Exercise 4: Creating a mosaic dataset using a raster type for orthorectification

In this exercise, you will be setting up a mosaic dataset using raw aerial imagery, a DEM, and some parameter files. The imagery added to this mosaic dataset has been processed with MATCH-AT and will be added to the mosaic dataset using the MATCH-AT raster type.

Complexity:
Beginner

Data Requirement:
ArcGIS Tutorial Data Setup

Data Path:
C:\arcgis\ArcTutor\Raster\Data

Goal:
To create a mosaic dataset using the MATCH-AT raster type, which will create on-the-fly orthorectified mosaicked images

This exercise does not rely on any previous exercises.

Before you begin, **you will need to edit the hard-coded paths to the data in the MATCH-AT project file** (Amberg_MAT2.prj in \your_folder\Data\Amberg_scans\Match-AT Parameters). This is a text file and can be edited in any text editor. This project file is a text file you can open in any text editor program (such as Notepad or WordPad). Search for the string C:\ImageServerTutorial\Data\Amberg_scans\Scans and replace it with your path to the \Scans folder containing the .tif files.

For example, if your path is D:\mydata, you will likely replace text in the line:

$PHOTO_FILE: **C:**ImageServerTutorial\Data\Amberg_scans\Scans\110211.tif

with

$PHOTO_FILE: **D:\mydata**ImageServerTutorial\Data\Amberg_scans\Scans\110211.tif

Start ArcMap

Steps:

1. Start ArcMap by clicking **Start** > **All Programs** > **ArcGIS** > **ArcMap 10.**

2. Click **Cancel** on the *ArcMap - Getting Started* window.
   This window may not open if you've previously opted not to show it.

   📓 **Note:** You will be setting the default map document's geodatabase later in this exercise.

Create a file geodatabase

If you have already created the ImageGDB in another exercise, you can skip this section of steps.

Steps:

1. Click the Catalog window button 📑 on the Standard toolbar.
   This opens the *Catalog* window.

2. In the **Location** text box, type `C:\your_folder` and press ENTER. This location is added to the Catalog tree under the Folders Connection heading.
   If your tutorial data was installed in a different location, alter the path according to your installation location.

3. Right-click the Raster folder and click **New** > **Folder**.

4. Name the folder Exercises.

5. Right-click the Exercises folder and click **New** > **File Geodatabase**.

6. Rename the new file geodatabase ImageGDB.

Set the default geodatabase

Each map document has a default geodatabase, which is the home location for the spatial content of your map. This location is used for adding datasets and saving resulting datasets created by various editing and geoprocessing operations.

Learn about the default geodatabase

Steps:

1. Right-click the ImageGDB geodatabase in the *Catalog* window and click **Make Default Geodatabase**.

Create a new mosaic dataset

Steps:

1. Right-click the ImageGDB in the *Catalog* window and click **New** > **Mosaic Dataset**.
   This opens the Create Mosaic Dataset tool.

2. Type AmbergOrtho in the **Mosaic Dataset Name** text box.

3. Click the **Coordinate System** browse button .

4. Click **Select**.

5. Double-click the **Projected Coordinate Systems** folder, double-click the **National Grids** folder, double-click the **Germany** folder, select **Germany Zone 4.prj**, then click **Add**.

6. Click **OK** to close the *Spatial Reference Properties* dialog box.

7. Click **OK** on the Create Mosaic Dataset tool window.
   The reporter window opens.

8. Once the process is complete, click **Close**.
   The AmbergOrtho mosaic dataset is created in the geodatabase and added to the ArcMap table of contents. This is an empty mosaic dataset. You will be adding raster datasets to it in the next steps.

When the mosaic dataset is added to the table of contents, it is added as a group layer. The top level has the name of the mosaic dataset--AmbergOrtho. There are also empty Boundary, Footprint, and Image layers.

Add rasters to the mosaic dataset

Steps:

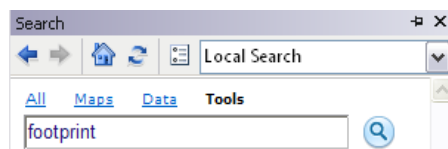1. Right-click the AmbergOrtho mosaic dataset in the *Catalog* window and click **Add Rasters**.

This opens the Add Rasters To Mosaic Dataset tool.

2. In the **Raster Type** list, choose **Match-AT**.

3. Click the **Properties** button .
   The *Raster Type Properties* dialog box is opened. Here, you will enter specific information about the DEM and the location of the camera file.

