The Zaxwerks 3D Flag™

for After Effects®, Premier® and Motion®

User Guide

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Using This Manual

This User Manual is divided into three main sections: Getting Started, Learning 3D Flag and References. Depending on what you need, you'll find the answers in one of these three sections. Read below for more information regarding each section.

Getting Started

If this is the first time you are installing the 3D Flag plug-in, these chapters will provide step-by-step instructions on how to properly install the plug-in.

Learning 3D Flag

You can read the chapters in this section to learn how to use the 3D Flag plug-in.

The Quick Start chapter will teach you the minimum steps needed to create a flag animation. You'll then learn the details of coloring and sizing your flag in Creating A Flag. You'll then learn how to use Wind And Gravity to make your flag move. In Changing Flag Attributes, you'll learn how to modify flag parameters to achieve the customized flag that fits your needs.

A flag wouldn't be very useful if you couldn't place it in your After Effects scene. The Flagpoles chapter will show you how to attach your flag to an After Effects 3D layer and animate it. The chapter on Self-Intersection will demonstrate how you can improve the realism of the flag.

Once you've mastered the basics, the Working With Multiple Flags chapter will teach you how to put multiple flags in a single scene. It will also demonstrate how to quickly and easily reuse a single flag animation with multiple flag images. Finally, Other Creative Uses For Flags will show you how to create more than just flags with the 3D Flag cloth engine.

References

As you learn to use the 3D Flag plug-in, you will likely want to learn more about certain parameters or features. This section of the manual will discuss in detail the parameters you'll see in the After Effects Effect Controls Window as well as the Flag Options Window. If you don't understand a particular parameter, or would like to know how something is calculated, these chapters will provide insight.

Installation

Macintosh

Minimum System Requirements

- G3 Power Mac (G4 or G5 recommended).
- Mac OS 9.2.2, OS X 10.3.8
- Apple's OpenGL system extension.
- Quicktime 5 or 6.
- High Res Color Monitor (Millions of Colors).
- 128 MB RAM (256 MB recommended).
- 30 MB unused hard-disk space.
- CD-ROM drive.
- Adobe After Effects 5.5 or above.
- Additional requirements of the host application

Software specifications subject to change without notice. Software used under license.

Installing the Software In After Effects

The 3D Flag software consists of a plug-in and support files. All parts are required for the software to run correctly.

1 Insert the application CD and open it, or decompress the archive you downloaded.

The disk or download archive you received contains a main folder with the words 3D Flag in the title. Double-click on this folder to open it.

Inside the window that opens you will find a folder called 3D Flag - AE. Inside this folder is the 3D Flag AE plug-in and several support files and folders. The 3D Flag - AE folder will be used in the next step.

2 Find and open the Plug-ins folder inside the Adobe After Effects folder. Drag or copy the 3D Flag - AE folder from its current location, into the Plug-ins folder.

WARNING: Do not move these folders individually! Only drag the 3D Flag - AE folder. This will copy all the required files into the appropriate location on your hard drive. If you drag only the plug-in into the Plug-ins folder, you will be missing a few important support files.

You are now ready to launch After Effects and create your first flag.

Authorization In After Effects

The first time you choose 3D Flag from the Effect menu it will ask you to enter your Authorization code.

Enter the Name and Organization, and type the code exactly as it was given to you. Then press the OK button.

If you click the Demo or Cancel buttons, you will have to relaunch After Effects before it will give you the Authorization window again.

Windows

Minimum System Requirements

- Intel Pentium II, III, or 4 processor.
- Microsoft Windows 2000 or Windows XP.
- The OpenGL system .dll file.
- High Res Color Monitor set to True Color.

(OpenGL accelerator card recommended)

- 128 MB RAM (256 MB recommended).
- 30 MB unused hard-disk space.
- CD-ROM drive.
- Adobe After Effects 5.5, 6.0 or 6.5.

Software specifications subject to change without notice. Software used under license.

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WARNING: Do not move these folders individually! Only drag the 3D Flag - AE folder. This will copy all the required files into the appropriate location on your hard drive. If you drag only the plug-in into the Plug-ins folder, you will be missing a few important support files.

