

3D Analyst - An Introduction

Geared toward new and potential new users, this session provides a comprehensive overview of the ArcGIS 3D Analyst extension. Techniques for visualizing GIS data in three dimensions with the ArcGlobe and ArcScene applications, demonstrations of the geoprocessing analysis functions, as well as data types relevant to 3D modeling, the use of aerial imagery in conjunction with surfaces to enhance 3D models, 3D editing, 3D animation, and conveying realism using 3D symbology will all be discussed.

<http://video.esri.com/watch/86/3d-analyst-an-introduction>

Video Transcription

00:01 So here's our plan of what we are going to cover in today's workshop.

00:07 I'll be starting off with a brief overview of the 3D Analyst extension.

00:12 We'll see what all the extension offers to you.

00:16 Then I'm going to cover some of the key concepts of the ArcGlobe application.

00:21 So it is one of the 3D visualization applications that you get with the 3D Analyst extension.

00:28 So following that, Michael is going to give you a quick demo of ArcGlobe...

00:32 ...and basically show you the navigation experience inside ArcGlobe...

00:37 ...and the enhancements related to navigation that have been made at 10.

00:44 After the first seminar, I'm going to quickly go over the ArcScene application.

00:49 Then we'll look at the tools available on the 3D Effects toolbar.

00:54 Or you can use those for doing some quick visual analysis of your data.

01:00 Then we'll look at 3D symbology, which you apply to your feature data to create realistic-looking 3D scenes.

01:06 So we'll look at the options that are available to you in both ArcGlobe and ArcScene.

01:12 So something new at 10 is 3D editing. So now you have editing capability inside both ArcGlobe and ArcScene.

01:21 So I'll briefly talk about 3D editing next.

01:25 And then I'm going to cover graphics, animation tools, the customization framework...

01:31 ...and I'll also talk a little bit about the 3D geoprocessing tools that are available to you with the extension.

01:40 After that, Michael is going to give you a second and final demo.

01:44 And after the demo, that will be the end of the workshop.

01:47 And then we'll be open for discussion or any questions that you may have.

01:53 So what is 3D Analyst?

01:55 Well it is an ArcGIS extension that offers you capabilities for interactive 3D visualization of your spatial data.

02:05 So there are two stand-alone applications.

02:08 There's ArcGlobe and ArcScene that you get with the 3D Analyst extension.

02:14 And you can add your data to these applications and visualize those, visualize the data and interact with the data.

02:22 So you can navigate around. You can identify features...all the standard stuff that you are used to with ArcMap.

02:29 You can do similar stuff in ArcGlobe and ArcScene.

02:33 Now in addition to visualizing your data, you can also edit your data.

02:37 So as I said, this is new at 10.

02:39 So you can create new features or you can edit existing features within both ArcGlobe and ArcScene.

02:47 So there's a 3D Editor toolbar, which is new at 10, which is available in both the applications.

02:54 Can everyone hear me at the, in the back?

02:57 Okay.

02:59 So, next is you also get analysis capabilities with the 3D Analyst extension.

03:05 So there is a rich set of 3D geoprocessing tools, which can be used for surface creation.

03:12 So you can create 10 terrain raster datasets.

03:16 You can use the geoprocessing tools for surface and feature analysis.

03:21 You can convert data from one format to another and you can extract data.

03:25 So you can extract feature data from your surfaces.

03:30 Now in ca-, in case of ArcGlobe, once you have created your documents...

03:34 ...once you have created your nice-looking ArcGlobe documents...

03:37 ...for example, if you create a virtual city, then you can publish those documents as services using ArcGIS Server.

03:46 So once your services are published, then your clients can consume those services, either inside ArcGIS Desktop...

03:52 ...so if they have ArcGIS Desktop installed on, on their local machines, they can consume your services within ArcGlobe...

04:00 ...or if they don't have ArcGIS installed or they don't have the 3D Analyst extension, then they can download the free client.

04:06 That's is ArcGIS Explorer. So it's a free download; they can download it.

04:12 View your data in track with your services, and in case you have any animation stored with your documents, those are also served.

04:23 So your clients will be able to play your animations as well.

04:27 Now you can also publish your [Arc]Globe documents for use in ArcReader, so you can use the Publisher toolbar for doing that.

04:35 That's available inside ArcGlobe.

04:37 So basically you can create your data, you can visualize the data...

04:42 ...you can analyze it, and then you can also serve it with the 3D Analyst extension.

04:50 So here are the full Desktop applications, which have 3D functionality.

04:55 So the two on top are ArcGlobe and ArcScene.

04:58 And I'll be talking more about these later on in the slides.

05:01 So I'm going to skip these for now.

05:04 The one in the lower-left corner is ArcMap, so as most of you probably already know, ArcMap is a 2D mapping application.

05:13 However, with the 3D Analyst extension, you get access to the 3D Analyst toolbar.

05:19 And there are a number of tools available on the toolbar which can be used for performing 3D analysis within ArcMap.

05:26 So examples are Create Line of Sight tool.

05:29 There's a Profile Graph tool. And there a couple of other tools available out there.

05:35 Now once you have run your analysis inside ArcMap, if you want to also visualize your results in 3D...

05:41 ...then you can simply copy the results from ArcMap and paste those into ArcScene or ArcGlobe.

05:48 So the exchange of the results between these applications is a simple copy-paste experience.

05:54 So you just copy all your results, paste those into another application.

05:59 The last application listed over here is ArcCatalog.

06:03 So you use ArcCatalog for data management, for creating new feature datasets...

06:09 ...creating new geodatabases, copying over data from one location to another.

06:13 And you can also preview your data in ArcCatalog.

06:17 Now with the 3D Analyst extension you can preview your data in 3D.

06:21 So you get access to two views. There's a 3D view, which is similar to the ArcScene view.

06:28 So it's a, your data would be very visible as it would be inside ArcScene.

06:36 And the second one is the globe view, which is similar to the ArcGlobe view...

06:40 ...similar to what the data would look like in ArcGlobe.

06:43 So you can also preview your documents using these views.

06:46 So you can preview your [Arc]Scene documents using the 3D view, and you can preview the [Arc]Globe documents using the Globe view.

06:54 Now in all of these applications, all the four applications...

06:58 ...you do have access to ArcToolbox and that's where all the 3D geoprocessing tools reside.

07:05 So in case of ArcGlobe and ArcScene, you always have the 3D Analyst Geoprocessing tools available.

07:12 However, for ArcMap and ArcCatalog you need to enable the 3D Analyst extension...

07:17 ...and then you'll be able to use the 3D Geoprocessing tools present inside ArcToolbox.

