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Viewing GIS Data in 3D

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ArcGIS 3D viewing applications...

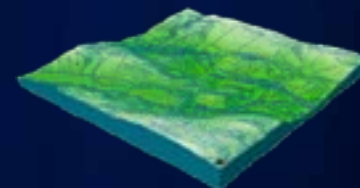
- **Desktop (require a license)**

- ArcScene
- ArcGlobe
- ArcGIS Engine apps (GlobeControl / SceneControl))



Help topic:

[Working with ArcGlobe and ArcScene](#)



- **Free viewers (for sharing)**

- ArcReader
- ArcGIS Explorer Desktop

What do I need to run 3D?

Software:

- ArcGIS 3D Analyst Extension with ArcView, ArcEditor or ArcInfo
- ArcGIS 9.0 or higher (latest Service Packs recommended)

Hardware:

- CPU at least 1.5 GHz

- Additional disk space for data cache, depending on need

- OpenGL 1.2 compatible video card with minimum 64 MB of memory

Data:

- Most ArcGIS-supported datasets

- ArcGIS.com services (Default content)

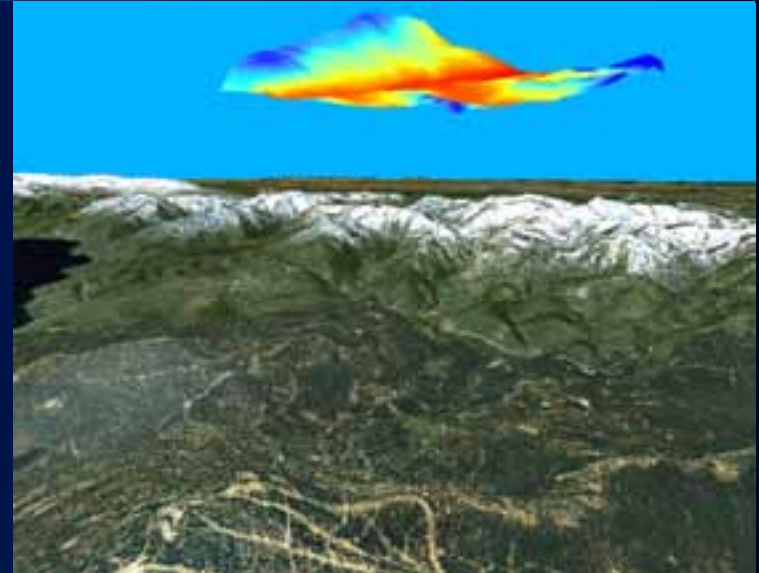
- ArcGIS Data and Maps DVD

Run a **free utility** to check whether your system is compatible to run ArcGlobe:

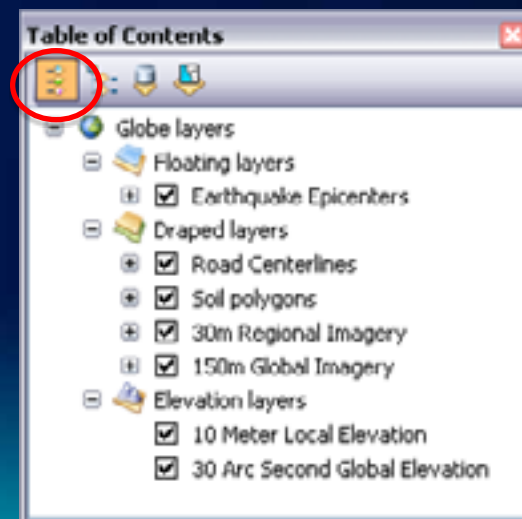
<http://cyri.systemrequirementslab.com/1186/10913>

Layer Types in ArcGlobe

- Elevation
 - Defining globe surface
- Draped
 - On the globe surface
- Floating
 - Above or below globe surface