NOTE: 3D Flag requires OpenGL to run. OpenGL is a system extension (opengl32.dll) that comes with your Windows operating system. If you try to run 3D Flag and get an error saying OpenGL is missing, reinstall it from your System CD or download it from the Microsoft Downloads Center.

You are now ready to launch After Effects and create your first flag.

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Enter the Name and Organization, and type the code exactly as it was given to you. Then press the OK button.

If you click the Demo or Cancel buttons, you will have to re-launch After Effects before it will give you the Authorization window again.

TROUBLESHOOTING TIP
On some systems running Windows XP, you will not be able to type any more than 2 or 3 characters per field. If this happens to you, type the information into Note Pad and then copy each line and paste it into the appropriate field.

Quick Start - Creating Your First Flag

Quick Start

Overview

This chapter describes the steps needed to create a basic 3D Flag animation.

Each chapter in "Learning 3D Flag" relies on your ability to create the basic animation described below, so learn this section first.

A working knowledge of your host program is required to use this plug-in, so familiarize yourself with After Effects Comps, layers, cameras, and lights before continuing. An understanding of the 3D animation system in After Effects will help you fully access the capabilities of this plug-in, although it is not required.

What's Needed

The 3D Flag plug-in creates its own 3D space. If you are working inside of After Effects there is no need to create cameras and lights, although there is the option to use them if you want. If you are in any other host you won't have 3D support any way so there won't be a need to concern yourself.

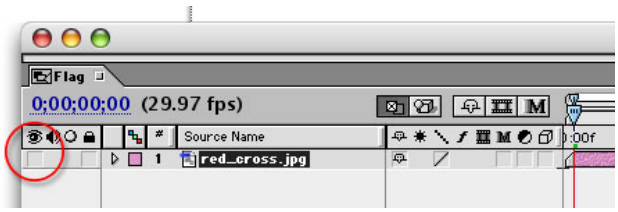
The plug-in effect is applied to a Solid, Color Matte or Video Layer that is the same size (and with the same pixel aspect ratio) as the Comp or main Monitor Window.

The plug-in will turn the layer it is applied to into a flag, or it can use another layer's image to set the color and size of the flag.

Setting Up The Comp

To create a basic 3D Flag composition, do the following:

1 Create a 640x480 Comp (use Preset: "NTSC, 640x480"). Set the duration to 10 seconds. Name the Comp "Flag."



2 Import the image called "Red Cross.jpg" found in the "Tutorial Images" folder within the "Flag Tutorials" folder. This image will be used to determine the color and size of the flag.

3 Drag the image into the Comp and then turn OFF the visibility switch.

4 Create a 3D camera using the menu option Layer> New> Camera. Click OK to accept the default settings.

ATTENTION AE 6.0 USERS:
The 3D camera should have the following attributes:
Zoom: 900
Film Size: 113.39
Angle of View: 39.15
Focal Length: 159.4

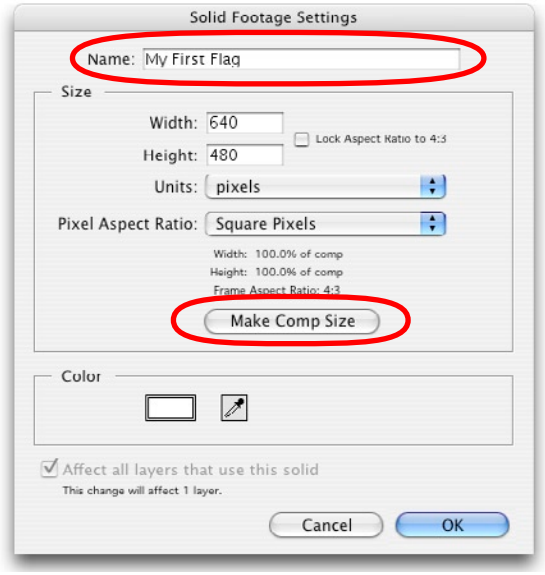
Additionally, the Position of the camera should be: 320, 240, -900.