4. Click the **Properties** tab.

5. Click the **DEM** radio button.

6. Click the browse button and navigate to
   `C:\your_folder\Data\Amberg_Scans\DEM`.

7. Click the **Show of type** drop-down arrow and click **Raster datasets**.

8. Click the `01x01.flt` file and click **Add**.

9. Click the **Auxiliary Inputs** tab.

10. Click the **Camera** browse button .

11. Navigate to `C:\your_folder\Data\Amberg_Scans\Match-AT Parameters`, click the `CAMERA` file, then click **Open**.

12. Click **OK** to close the dialog box.

13. Click the **Input** browse button .

14. Navigate to `C:\your_folder\Data\Amberg_Scans\Match-AT Parameters\Amberg_MAT2.prj` and click **Open**.

15. Click **OK** to run the tool.

16. Once the process is complete, click **Close**.
    The raster datasets are added to the mosaic dataset. The footprints are created for each raster dataset, and the boundary is generated for the entire mosaic dataset.
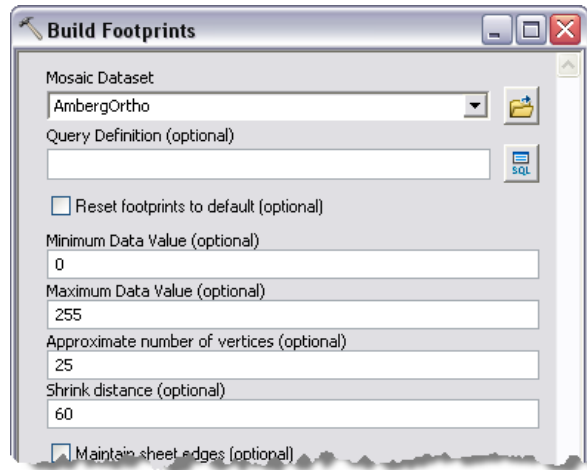
Shrink the footprints

Steps:

1. Click the **Search window** button .

2. Click **Tools**.

3. Type `footprint` and click the **Search** button .

4. Click **Build Footprints** in the returned list.
   The Build Footprints tool is opened.

5. Click the **Mosaic Dataset** drop-down arrow and click **AmbergOrtho**.

6. Type `0` in the **Minimum Data Value** text box.

7. Type `255` in the **Maximum Data Value** text box.

8. Type `60` in the **Shrink Distance** text box.

9. Click **OK**.

10. Once the process is complete, click **Close**.
    The footprints will be updated in the display view.
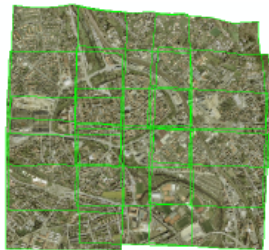
Build the overviews

Steps:

1. Right-click the AmbergOrtho mosaic dataset in the *Catalog* window and click **Build Overviews**.
   This opens the Build Overviews tool.

2. Accept the defaults and click **OK**.

3. Once the process is complete, click **Close**.

The mosaic dataset has been created and is ready to publish as an image service using ArcGIS Server. You can also use the mosaic dataset as a layer within ArcMap or ArcGlobe.

练习要求：将轮廓线优化之后的镶嵌图出图提交

Exercise 5: Color balancing a mosaic dataset

In this exercise, you will create a mosaic dataset wherein all the raster datasets will be color balanced using geoprocessing tools in ArcMap.

This exercise does not rely on any previous exercises.

Before you begin, it is assumed that you have installed the tutorial at C:\your_folder\Data. If not, make the appropriate path changes throughout this tutorial so it works properly for you.

Complexity:
Beginner
Data Requirement:
ArcGIS Tutorial Data Setup
Data Path:
C:\arcgis\ArcTutor\Raster\Data
Goal:
Create a mosaic dataset and apply a color correction to balance the mosaicked image.

Start ArcMap

Steps:

1. Start ArcMap by clicking **Start** > **All Programs** > **ArcGIS** > **ArcMap 10.**

2. Click **Cancel** on the **ArcMap - Getting Started** window.
    This window may not open if you've previously opted not to show it.

    📋 **Note:**   You will be setting the default map document's geodatabase later in this exercise.

Create a file geodatabase

If you have already created ImageGDB in another exercise, you can skip this section of steps.

Steps:

1. Click the Catalog window button 🗂 on the Standard toolbar.
    This opens the **Catalog** window.

2. In the **Location** text box, type C:\your_folder and press ENTER. This location is added to the Catalog tree under the Folders Connection heading.
    If your tutorial data was installed in a different location, alter the path according to your installation location.

3. Right-click the Raster folder and click **New** > **Folder**.

4. Name the folder Exercises.

5. Right-click the Exercises folder and click **New** > **File Geodatabase**.

6. Rename the new file geodatabase ImageGDB.

Set the default geodatabase

Each map document has a default geodatabase, which is the home location for the spatial content of your map. This location is used for adding datasets and saving resulting datasets created by various editing and geoprocessing operations.

Learn about the default geodatabase

Steps:

1. Right-click the ImageGDB geodatabase in the *Catalog* window and click **Make Default Geodatabase**.

Create a new mosaic dataset

Steps:

1. Right-click ImageGDB in the *Catalog* window and click **New** > **Mosaic Dataset**.
   This opens the *Create Mosaic Dataset* tool dialog box.

