

# *Animation* **WORKS**

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# 1. Introduction

## TIP

A simplified tutorial can be found in the AnimationWorks Tutorial file included in this package. Each tutorial chapter is on a different layer of the file.



Camera



Camera Path



Moving Object



Moving Object Path



Rotating Object



Sliding Object



Light



Class Visibility



Transparency

**AnimationWorks** is a VectorWorks add-on containing a set of plug-in objects that help create complex animations entirely within VectorWorks. This tool can create dynamic walk-throughs or static scenes with animated objects within them, and export movies that can be seen by anybody who has Quicktime installed (included in the VectorWorks package).

### Basic Concept

With AW a camera travels through the scene along a camera path. The camera can be made to look straight ahead throughout its entire travel, or targeted at specific objects within the scene. Individual objects within the scene can be animated (within limits) and can be made to move or rotate in place.

### Basic Procedure

In AW you first create a camera path through the scene, and if desired, place a camera upon it. Then you create 3-D animation objects as symbols, and place them in the scene as well. The Object Info palette allows complex editing of paths, cameras and objects, and can be used at any time to modify the animation and control the movement of both cameras and animated objects. Finally, you activate the AnimationWorks menu command to complete the animation's settings, preview the movie then export it.

### Tools

AW's tool collection can be found in a compact palette, available via the AW Workspace. Some of the tools are used to create specific types of objects, and others are used to control various aspects of the scene (visibility, lighting and transparency).

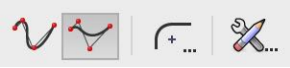
### Compatibility

AnimationWorks is designed to work with the full range of VectorWorks objects and technologies, including recent additions such as the Create Image Prop command (which creates scene props, such as trees, that automatically orient themselves to the camera).

## 2. Camera Paths



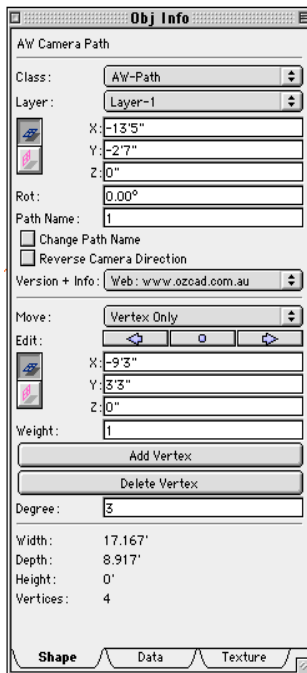
Camera Path tool



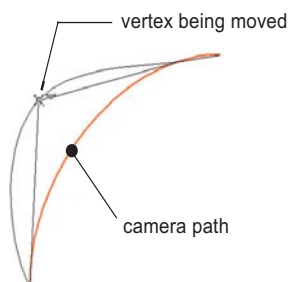
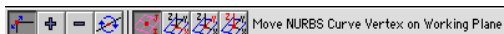
mode bar

### TIP

A detailed discussion of how to create and edit camera paths can be found in Appendix 1.



Reshape Tool



### To create a camera path:

1. Click on the Camera Path tool.
2. In the *Mode Bar*, select *Interpolation Points* or *Control Points*.
3. Click once in the scene to start the path, and click again as often as required to draw the path.

**Note:** a camera path can be open, or closed. If the path is open, you must double-click in order to finish drawing it.

4. Click once (if closed path) or double-click (if open path) to finish.

### To edit a camera path using the Object Info Palette:

1. Open the Object Info palette.
2. Click on a path to select it.
3. Modify settings within Object Info (OI) palette.

**Note:** a camera path is a NURBS object, and you can select and then move individual vertices in three dimensions by selecting *Vertex Only* in the *Move* pop-up menu in the OI palette. This is especially useful when creating a path with very precise 3-D coordinates, such as a bridge or ramp.