07:26 For data types, all the vector feature types are supported, so you're already familiar with points, lines, and polygons.

07:35 And multipatches are used for representing your 3D objects.

07:40 So examples would be your buildings, cars, trees...

07:45 ...so any 3D objects are represented inside ArcGIS using the multipatch data type.

07:52 For surfaces, there's support for TINs, which are triangular irregular networks, rasters as well as terrain datasets.

08:00 So you can create these datasets using the 3D Geoprocessing tools.

08:07 Next let's look at ArcGlobe.

08:09 So as I mentioned, this is one of the 3D visualization apps that you get with the extension.

08:15 And as its name suggests, you interact with data that is placed on a 3D globe.

08:22 So there's support for both maplike as well as oblique views.

08:28 What we mean by maplike views is if you look in the graphic on the slide, the two smaller viewers...

08:34 ...the secondary viewers in the lower-left corner, those are the top-down views of your data.

08:40 So that's what the maplike view is. It's a top-down view. You're not actually seeing the data in 3D.

08:46 And the oblique view is where you tilt the globe and view your data in perspective.

08:51 So you are basically viewing your data in 3D, and that's the main viewer, where you're seeing the buildings.

08:56 So there's support for both types of views.

09:01 ArcGlobe has one logical globe surface, so, what we mean by that is...

09:07 ...that you can add multiple elevation datasets to ArcGlobe...

09:11 ...but it will automatically stitch those together to present you with one globe surface.

09:16 So it creates one multiresolution mesh upon which then you subsequently add your own data.

09:23 So example would be that you could have a 30-meter elevation data and a 90-meter elevation dataset.

09:30 So you could add both of those to ArcGlobe, but the application will create one surface from those two elevation datasets.

09:38 So in areas where you have the 30-meter elevation, that's what will be used over there.

09:45 Now one of the main features of the ArcGlobe application is that it can handle large amounts of data...

09:51 ...as opposed to ArcScene, which is more suitable for smaller datasets and for smaller well-defined study areas.

10:00 And the reason ArcGlobe can handle large amounts of data is that it employs two mechanisms.

10:05 One is caching and the second one is levels of detail.

10:10 So there are two types of caching. There's disk caching and memory caching.

10:15 So disk caching refers to tiles that get stored on your local machine for reuse at a later time.

10:24 And memory caching, whatever is displayed to you by the application...

10:28 ...by the ArcGlobe application, it is being loaded into the memory cache...

10:31 ...basically your computer's memory, and is being displayed to you.

10:35 So there's a continuous swapping of tiles that goes on between the disk cache and the memory cache on an as-needed basis.

10:43 So for example, if you navigate to an area on the globe, and the memory cache is already full...

10:49 ...then some of the tiles which are not being used in the memory cache, are discarded...

10:54 ...and fresh tiles from the disk cache are loaded into the memory cache, and those are then displayed to you.

11:00 So this is an advanced topic and we won't go into much detail on this over here.

11:05 If you need more information on this, I guess the Visualization with ArcGlobe session...

11:10 ...should cover this topic more than we would be covering over here.

11:14 And another good source is ArcGIS Desktop Help.

11:18 There's a lot of detailed information on caching...

11:20 ...as well as how you can configure your memory caches for improving the performance of ArcGlobe.

11:27 The second concept is levels of detail.

11:30 So ArcGlobe employs multiple levels of detail for displaying your raster data, your imagery.

11:37 So what do we mean by that?

11:40 So here's a simple explanation in the graphic on the left...the image.

11:45 In the image you don't see much detail. This is because you are zoomed out.

11:50 So when you start to zoom in, you progressively start to see more and more detail in your image.

11:56 And as we are zoomed in very close, you'll see the full detail of your imagery.

12:01 So basically, multiple levels of detail mean that when you're zoomed out you get a coarser representation of your data.

12:07 And as you zoom in, you start to get more and more detail in your data.

12:12 So that's, again, an advanced topic, again, the same thing...

12:17 ...refer to the Desktop Help or attend the advanced workshop on ArcGlobe.

12:26 Now the layers, the data that you add inside ArcGlobe...

12:29 ...it gets classified into one of the following three types that are listed over here, elevation, draped, and floating.

12:36 So let's look at these one by one.

12:39 So elevation layers are those which define the globe surface.

12:43 So these are the ones that provide the elevation information.

12:46 So in the graphic on the slide I have an image, but I don't have any elevation data.

12:51 So if I add some elevation data to the elevation category, it will define the globe surface.

13:00 The second type of layers are the draped layers.

13:02 So these are the layers which do not have their own height information.

13:07 So example would be your imagery.

13:09 So the raster imagery that I have turned on right now, it doesn't have its own height information.

13:15 It gets draped on the base surface.

13:18 So it's getting its height from the elevation data that you have added, added to the globe.

13:23 The third type of layers are the floating layers.

13:28 So these are the layers which have their own height information.

13:31 So these are, these do not get their height information from the globe surface.

13:36 These are not relative to the globe surface.

13:39 An example would be your 3D point feature layer representing airplanes.

13:45 So your airplanes have their own height information, so you could potentially classify those as floating layers.

13:52 And Michael is actually going to show you during the demo, how these...

13:56 ...where these layers are classified in the table of contents; the elevation, floating, and drape categories.

14:05 So we have two navigation modes. I already talked about these.

14:08 The one on the left is the global navigation mode.

14:11 So this is the maplike or the top-down view of your data.

14:15 And the one on your right is the surface navigation mode, which is the...

14:19 ...where you tilt the globe and view your data in perspective.

14:23 Again, Michael is going to show, show this to you in his demo, which is next.

14:28 So I'm going to hand it over to Michael.

14:34 Can everybody hear me okay? Good.

14:38 Okay, well thanks Deepinder.

14:41 Well, here's the main display of how ArcGlobe looks like. This is for those of you who haven't seen it before.

14:47 Here's the main toolbar section area.

14:51 And here is the table of contents.

14:54 And as Deepinder talked about in slides, there're three main categories of how your layers will be displayed on ArcGlobe.

15:00 They're either going to be displayed as floating layers, drape layers, or elevation layers.

15:06 Right now, I don't have any floating layers. I have a couple of drape layers and two elevation layers.

15:13 So when you open ArcGlobe, it opens up with some default content that includes some high-resolution imagery...

15:21 ...two elevation layers, a transportation layer, and boundaries layers...

15:25 ...which are turned off by default, but you can turn it back on if you would like to.

15:29 You can use this default content as your base document or you can also use the imagery as your reference for doing the editing.

15:37 This default content is provided by ArcGIS Online and it's also available for download.