2. Type `ColorCorrected` in the **Mosaic Dataset Name** text box.

3. Click the **Coordinate System** browse button .

4. Click **Import**.

5. Navigate to C:\your_folder\Data\Orthos, click the first file listed, then click **Add**.

6. Click **OK** to close the *Spatial Reference Properties* dialog box.

7. Click **OK** on the *Create Mosaic Dataset* tool dialog box.
   If the reporter window opens, click **Close** once the process is complete.
   The ColorCorrected mosaic dataset is created in the geodatabase and added to the ArcMap table of contents. This is an empty mosaic dataset. You will be adding raster datasets to it in the next steps.

When the mosaic dataset is added to the table of contents, it is added as a mosaic layer, which is essentially a special group layer. The top level has the name of the mosaic dataset—ColorCorrected. There are also empty Boundary, Footprint, and Image layers.

Add rasters to the mosaic dataset

Steps:

1. Right-click the ColorCorrected mosaic dataset in the *Catalog* window and click **Add Rasters**.
   This opens the Add Rasters To Mosaic Dataset tool dialog box.

2. **Raster Type** should be set to **Raster Dataset**.

3. Click the drop-down arrow and click **Workspace**.

4. Click the **Input** browse button .

5. Navigate to C:\your_folder\Data\Orthos and click **Add**.

6. Expand **Advanced Options**.
   Normally, you would also check the options **Build Raster Pyramids** and **Calculate Statistics**; however, these input files are MrSIDs and already have this information stored within their format, so you do not need to check these options.

7. Click **OK** to run the tool.
   If the reporter window opens, click **Close** once the process is complete.
   The raster datasets are added to the mosaic dataset. The footprints are created for each raster dataset, and the boundary is generated for the entire mosaic dataset.

8. You may need to click the **Full Extent** button to view the mosaic dataset.
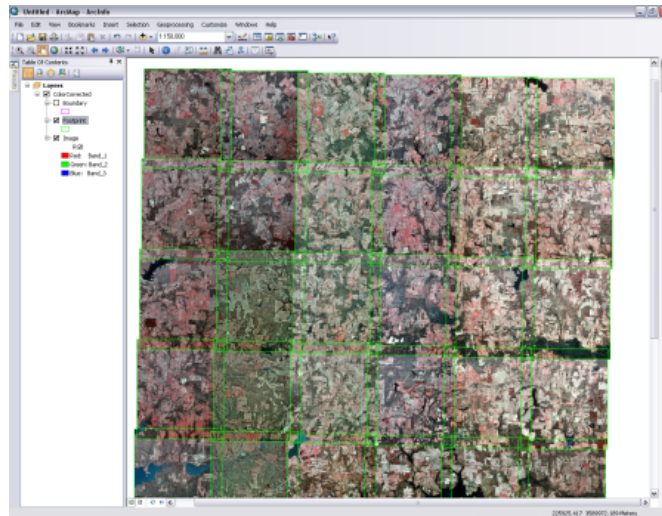
Color balance the mosaic dataset

Steps:

1. In the scale box on the *Standard* toolbar, type `150,000` and press ENTER.
   At this scale, you should see the images in the mosaic dataset. They may not all be drawn because, by default, there is a display limit of 20 rasters.
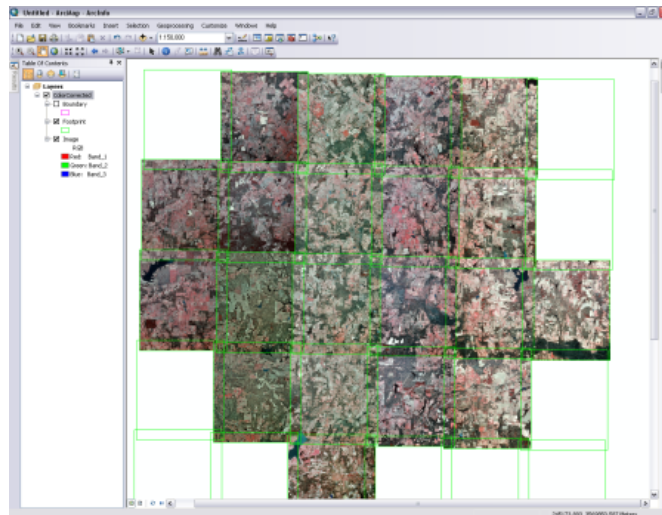
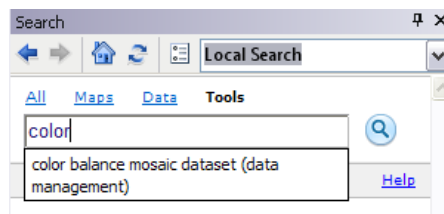2. In the *Catalog* window, right-click the ColorCorrected mosaic dataset and click **Properties**. This opens the *Mosaic Dataset Properties* dialog box.