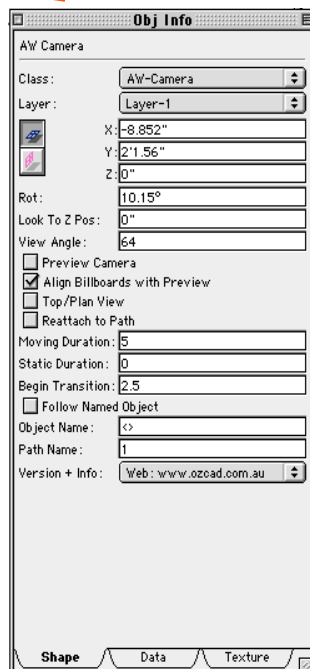
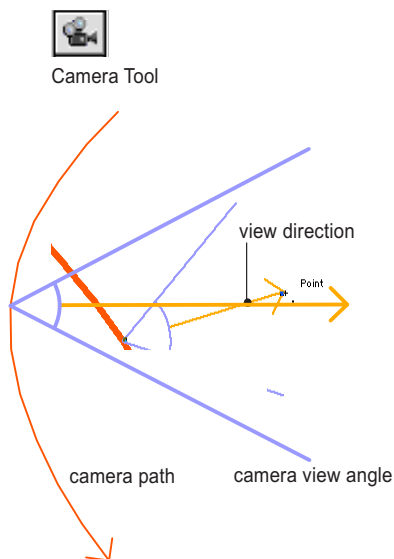
### To edit a camera path using the 3D Reshape Tool:

1. Click once on the camera path to select it.
2. Click on the 3D Reshape Tool to activate it.
3. Back to the camera path: click on any vertex and then drag the mouse in order to move the vertex.

**Note:** switching to a 3-D view makes it easier to select and move individual vertices, and to see the resulting effect.

# 3. Cameras

**Note:** you don't need a camera to make simple movies, only a camera path. The "camera" will travel along the camera path with a view controllable via the main AW Dialog. Anything more complex requires one or more cameras placed along the camera path. See the next page for more info.



## To create a camera:

1. Click once on the camera tool;
2. Click a second time on the camera path created earlier (to place the camera on the path).
3. Drag the mouse in the desired view direction—the camera direction will follow that of the mouse.
4. Click a final time to complete the camera.

**Note:** the camera preferences dialog box will open up the first time the tool is used. You can edit the information in the box, or simply click "OK" to complete the camera. The camera's preferences can always be edited later, via the OI Palette.

**To edit a camera:** use the Object Info palette to modify various camera settings, including angle of view, rotation and look-to height.

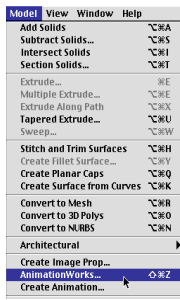
## Other Settings include:

1. **Look to Z Position** (the camera's vertical angle in the direction of view);
2. **Moving Duration** (the number of seconds it takes for the camera to travel the length of the camera path, or the distance to the next camera on the path);
3. **Static Duration** (the number of seconds the camera stands still before moving);
4. **Begin Transition** (the moment when the view begins to transition to the next camera on the path, measured by the number of seconds before the end of the camera's duration).

