# CREATING A SPATIAL MODEL IN ERDAS IMAGINE

## eTRAINING

## Introduction

Introduces the basic components of Spatial Modeler and demonstrates how to build and execute a model.

## Software

- ERDAS IMAGINE

## Data

- qb_05_cherokee_pan.img – Panchromatic image
- qb_05_cherokee_ms.img – Multispectral image

## Transcript

0:09

Thank you for watching Creating a Spatial Model in ERDAS IMAGINE by Hexagon Geospatial eTraining. In this module you will be introduced to the Spatial Modeler, understand its basic components, and finally, build and execute a model.

The Spatial Modeler allows you to build a flow chart that contains operators strung together logically to produce output results. Real-time previews and visual indicators allow you to inspect the model as it runs, easily find and correct errors, and see the results before running the model.

0:40

The Spatial Modeler has three main parts:

- Objects,
- Operators, and
- Connections.

Objects define the items that are acted upon or created in the model. Operators are the actions that are done to the objects. Connections tie everything together and define the flow of the model.

Objects and operators have ports that are used to define input and output values including connections to and from other operators. The number of ports seen on an object will be different if the object is used as an input object or as an output object.

1:12

Red ports let us know that there are arguments that are not yet defined and either need a connection or a value associated to it.

If the port is gray, it’s either defined with a suitable value, or the port is used to define an optional value.

1:26

The model you'll create today will use two input raster objects along with a matrix. You'll run a convolution operator to create a custom pansharpened image. Before running the model, you'll preview the results by adding a preview object to the model. Finally, we'll run the model and generate an output image.

1. To get started, we have ERDAS IMAGINE open with two Viewers showing the QuickBird Satellite imagery that we'll use as the inputs to our model.

In Viewer 1, you have the higher resolution panchromatic image and in Viewer 2 you have the corresponding multispectral image. The model we will build will take these two images as inputs, and create a pansharpened output image that contains the high resolution of the panchromatic, with the band information from multispectral image.

2. Zoom in to show the difference between the images.

As you zoom in and view finer detail, it's easy to see the spatial resolution and band differences between the two images.

2:21

Now let's open the Spatial Modeler and build our model.

3. For now, clear the other Viewers.
4. From the **Toolbox** tab, select **Spatial Model Editor**.

You can see we now have a Spatial Model Editor window for building our model. Also, a new tab, **Spatial Modeler**, has been added along the ribbon providing tools to use as we build our model.

2:45

On the far left we see the **Contents** pane specific to the Spatial Modeler and on the far right we see an **Operators** pane. This pane gives me quick access to all predefined operators available when building a model.

To start building our model we'll first need to add an Input Raster operator.

5. From the **Operators** pane, expand the **Input** category > **Raster** and drag **Raster Input** into the viewer.
6. Double clicking on the operator opens the **Properties** box.
7. For our first input raster, add **qb_05_cherokee_pan.img**, ensure the **Interpolation** is set to **Bilinear**, and set **Read As** to **Float**.
8. Then click **OK**.

Once you click OK, the ports turn grey and a label has been assigned based on my defined criteria.

3:34

Next we'll add a matrix.

9. Again from the **Input Operators**, drag **Matrix > Kernel Matrix Input** into the viewer.
10. Double click the **Operator** to open and define the properties.
11. For this matrix, click **From Library** and select the default **7x7 Low Pass**, click **OK**, and **OK** to the Matrix dialog.

3:58

Next we need to add a Convolve operator. We can use the keyword search in the Operators pane to easily find it.

12. In the text window, I'll type `C-O-N`. As you type, the filter is applied and you quickly see the operator you're looking for.
13. Select it and drag it to the Modeler window.
14. Clear your search by clicking the X in the upper right corner.

4:22

Now you'll connect the Inputs to the operator.

15. First, connect the **RasterOut** port to the **RasterIn** port on the **Convolve** operator.
16. Drag the **RasterOut** port and drop it onto the **RasterIn** of the **Convolution** operator.
17. Do the same with the **Matrix** port to the **Kernel** port.

4:40

Now you'll add another operator.

18. Expand the **Math and Trig** category, scroll down and add **Divide** to the model.
19. Connect the **Output** port from **Raster Input** to Input Port 1 and **RasterOut** from the **Convolve** operator to Input2.
20. Now add the last **Raster Input** operator and double click to open the properties and define it.
21. Add qb_05_cherokee_ms.img as the input image, set the **Interpolation** to **Bilinear Interpolation** and **Read As** to **Float** and click **OK**.
22. Now add a **Multiply** operator from the **Math and Trig** group.
23. You can connect the output from **Divide** and the **RasterOut** port from Raster Input 2 object.

5:31

Next let's generate a preview.

24. From the **Output** operators, expand **View** and add **Preview** to the model.
25. Connect the **Output** port from **Multiply** to the **Preview** object.
26. From the **Execute** group on the **Spatial Model** tab, click the **Preview** button. This runs the model, opens a preview Viewer and loads a preview of the output image.

5:55

The model can be resized to the extent of the smaller model window. You can also see green checkmarks on each object and operator indicating that the model has not encountered any syntax errors and is able to run properly each step of the way.

If there were any syntax issues with the model, a red X would appear instead of a green checkmark. This allows you to see specifically where the model has run into an error and allows you to open that operator directly and fix it.

6:20

We can use the zoom tools to take a closer look at the preview results. We started this model with a 7x7 matrix. We can make changes to the model using the matrix properties box and view the on-the-fly results in the preview window.

27. First select the **Matrix** object to activate the **Properties** box.

28. Change the **KernelName** to **3x3** and see the results update in the preview window.

29. Next, change **5x5** and again see the change. This is a great way to modify input values and view the results before running the model.

30. For this model, return it to the original **7x7** matrix.

31. You're done with the preview window so go ahead and close it.

7:00

On the **Spatial Modeler** tab, you can use the **Fit to Frame** button along with your mouse wheel to resize the model to the Viewer. Now you can add the final Output object.

32. From the **Output** category, expand **Raster** and choose **Raster Output**.

33. Attach the **RasterOut** from the **Multiply** operator to the **Raster Output** object.

34. Define an output file name – in this case `resmerge.img`, set the **Data Type** to **Float 64 bit**, and the **File Type** to **Continuous** and click **OK**.

7:32

Before running the model, you'll set the **Processing Properties**. There are several tabs in this dialog box with many different processing options.

35. For this model, set the **Cell Size Rule** to **Minimum of all Inputs in Model**.

The **Window Rule** has many options including Intersection, Union of the Inputs, Specify and others.

36. Select **Specify** and define the corner coordinates used to define the subset boundary for the output image.

8:03

In this model, we will use the default options for the **Projection**, **Area of Interest**, and **Operator** tabs. These can all be modified based on the needs of your specific model and output criteria.

37. Once everything is defined, click **OK** to the Processing Properties.

Now save the model by selecting **File** > **Save As** > **Save Model As**, give the model a name and click **OK**.

8:29

Now you'll run the model.

38. From the **Execute** group, click **Run**.

8:34

The checkmarks indicate the model is running properly without syntax errors. In the lower right, I can see a status bar showing the model is running. I also see the Raster Output object showing the status of the image being processed.

39. Once the indicator shows 100%, close the model.

40. Open a new 2D Viewer and load your results. Here is **resmerge.img** image.

Notice that it has been subset based on the corner coordinates that were defined in the model.

9:07

Thank you for watching this eTraining module from Hexagon Geospatial. For more eTraining please visit hexagongeospatial.com/eTraining.