3. Click the **Defaults** tab.

4. Click in the **Maximum Number of Rasters per Mosaic** text box and type `50`.
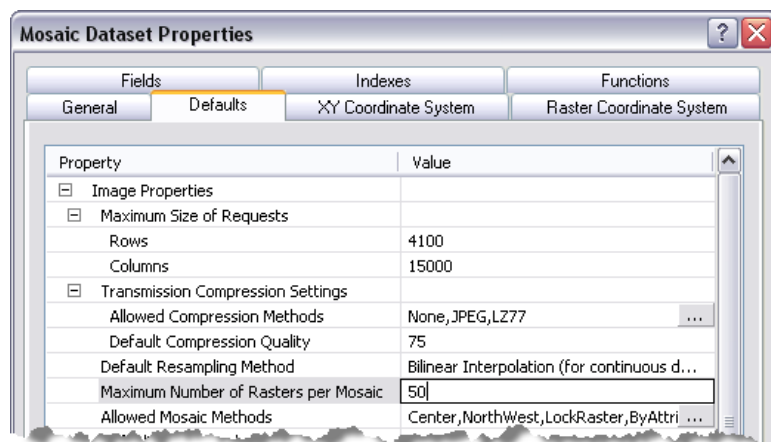
5. Click **OK** to close the *Mosaic Dataset Properties* dialog box.

6. Click the **Refresh** button at the bottom of the window.

7. Click the **Search Window** button .

8. Click **Tools**.

9. Type `Color` in the Search window and click the text that appears.

10. Click **Color Balance Mosaic Dataset** in the returned list to open the tool.

11. Click the **Mosaic Dataset** drop-down arrow and choose the **ColorCorrected** mosaic dataset.

12. Click the **Color Surface Type** drop-down arrow and click **FIRST_ORDER**.

13. Click **OK** to run the tool.
    If the reporter window opens, click **Close** once the process is complete.

    The display view is updated with a color balanced image.
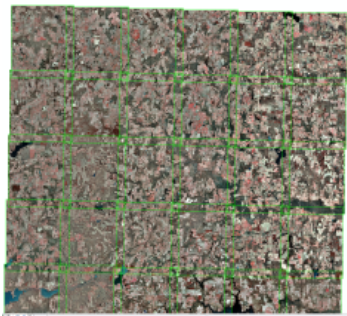
Generate the overviews

Steps:

1. In the *Catalog* window, right-click the ColorCorrected mosaic dataset and click **Build Overviews**.
This opens the Build Overviews tool dialog box.

2. Click **OK** to run the tool.
If the reporter window opens, click **Close** once the process is complete.

The mosaic dataset is created and is ready to publish as an image service using ArcGIS Server. You can also use the mosaic dataset as a layer within ArcMap or ArcGlobe.

练习要求：将经颜色均衡后的镶嵌图出图提交

Exercise 6: Color balancing a raster catalog

In this exercise, you will color balance the raster datasets within a raster catalog and create a single raster dataset from the color-balanced raster catalog. This exercise takes you through three color correction options to show you how you can experiment with the options to define the correct color correction for your data.

This exercise does not rely on any previous exercises.

Before you begin, it is assumed that you have installed the tutorial at C:\your_folder\Data. If not, make the appropriate path changes throughout this tutorial so it works properly for you.

Complexity:
Beginner
Data Requirement:
ArcGIS Tutorial Data Setup
Data Path:
C:\arcgis\ArcTutor\Raster\Data
Goal:
Color balance the raster datasets within a raster catalog and export to a mosaicked raster dataset.

Start ArcMap

Steps:

1. Start ArcMap by clicking **Start** > **All Programs** > **ArcGIS** > **ArcMap 10.**

2. Click **Cancel** on the ***ArcMap - Getting Started*** window.
   This window may not open if you've previously opted not to show it.

   Note: You will be setting the default map document's geodatabase later in this exercise.

Create a file geodatabase

If you have already created the ImageGDB in another exercise, you can skip this section of steps.

Steps:

1. Click the Catalog window button on the Standard toolbar.
   This opens the ***Catalog*** window.

2. In the **Location** text box, type C:\your_folder and press ENTER. This location is added to the Catalog tree under the Folders Connection heading.
   If your tutorial data was installed in a different location, alter the path according to your installation location.

3. Right-click the Raster folder and click **New** > **Folder**.

4. Name the folder Exercises.

5. Right-click the Exercises folder and click **New** > **File Geodatabase**.

6. Rename the new file geodatabase ImageGDB.

Set the default geodatabase

Each map document has a default geodatabase, which is the home location for the spatial content of your map. This location is used for adding datasets and saving resulting datasets created by various editing and geoprocessing operations.

Learn about the default geodatabase

Steps:

1. Right-click the ImageGDB geodatabase in the *Catalog* window and click **Make Default Geodatabase**.

Create a new raster catalog

You will be creating an unmanaged raster catalog. This is a raster catalog that contains pointers to the source data instead of loading the raster datasets within.

Steps:

1. Right-click the ImageGDB in the *Catalog* window and click **New** > **Raster Catalog**.
   This opens the Create Raster Catalog tool.