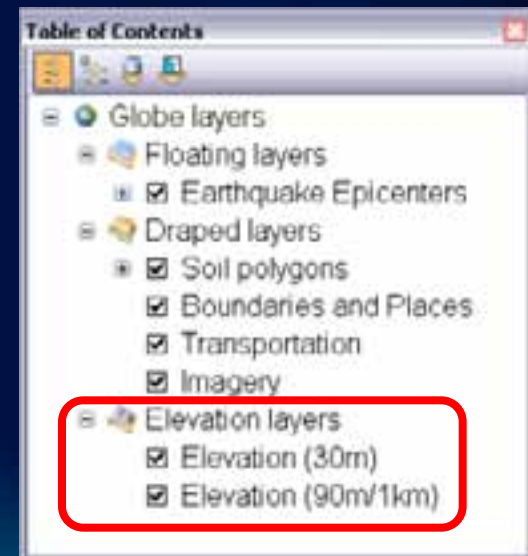


NOTE - Draw order of overlapping draped and elevation layers is set via the default 'List By Type' view on the Table of Contents



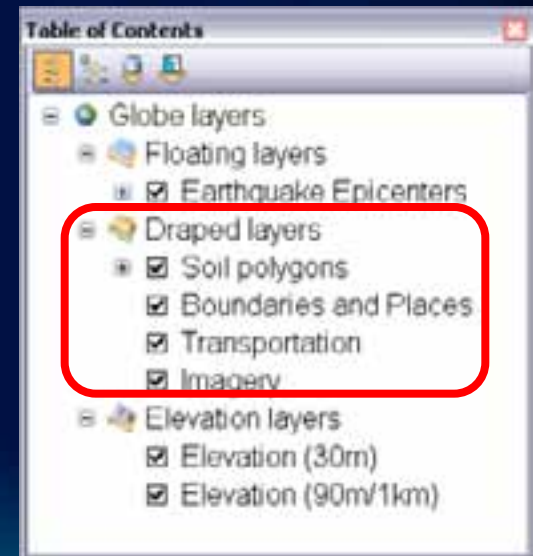
Layer Draw Order (Elevation)

- Elevation layers define the surface of the globe
 - Raster, TIN, terrain dataset
- Order is defined by the list in the TOC where layers on top draw last
- Single seamless surface from multiple sources (regardless of resolution)



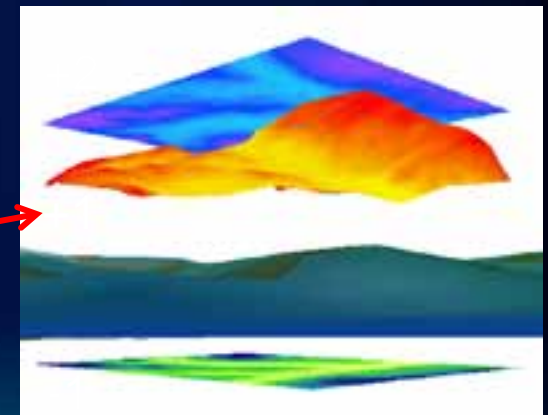
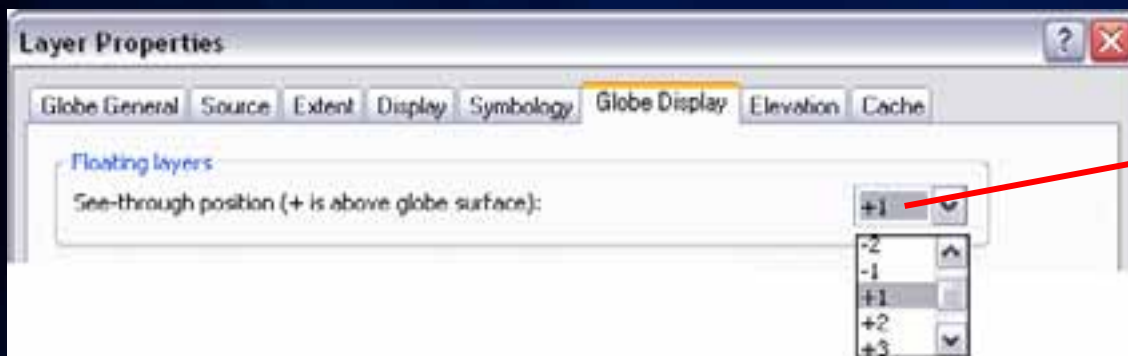
Layer Draw Order (Draped)

