Create a 3D Image Visualization

Image Analysis for ArcGIS Reference Document[1]

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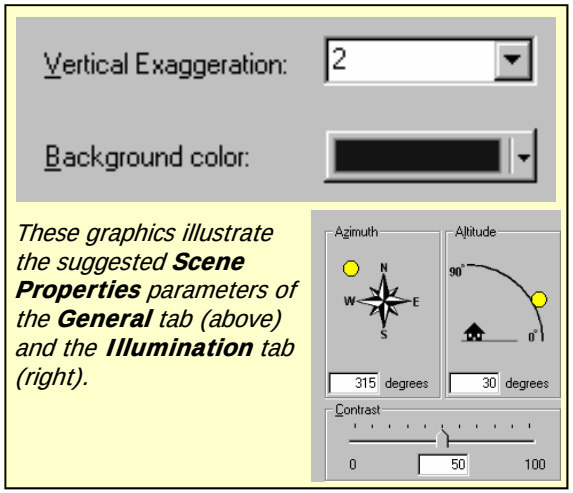
Assumptions of Creating a 3D Image Visualization:

1) ***A DEM for your project area.*** *Ensure that the extent of the DEM covers your entire project area.*
2) ***Your Image must be terrain corrected***
3) ***Your DEM and Image must have the same projection and coordinate system.***



*These graphics illustrate the suggested **Scene Properties** parameters of the **General** tab (above) and the **Illumination** tab (right).*

Objective

- To create a 3D image visualization.

Required Data

- A DEM (Digital Elevation Model) and an Image (Landsat TM, SPOT, IKONOS, DOQs, etc.)

Introduction and Overview of Procedure Steps

Three-dimensional (3D) image visualizations are tools used to enhance an image's visual interpretability and illustrate the effects of terrain. The goal of this document is to describe how to create a 3D Image Visualization using ArcScene.

1. Load Data and Set-Up Data Frame Parameters
2. Set-up DEM and Image Parameters
3. Inspect the 3D Image Visualization
4. Perform a 3D Fly-by

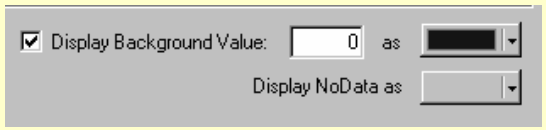
I. Load Data and Set-up Data Frame Parameters

1. Launch **ArcScene** from the **Start** menu (**Start | Programs | ArcGIS | ArcScene**).
2. Select the **Add Data** button from **ArcScene's Standard** toolbar.
3. Navigate to and select your **DEM**.
4. Select **Add** to load the **DEM** into **ArcScene's Table of Contents**.
5. Select the **Add Data** button from **ArcScene's Standard** toolbar.
6. Navigate to and select your **Image**.
7. Select **Add** to load the **Image** into **ArcScene's Table of Contents**.
8. Double-click on **Scene Layers** in the **Table of Contents** and the **Scene Properties** will open.
9. Select the **General** tab from the **Scene Properties** dialog. Set the following parameters:
   - **Vertical Exaggeration**: *2*
   - **Background Color**: *Black*
10. Select the **Illumination** tab from the **Scene Properties** dialog. Set the following parameters:
    - **Azimuth**: *315*
    - **Altitude**: *30*
    - **Contrast**: *50*
    - Select **Apply**, and then **OK** to close the dialog

II. Set-up DEM and Image Parameters

1. Double-click your **DEM** in the **Table of Contents**.

[1] Produced by the USDA Forest Service-RSAC. A Forest Service version of Image Analysis for ArcGIS was used to develop this document. No warranty is made as to the completeness or accuracy.



*This graphic illustrates the suggested set-up for the **Display Background Color** option.*

The higher the rendering quality the better the image is displayed but the longer it will take to draw on the screen.

*These graphics illustrate some commonly used buttons (tools) from **ArcScene's Tools** toolbar to inspect 3D Image Visualizations.*

2. Select the **Base Heights** tab from the **Layer Properties** dialog. Set the following parameters:
   - Enable the **Obtain heights for a layer from surface** radio button and ensure that the associated directory identifies the correct path to your **DEM**
   - Select **Apply**, and then **OK** to close the dialog
3. Check the check box associated with your **DEM** in the **Table of Contents**—this will turn off the display of your **DEM** in the **Data View**.
4. Double-click your **Image** in the **Table of Contents**.
5. Select the **Base Heights** tab from the **Layer Properties** dialog. Set the following parameters:
   - Enable the **Obtain heights for a layer from surface** radio button and set the associated directory to your **DEM** (select the associated **Yellow Folder** button, navigate to your **DEM** in the **Surface** dialog, select your **DEM**, and click **Add**)
   - **Offset**: *20*
6. Select the **Symbology** tab from the **Layer Properties** dialog. Set the following parameter:
   - Enable the **Display Background Value**, click the pulldown arrow from its associated **Color Box**, and select *Black* from **Color Palette** (see graphic to the left)
7. Select the **Rendering** tab from the **Layer Properties** dialog. Set the following parameters:
   - Adjust **Quality enhancement for raster images** to *medium-high* (adjust slider bar as necessary)
8. Select **Apply**, and then **OK** to close the dialog

III. Inspect the 3D Image Visualization

1. Use the **Pan**, **Zoom**, and **Navigate** buttons from **ArcScene's Tools** toolbar to inspect the 3D image visualization in the **Data View** (see graphic to the left).
2. Experiment by changing the suggested **Data Frame**, **DEM**, and **Image** parameters from sections one and two.

IV. Perform a 3D Fly-by

1. Select the **Fly** button from **ArcScene's Tools** toolbar (see graphic to the left).
2. Move your cursor over the **Data View**. The cursor should change to a 'standing bird'.
3. Left-click over the center of the image. The cursor should change to a 'flying bird', and it will slowly zoom towards the image—use your cursor to navigate.
4. Use the following controls to help navigate the 3D Fly-by:
   - Use the **Cursor** (alternatively, the **Arrow Keys**) to *navigate the fly-by*
   - **Left-Click** (alternatively, the **Page Up Key**): *increases speed of fly-by*
   - **Right-Click** (alternatively, the **Page Down Key**): *decreases speed of fly-by*
   - **Hold Shift Key** to 'hover' while in flight

- **ESC Key:** *stops fly-by*

5. Modify scene and image parameters (if you wish) and perform the 3D Fly-by again.