**Note:** for a detailed description of the remaining settings, see Appendix 1.

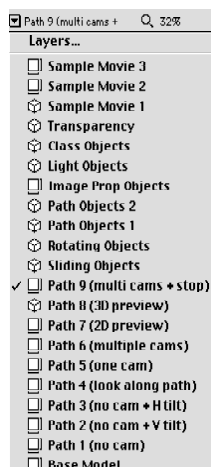
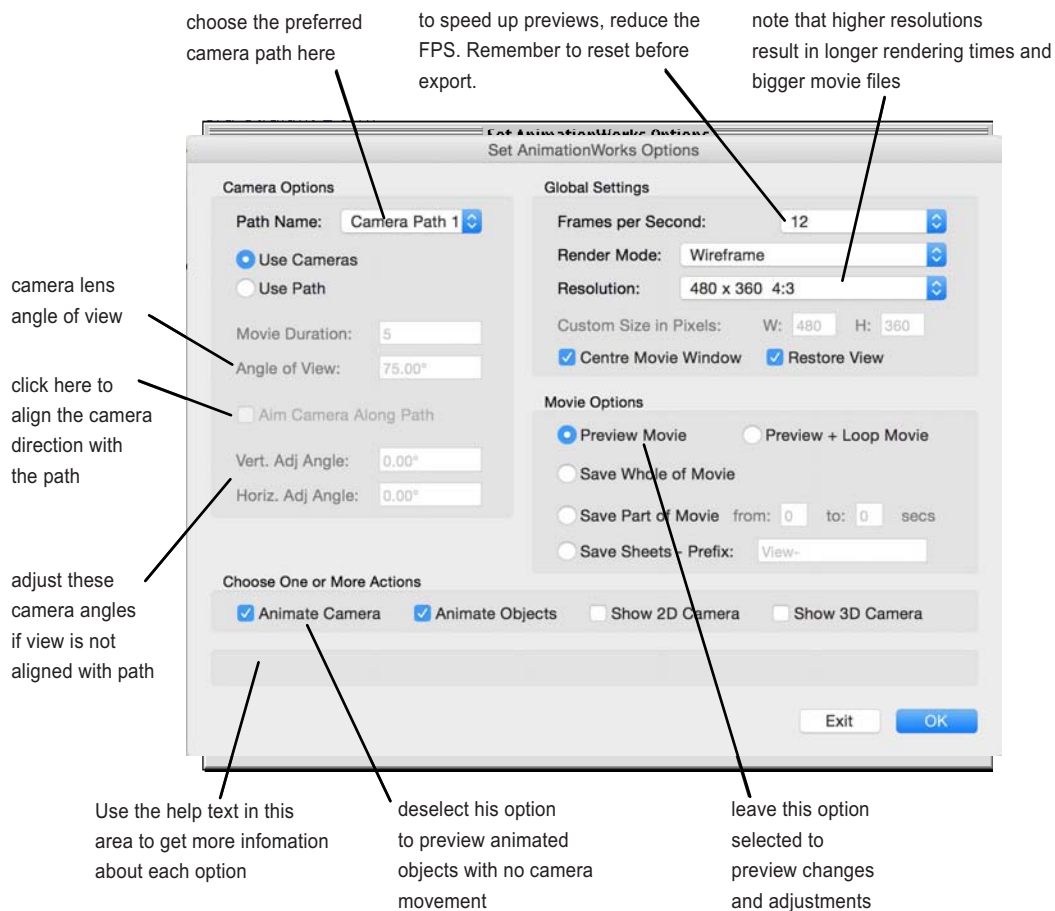
## 3. Cameras *(cont.)*

### 3. Cameras



#### Simple Movies with No Camera Objects:

1. Create a camera path as described earlier.
2. Activate the AnimationWorks menu command.
3. Modify options as required.



#### Additional information:

The tutorial file included with AnimationWorks has individual tutorials arranged in sequential layers. To access any of the camera path tutorials (or any of the other tutorials), select the corresponding layer. Each layer contains both descriptive text and objects, and you can preview the tutorial's effects by activating the AnimationWorks menu command.

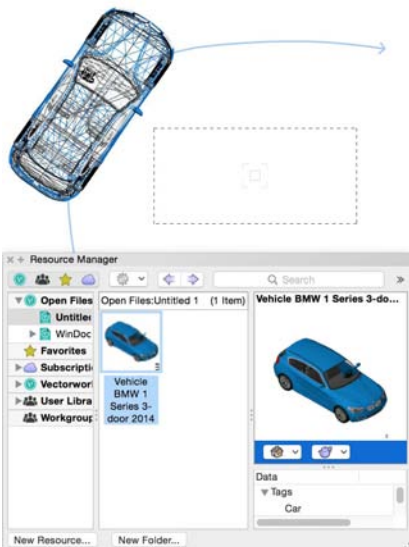
# 4. Moving Objects



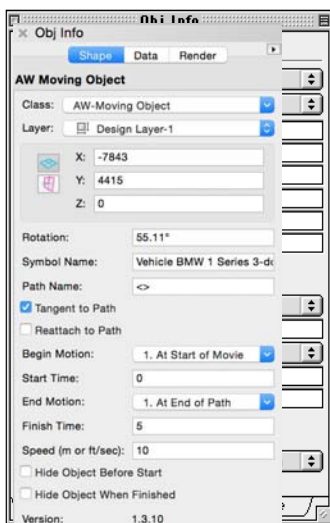
Moving Object Path Tool

## TIP

A Moving Object Path need not be “flat.” In the OI palette you can edit any vertex in the z-dimension (that is, in 3-D) to move it vertically—good for creating a roller-coaster, for example.



selecting and placing a Moving Object



OI Palette with Moving Object selected

An **AnimationWorks Moving Object** is an animated 3-D object that can move along a path, such as an automobile. To create a moving object, you must first create a path along which the moving object will travel, and then create the moving object itself. Finally you place the moving object upon the path.