- Draped layers are usually 2D data that logically lay on the surface of the globe
 - Aerial imagery, land use polygons, roads, and so on
- Order is defined by the list in the TOC where layers on top draw last
- Important for transparency



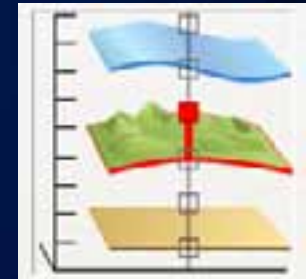
Layer Draw Order (Floating)

- Floating layers define their heights from sources other than the globe surface.
 - Subsurface geology, flight paths, security cameras, etc
- Order is defined by the layer's see-through position
 - Positive numbers – above ground
 - Negative numbers – below ground
- Critical for transparency



Base Heights of features

- The elevation at which to display each feature
- **Base Heights = Surface + Features + Layer Offset**
 - Surface {Globe, Custom, None}
 - Feature {Shape.Z, Attribute, None}
 - Layer Offset {Constant, None}
- Three most common types:
 - Draped (bus stop) > {Globe, None, None}
 - Absolute (airplane) > {None, Shape.Z, None}
 - Relative to ground (security cam) > {Globe, Attribute, None}



Layer Authoring - Visibility Ranges

- Important to display large sets of 3D features
 - 💡 Can be used to manage multiple representations
 - 💡 Units are defined in Globe display units (as reflected in the status bar)

Distance: 2395.421 Feet

- Feature / Tile based visibility

Layer Properties

Labels | Joins & Relates | Elevation | Cache | Time | Globe Display | Display | Symbolization

Globe General | Source | Selection | **Globe Display** | Display | Symbolization

Layer Name: City Streets ☒ Visible

Description:

Credits:

Distance Range
You can specify the range of distances this layer will be shown:

☐ Show layer at all distances

☒ Don't show layer when zoomed:

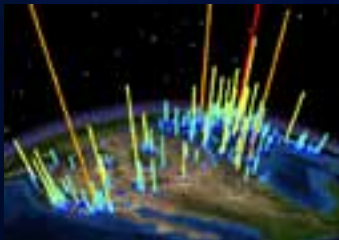
Out beyond : 1000 (maximum distance)

In beyond : 0 (minimum distance)

OK | Cancel | Help

Extrusion of features

- **Stretching a flat 2D shape vertically to create a 3D object.**
 - A simple method to create 3D symbology from 2D features
 - Points, lines and polygons only
- **Extrusion can be feature attribute based or a constant and applied from a single height (z) value per feature**



- **Added to each feature's Maximum Z, Minimum Z, base height, or as a value features are extruded to**

Layer Authoring - Text

- **Display text billboarded facing the camera**
 - Annotation or point labels
 - Important positional text, such as City Names
- **Display annotation or labels draped on a 3D surface**
 - Text with direction, such as Street Names



3D Billboarded
annotation



Labeling



Draped labels

Layer Authoring - 3D Objects

- **3D (textured) Objects can be added to ArcGlobe by:**

- 1. Symbolizing points with 3D markers**

- ESRI-provided styles
- Supported 3D file formats

- 2. Multipatch features**

- Result of GP tasks
- Imported 3D files
- Generated using ArcObjects
- 3D Editing “Replace with Multipatch” tool