2. Type `ColorBalanced` in the **Raster Catalog Name** text box.

3. Click the **Coordinate System for Geometry Column** button .

4. Click **Import**.

5. Navigate to C:\your_folder\Data\Orthos, click the first file, then click **Add**.

6. Click **OK** to close the *Spatial Reference Properties* dialog box.

7. Click the **Raster Management Type** drop-down arrow and click **UNMANAGED**.

8. Click **OK** on the Create Raster Catalog tool window.
   If the reporter window opens, click **Close** once the process is complete.
   The ColorBalanced raster catalog is created in the geodatabase and added to the ArcMap table of contents. This is an empty raster catalog. You will be adding raster datasets to it in the next steps.

Add raster datasets to the raster catalog

Steps:

1. Right-click the ColorBalanced raster catalog in the *Catalog* window and click **Load** > **Load From Workspace**.
   This opens the Workspace To Raster Catalog tool.

2. Click the Input Workspace browse button .

3. Navigate to C:\your_folder\Data\Orthos and click **Add**.

4. Click **OK** on the Create Raster Catalog tool window.
   If the reporter window opens, click **Close** once the process is complete.

5. You may need to click the **Full Extent** button to view the mosaic dataset.
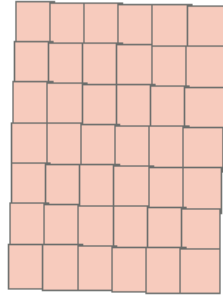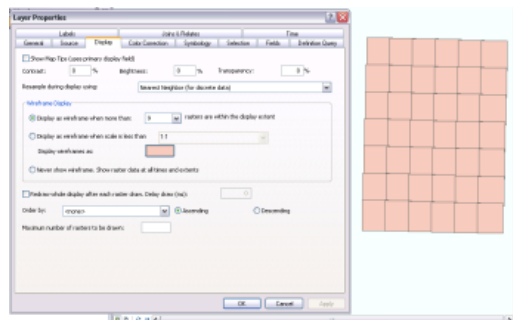
Color correcting the raster catalog

The color correction is stored within the Layer Properties; therefore, from within that dialog box, you can interactively modify and view the results.

In the following steps, **you will try several color correction methods.**

Turn off the wireframe

Steps:

1. Set up your display so you can see the raster catalog and the Layer Properties dialog box. It is recommended that you modify the scale of the display to 1:500,000 and pan the display so that the raster catalog is to one side. This way, the Layer Properties dialog box does not cover the raster catalog.

2. Right-click **ColorBalanced** in the table of contents and click **Properties**.

3. Click the **Display** tab.

4. Click the **Never show wireframe** radio button and click **OK**.
   The raster catalog will redraw by rendering the rasters and not the wireframe. Now you can see each raster dataset in the raster catalog.

Color matching

Color matching matches the overlapping areas between the reference raster and the source rasters. Color matching is not recommended for this dataset because there is not much overlap. However, you can go though the steps to see how this process is done and see the results.

Steps:

1. Click the **Select Features By Geometry** button on the *Tools* toolbar.

2. Click a raster dataset within the raster catalog.
   The selected footprint will be highlighted.

3. Right-click **ColorBalanced** in the table of contents and click **Properties**.

4. Click the **Color Correction** tab.

5. Check **Color Matching**.

6. Click the **Define From Selection** radio button.

7. Click **Apply**.
   You will see this result is very poor. This is because there are almost no overlapping pixels within this raster catalog. Therefore, this method should not be used.

8. Uncheck **Color Matching** and click **Apply**.

9. Click **OK** to close the dialog box.

10. Click the **Clear Selected Features** button on the Tools toolbar.

Histogram balancing

Histogram balancing changes each of the pixel's values toward the target histogram. Histogram balancing works best when each raster catalog items have similar histogram distributions.

Steps:

1. Click the **Color Correction** tab.

2. Check **Color Balancing**.

3. Click the **Balancing Method** drop-down and click **Histogram Balancing**.

4. Click **Apply**.
   Once the raster catalog redraws, you will see that these results are better than the previous result, but still not correct.

Dodging balancing

When you use dodging, each of the pixel values are changed toward the target color. These values are used to determine the output value for each pixel. When using this method, you must also choose the type of target color surface to use, which will affect what the target color is. Dodging balancing tends to give the best result in most cases.

This final method will be one that provides the best correction for this dataset.

Steps:

1. Click the **Balancing Method** drop-down arrow and click **Dodging Balancing**.

2. Click the **Target Color Surface Type** drop-down arrow and select **First Order Surface**.

3. Check **Apply Contrast Adjustment**.

4. Click **Apply**.
   First the target color surface statistics are calculated, then the color balancing is applied.

5. When the correction is complete, click **OK** to close the dialog box.

Create a color balanced raster dataset

You can export the raster catalog layer to a raster dataset from the table of contents (as described in the steps below) or you can use the Raster Catalog To Raster Dataset tool and check the **Color Balancing** check box.

> **Note:** The process to export to a raster dataset may take some time and can be skipped as part of this exercise.

