

# GeoMedia 3D

## Leveraging 3D Mesh Layer (3DML) Files





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## Acknowledgments

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# This Tutorial

## Tutorial Objective

The objective of this tutorial is to learn how to make use of the 3D Mesh Layer (3DML) files within GeoMedia 3D.

## Tutorial Overview

3D models are complex by their very nature, and when working with them in GIS systems the expectation is that there will be a lag in displaying large swaths of data for analysis and navigation. Not so with GeoMedia 3D. With the ability to create 3DML “meshes” of 3D models, GeoMedia 3D displays large collections of 3D models extremely quickly.

With this new rendering technique, urban planners can see new buildings in context of an entire downtown city scape.<sup>1</sup>



Entire city of Indianapolis, Indiana, USA.

As illustrated above, the ability to display large amounts of 3D models improves visualization and it allows users to get a better representation of the real world.

3DML files can be used in place of any 3D model layer in GeoMedia 3D. For example, they can be used in place of any feature class representing 3D models (such as buildings). Given this, if you have a feature class containing a large collection of relatively static models (that is, models where appearance is not driven through attribute-based symbology), you may want to consider creating a 3DML representation of this layer for performance reasons, as 3DML files are highly optimized for display within the 3D map window.

Note that once a 3DML file is created through the **Construct 3DML** publishing process, it is disconnected from the underlying feature class. Hence, changes within the source feature classes do not percolate through to the 3DML file. Given this, you will want to balance when 3DML files are used in place of actual model layers.

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<sup>1</sup> Models used to illustrate city scape in screen shots are courtesy of Pictometry ([www.eagleview.com](http://www.eagleview.com)).

## Tutorial Data Set

The exercises outlined in the GeoMedia 3D tutorials make use of specific data sets. Specifically, the GeoMedia 3D tutorial data sets include: vector sources (point, line, and area features), raster sources (aerial photographs in GeoTIFF format), and elevation sources in ERDAS Imagine and USGS SDTS formats.

## Tutorial Text Conventions

There are several conventions used throughout the tutorial:

- ❖ Ribbon bar items are shown as: On the **Aaa** tab, in the **Bbb** group, click **Ccc**.
- ❖ Dialog box names, field names, and button names are depicted using **Bolded Text**.
- ❖ Information to be entered, either by selecting from a list or by typing, is depicted using *Italicized Text*.

## Tutorial Prerequisites

There are no prerequisites for making use of this tutorial; however, having a basic understanding of the GeoMedia Desktop will be helpful in expediting the execution of certain steps within this tutorial.

# Section 1: Making use of 3DML Files

## Section Objective

In GeoMedia 3D, you can use the controls found within the **3D Mesh Layers** group to process and manipulate 3DML files. More specifically, these commands can be used to create and to display 3DML files. In this tutorial, you will learn how to:

- ❖ Create a 3DML file from a Feature Class containing 3D models.
- ❖ Insert a 3DML file into a 3D map window.

You must be connected to the Internet to complete this exercise as the default content file makes use of a TerraGate® connection to serve imagery and terrain information to the 3D map window.

## Tools Used

The GeoMedia 3D **Construct** and **Insert** commands are used in this section.



# Exercise 1: Creating a 3DML File

## Objective:

Making use of 3DML files requires two steps: (1) use the **Construct 3DML** command to create 3DML files from feature classes that reference 3D models, and (2) use the **Insert 3DML** command to create footprints, which in turn are used to render the models as a highly optimized mesh when in the 3D window. The objective of this exercise is to learn how to make use of the **Construct 3DML** command.

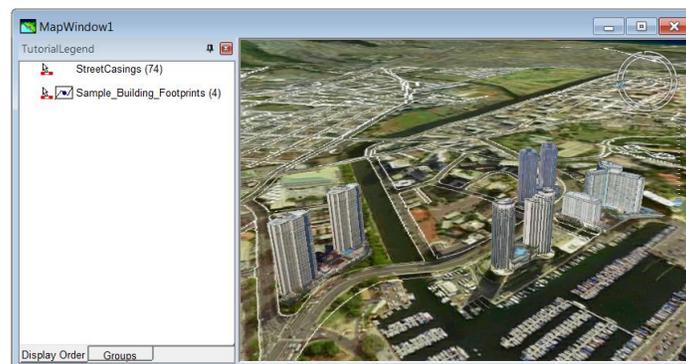
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## Task 1: Launch GeoMedia

Like most commands in GeoMedia 3D, the **3D Mesh Layers** commands are only available when there is a 3D window open and active.

1. Use your mouse and desktop controls to navigate to *C:\GeoMedia 3D 2015 Tutorials\Lesson 2*.
2. Double-click **Lesson 2.gws**. This action will start GeoMedia Desktop and open the GeoWorkspace called **Lesson 2**.

This GeoWorkspace was previously saved in a state where the user had toggled to a 3D window. So in this case, GeoMedia Desktop opens within the 3D map window. Your 3D map window should therefore look similar to the one in the example provided below.



As mentioned in other tutorials, the legend drives the contents of a map window. In this example the legend contains two legend entries (**StreetCasings** and **Sample\_Building\_Footprints**).

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## Task 2: Create a 3DML File

The **Construct 3DML** command allows you to create 3DML files. Once the files have been created, they can be added to the 3D map window using the **Insert 3DML** command.

3DML files are designed to work best with feature classes that have one unique 3D model per feature record, such as the feature classes created using the **Import 3D Objects** utility. Converting this type of feature class to a 3DML file will dramatically improve rendering.