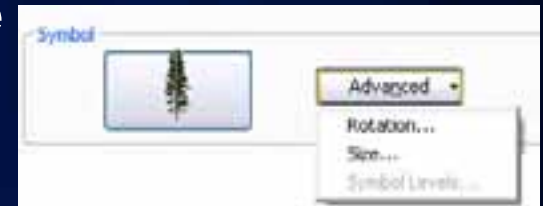
Supported 3D file formats: .3ds, .flt, .skp, .dae, .wrl

- **Extruding features**

- For example, displaying building footprints as blocks for mass modeling

Attribute driven size and rotation

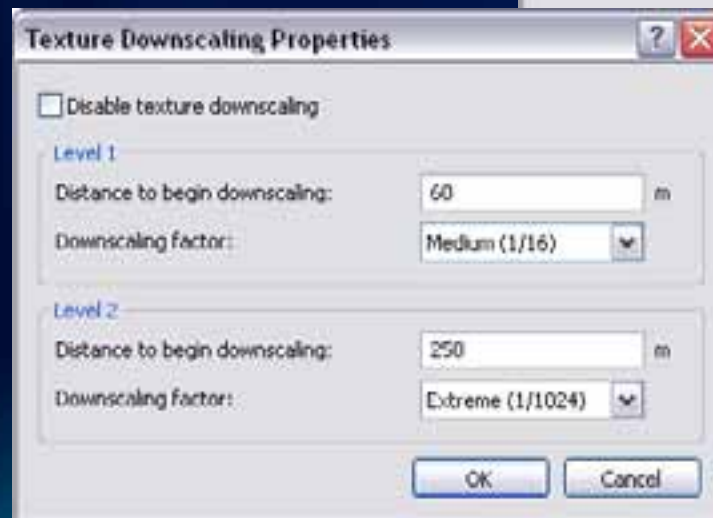
- **Symbol size driven by feature attribute**
 - For example: tree height
- **3D rotation driven by feature attribute**
 - For example: classic 2D rotation for street furniture
 - For example: full 3D rotation for airplanes



TIP: Use a single attribute, an expression or random value

Layer Authoring - 3D Objects (Key Properties)

1. Distance based visibility
2. Texture management
 - Texture quality
 - Downscaling distances
3. Generate full data cache



Visualizing Time

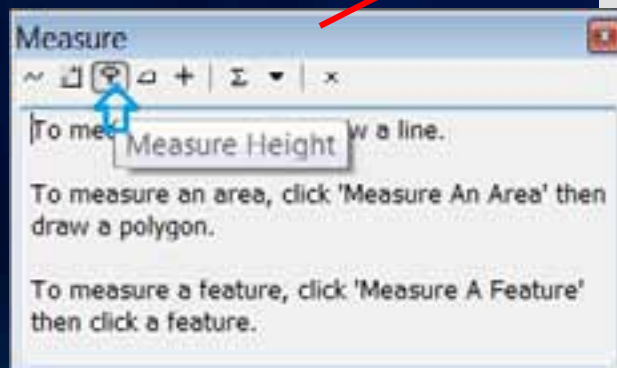
- Intended for viewing moments in time on time-enabled data sets
- Use the Time Slider window to set the document time
- Each layer defines its own time properties

💡 NOTE: Caching is not optimized for Time



Measuring in 3D

- **Measuring in 3D offers more opportunities than 2D**
 - Heights of objects
 - Direct 3D distance / closest points
 - Distance along the ground



3D is (mostly) the same in ArcScene and ArcGlobe

- **Most things are the same in the two applications**
 - Layer-based authoring, draw order
 - Attr-driven symbology, extrusion, base heights
 - Measuring, identifying
- **Some things are different...**
 - **Globe has**
 - A dedicated “ground” surface (elevation)
 - Uses caching and dist-visibility, for large volumes of data
 - Support for feature labels and annotation
 - **Scene has**
 - Support for native or unprojected coordinate systems
 - Stereo viewing
 - Interactive analysis tools (contouring, steepest path)

Questions?

Please fill in your surveys

www.esri.com/sessionevals