15:43 Also, if you have your own data, and you want this data to be your default layers, so that every time you open ArcGlobe...

15:50 ...you can do that by going to Customize > ArcGlobe Options, and here there's a tab called Default Layers.

16:00 Just click Use my choice of default layers.

16:05 There's other options that you can use here and you can even say that you don't want any default layers...

16:11 ...and you just get an empty globe. And then you add your own data.

16:16 You can also change any application settings in this window, such as changing your default content...

16:24 ...turning off warning messages, and configuring your caches.

16:31 And there's other default settings that you can change also in this window.

16:37 Next, we're moving to navigation in ArcGlobe.

16:42 So the default tool is the one that is selected right now, and it's available here on the Tools toolbar.

16:52 If I click and hold the left mouse button, I can rotate the globe.

17:00 And if I hold the right mouse button, and I drag in for zooming in and drag out for zooming out.

17:11 Another useful way of navigating in ArcGlobe is using bookmarks.

17:15 This is something that you would use quite a bit when you start using ArcGlobe.

17:20 You can use bookmarks when you're navigating in ArcGlobe...

17:22 ...and you want to capture certain camera location to use it in another location.

17:28 So for example, if you go to this location and you want to store this location to come back to it later...

17:36 ...you can go to that Bookmarks menu, click on Create, and here I'm going to rename my bookmark to View1.

17:48 Click OK.

17:51 And now I can go back to another location, but if I would like to go back to that previous location...

17:57 ...I would just go back to Bookmarks, click on my view, and here we go.

18:02 This is a simple way of navigating in ArcGlobe by using bookmarks.

18:08 I'm going now to a previous bookmark that I have made earlier of the San Diego Convention Center area.

18:16 So here we have the convention center and the downtown area.

18:23 So now, continuing with navigation.

18:26 In the slides, Deepinder talked about two navigation methods, which are global navigation mode and surface navigation mode.

18:35 So far, we have been using that global navigation mode, which is that top-down view of your data.

18:42 If you want to change to the Surface mode...

18:44 ...you can click that Navigation mode button, which is right here on the Tools toolbar.

18:50 Now, the easiest way to change to Surface mode is to click the middle mouse button once and notice how my cursor changes.

19:02 Now, I'm in Surface mode.

19:05 So if I hold down the left mouse key and drag up or down, I can tilt the globe.

19:19 Another useful tool is the Pan tool located here on the Tools toolbar.

19:25 Or if you're in Surface mode, you can hold down the middle mouse button and it changes to the Pan function.

19:38 There're other functions that you can use to navigate around ArcGlobe...

19:42 ...such as the Fly tool, Set Up Server, and other functions.

19:47 Now, one of the new enhancements on ArcGIS 10 is using that targeted zooming function on the surface navigation mode.

19:56 So now, you can click and hold the right mouse button and drag up or down to zoom in or out of an area or a feature.

20:05 So if I click and hold the right mouse button, notice how the cursor changes.

20:13 Now I can drag up or down to zoom in or out to the central targeted area in the symbol.

20:21 So for example, if I place it here on the convention center, I can zoom into that particular area.

20:28 And I can zoom out.

20:30 Also, if I select here the baseball park, I can now zoom into that particular area also.

20:37 So these are new enhancements for ArcGIS 10 to, how to navigate around ArcGlobe.

20:42 Another enhancement for 3D Analyst application for 10...

20:45 ...is the support of 3D navigation device for ArcGlobe and ArcScene, straight out of the box.

20:51 So, for example, the one that I'm using now is the 3D collection that I just plug in right out of the box.

20:58 This helps me to easily visualize and navigate around my 3D data.

21:03 This also improved the 3D navigation experience around the globe.

21:07 So I can zoom in, rotate, tilt the view, and I can also zoom out to full extent.

21:20 The 3D navigation device that I'm using right now looks something like this, but you...

21:24 ...there's other products also that you can buy and they're going to be able to work straight out of the box.

21:31 So this concludes the first part of my demo, and now Deepinder is going to continue with the second part of the presentation...

21:37 ...followed by my second and final part of the demo.

21:43 Thanks Michael. Okay, so coming back to the slides, let's look at ArcScene next.

21:50 So ArcScene is the second 3D visualization application that you get with the extension...

21:57 ...and as I mentioned, ArcScene is a memory-based application.

22:02 So whatever data you add inside ArcScene, it gets loaded into the computer's memory and is displayed to you.

22:09 So there's no caching going on inside ArcScene as it do-, as we have in ArcGlobe.

22:14 So as a result, the amount of data that you add, that you can add inside ArcScene...

22:20 ...it is limited by the amount of physical, available physical memory on your machine.

22:27 So basically, ArcScene is not suitable for handling large amounts of data.

22:32 So if your study areas are small and well defined, your datasets are not too huge, then you should, you can use ArcScene.

22:40 However, if you are working with larger datasets, then you should explore the use of ArcGlobe for your work.

22:47 One of the features which is unique to ArcScene is Studio Viewing.

22:51 So it is supported inside [Arc]Scene but not in [Arc]Globe.

22:54 And there are a couple of different modes which are supported...

22:57 ...and there's a lot of help information in the Desktop Help if you need to use this function.

23:07 In both [Arc]Scene and [Arc]Globe you get access to the 3D Effects toolbar.

23:11 So the tools on the 3D Effects toolbar are used for real-time feedback for transparency...

23:19 ...for front and back face Culling, for turning lighting on or off on a per-layer basis...

23:25 ...for setting the depth priority inside ArcScene.

23:29 So depth priority basically means, for example, if you have two polygon layers in [Arc]Scene, which are at the same height...

23:37 ...then you may have some conflicts of when those layers are displayed.

23:42 So in order to avoid that, you can set a lower depth priority for one of the layers, as compared to the other one...

23:48 ...and in that case, the layer with the higher priority will be, will always be displayed above the other layer.

23:54 So you won't have any conflicts in visualization.

23:58 Two tools that are available only inside ArcGlobe are the Swipe tool and the Flicker tool.

24:03 So why would you use the 3D Effects tools?

24:09 Well, you can do some quick visual analysis using these tools.

24:12 So for example, let's take transparency.

24:16 So in this graphic over here, I have imagery for a lake and the area surrounding the lake...

24:22 ...and you can also see a dam that is, that is constructed on the lake.

24:27 Now in this scene I also have layers representing the internal structure of the dam.

24:32 However, right now you cannot see those because the aerial imagery is overlapping those layers.

24:38 So what I can do is I can apply some transparency to the aerial imagery and then you can see the layers that lie underneath it.

24:46 So this is a very simple but powerful, or quick, visual analysis that you can do...