If you have a one 3D model to many feature records relationship, you can still convert these features to a 3DML file; however, the resulting models may not match the input models one-to-

one, and additionally using the resulting 3DML file may not improve rendering. This is because when one specific 3D model is used in many locations, the 3D model is cached and hence rendering is already optimal.

1. On the **3D** tab, in the **3D Mesh Layers** group, click **Construct** to display the **Construct 3D Mesh Layers** dialog.



*The **Construct 3DML** command only takes feature classes that are displayed in the 3D map window and whose style properties have been set up to make use of 3D models as input. Given this, even if you had several feature classes displayed in the legend only those that meet the above criteria will be listed.*

2. Ensure that **Sample\_Building\_Footprints** is checked.



*The **Construct 3DML** command outputs one 3DML file for each of the input feature classes.*

3. Click the **Browse** button and use the **Select Folder** dialog to specify *C:\GeoMedia 3D 2015 Tutorials\Lesson 2*.



*This path is used as the location on disk for storing the resulting 3DML file.*

4. Click **OK** to display the **Construct 3D Mesh Layer** status dialog and to start the conversion process.



*The conversion process is a CPU intensive process and will take time to complete. This dialog box is displayed to help provide a sense of progress.*

5. Once the 3DML file has been created a message box will be displayed informing you that **the process completed successfully**.
6. Click the **OK** button to dismiss this message box.

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### Task 3: Toggling the Existing Feature Class off

Since we now have a 3DML representation of the feature class called **Sample\_Building\_Footprints** this feature class can be toggled off and therefore not displayed in the 3D map window.

1. Right-click on the legend entry called **Sample\_Building\_Footprints** and then choose the **Display Off** option in the context menu that is displayed.

With this legend entry now turned off we can display its replacement, namely the 3DML file created above.

## Exercise 2: Inserting a 3DML File

### Objective:

The **Insert 3DML** command allows you view 3DML files within the 3D map window. This command creates footprints for 3DML files that are stored on disk. Once one or more footprints have been created, the resulting footprint features are used to drive the display of 3DML files within the GeoMedia 3D map window.

The objective of this exercise is to learn how to make use of the **Insert 3DML** command.

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### Task 1: Insert a 3DML File

To use the **Insert 3DML** command, one or more read-write connections must exist for the active GeoWorkspace.

1. On the **3D** tab, in the **3D Mesh Layers** group, click **Insert** to display the **Insert 3D Mesh Layer Footprints** dialog.



*You can specify 3DML files using any one of the following methods: Browse to a location on disk and select the 3DML files for which you want to create footprints; Use the built-in search capability; or Drag and drop 3DML files from Windows Explorer into the Insert 3D Mesh Layer Footprints dialog box.*

2. In this case, click the **Add** button.
3. Use the **Open Files** dialog to specify C:\GeoMedia 3D 2015 Tutorials\Lesson 2\Sample\_Building\_Footprints.3dml.
4. You can leave the remainder of the inputs/options as defaults.

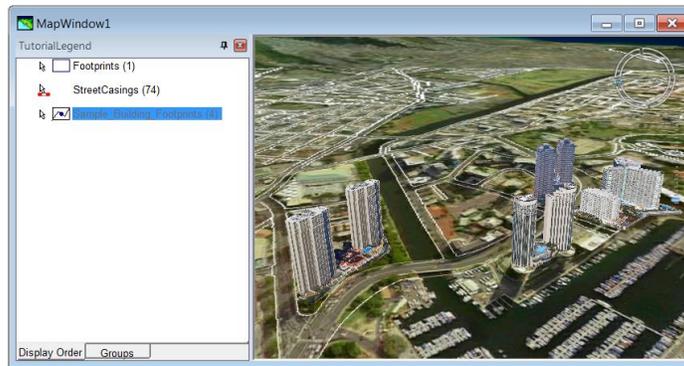


*You can create footprints for one or more 3DML files of the same projection. Once you have selected the files for which you want to create footprints, specify a target connection and a feature class name.*

*Once all of the parameters have been chosen, the command creates footprints from the information within the selected 3DML files and inserts them into the specified feature class.*

5. Click the **OK** button to display the results in the active 3D map window.
6. After the insert process has completed, a message box is displayed with information about the insert process.
7. Click **Close** to dismiss the message box.

Displaying 3DML files within the 3D map window automatically occurs once the footprint features are added to the 3D map window. Your 3D map window should now contain three legend entries (**Footprints**, **StreetCasings**, and **Sample\_Building\_Footprints**).



In short, you now have a 3DML representation of the building layer. This type of layer will render extremely quickly regardless of the number of models.

As noted above, 3DML files can be used in place of any 3D model layer in GeoMedia 3D. For example, they can be used in place of any feature class representing 3D models. Given this, if you have a feature class containing a large collection of relatively static models (that is, models where appearance is not driven through attribute-based symbology), you may want to consider creating a 3DML representation of these layers for performance reasons as 3DML files are highly optimized for display within the 3D map window.

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## Task 2: Exit GeoMedia Desktop

You have completed this exercise. You can now exit GeoMedia Desktop and begin the next exercise. Given that you may want to revisit this exercise, it is recommended you do not save any of your changes. By not saving your changes, you can restart the exercise in the future with a clean GeoWorkspace.

1. Click the **Close** icon in the upper-right corner of the GeoMedia Desktop application window to exit GeoMedia Desktop. The system displays a warning dialog box.
2. Click **No**.