### To Create a Moving Object Path:

1. Click once on the Moving Object Path tool to select;
2. In the *Mode Bar*, select one of the two curve types;
3. Create the path by clicking several times in the drawing;
4. For a closed path, end by clicking at the path's opening point;
5. For an open path, double-click where the path ends.

### To create a Moving Object:

1. Create or import a 3-D object;
2. Convert the 3-D object into a 3-D-only symbol;
3. Click once on the Moving Object tool to select;

**Note:** if you've created a number of different 3D objects/symbols, the Moving Object tool will automatically select the most recently-created one when you click upon the tool. If you prefer to use a different symbol, open the Resource Browser then select your preferred 3-D symbol by double-clicking on it. The Moving Object tool will now use this symbol as the moving object itself.

4. Place the selected Moving Object upon the Moving Object path;
5. Adjust the object's characteristics in the OI Palette.

### To Preview the Moving Object:

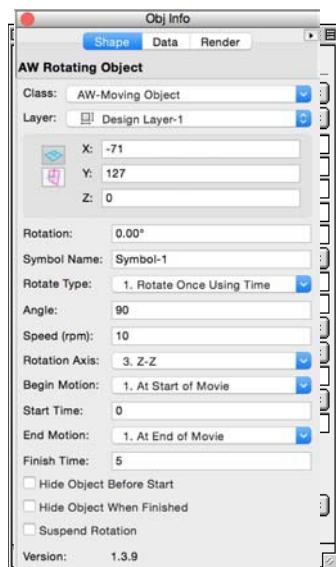
1. You must have a camera path placed in the scene.
2. Select a desired view (Top, isometric or perspective).
3. Activate the AnimationWorks menu command.
4. In the dialog box that opens, under *Choose One or More Actions*, select *Animate Objects* and deselect the rest. This will cause only the animated 3-D object to show its movement. Click OK.

**Note:** To make the Moving Object Path visible in the preview, click on either the *Show 2D Camera* or the *Show 3D Camera* checkboxes.

# 5. Sliding & Rotating Objects



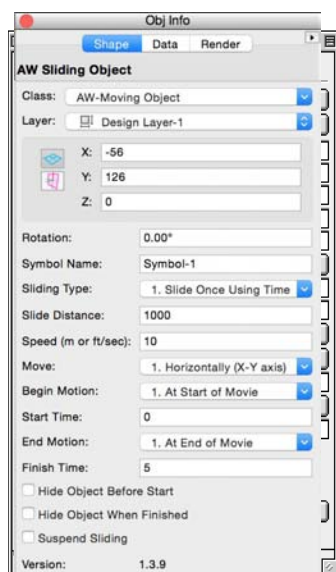
Rotating Object Tool



Obj Palette with Rotating Object selected



Sliding Object Tool



Obj Palette with Sliding Object selected

**AnimationWorks Rotating Objects** and **Sliding Objects** are animated 3-D objects that can either rotate around, or slide along a 3-D axis, vertically or horizontally. Although these are two different types of objects, their creation and preparation are very similar.

## To create a Rotating Object:

1. Create or import a 3-D object;
2. Convert the 3-D object into a symbol;
3. Click once on the Rotating Object tool to select;

**Note:** if you've created a number of different 3D objects/symbols, the Rotating Object tool (and the Sliding Object tool as well) will automatically use either the active symbol, or the most recently-created one when you click upon the tool. If you prefer to use a different symbol, open the Resource Browser then select your preferred 3-D symbol by double-clicking on it. The Moving Object tool will now use this symbol as the moving object itself, with the insertion point being the axis of rotation. A door for example, would have the insertion point at the hinge location.

4. Place the selected Rotating Object in the scene;
5. Adjust the object's characteristics in the OI Palette.
6. Try adjusting different OI Palette parameters and then immediately previewing the object to observe the resulting effect.