24:51 ...where you can see how the layers are arranged in relation to one another.

24:56 Another use of transparency could be in before-and-after-effect scenarios.

25:02 So, for example, if you have imagery for a region, before and after wildfires...

25:07 ...you could overlay those images on top of each other...

25:11 ...and apply transparency to one of the layers to see how the wildfires have affected the region.

25:18 You can, in case of ArcGlobe, you can also use the Slide tool for doing before-and-after-effect scenarios.

25:23 So with the Slide tool, you basically, interactively drag one of the layers away.

25:29 So you set your target layer and then you use the Slide tool to drag one of the layers away...

25:34 ...and then you can see what, what other layers lie underneath that layer.

25:41 So 3D symbology is applied to your feature data and you use 3D symbology to add realism to your documents.

25:49 So you can create realistic-looking documents using 3D symbology.

25:53 As an example, in the graphic I have some data for a housing locality.

26:00 So we have green points that represent trees, the brown points represent houses...

26:06 ...and the red points represent some street furniture like stop signs and cars, et cetera.

26:11 However, with the simple 2D symbology, means you can't really say what you're looking at unless I tell you...

26:18 ...or unless you look at the legend.

26:20 So if you apply proper 3D symbology, see how the scene transforms.

26:26 So now I don't have to tell you that the green symbols were trees or the, what points represented the houses.

26:36 So in this way you can create realistic-looking documents if you use 3D symbology in your workflow.

26:43 So there are a number of different options that are available to you for applying 3D symbology...

26:47 ...and one of the very useful features is to apply symbology based on an attribute.

26:53 So for example, in this graphic, in this scene, I have houses of a number of different kinds.

27:00 So instead of going to each feature and applying symbology separately...

27:04 ...if I had that information stored in the, stored as an attribute, in the attribute table for my feature layer...

27:11 ...then I could use that information to automatically assign symbology by using this option that is matched to symbols in a style.

27:21 So what this option does is, it will read that attribute information...

27:24 ...and will match it to the existing symbols in a style gallery and apply those symbols.

27:32 Other features that you can apply based on attribute are Size by Attribute.

27:36 So if you have the size information for your features...

27:40 ...you could, you could store that in the attribute as well and the software will automatically assign sizes to your symbols.

27:46 And there's also Rotation by Attribute.

27:48 So if you have orientation information, that can also be applied based on an attribute.

27:53 So Michael is actually going to give you, show you how you can use all these three features during his demo.

28:01 So ArcGIS ships with a number of, with a rich set of styles...

28:06 ...and there are a number of 3D styles as well, that are shipped with the product.

28:10 So let's quickly look at the different symbology options you have with, for 3D.

28:15 So for point features, you can apply 3D geometric parameters.

28:20 So geometric parameters would be simple 3D models like a sphere, a cones, a cube, tetrahedron, and so on.

28:30 You can, if you don't want simple models, you can use the textured models.

28:35 You can use the out-of-the-box styles. So there are a number of styles that ship with the product.

28:39 For example, we have 3D trees style, with a number of different tree symbols.

28:45 There's a 3D street furniture style. There's a 3D residential style, 3D style for commercial buildings, and so on.

28:55 So these are provided to you out of the box.

28:57 Now if you have your own third-party models, for example, if you have your textured COLLADA models...

29:05 ...catch-up files, open-flight files, or 3ds Max files, you can use those for applying symbology as well.

29:12 So those can be imported inside, imported into the software for applying symbology to your point features.

29:18 Another option is using 3D character marker symbols for your point data.

29:27 For lines, in case of ArcScene, you have the option to apply 3D geometric perimeters.

29:33 So you can assign tube symbols to your line features.

29:38 So for example, if you have line, line datasets representing gas pap-, pipelines or water mains...

29:45 ...then instead of applying the simple line feature symbology, line symbology to your line, to your features, you can create tubes.

29:54 So then you'll have actual pipes instead of line, simple line symbology.

30:00 You can also create strips. So strips would be flat on the ground.

30:05 And walls, the last option is walls, which would be vertical symbols.

30:11 You can also apply 3D texture line symbols.

30:15 So if you have, for example, a line feature representing streets...

30:19 ...then you can apply pavement or concrete texture to that feature layer...

30:25 ...then you'll have a lot more realistic symbology than simple solid fill line symbology.

30:33 Again, in case of polygons, you can apply 3D texture fill symbols.

30:37 So for example, if you have a polygon layer representing parks, then you can apply grass textures to it.

30:45 And again, that will add a lot more realism than a solid fill green sym-, green color to your polygons.

30:55 Now as I mentioned, 3D editing is new at 10.

30:59 So in both ArcGlobe and ArcScene there's a new toolbar called the 3D Editor toolbar and it's shown in the graphic over here.

31:06 So using the tools on the 3D Editor toolbar you can modify your existing features.

31:12 So you can move your features to a new location. You can rotate the features.

31:17 You can scale them, basically meaning you can make them bigger or smaller, interactively.

31:23 And then I say, you can move the features.

31:26 Then you can move the features in both in the x,y plane so they maintain their height...

31:31 ...or you can change the height of the features.

31:34 So you can interactively drag the features up or down.

31:38 There are a number of other commands and tools which are specific to 3D.

31:44 For example, there's a Duplicate Vertical command, which is highlighted in the graphic over there.

31:49 So you can use the Duplicate Vertical command for modeling, for example, the floors of a building.

31:56 So if you have modeled the first, or one of the floors of a building, and you quickly want to create other floors...

32:03 ...then what you can do is, you can select all the features of...of the floor that you have already created...

32:09 ...and then provide an offset by using the Duplicate Vertical command...

32:13 ...and then all the features that you had selected would be duplicated at the specified offset.

32:18 So it's a very easy way of creating floors of a building, or maybe it means there could be other use cases as well.

32:28 For 3D editing, we are making use of the new template-based editing experience...

32:33 ...so in ArcMap at 10, there's a, the editing experience is based on templates, and ArcGlobe and ArcScene use the same experience.

32:43 And for snapping, we make use of classical, classic snapping.

32:47 So at 10, ArcMap has a new snapping environment...

32:51 ...but ArcGlobe and ArcScene are using the older snapping environment that was before 10, that existed in ArcMap.

32:59 And again, Michael will give you a quick demo of 3D editing.

33:05 In both the applications, in ArcGlobe and ArcScene, there's a 3D Graphics toolbar.

33:10 So you can digitize point, line, polygon, and text graphics in your documents.

33:16 So if you want to create one, or entity, means you don't want a feature class.

33:21 For example, you want, just want to place one street lamp in your document...

