Creating a new Toolbox & Model

1. **Open ArcToolbox.**

2. In the **TreeView of ArcCatalog**, **navigate** to the C:\TempSDM\12_Model_Builder_and_Customization\Data\Tools folder.

3. **Right-click** on the **Tools** folder and **go to New>Toolbox.**

4. A **new toolbox** is added to the folder. **Change** the default name to “View Tools.”

5. **Right-click** on the **View Tools** toolbox you just created and **go to New>Model.** The **Model Editor** window will open.

6. In the **Main Menu**, **go to Model>Model**
Properties...

7. In the Name: text box, change the default model name from Model to “Higuchi Viewshed.” Click OK to close the Model Properties window.

8. Click on the Save Button to save your changes to the model.

Adding the New Toolbox to ArcMap and the ArcToolbox

1. In the TreeView of ArcCatalog, double-click the Observer_Points.mxd Map Document to open it.

2. Open the ArcToolbox Panel in ArcMap.

3. In the ArcCatalog TreeView, click-and-hold the View Tools Toolbox and drag it to the ArcToolbox icon at the top of the ArcToolbox panel. The View Tools will be added to the ArcToolbox, in alphabetical order.

4. Click on the Save Button in ArcMap.

Building the Model

1. From the Table of Contents in ArcMap, click-and-drag the Observer_Points layer from ArcMap into the Model Builder window.
2. **Activate** the ArcToolbox Search Tab and **search** on the term “add field.”

3. From the Search Results, **click-and-drag** the Add Field tool into the Model Window, just as you did the Observer_Points layer.

4. While the two Add Field objects are still selected, in the main menu **go to Edit>Copy**.

5. Again in the Main Menu, **go to Edit>Paste**. A second copy of the Add Field Object pair will be added.

6. **Activate** the Add Connection Button and use it to create a connection between the Observer_Points layer and the first Add Field Object.

7. **Double-click** on the Add Field Object you just created to open the ArcToolbox Dialog.

8. Your Observer_Points layer should already be assigned as the Input Table.

9. **Assign** a Field Name as “OFFSETA” taking care to use all caps.

10. **Leave** the Field Type as Long. **Click OK**.

11. **Select** the Add Connection Tool again and **connect** the Observer_Points (2) Object to the second Add Field Object.

12. **Double-click** on the second Add Field Object to open the dialog box.
13. **Assign a Field Name** of VERT1 and **accept** the **defaults** for the rest of the **settings**. **Click OK.**

14. **Return** to the **ArcToolbox Search Tab** and **search** on the term “calculate field.”

15. **Click-and-drag** the **Calculate Field Tool** to your **Model Builder window.**

16. While the new objects are still selected, **Copy-and-Paste** a second set to the model.

17. **Activate** the **Add Connection Tool** and **add** a connection between the Observer_Points (3) object and the first Calculate Field Object.

18. **Double-click** on the Calculate Field Object you just created the connection to to open the dialog.

19. **Use** the **drop-down** to **select** OFFSETA as the **Field Name**.

20. **Leave** the **Expression Field blank**. **Click OK.**

21. **Right-click** on the Calculate Field Object and **go to Make Variable>From Parameter>Expression.**

22. **Right-click** on the Expression Object and **select Model Parameter.**

23. **Right-click** on the Expression Object and **select Rename.** **Rename** the Object OFFSETA.
24. *Use* the Add Connection Tool to connect the Observer_Points (4) Object to the Calculate Field (2) Object.

25. *Double-click* on the Calculate Field (2) Object to open the dialog.

26. *Use* the drop-down to select VERT1 as the Field Name. *Click* OK.

27. *Right-click* on the Calculate Field (2) Object and *go to Make Variable>*From Parameter>*Expression.*


Adding the Viewshed Analysis Tool

1. *Return* to the ArcToolbox Search Tab and *search* on the term “viewshed.”

2. *Click-and-drag* the Viewshed Tool from the ArcToolbox Search Tab into your Model Builder window.

3. *Click-and-drag* the elevation layer from ArcMap’s Table of Contents to the Model Builder window.

4. *Activate* the Add Connection Tool and connect the last Observer_Points (5) object to the Viewshed Object.
5. **Use** the **Add Connection Tool** to connect the elevation Object to the Viewshed Object.

6. **Right-click** on the Output Raster Object and **select** Model Parameter.

7. **Save** your work in the **Model Builder Window**.

**Final Touches**

1. **Return** to the **ArcToolBox Search Tab** and **search** on the term “delete field.”

2. **Copy-and-Paste** a second copy of the Delete Field Objects to the **Model Window**.

3. **Use the Add Connection Tool** to connect the final Observer_Points (5) Object to the first Delete Field Object.