5 Create a 3D light using the menu option Layer> New> Light. Make the Light Type “Parallel” and click OK.

6 Create a Solid using the menu option Layer> New> Solid. Name the Solid “My First Flag.”

IMPORTANT: The Solid containing the 3D Flag effect should have the same size and pixel aspect ratio as the Comp. Use the “Make Comp Size” button in the Solid Footage Settings dialog.

NOTE: Do not make this layer a 3D layer. The image created by the 3D Flag plug-in will look 3D even though the effect is applied to a 2D layer.

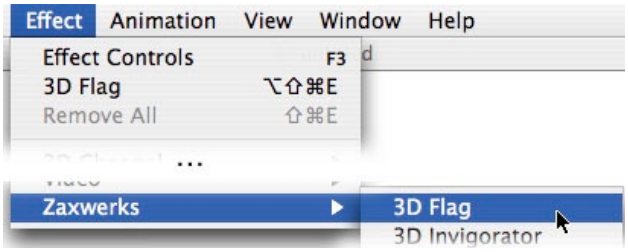


Click OK to add the Solid to the Comp.

Adding The Flag Effect

1 Select the “My First Flag” Solid.

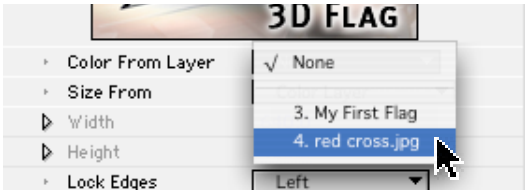
2 Add the 3D Flag effect to the “My First Flag” Solid by selecting Effect> Zaxwerks> 3D Flag. Do not add the effect to “Red Cross.jpg” image.



At this point, the “My First Flag” layer has turned into a flag, as if the layer suddenly went limp like cloth.

Notice that the color of the flag is the same color as the Solid. While it’s possible to create flags this way, we recommend taking an additional step in order to better choose how the flag is colored and sized.

3 In the Effect Controls window (ECW), find the Color From Layer control and choose “Red Cross.jpg” from the menu.



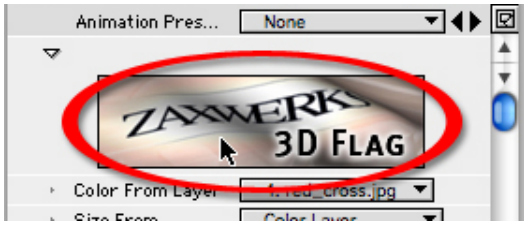
The image on the flag becomes the layer you just chose. Notice that the size of the flag has changed to be the same size as the layer you just chose.

At this point, you should have a basic flag animation ready for customization. Save this scene as a starting point for the Learning 3D Flag chapters in the next section.

An example project called “Quick Start.aep” exists in the Tutorials folder. You may use this file when learning each chapter.

Viewing the Flag Animation

The 3D Flag plug-in can display your animation in real-time without needing to do a RAM preview. This is done within the 3D Flag Options window. To view the animation in real-time, do the following:



1 Click on the 3D Flag logo at the top of the Effect Controls window.

2 The 3D Flag Options window will be displayed, showing the flag animation in real-time.

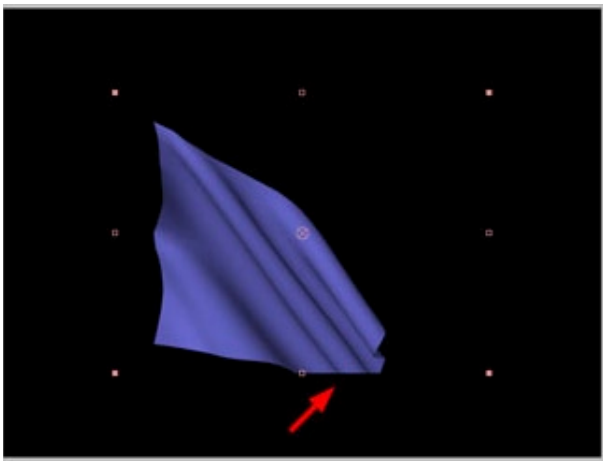
3 Notice how the flag seems to be blowing in the wind.
4 Click the OK button to close the window.