Steps:

1. Right-click **ColorBalanced** in the table of contents and click **Data** > **Mosaic Raster Catalog**.

2. Click the **Location** browse button .

3. Navigate to and select the ImageGDB and click **Add**.

4. Type `BalancedImage` in the **Name** text box.

5. Click **Save**.

6. Click **Yes** to add the exported raster dataset to *ArcMap*.

You've now created a single color-balanced raster dataset from many raster datasets using a raster catalog. You can close ArcMap without saving the map document.

练习要求：对比三种方法效果，将颜色平衡前后的对比图提交。

Exercise 7: Adding a satellite sensor raster type to a mosaic dataset

In this exercise, you will create a mosaic dataset containing a Landsat 7 ETM+ scene using geoprocessing tools within ArcMap. This will be a multiband, pan-sharpened mosaic dataset. You will edit the raster type's properties to modify some default parameters that are applied when adding this data to the mosaic dataset.

This exercise does not rely on any previous exercises.

Before you begin, it is assumed that you have installed the tutorial at C:\your_folder\Data. If not, make the appropriate path changes throughout this tutorial so it works properly for you.

The data provided in the Landsat_p114r75 folder comes from Landsat.org/Tropical Rain Forest Information Center, a member of NASA's Federation for Earth Science Information Partners (ESIP) at Michigan State University (http://www.landsat.org/).

Complexity:
  Intermediate
Data Requirement:
  ArcGIS Tutorial Data Setup
Data Path:
  C:\arcgis\ArcTutor\Raster\Data
Goal:
  Learn how to add the Landsat 7 ETM+ raster type to a mosaic dataset.

Start ArcMap

Steps:

1. Start ArcMap by clicking **Start** > **All Programs** > **ArcGIS** > **ArcMap 10.**

2. Click **Cancel** on the *ArcMap - Getting Started* window.
    This window may not open if you've previously opted not to show it.

    Note: You will be setting the default map document's geodatabase later in this exercise.

Create a file geodatabase

If you have already created ImageGDB in another exercise, you can skip this section of steps.

Steps:

1. Click the Catalog window button on the Standard toolbar.
    This opens the *Catalog* window.

2. In the **Location** text box, type `C:\your_folder` and press ENTER. This location is added to the Catalog tree under the Folders Connection heading.
    If your tutorial data was installed in a different location, alter the path according to your installation location.

3. Right-click the Raster folder and click **New** > **Folder**.

4. Name the folder `Exercises`.

5. Right-click the Exercises folder and click **New** > **File Geodatabase**.

6. Rename the new file geodatabase `ImageGDB`.

Set the default geodatabase

Each map document has a default geodatabase, which is the home location for the spatial content of your map. This location is used for adding datasets and saving resulting datasets created by various editing and geoprocessing operations.

Learn about the default geodatabase

Steps:

1. Right-click the ImageGDB geodatabase in the *Catalog* window and click **Make Default Geodatabase**.

Create a new mosaic dataset

Create a mosaic dataset to add the Landsat imagery that will be pan-sharpened.

Steps:

1. Right-click the ImageGDB in the *Catalog* window and click **New** > **Mosaic Dataset**.
   This opens the *Create Mosaic Dataset* tool dialog box.

2. Type `LandsatPS` in the **Mosaic Dataset Name** text box.

3. Click the **Coordinate System** browse button .

4. Click **Select**.
   Do not click Import as the internal spatial reference of the files you will be adding are referenced to the wrong hemisphere.

5. Double-click the Projected Coordinate Systems folder, double-click the UTM folder, double-click the WGS 1984 folder, double-click the Southern Hemisphere folder, choose WGS 1984 UTM Zone 50S.prj, then click **Add**.

6. Click **OK** to close the *Spatial Reference Properties* dialog box.

7. Click **OK** on the *Create Mosaic Dataset* tool dialog box.
   If the reporter window opens, click **Close** once the process is complete.

   The LandsatPS mosaic dataset is created in the geodatabase and added to the ArcMap table of contents. This is an empty mosaic dataset. It is added as a mosaic layer, which is a special group layer. The top level has the name of the mosaic dataset—LandsatPS. There are also empty Boundary, Footprint, and Image layers. You will add the Landsat imagery to it in the next steps.

Add rasters to the mosaic dataset

Steps:

1. Right-click the LandsatPS mosaic dataset in the *Catalog* window and click **Add Rasters**.
   This opens the *Add Rasters To Mosaic Dataset* tool dialog box.

2. In the **Raster Type** list, choose **Landsat 7 ETM+**.

3. Click the **Properties** button .

The *Raster Type Properties* dialog box opens. Here you will enter information to define how the data will be added and any processing that will be applied, such as the bands that will be added and the enhancement that will be applied to the data.

4. Click the **General** tab.

5. Click the **Processing Templates** drop-down arrow and click **Pansharpen**.
   The processing templates define how the data will be added to the mosaic dataset; for example, the template you select creates a multiband image that is pan-sharpened once you zoom in to the pixel level of the higher-resolution panchromatic band.

6. Click the **Properties** tab.
   Here you can modify some of the defaults. For example, you can modify the band combination by changing the order or removing some of the bands. The band combination is defined by a space-delimited list. You can also modify the type of histogram stretch you want applied and the type of pan-sharpening.

