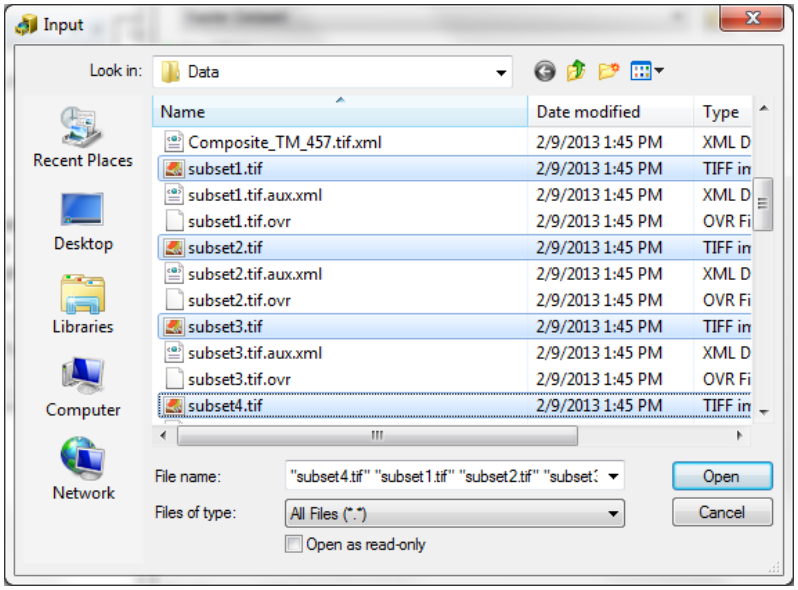
5. Right-click on the **MosaicDataset** just created. Choose **Add Rasters.**



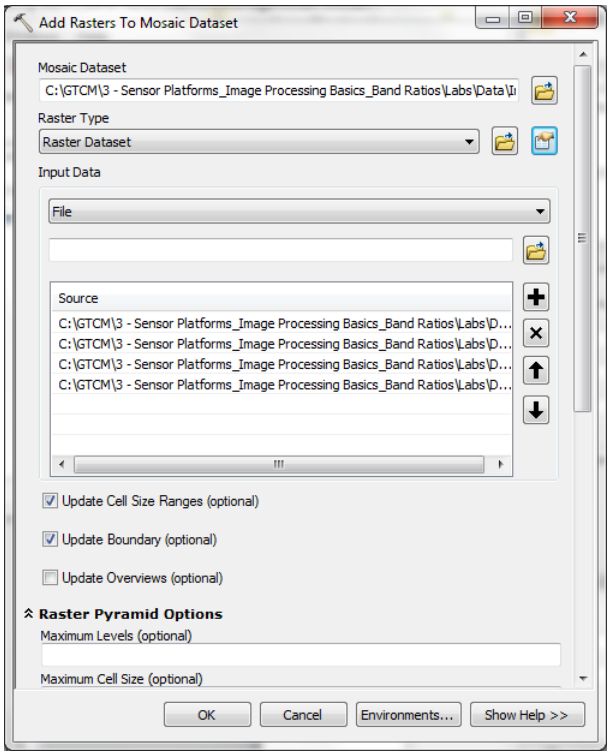
6. Fill in the parameters in the following manner. The Raster Type will be **Raster Dataset** from the dropdown box and the Input Data will be **File** from the dropdown. Click on the **Folder** above the empty tale, and choose the individual files to add (listed in the table below):

Image File
subset1.tif
subset2.tif
subset3.tif
subset4.tif

Choose only the **.TIF** files. In the dialog box to select the specific images, the value ***.TIF** can be typed into the **File name:** location to restrict the list to just **TIF** type files. Also, the **Ctrl key and left-click** can be used to select more than one TIF file at a time so that multiple TIF files can be added at one time.