## To create a Sliding Object:

1. Create or import a 3-D object;
2. Convert the 3-D object into a symbol;
3. Click once on the Sliding Object tool to select;
4. Place the selected Sliding Object in the scene;
5. Adjust the object's characteristics in the OI Palette.

## To Preview the Rotating or Sliding Object:

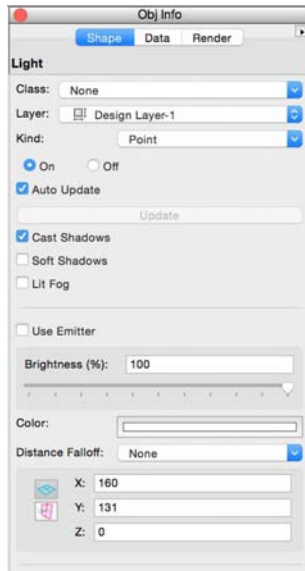
1. You must have a camera path placed in the scene.
2. Select a desired view (Top, isometric or perspective).
3. Activate the AnimationWorks menu command.
4. To show only the Rotating (or Sliding) Object's movement, in the dialog box that opens, under *Choose One or More Actions*—select *Animate Objects* and deselect the rest.



## 6. Light Objects



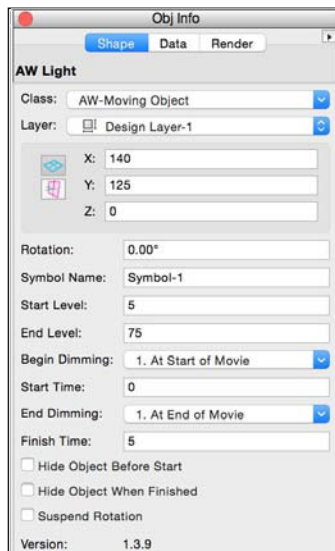
VectorWorks Light Tool



OI Palette with VW Light Object selected



AnimationWorks Light Tool



OI Palette with AW Light Object selected

**AnimationWorks** can create a light whose visibility and brightness can be animated: the light can be turned on, made bright and then fade away by the end of the movie, for example. A scene could have multiple lights in it, each one fading in or out separately and repeatedly as required.

### To create an AW Light:

1. Create a point light using the *VectorWorks* Light Tool and click in the scene to place the light.
2. Convert the light object into a symbol; make sure Leave Instance In-Place is deselected (to avoid adding unnecessary lights in the scene)
3. Click once on the *AnimationWorks* Light tool to select, then click in the scene to place the light.

**Note:** The AW Light tool will only work properly with point lights. Any other light type will not work as expected.

### To create a second AW Light:

1. You can use the 3-D light symbol created and placed earlier.
2. Click once to select it, then duplicate the symbol (Command- or Control-D) and move the duplicate to the desired location.
3. In the OI Palette, adjust the duplicate AW Light's characteristics as required.

**Note:** even though the same 3-D light symbol may be used multiple times, the specific AnimationWorks settings are unique to each instance of the symbol.

**Note 2:** instead of fading in and out, an AW Light can be “switched on” or “off” abruptly by selecting any of the Hide Object check boxes at the bottom of the OI Palette, and then adjusting the Start and Finish times appropriately.

### To Preview the AW Light:

There is no way at present to preview the effect of the AW Light—you must save it as a Quicktime Movie (see next chapter) in order to observe the effect.



# 7. Class Visibility Objects

**AnimationWorks** can make an object appear and disappear at predetermined times in a movie by controlling the visibility of the object's class. The Class Visibility Tool allows an object to appear and disappear once or multiple times sequentially, at specified intervals.

## Basic Method:

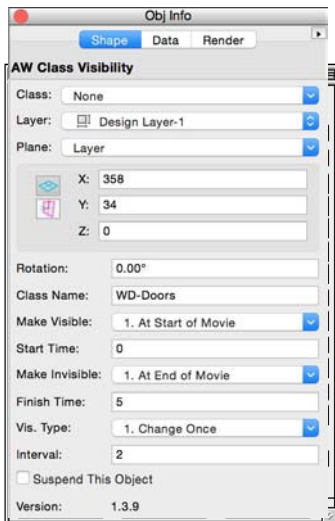
- First you create a specific class for the movie object that is intended to appear/disappear.
- Use the Class Visibility Tool to create a Class Visibility Object (a banner-like object that displays, for reference purposes, the object's class name and all its controllable parameters via the OI Palette).
- Finally, create a 3-D object and place it within the special class created with the Class Visibility Tool.