7. Type `1.5` in the **Percent Clip Minimum** and **Percent Clip Maximum** text boxes.

8. Check the **4th-band as infrared image** check box.
   This ensures that the fourth band is calculated in the pan-sharpening algorithm.

9. Click **Apply**.

10. Click the **Functions** tab.
    This tab displays the functions that are applied based on the processing template that you chose on the General tab. You chose the Pansharpen template.
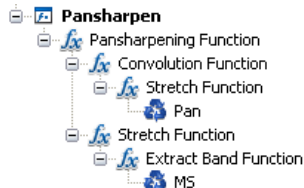
The functions are applied to the imagery from the bottom of the chain to the top. You can see that the Pansharpen template creates a MS (multispectral) image, then uses the Extract Bands function to define the four bands used in the pan-sharpening algorithm. Both MS and Pan (panchromatic) images are enhanced using the Stretch function. A Convolution function, which is sharpening the Pan image, is applied, then the Pan and MS images are combined using the Pansharpening function.

You can add or edit the functions in the function chain prior to adding the data to the mosaic dataset. You won't be doing it in this exercise; however, if you do make modifications to the function chain or any of the properties on this dialog box, you can save the changes to a new raster type so you can use it again and be sure to apply the same settings. To save the changes, click the Save As button on the General tab.

11. Click **OK**.

12. Click the drop-down arrow and click **Workspace**.
    You only have one image scene to add, so you could point to the single file needed; however, if you're adding multiple images organized into a folder, you want to use the Workspace option.

13. Click the **Input** browse button .

14. Navigate to C:\your_folder\Data, click Landsat_p114r75, then click **Add**.

15. Check **Update Overviews**.

16. Click **Advanced Options** to expand the list of parameters.

17. Check **Build Raster Pyramids**.

18. Check **Calculate Statistics**.
    It is generally recommended that you build pyramids and calculate statistics on the data that is added to a mosaic dataset. Statistics improve the display, and pyramids reduce the number of overviews that are generated. By checking these check boxes, the operations are run prior to calculating the cell sizes or overviews. If pyramids or statistics exist for a raster dataset, they are not regenerated.

19. Check **Build Thumbnails**.

20. Type `Pan-sharpening Landsat imagery` in the **Operation Description** text box.
    This parameter allows you to add descriptive text to the log that is maintained by the mosaic dataset.

21. Click **OK** to run the tool.
    If the reporter window opens, click **Close** once the process is complete.
    The Landsat 7 ETM+ satellite image is added to the mosaic dataset. The footprints are created for each raster dataset, and the boundary is generated for the entire mosaic dataset. The overviews are then generated for the entire mosaic dataset.

22. You may need to click the **Full Extent** button to view the mosaic dataset.

Change the band combination

By default, the bands are displayed in the order they were added to the mosaic dataset. Therefore, the default band combination is 1, 2, 3 for red, green, and blue.

Steps:

1. Right-click **Image** in the table of contents and click **Properties**.
   The *Layer Properties* dialog box for the mosaic dataset image is opened.

2. Click the **Symbology** tab.

3. Click the drop-down arrows to change the band combination to 3, 2, 1.
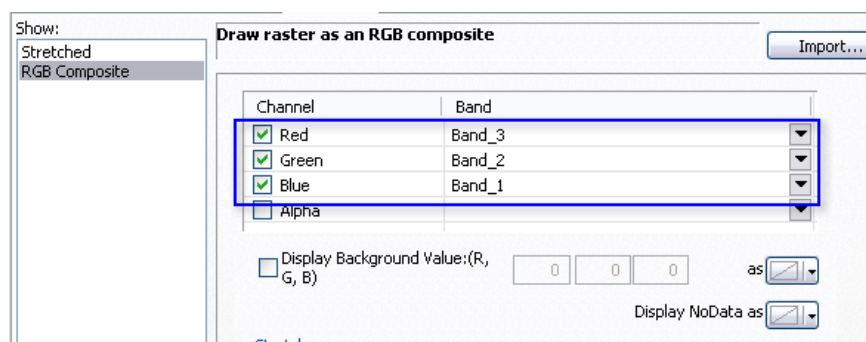
4. Click **OK**.

A natural or true-color image is displayed.

Examine the tables

There are three main tables that are maintained with all mosaic datasets: the Attribute table, Logs table, and Raster Type table. The Attribute table contains specific metadata information for each raster dataset in the mosaic dataset. You can also add and populate fields. These fields can be used when defining a query on the mosaic dataset (or image service). If you don't want all the fields exposed to those using the mosaic dataset, you can edit Allowed Fields on the Mosaic Dataset Properties dialog box. The Logs table maintains a list of every action that was performed on the mosaic dataset, such as adding data, creating service overviews, and removing data. The Raster Type table maintains a list of all the raster types used to create the mosaic dataset.