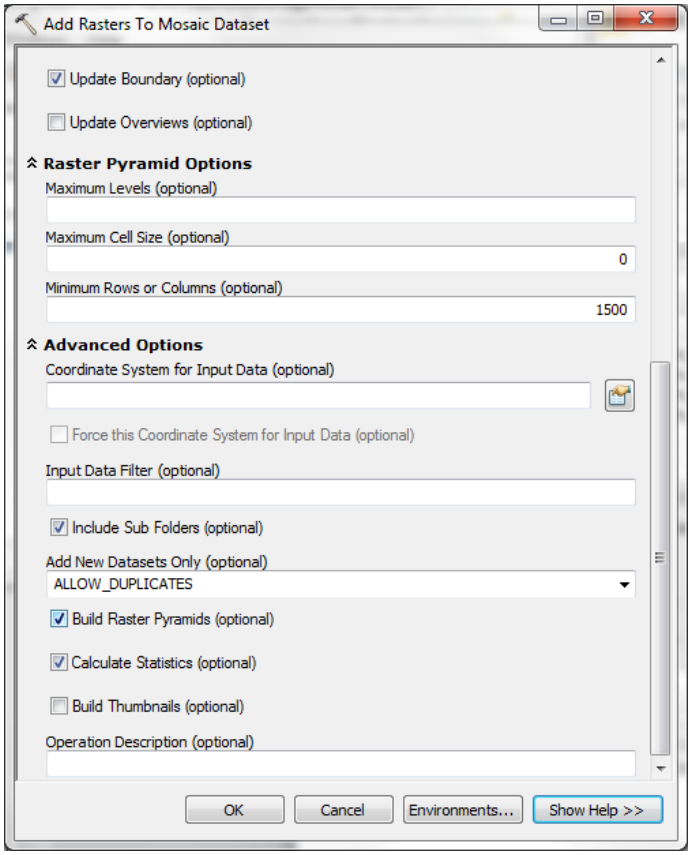


7. Click **Open** to add the specific TIF files to the Input Data list.
8. Check the **Update Cell Size, Update Boundary.**



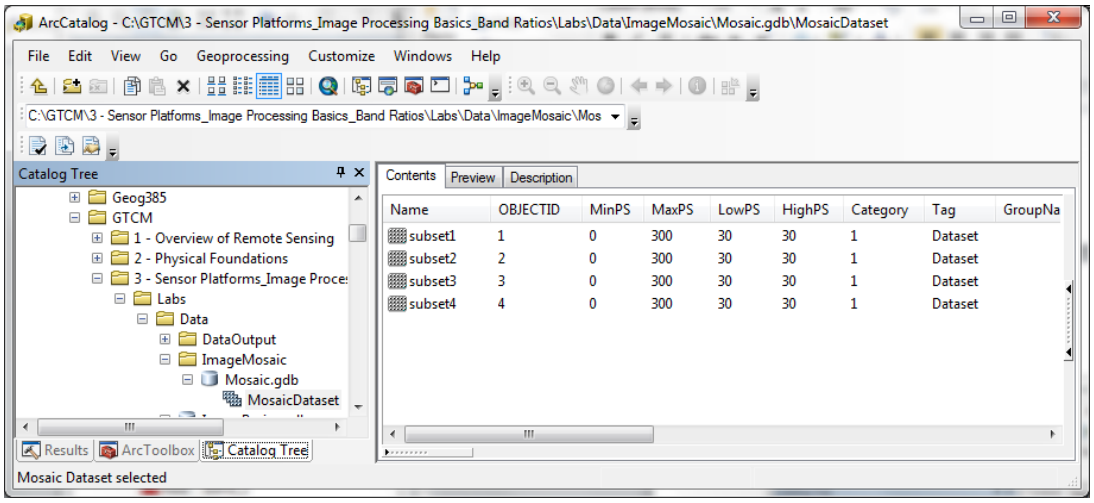
We must also set the additional following parameters.

9. Expand **Advanced Options** and check **Build Pyramids** and **Calculate Statistics** on the input files. This will ensure these options are set for helping improve display performance of the individual source files.