Class Visibility Tool

**AW Class Visibility**  
**Class Name: WD-Doors**

Class Visibility Object



OI Palette with Class Visibility Object selected

## TIP

As in all other objects, in order to preview class visibility settings you must have a Camera Path Object somewhere within the scene.

## To create a Class Visibility Object:

- First create a special class and name it appropriately.
- Click once on the Class Visibility tool, and click a second time to place it in the drawing.
- With the Class Visibility Object selected, adjust its parameters in the OI Palette, including the new class name. You have now created a visibility class with all its characteristics editable via the OI Palette.
- Create a 3-D object, and place it within the special class created with the Class Visibility Tool.
- Place this 3-D object in the scene.

**Note:** make sure you do not discard the Class Visibility Object (the banner-like object created by the Class Visibility Tool)—save it off to one side.

**Note 2:** to later modify the settings for a particular visibility class, click once on the appropriate Class Visibility Object, and then edit its settings via the OI Palette.

**Note 3:** You can have many completely different 3-D objects placed within this special visibility class, and they will all share the same visibility settings common to that class. To create 3-D objects with different visibility characteristics you must create more Class Visibility Objects.

# 8. Transparency Objects

## TIP

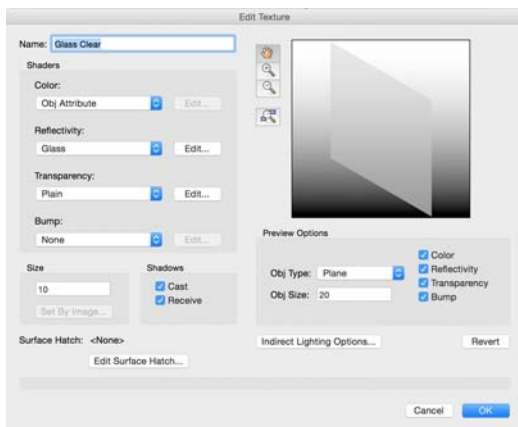
You must have RenderWorks installed in order to use the Transparency Tool.



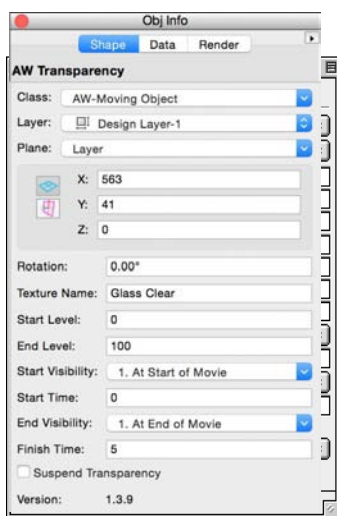
Transparency Tool

AW Transparency  
Texture Name: Glass Clear

Transparency Object



Texture Settings in the Edit Texture dialog



OI Palette with Transparency Object selected

**AnimationWorks** can also make an object appear and disappear in a movie by controlling the transparency level of a texture that is applied to the 3-D object. The Transparency Tool allows full control over the texture's transparency level at both the beginning and end of the fade-in/fade-out process. An object can be only partially transparent at the beginning of the sequence, for example, and then be fully solid by the end.

### Basic Method:

- First you create a specific texture (with transparency) for the movie object that is intended to appear/disappear.
- Use the Transparency Tool to create a Transparency Object (a banner-like object that displays, for reference purposes, the texture's name and all its controllable parameters via the OI Palette).
- Finally, create a 3-D object and apply the new texture to it.

### To create a Transparency Object:

- First create a special texture and name it appropriately.
- You can use any image or shader based texture that doesn't have its own transparency (like Glass Reflectivity). In the Edit Texture dialog box, make sure that *Transparency* is set to *Plain Transparency*.
- Click once on the Transparency Tool, and then double-click in the drawing to place the Transparency Object.
- With the Transparency Object selected, adjust its parameters in the OI Palette, including the new texture's name you created earlier. You have now created a transparent texture with all its movie-related characteristics editable via the OI Palette.
- Create a 3-D object, and apply the new texture to it via the OI Palette.