For now, just remember that you can get a real-time preview of your animation in the 3D Flag Options window. When changing parameter values in the Effect Controls window, it's helpful to see quick results using this preview window.

The 3D Flag Options window, and all of its parameters will be discussed in more detail in the chapter called Changing Flag Attributes.

Match The Comp Size!

The 3D Flag effect must be applied to a Solid that has the same size and pixel aspect ratio of the Comp. If not, then a variety of bad things can happen.



In the above image, the 3D Flag effect was applied to a layer that was smaller than the Comp. Therefore, the resulting flag image gets clipped by the layer's bounds. There are other ways to make a flag smaller. See the Resizing A Flag section in the Creating a Flag chapter for an example.

Coloring The Flag

Overview

This section describes how to set the color of your flag.

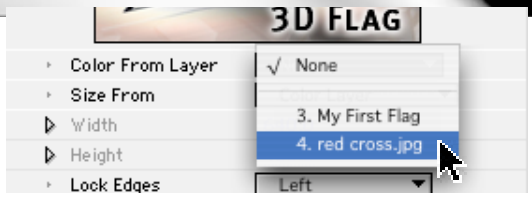
This section assumes that you have read the Quick Start chapter and can create a Comp with a 3D Flag in it.

The Flag Color Comes From A Layer

When the 3D Flag effect is initially applied to a layer, the contents of that layer is used to color the flag. Therefore, if you apply the 3D Flag effect to a blue Solid, the flag will be blue. If you apply the 3D Flag effect to an image or a video clip, that image or video will show up on the flag.

While you can certainly use the layer you have applied the effect to, to color your flag, the 3D Flag plug-in allows you to select any layer to use as your flag image. The advantage of this is that you can do multiple versions of the same flag animation simply by switching the layer that the color is coming from.

For instance, you can apply the flag to a static layer such as a Solid or a Color Matte and then take the color from a separate source layer. When it is time to change the color of the flag just pick the new layer from the Color From Layer menu.



Selecting A Flag Image Layer

The parameter called Color From Layer is used to set the color of the flag.

In the Quick Start chapter, we created a project with the Red Cross flag. When we first applied the 3D Flag effect, we had a flag with a solid color.

It wasn't until we used the Color From Layer parameter that the flag started to have some character.

By coloring the flag with an image, you'll have more control over how the flag looks.

In the next section, Automatically Resizing A Flag, we'll learn how choosing a different color layer can change the flag color and size.

Getting Effects To Appear In The Flag Image

There will be occasions when you'll want to select a color layer that includes effects or masks. You'll probably find that the effects and masks do not appear on the flag.

To get around this limitation, pre-compose the layer, transferring all settings to the new Comp.

Here is an example project demonstrating the need for pre-composing:

Show The Color Layer

1 Open the "Quick Start.aep" project.

2 Turn off the visibility of the "My First Flag" layer and turn on the visibility of the "Red Cross.jpg" layer.
The visibility settings of the two layers should look like the image below.

3 You should now see the "Red Cross.jpg" image in the Comp window.

Apply Effects

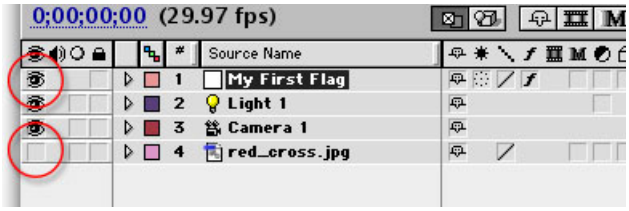
1 Apply an effect to this layer. Select the “Red Cross.jpg” layer and apply the effect Effect> Stylize> Brush Strokes.

2 The Comp window should now show the image with the effect applied.

3 Now turn off the visibility of the “Red Cross.jpg” layer and turn on the visibility of the “My First Flag” layer again.

You would expect to see the “Brush Strokes” effect applied to our flag image, but instead, nothing has changed.

This is because effects and masks applied to the color layer are not available to the 3D Flag plug-in. To get around this limitation, pre-compose the layer.