Steps:

1. Right-click LandsatPS in the ArcMap table of contents and click **Open** > **Raster Type Table**. There are two rows in this table. The first row (OBJECTID = 1) identifies the Landsat 7 ETM+ raster type that you used to add the data to the mosaic dataset. The operation description you added is displayed in the Description column. The second row (OBJECTID = 2) identifies that there are overviews generated for this mosaic dataset and the time at which they were created.

2. Close the table.

3. Zoom in to your mosaic dataset so you're viewing it at approximately a 1:200,000 scale.

4. Right-click LandsatPS in the ArcMap table of contents and click **Open** > **Attribute Table**. You should see four rows in the table. The name of the rasters or their source datasets are listed in the Name column. If you scroll across the table, you will see the Tag column. The Tag column is associated with the sources identified in the Pansharpen function chain. The MS tag represents the multispectral image, and the Pansharpened tag represents the pan-sharpened image.

Name	MinPS *	MaxPS *	LowPS *	HighPS *	Category	Tag
p114r075_7x20000501.met	28.5	342	28.5	114	1	MS
p114r075_7x20000501.met;p114r075_7x20000501.met	0	28.5	14.25	114	1	Pansharpened
Ov_i02_L01_R00000004_C00000003.tif	0	1026	342	342	2	Dataset
Ov_i02_L02_R00000001_C00000001.tif	1026	51300	1026	1026	2	Dataset

MinPS and MaxPS indicate the pixel resolutions where the images will be displayed. There are only two overview images. These can be identified by the Ov_ prefix in their name. When you view the image at its full extent, the bottom overview image is displayed, and as you zoom in, requiring a higher pixel size, you see the image above it in the table. Next you see the source imagery identified by the MS tag. This is displayed when you are viewing an image at a pixel resolution between 28.5 meters to 342 meters. When you zoom in to a pixel resolution smaller than 28.5 meters, you view the pan-sharpened image.

5. Type `80000` into the scale box on the *Standard* toolbar.
   You are viewing the pan-sharpened image.

You can see some artifacts in the pan-sharpened image that were not present before. This is because the panchromatic image has some artifacts that the convolution filter is enhancing.

6. Click the row under the **Raster** column representing the pan-sharpened image.
   A gray button appears.

7. Click the gray button.
   This opens a window allowing you to preview the raster image, its properties and metadata, and the function chain used to generate the image.

8. Click the **Functions** tab.
   You see the same function chain that was displayed when you were adding imagery to the mosaic dataset. The only difference is there are specific files listed where earlier you saw MS and Pan.

9. Right-click **Convolution Function** and click **Properties**.

10. Click the **Convolution** tab.

11. Click the **Type** drop-down arrow and click **Smooth Arithmetic Mean**.
    This filter removes the artifacts that the Sharpen type was enhancing.

12. Click **OK** to close the *Raster Function Properties* dialog box.

13. Click **Apply**.
    The display is updated and the artifacts are removed, resulting in a much nicer image.

14. Close the table window.
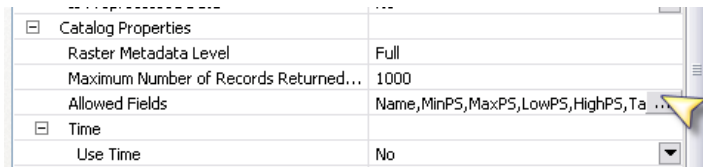
Properties and metadata

Steps:

1. In the *Catalog* window, right-click the LandsatPS mosaic dataset and click **Properties**.
   The *Mosaic Dataset Properties* dialog box opens. Here you can view the properties for the entire mosaic dataset, including the setting that will affect how users interact with the dataset. You can also edit functions that will be applied to the entire mosaic dataset.

2. Click the **Defaults** tab.

3. Click the ellipsis button next to the **Allowed Mosaic Methods** row.

4. Uncheck **Seamline**, as no seamline is created as part of this exercise.

5. Click **OK**.

6. Click the ellipsis button next to the **Allowed Fields** row.

7. Uncheck the following: Name, LowPS, HighPS, GroupName, ProductName, ZOrder, SOrder, StereoID, Shape_Length, and Shape_Area.
    If you serve this dataset as an image service, only the fields checked will be accessible.

8. Click **OK** to close the *Mosaic Dataset Properties* dialog box.

9. In the Catalog window, right-click the LandsatPS mosaic dataset and click **Item Description**.
    The *Item Description* dialog box is opened. Here you can view or edit metadata information for the mosaic dataset.

10. Click the **Preview** tab.

11. Click the **Create Thumbnail** button .

12. Click the **Description** tab.
    The thumbnail you created is displayed on this tab.

13. Click the **Edit** button .

14. Type `Landsat image` in the **Title** text box.

15. Type `Landsat 7 ETM+ image within Australia` in the **Summary** text box.

16. Type your name in the **Credits** text box.

17. Click the **Save** button .

18. Close the window.

You have completed creating a mosaic dataset, adding data, and modifying the properties and metadata. You can share the ImageGDB location to make this mosaic dataset available within your organization, or serve this mosaic dataset as an image service using ArcGIS Server.

练习要求：将含有有影像的镶嵌图出图提交。