**Note:** make sure you do not discard the Transparency Object (the banner-like object created by the Transparency Tool)—save it off to one side.

**Note 2:** to later modify the settings for a particular transparency texture, click once on the appropriate Transparency Object, and then edit its settings via the OI Palette.

# Appendix 1. Author's Notes

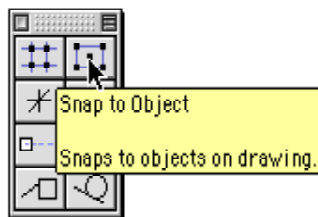
**F**undamental to the use of AnimationWorks, is an understanding of how to manipulate NURBS curves, which are what camera and object paths are based on. A NURBS curve is a curved line in 3D space, that is produced by connecting a series of 3D vertices:

The curvature depends on various factors including the types of points, weight and degree of the curve. Here we will talk about camera paths, however object paths work in exactly the same way.



## Defining Camera Paths

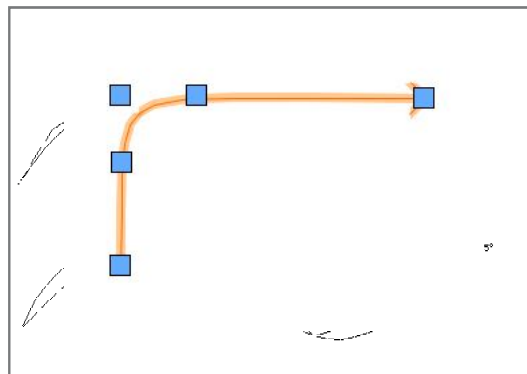
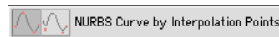
A camera path is defined using the Camera Path Tool, by making a series of mouse clicks in your model. If a mouse click is made on or near an existing 3D point (like the corner of a wall or at a vertex of a 3D polygon), then the NURBS curve will snap to that point. If not, the curve will be drawn on the current Working Plane which unless you have moved it, is likely to be the Ground Plane. If you do not wish to snap to existing 3D points, turn Snap to Object off in the Constraint palette (recommended)



*Paths* can be drawn using Interpolation Points or Control Points, depending on which button you have clicked in the *MODE BAR*. Interpolation Points are a bit like Bezier curves, where the curve does not actually pass through the click points. Control Points on the other hand, are more like Cubic Spline points, where the curve will actually pass through the point

you have clicked on.

You need to experiment with both methods of curve creation. Interpolation Points are perhaps better where the precise path location is not so critical, whereas Control points are best used where you might want to make precise and accurate turns or corners.



**Tip:** To produce a smooth and rounded right angle turn in a *Path* try this:

- Draw using Control Point mode.
- As you are approaching the corner or turning point, place a vertex before the corner by an amount roughly equal to the desired corner radius.
- Place another point on the actual corner location.
- Change direction and place another point roughly equal to the corner radius away from the actual corner.
- Proceed with drawing the rest of the path.

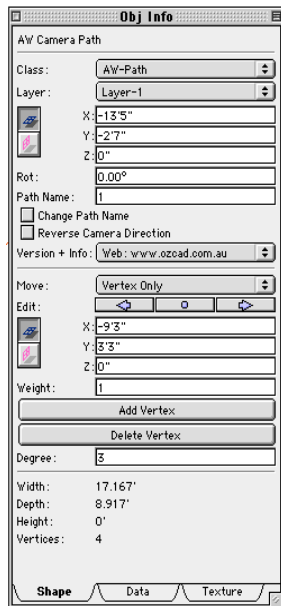
If your path is not closed, you will have to double click to finish drawing it.

## Editing Camera Paths Using the Object Info Palette

The easiest edit to make for a 3D path is to adjust the Z position using the Object Info palette. This will move the whole path to the nominated Z location. By selecting *Vertex Only* from the popup menu at the top of the palette, you can step through each vertex point using

# A1. Author's Notes *(cont.)*

the forward and back arrows, then adjust the coordinates of individual points. This can be useful when you have a limited number of points to edit and you know precisely what the coordinates need to be.