33:26 ...or you want to place some descriptive text for a building, then you could use the 3D Graphics toolbar to do that.

33:35 And just as you can do for your features...

33:37 ...you can apply symbology to your features in the same way you can apply symbology to your graphics.

33:43 So you can apply, for example, a SketchUp model to your point graphic as well.

33:51 And another thing to note is that these graphics are persisted with your document.

33:55 So if you create graphics, save your document, close it. The next time you open it up, the graphic will still be there.

34:01 So it's not just within the session; it's persisted with your documents.

34:06 In ArcGlobe we have strong support for KML. So KML is Keyhole Markup Language.

34:12 So we have strong support for KML 2.2.

34:14 And there's a KML toolbar inside ArcGlobe, which can be used for adding the KML files, the local KML files you have.

34:22 Or you can also add the KML network links.

34:26 And there are actually a couple of geoprocessing tools as well...

34:30 ...which can be used for exporting your layer files or your map files to KML.

34:37 So you can consume KML as well as export your data as KML.

34:41 And those would be available in ArcToolbox.

34:45 I guess you may have to search for it, but they should be under conversion or data management. Somewhere.

34:53 We have a rich set of animation tools, so you can create a number of different types of animations.

35:00 For example, you can create camera flybys.

35:02 So what you do is, you capture certain keyframe locations in your scene, and when you play the animation...

35:08 ...the software automatically interpolates between those keyframe locations...

35:14 ...the position of the camera, and the result is a smooth animation.

35:18 So you can create camera flybys, you can create scene animation, layer animation, and so on.

35:23 So there are some differences between the types of animations you can create in [Arc]Scene versus [Arc]Globe...

35:29 ...and we won't go into much detail over here...

35:31 ...because there's a whole workshop on animations, which is being offered today and I think tomorrow as well.

35:38 So you can attend that if you need more information on animations.

35:44 Three-D geoprocessing, all the 3D geoprocessing tools are located inside ArcToolbox under

the 3D Analyst toolkit.

35:54 So I already mentioned you can access these tools in any of the applications in ArcMap and ArcCatalog as well, if you have the extension enabled.

36:03 So the tools, the 3D geoprocessing tools have logically, are fun-, are logically grouped together.

36:11 So all the conversion tools are grouped under the Conversion toolset and so are the TIN and terrain tools.

36:19 So you can use these tools for creating surfaces so you can create TINs, you can create terrain datasets, edit those.

36:27 You can create raster datasets and in addition to creating surfaces, you can do surface analysis.

36:33 You can do feature analysis. A new tool at 10 is the Skyline tool. You can also extract feature data from your surfaces.

36:42 So for example, you can extract line features from your TIN datasets.

36:47 You can also convert data from one format to another.

36:50 So for example, we have the Layer 3D to Feature Class tool, geoprocessing tool...

36:58 ...which can convert your symbolized point feature class into a multipatch feature class.

37:04 So it's a very useful tool once you start working with 3D Analyst with ArcGlobe...

37:09 ...you may feel the need to use the tool to create your own multipatch feature classes from...

37:15 ...by importing the third-party models for example, and then importing those into the ArcGIS format.

37:23 Again, we won't go into much detail.

37:25 There are actually a couple of workshops that have, that are being offered on 3D geoprocessing...

37:31 ...on feature and surface analysis, on creating terrain datasets and, so you can attend those for more information.

37:39 For customization, there are different levels of customization that you can do.

37:43 So at a very simple level, you can customize the UI of ArcGlobe and ArcScene, so you can move the toolbars around...

37:50 ...you can change the location of the table of contents, and so you can basically modify the UI according to your own preferences.

38:00 A step above that would be using Visual Basic for Applications for creating some custom components...

38:07 ...custom command, or a custom tool within these applications.

38:11 And an advanced-level of customization for [ArcGIS] Desktop would be creating add-ins.

38:16 So you can create custom functionality using any of these languages listed over here.

38:21 That's C#, Visual Basic, .NET, Java, C++, et cetera.

38:26 You can also use Python scripting for your geoprocessing tasks.

38:31 So, but, these are advanced-level customizations.

38:35 Now in case you don't want to use ArcGlobe and ArcScene...

38:38 ...so you don't want the out-of-the-box 3D applications that are provided...

38:42 ...then you can create your own 3D applications from scratch.

38:47 So if you have a highly customized workflow or use case...

38:50 ...then you can use Scene control or Globe control engine components for creating your own 3D applications.

38:57 And you can write your own custom tool...

38:59 ...or there are some tools which are provided out of the box that you can add to your applications.

39:05 And in these custom applications also, you can use your existing [Arc]Scene and [Arc]Globe documents.

39:10 So if you write a Scene control application, you can still view the [Arc]Scene documents that you had or someone else sent to you.

39:19 Similarly for [Arc]Globe documents.

39:22 So now Michael is going to give you a demo where he'll be covering most of the stuff that we have talked about in the slides.

39:33 Okay. Thank you Deepinder.

39:37 Okay. So for this part of the demo, I'm going to create a 3D view of the area around San Diego Convention Center.

39:45 So I have some 2D polygon data that represents the buildings footprint in this area.

39:55 And as you can see, these are 2D footprints...

39:59 ...so these are just polygon data that can be displayed in ArcMap and ArcScene as 2D polygons.

40:08 But if you want to create 3D building blocks out of this data, then you can apply extrusion to your features.

40:16 So to apply extrusion to this layer, we will go to that Layer Properties...

40:23 ...and here there's a tab called Globe Extrusion.

40:29 So I can type in the value here, and this is a constant value, so let's say, 100...

40:38 ...so now all the features will be extruded to the same height.

40:43 But that's not what I want, because I have the building height for each feature stored in a field on the attributes table.

40:51 So I can extrude the features using these values. Just select the field that contains those values for each feature.

40:59 In this case, I place the values on a field called Meters.

41:06 I'll click OK, then OK.

41:13 So now, each feature is extruded to the attributes field containing the building's height.

41:21 So now, at a very simple level, I have created 3D features out of my 2D data.

41:26 These are only display changes. So your base data won't change.

41:31 And it's not like your building's footprints have now been converted into multipatches.

41:36 If you want to do that, then you can export these extruded buildings into a feature class, multipatch, using a geoprocessing tool.

41:47 Also, these are nontextured buildings, so if you have textured buildings...

41:53 ...like realistic textured models, you can add those straight into your 3D view.

42:00 So I have a layer here with some textured buildings. That includes the convention center over here.

42:14 It also includes two hotels.

42:19 So, these extruded objects are multipatch stored in a multipatch feature class.

42:25 And I got those, these models, from the 3D Warehouse...