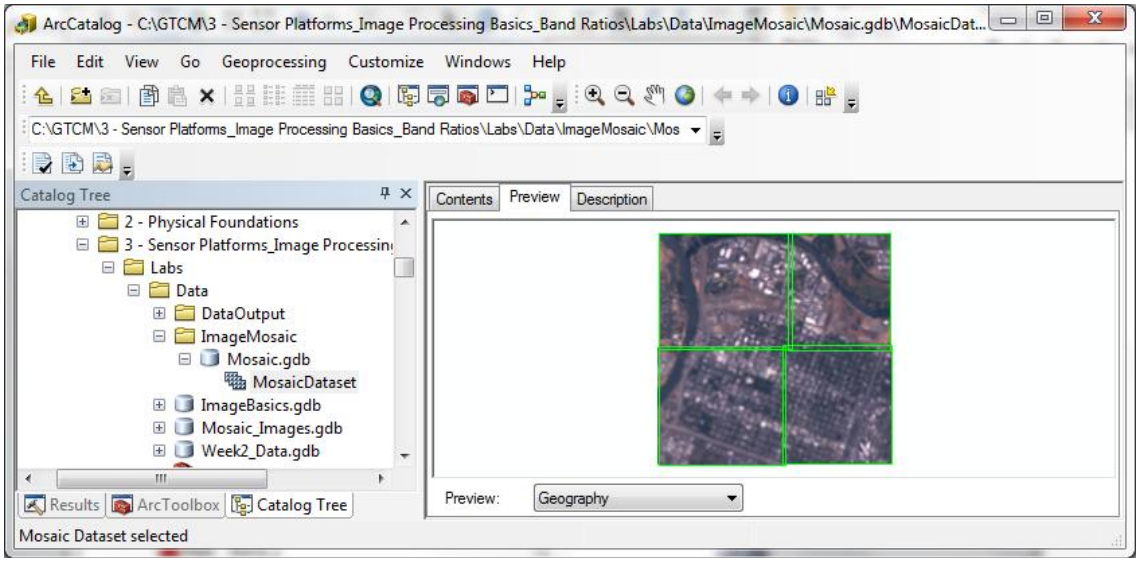


10. Click **OK**.

When this process is completed, the following will be seen in ArcCatalog when you click on **MosaicDataset**.

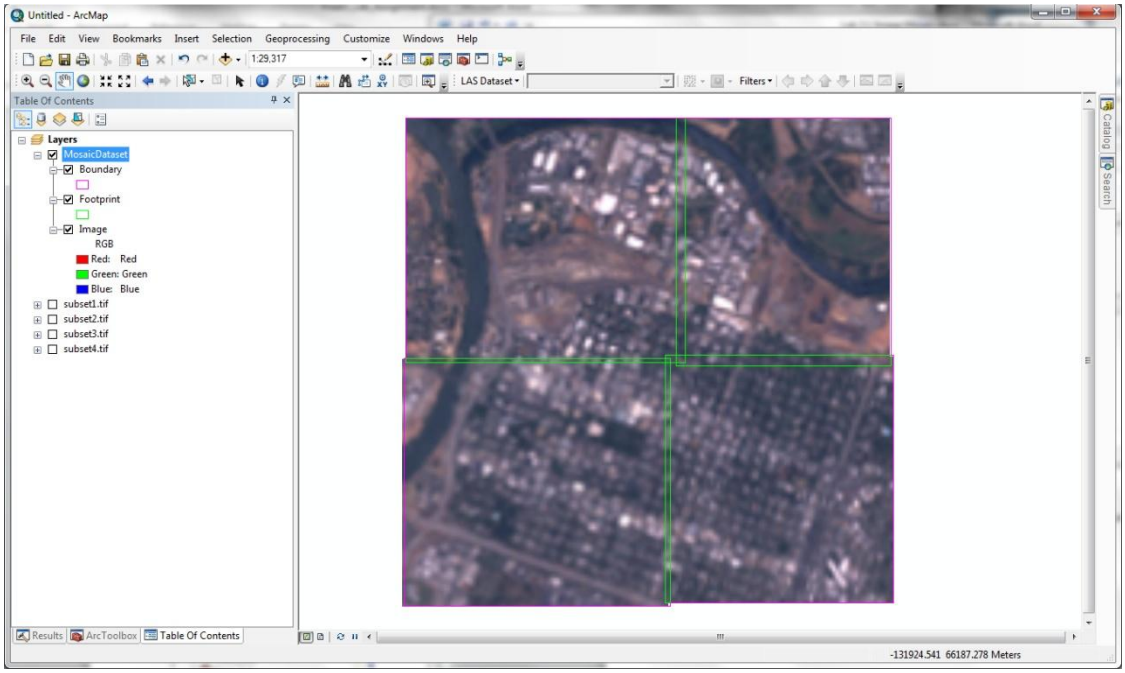


9. Click the **Preview** tab to see the mosaic image.



Note that individual polygons are created and are part of the mosaic dataset.

The mosaic dataset can now be added to ArcMap. Notice that the Image, Footprint, and Boundary all appear within the Mosaic Dataset in the Table of Contents.



Conclusion

In this lab, the image mosaic routine in the Image Analysis Window was used to bring multiple images together to make a larger image. An image mosaic can be used as a background or in other processing steps. A mosaic dataset can be used to create image mosaics composed of many images and improve performance when the dataset has a large number of images or the images are spread across large geographic areas.

Review Exercises

The review exercise included throughout the lab is listed in this section. You may click the name of the exercise to link to the exercise's location within the lab.

Exercise A: *What are the number of bands, rows, and columns for the mosaic dataset?*