## Editing Camera Paths Using the Reshape Tool

The Reshape tool provides a more graphical way to edit paths because you can simply drag points around to their desired location. The use of



Reshape Tool

the *Mode Bar* options that appear when this tool is selected are extremely important, because they allow movement to be constrained to one particular axis.



Assuming you have drawn the path so that it looks correct in a Top/Plan view, the constraint of movement is most likely to be in the Z axis.

- Select the curve and switch to a 3D view that gives you a clear view of the model (isometric perhaps).
- Select the 3D Reshape tool and click the right

hand button in the second set of options in the *Mode Bar*. This will limit movement to the Z axis.

- Place the cursor over a control point until its shape changes to the four pointed arrow.
- Click and drag the point to the desired location.

Because movement is constrained, you can easily snap to the Z position of another 3D point in the model, by moving the mouse over that point before you release the mouse. You should see the point you are editing jump up or down as your cursor snaps to the other 3D point. For this to work, you must have Snap to Object turned on in the Constraint palette.

Once you begin to drag a vertex point, you will see its current coordinates being displayed in the Data Bar. You can also tab into the Z field here to enter a specific value if desired. Press the Enter or Return keys to lock in the value once you have typed it.

### TIP:

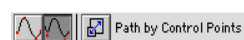
Avoid using the 3D Reshape tool for changing control point types on existing curves, because this will result in multi piece curves which AnimationWorks does not yet support.

### More General Info (in no particular order):

Object animations are not linked to any particular path, so if you have Animate Objects checked for any path, the objects will animate. Obviously the more action there is in a movie, the slower the preview will be. Be sure to TURN THE GRID OFF, otherwise previews flicker annoyingly.

### Camera Paths

Camera paths can be used alone to make a movie (you don't need cameras or moving objects). I find it best to draw them using control points (the second option in the *MODE BAR*), because you can approximate radiused corners better.



# A1. Author's Notes *(cont.)*

Remember that NURBS curves will snap to 3D objects when you draw them, so you may want to initially turn off point snapping. Curves are drawn on the working plane, so you often need to move them vertically to get them at say eye level. Paths can be open or closed. Closed is good if you want to loop a movie.

## Cameras

A camera is a linear PIO, with a look-from and look-to point. To be recognized, cameras must be placed on a path. This action will automatically adjust the camera position to the Z level at that point on the path. This feature took a great deal of work and is still not perfect.

Paths are hybrid, displaying a multi vertex polygon in 2D and a NURBS curve in 3D (BTW, curve res is affected by the 3D conversion res). When a camera is placed on a path, it jumps to the nearest 2D vertex, calculates the u value of the curve at that point and derives the Z value. Sometimes when a camera is edited in a 3D view, the camera fails to find the path and so it becomes unattached and turns grey in colour. Because of the colour change, it is easy to

identify a lost camera. To remedy this, switch to a Top/Plan view and click the *Reattach to Path* button for that camera.

Unlike Art\*lantis, AnimationWorks cameras have a user definable transition time. This is the time at which the camera will begin the transition to the next look-to point. Cameras can also look at moving path objects, though this currently only works well for the first camera, because I have yet to figure a way to transition to a point in the future of the movie.

## Object Animation

Currently we do 3D path, rotation and sliding object animation, along with image props (objects that always face the camera; included in VectorWorks), light brightness and class visibility. Objects can generally be animated based on time or distance/angle. For example, you can rotate an object at a certain RPM, or to say 90 degrees over a period of 5 seconds. Similarly, you can move an object at a nominated speed (m or ft/sec), or specify a distance, start and finish time.

Object movement begin and end times can use the movie start and finish times, or be set to begin after them movie has commenced and finish before the movie ends. So if you had say a 20 second movie, you could start an object moving at 5 seconds into the movie, and stop it at 10 seconds. You can also choose to hide objects before or after the begin or finish moving.

## Export Frame

Only the perspective clipping frame is exported with QuickTime movies. This allows precise definition of the movie size. In non-perspective views, the whole drawing window is exported (only possible when camera is stationary).