42:29 ...and imported it, those into multipatch feature class, and that's what we're looking [at] right now.

42:40 So I'm going to turn on a layer called Trees so that we have palm trees over here.

42:52 So these are actually point features that are being symbolized with the palm tree symbol...

42:57 ...that I have used out of the box from the Tree style to assign the symbology.

43:02 I also apply random rotation to these trees so that their orientation looks more realistic...

43:08 ...otherwise, all of them will have the same orientation.

43:13 So to apply 3D symbology, let's look at this example.

43:18 I have a point layer called Cars...

43:24 ...that has three point features that represents cars but they're being symbolized with the default Pushpin symbol.

43:31 So let's look at the attributes table for cars.

43:39 Here you can see that I have an attribute field called Model, which defines how each feature should be symbolized as.

43:48 This is what Deepinder talked about in the slides, with attribute-based symbology.

43:53 Another field here is Angle. This is our rotation information.

43:59 So if I know the rotation of my features, I can put that in the rotation table as well...

44:04 ...and apply the rotation to each feature based on an attribute.

44:08 So to apply symbology, I'll go to that Layer Properties...

44:17 ...and there's a Symbology tab.

44:21 Here, I'm going on the Categories, and I'm going to select Match to symbols in a style.

44:28 So we will be using the out-of-the-box 3D vehicle style to apply symbology.

44:34 First, I will select my attribute field that had the model description.

44:38 In this case, the field is named Model.

44:43 Then I will browse to a style, and you have these styles on your machine, and if you haven't used it...

44:51 ...they can be found under your ArcGIS Installation directory...

44:54 ...that should be something like "Program files, ArcGIS Desktop 10," and there should be a folder there called Styles.

45:02 And here is where all the styles are stored.

45:05 So I'm going to select the 3D vehicle style and say Open.

45:14 So the other thing that I need to do now is click on the Match symbols button, and the proper symbology...

45:24 ...will be matched to the one with each feature attribute.

45:28 So now, I'm going to select all the symbols...

45:35 ...and give them a size of 3.

45:40 Then I'm going to click OK...and OK.

45:46 So now, we have cars there with the proper symbology, but they don't have the proper orientation.

45:55 As you can see, the three of them are looking to the same direction.

46:01 So to apply orientation, I will go back to the Symbology tab on the Layers Properties...

46:10 ...and I will go to that Advanced button and there is a rotation option over here...

46:19 ...and I will select the field that had the orientation angle.

46:22 In this case, the field's name was Angle. So I click OK, and OK.

46:29 So now, we have the cars with the proper symbol and proper orientation.

46:35 So this way, you can assign out-of-the-box 3D symbology to create realistic-looking views of your document.

46:46 So now, I'm going to turn on two layers that have the proper symbology and proper orientation.

46:56 So here we have some point features which are being symbolized as streetlamps.

47:05 So they're being symbolized with the proper symbology and also with the proper orientation.

47:10 I have another layer here, which is the Multipatch layer and this contains some 3D realistic models...

47:19 ...that are actually COLLADA models that I have gotten from that 3D Warehouse.

47:25 As you can see, this gives a better and realistic view of your data.

47:39 Next, we're going to be looking at graphics.

47:45 So, if you right-click on an empty area next to the toolbars, like here...

47:53 ...you can select the Globe 3D Graphics toolbar, which is not visible by default.

48:02 So I can digitize a graphic by using the options over here.

48:07 I can create a point, line, polygon, or text graphic.

48:13 So I'm going to create a point graphic of a rail crossing signal right here.

48:20 So it's being symbolized with the default Point Graphic symbol.

48:26 So I place the graphic and I can select the graphic and right-click to the...to change its symbol properties.

48:38 So I already have my 3D street furniture style and I'm looking for a rail crossing sign.

48:45 So I can manually look for a sign or, new in ArcGIS 10...

48:49 ...I can now type in for a quick search, the name or keywords related to the symbol.

48:55 So I'm going to type and search the word "railway."

49:05 So now these are the symbols related to the word "railway."

49:08 So the ones that I'm, I'm using now will be that Railway Crossing Lights.

49:14 So I will select the symbol, maybe give it a size of 8, and click OK, and OK.

49:24 So there you go.

49:27 Now we have a, the street signal over here, which is actually a point graphic.

49:32 But as you can see, it does not have the proper orientation.

49:38 So one way to change this is to go back to its properties and type in a value.

49:43 But I have a custom tool to interactively rotate the graphic.

49:46 So here's my tool.

49:49 Now I'll click on it, click on the graphic, and I'll interactively rotate the graphic, let's say about there looks okay.

50:02 So the reason I showed you this is because I got this tool from the EDN Esri Developer's Network Web site...

50:10 ...and there might be functionality that may not be provided to you out of the box...

50:15 ...but there's custom functionality available to you as a developer sample.

50:19 So you can go to that EDN Web site, download it, and use it in your own work.

50:24 Feel free to explore the EDN Web site and look for developer samples over there.

50:33 So now, we will be looking at 3D editing.

50:38 So I'm going to zoom into the baseball park area...

50:45 ...and I'm going to give you a simple example of how to use 3D Editor in ArcGlobe using multipatch feature.

50:54 So, new in ArcGIS 10, you can now edit 3D points, lines, polygons, and multipatches from ArcGlobe and ArcScene applications.

51:06 So, note that there is no polygon footprint or any other feature representing the baseball park.

51:13 So if I right-click on an empty area next to the Tools toolbar, like here...

51:21 ...you can select the 3D Editor toolbar, which is not visible by default.

51:28 So now, let's say that there is no baseball park here or that the city is designing a new baseball park...

51:35 ...and they want to now how the new baseball park would look like on this area.

51:40 Also, let's say that the engineering company that they're working with...

51:43 ...provided them with a 3D model of the new design for the baseball park.

51:48 We support a number of model formats such as SketchUp, 3ds Max, et cetera.

51:53 In this case, I have a 3D realistic model that I have acquired from the 3D Warehouse Web site as a COLLADA file.

52:00 But you can create your own models and use it on ArcScene and ArcGlobe.

52:07 So I will begin by accessing that 3D Editor toolbar and clicking on Start Editing.

52:16 So the 3D editing also uses the new template-based editing environment similar to ArcMap.

52:23 The template features will be created automatically for you according to the layer symbology.

52:29 So in this case, we are going to use that existing multipatch feature, which has the buildings textures to add another feature...

52:37 ...so in this case, the baseball park model that the engineering company has provided us with.

52:43 I will first click on the buildings textures template, and then use that Insert tool from the Construction tools below.

52:55 Notice that each feature class has its own construction tool such as polygon, point, et cetera.