4. **Double-click** on the Delete Field Object to open its **dialog** and **select** OFFSETA as the field to delete. **Click OK**.

5. **Right-click** on the Delete Field Object you just altered and **select** Properties.

6. **Click** on the Preconditions Tab and **select** Output Raster. **Click OK**.

7. **Use the Add Connection Tool** to connect the Observer_Points (6) Object to the second Delete Field (2) Object.

8. **Double-click** on the Delete Field (2) Object to open its dialog, and **select** VERT1 as the field to be deleted. **Click**
OK.

9. **Right-click** on the Delete Field (2) Object and **open** the **Properties**.

10. **Select** the **Preconditions Tab** and **check** the Observer_Points (6) checkbox. **Click OK**.

11. **Save** your work in the **Model Builder Window**.

Using the Model

1. **Return** to ArcMap and find the Higuchi Viewshed Model in the ArcToolbox Panel.

2. **Double-click** on the Higuchi Viewshed Tool to **open** its dialog box.

3. **Assign** an OFFSETA value of 150.

4. **Assign** a VERT1 value of -10

5. **Browse** to your
   C:\Temp\initials\12_Model_Builder_and_Customization\Data\Work Folder and give the **Output Raster** an appropriate name.

6. **Cross your fingers & Click OK**.
7. You should be presented with a new raster layer of the Viewshed resulting from the parameters you have set.

**ArcGIS Weirdness**

For some reason, even though you have inserted a Delete Field routine in your model, if you try to run the model again from ArcToolbox you will get a message that OFFSETA and VERT1 already exist. Of course, they don’t, and this is a bug. The workaround would be to eliminate the Add Field Objects and simply use an Observer Points layer that already had the appropriate fields. This would allow you to recalculate (the model will overwrite each previous iteration of the field values) the parameter values without having to delete the fields. Or, you can simply leave the Model Builder Window open and use the File>Validate Entire Model routine before running the model each time (which is still faster that running all these routines manually each time).

The use of a model with this type of weirdness is intentional, so that you can see that sometimes problems require that you come at them from several directions in ArcMap.

**How to create custom toolbars**

1. On the **Main Menu**, go to **Tools>Customize**.

2. **Click** the **Toolbars tab**.

3. **Click New**.

4. **Name** the new toolbar “Workshop.”

5. **Click** the dropdown arrow of the **Save in combo box** and choose the **Normal.mxt**.

   This choice will save the new toolbar to the default view of ArcMap every time the program is opened on this machine. Saving the toolbar to the current document will cause the toolbar to be available only when this document is opened.

6. **Click OK**.

The new, empty toolbar appears in the Toolbars list; it is displayed in the application as a floating toolbar.
7. **Click** on the **Commands Tab** in the **Customize Dialog**.

8. **Scroll** down the list of **Categories** and **select** **Surface**.

9. **Click-and-drag** the **Slope...** item (in the **Commands** list), to the **Workshop Toolbar**.

10. **Click-and-drag** the **Hillshade item** (in the **Commands** list), to the **Workshop Toolbar**.

11. **Click Close**. You can **“dock”** the new toolbar in a place of your choice in the **ArcMap application window**.

---

**Adding an ArcScript to ArcMap**

1. **Open** your **web browser** and go to [http://arcscripts.esri.com/](http://arcscripts.esri.com/)

2. **Register** for an **account** (if you don’t have one).

3. **Return** to the **ArcScript Search page**.

4. **Change** the **ESRI Software drop-down** to **ArcGIS Desktop** and **search** on the term **“fishnet.”**

5. The first result should be the **Create a grid polygon shapefile (FINSHNET) tool**.

6. **Click** through the pages required to download the tool and **download** it to your computer.

7. **Browse** to the **folder** you have **downloaded** the tool to and **unzip** its contents.

---

**Installing the Tool in ArcMap**

1. **Return** to **ArcMap** and, in the **Main Menu**, go to **Tools>Customize**.
2. *Click* on the **Add from file**… **Button**.

3. *Browse* to the location of the files you extracted from the zipped file and **select** the Fishnet.dll file. *Click* **Open**.

4. You should receive a dialog box that indicates that the **clsFishnet Object** has been added. *Click* **OK**.

5. *Click* on the **Commands Tab** and scroll down the **Categories List** to find the **Developer Samples**. **Highlight** the **Developer Samples** item and **click-and-drag** the **Create Fishnet tool** to the **Workshop Toolbar** you created earlier.

6. **Close** the **Customize Window**.

7. *Click* on the **Fishnet Button** you dragged to the **Workshop Toolbar** to make sure that it launches the tool.