53:01 So if I click on Polygons, you will see that Construction tools changes.

53:06 So now, I can create a polygon using the ellipse, rectangle, circle, specified to, specifically to the polygon layer.

53:19 So, in this case, we're using the Insert tool from the multipatch feature.

53:26 So now, I'll place the cursor to the location that the baseball park will be constructed, and make a left-mouse click.

53:36 Now I will browse to that location and select the model that you will be using.

53:41 In this case, I'll be using that PETCO Park model and click Open.

53:48 Now the 3D model symbolizing the baseball park has been placed on the new or ex-, existing construction site.

54:01 Now, using the Edit Placement tool on the 3D Editor toolbar...

54:06 ...you can interactively move, rotate, and scale the features until you are satisfied with the location.

54:13 So now, I'll click on that Edit Placement tool...

54:19 ...and I can move the feature.

54:25 I can rotate the feature.

54:33 I can scale the feature.

54:40 And also, I can move the feature on its Z value.

54:54 You can also type in the value of the move, rotate, and scale for more precise edits.

55:00 And there's other functionality available on the 3D Editor, such as Duplicate Vertical, Replace with Model...

55:08 ...and other functions similar to the ArcMap editing environment.

55:14 So when you're done editing, simply save your edits and click on Stop Editing.

55:28 So this was a simple scenario of how to use 3D editing on a new or existing development using multipatches.

55:37 There are a number of tools and 3D functions that you can use on the 3D editing...

55:43 ...including the functionality of using classic snapping.

55:51 So now, I will show you an example of how to use a 3D Analyst geoprocessing tool.

55:59 3D Analyst contains a number of 3D-specialized geoprocessing tools...

56:03 ...which can help you in the construction and analysis of your 3D project.

56:08 So to give you an example, and continuing with this San Diego 3D view scenario...

56:13 ...let's say that the new proposed baseball park that was just developed, has caused a good impact on tourism.

56:20 And some hotels in the downtown area want to advertise some of their rooms with a view to the baseball park.

56:27 They would like to know what rooms may have views to the baseball park area.

56:31 So I have created two points located at two different hotels in different levels called Viewpoints...

56:41 ...which are located right here, symbolized with two yellow points.

56:53 And I also created a target point located at the center of the new proposed baseball park...

57:02 ...symbolized as that blue flag right here.

57:09 So now I will access my toolbox by using the ArcToolbox window, which is right here.

57:17 And here I have my applications toolboxes and I'm clicking on that 3D Analyst toolbox...

57:25 ...and here are the toolsets that are being logically grouped depending on the tool's functionality.

57:31 So I'm looking for the Construct Sight Line tool, which is under the 3D Features, and right here on that Construct Sight Lines.

57:44 So here's the tool, and now I will select my several points, which were the point features...

57:51 ...which I already created to represent the different hotel rooms at different levels, which I named Viewpoints.

58:01 Now the target features are the next feature that you will type in here...

58:07 ...and are the points that I have already created in the middle of the baseball park called Target Points.

58:17 Now, I will then select and name my new output line feature, which is ac-, which is called Views of Baseball Park.

58:40 Click on Save.

58:42 Now I will also leave all this default content as it is.

58:47 I'll click OK...to run the tool.

58:53 And now a line has been created from the targeted points to the viewpoints.

59:03 So I have now created line of sight from the point features representing two different hotel rooms...

59:10 ...in two different levels that have views to the baseball park.

59:14 I can also change the symbology of the line to be thicker, maybe a size of 5, no, so, maybe another color.

59:27 There.

59:28 So now you can see from that target point to the two hotels...

59:37 ...which one has better view of the baseball park.

59:41 So from this hotel, you can't actually see the field.

59:46 From this hotel, you can really see it.

59:50 So it's just a simple example, so using a specialized 3D Analyst tool in your 3D projects.

1:00:00 So as my last step for this demo, I will show you how to create a quick 3D animation flyby out of your current 3D view.

1:00:09 So in order to create animation, you will bring up the Animation toolbar...

1:00:17 ...and here, we have the Animation toolbar and we have a Capture View button...

1:00:25 ...and this camera, this button over here, when you click on this camer-, capture the cap, the, sorry.

1:00:32 When you click on this button, you will capture the current view and create a keyframe of the follow views.

1:00:39 So depending on your point of interest, you can capture different type of views for animations...

1:00:46 ...by pointing to a more general or specific points that you desire.

1:00:51 So if I click on this button, I have captured this view as part of my keyframes.

1:00:58 So I'm going to move to other locations, and each time that I want to include that particular view...

1:01:07 ...I will click on the button Capture View to create an animation out of those particular areas that I'm clicking.

1:01:19 Let's say I want to include the new baseball park.

1:01:28 So now, you have created the keyframes and when you run the animation...

1:01:31 ...the software will automatically interpolate between those keyframes and you will get a smooth animation affect.

1:01:38 So let's play this animation and for presentation purposes you can change your current screens to full-screen mode.

1:01:46 So you will go, you don't get the toolbars, and you would just go to full screen.

1:01:54 So you can do that by pressing the F11 key.

1:02:01 So now, we're in full-screen mode.

1:02:03 So you can also change the duration of the animation by going to the Open Animation Controls, and here is an option.

1:02:15 And let's say we're going to give it 30 seconds.

1:02:21 Now, then I would just click Play.

1:02:27 So this way, you create a smooth animation out of your capture views.

1:02:35 So this concludes the end of my demo presentation and the end of this technical workshop for An Introduction to 3D Analyst.

1:02:43 If you want to know more information on 3D Analyst or if you want to talk with us directly...

1:02:48 ...please feel free to stop by the 3D Analyst booth located in the Showcase Software Island in the Mapping and Visualization area.

1:02:56 Once again, thank you for coming, and now we will take some general questions.

1:03:06 Yes sir?

1:03:08 [Audience question] Is the functionality the same across all license levels?

1:03:13 Yes. The 3D editing, I guess, means, is the functionality for 2D editing different across the license?

1:03:23 I guess it would be the same...it would follow that pattern.

1:03:30 Yes?

1:03:32 [Audience question] The potential in ArcScene, that it supports stereo viewing...

1:03:37 Yes.

1:03:38 [Audience question] Does that provide, is that like similar, analytical abilities as studio imagery and analysis like in [inaudible] memory?

1:03:50 I'm, I'm not an expert in stereo viewing, but it means you have like red, blue and anaglyph mode and there're a couple of viewing options.

1:04:00 As far as analytical abilities, I don't think there are any. So, but you can look into the Desktop Help for that.

1:04:07 Or maybe if you want to drop by the island area, then I can get you in touch with someone who's more familiar with stereo viewing.

1:04:16 Yes?

1:04:18 [Audience question] 3D symbology for graphic elements. Is that only supported in Arc[GIS] 10?

1:04:23 Is that only supported in what?

1:04:25 Arc[GIS] 10.

1:04:26 [Audience question] Arc[GIS] 10.

1:04:27 No. No, it's been there for a couple of releases now.

1:04:31 [Audience question] Okay.

1:04:32 Yeah.

1:04:35 Any more questions?

1:04:38 Yes?

1:04:39 [Audience question] How do you symbolize, or how would you symbolize information from a portal?

1:04:47 What kind of information do you have?

1:04:49 [Audience question] All kinds. I have lithology, I have water quality data on verticals. I have chemistry data on verticals...

1:04:57 So you're basically talking about textural information?

1:05:01 [Audience question] Correct. Stuff that might be included in a spreadsheet...

1:05:04 ...and at each elevation, at various elevations you have different values for a parameter...

1:05:11 ...and you want to visualize that and kept, say, 20 or 30 holes in a region.

1:05:17 You want to see how they relate in a, in the big picture.

1:05:27 Well, as far as the textural information is concerned...

1:05:32 ...it means you can symbolize using the models for the borehole, boreholes.

1:05:35 Or it means if there are any, I don't know if there are going to be any physical connections between the boreholes?

1:05:42 [Audience question] For each well, each hole, there's a discreet point....

1:05:46 Okay.

1:05:47 [Audience question] ...that might have vertical information. But I want to now, see I want to draw lines between similar [inaudible] and great.

1:05:54 [Audience question] I want to see what the geology is in the whole region by connecting the similar information from the boreholes.

1:06:00 So for the boreholes, would extrusion be helpful for that?

1:06:04 It means, would you, for example you have, you only have point, point data for your boreholes.

1:06:09 So would you, would the boreholes have any depth information as well?

1:06:13 [Audience question] Oh yeah. They have...

1:06:14 So you could extrude those boreholes with depth information, [inaudible], like give it...

1:06:21 [Audience question] But, if I, if that's information, I go from 0 to 10, one type of rock, from 10 to 20, another type of rock. It varies with depth.

1:06:33 Um hmm.

1:06:34 [Inaudible audience question]

1:06:37 Well, I guess I'll have to look at your data to give you a more specific answer.

1:06:43 So maybe if you can stop by the island and we can take a look at your data over there and see how we can symbolize it.

1:06:51 [Audience question] Okay.

1:06:54 Yes?

1:06:55 [Inaudible audience question]

1:07:16 So, the question is to create a number of sight lines, correct?

1:07:21 [Inaudible audience question]

1:07:24 Yes, the particular tool that I was using, it's just construct sight lines between two

particular points.

1:07:32 There's other tools in the ArcToolbox that are specialized to creating sight lines that impact with building and structures.

1:07:42 So the particular feature, the tool that I was using...

1:07:45 ...it was more specialized to creating a simple straight line between a targeted point and a viewpoint. So.

1:07:56 [Inaudible audience question]

1:07:59 It's a, when you deal with the line of sight analysis there, does the, a point symbolized by a 3D symbol...

1:08:06 ...does that affect the line of sight or does it have to be multipatched to [inaudible] line of sight?

1:08:14 It has to be a multipatch, means, to affect that.

1:08:21 Yes ma'am.

1:08:22 [Audience question] Can I take a street view or head-on photograph and drape that onto the [inaudible]?

1:08:32 No, you cannot. So you, so, so your question is whether you can texture the buildings inside.

1:08:38 Means you want to put textures on your multipatch features. Is that the question?

1:08:44 No, you cannot do that.

1:08:50 Yes please.

1:08:51 [Audience question] In your demo, how did you create texture for the two hotels and the convention center?

1:09:01 So, all right, so those, the hotel and the convention center, those were 3D models, textured 3D models...

1:09:11 ...which were, means, imported from the 3D Warehouse.

1:09:16 So the 3D Warehouse is a Web site where you can find a number of 3D models.

1:09:23 So these were in the COLLADA format, so those were import...

1:09:26 Means I just downloaded those and then imported those as multipatch features inside a feature class.

1:09:34 So the model's already existed as third-party models, and we just imported those into our, into the multipatch format.

1:09:42 [Inaudible audience question]

1:09:44 Excuse me? Sir.

1:09:45 [Inaudible audience question]

1:09:50 Yeah.

1:09:51 There's many softwares out there that are free downloads.

1:09:54 To mention one, would be the SketchUp from Google...

1:09:58 ...and there's a number of models that are free also on the 3D Warehouse...

1:10:01 ...and there's a number of models that you can use...

1:10:04 ...and just create them yourself also and put it in the SketchUp environment...

1:10:11 ...and then you can just bring it to your ArcGlobe and ArcScene environment, so...

1:10:17 But remember that these are mo-, 3D realistic models.

1:10:20 So they were only be displayed in ArcScene and ArcGlobe with the textures.

1:10:24 So ArcMap, you will see just, all the, vertices of the multipatch will be places, so.

1:10:34 Yes.

1:10:36 [Audience question] So, line of sight, you know your target.

1:10:40 Are your viewpoints, they're like at the top of the buildings or anything?

1:10:44 Did you assign, did you assign a z value already, or...?

1:10:50 So the question is, if the points that are being used as the viewpoints for the line of sight, if I assign some z values to it?

1:11:00 [Inaudible audience question] Correct. Shouldn't [inaudible] at the top already?

1:11:01 Yep.

1:11:02 [Inaudible audience question]

1:11:09 Yes, I used, I used the placement of the 3D Editor to just create a point feature and just place it...

1:11:17 ...the location that I would think will be appropriate in terms of like the height.

1:11:21 So you can just click on the z val...you can just place that using the z value that you would like.

1:11:27 But also, on that tool, there's other options that I left off default...

1:11:32 ...but those other options will also ask you for...

1:11:35 ...if have your height already in a field or if you want to put a offset to that particular point.

1:11:42 So there's other functionality that I can give.

1:11:44 I just used that one just to place any map on a particular hotel, just to give a quick example of...

1:11:50 ...how to use that.

1:11:51 So it was a 3D point, so it already had z in its geometry.

1:11:59 Yes please.

1:12:00 [Inaudible audience question]

1:12:12 Yes.

1:12:14 Yes, correct. I only showed that one...

1:12:17 So this particular tool was just creating like a 3D line between two points.

1:12:22 So you could get more complex than that using other tools.

1:12:31 Any other questions?

1:12:34 All right, thank you very much.

1:12:40 Thank you.