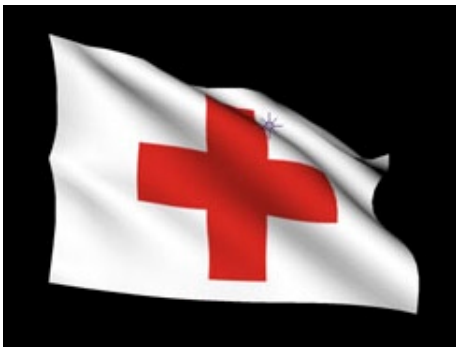


Pre-Compose The Layer That Has Effects

1 Select the “Red Cross.jpg” layer.

2 Then, from the Layer menu, select the “Pre-compose...” command (Layer> Pre-compose). The Pre-compose dialog will be displayed.

3 Name the new Comp “Red Cross Pre-Comp” and select the “Move all attributes into the new composition” option.



Click the OK button and let After Effects work its magic.

A new Comp called “Red Cross Pre-Comp” will be created, replacing the “Red Cross.jpg” layer.

Resizing The Pre-Comp

The pre-compose operation creates a Comp that has the same size as the “Flag” Comp (640x480). We want the “Red Cross Pre-Comp” Comp to be the same size as the flag image (400x266). Let’s fix that now.

1 Open the “Red Cross Pre-Comp” Comp.

2 Open the Composition Settings dialog (Composition> Composition Settings).

3 We want our Comp size to match the size of the flag, so set the Comp Width to 400 and the Comp Height to 266.

4 Accept the changes and close the window by pressing the OK button.

Updating The Flag

Now that we’ve changed the flag’s color layer, we’ll need to update the flag by re-selecting the color layer. This step is necessary so that the plug-in properly rebuilds the flag object.

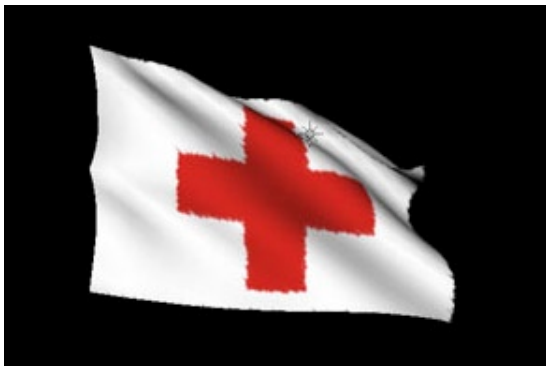
1 Open the “Flag” Comp again.

2 Select the “My First Flag” layer.

3 Open the Effect Controls window (Effect> Effect Controls).

4 Find the Color From Layer menu and select “None.” This will reset the color layer back to the color of the Solid. Now that we’ve changed it, we can change it back.

5 From the Color From Layer menu, select “Red Cross Pre-Comp.” The Brush Strokes effect now appears properly on the flag and the flag is properly sized.

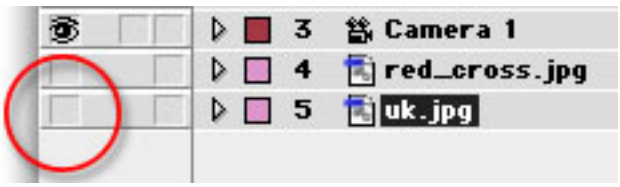


An example file demonstrating this technique called “Pre-Comp Effects.aep” is in the Tutorials folder.

Automatically Resizing A Flag

Overview

This section shows how changing the flag's color can also change the flag's shape and size.



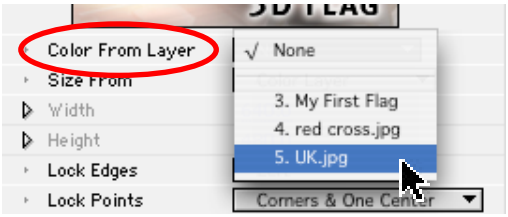
Changing The Flag Image

In the Quick Start chapter, we created a project with the Red Cross flag. Let's open that project and change the flag image.

1 Open the "Quick Start.aep" project.

2 Import the file called "United Kingdom.jpg" in the "Tutorial Images" folder. This is an image of the British flag.

3 Add the "United Kingdom.jpg" image to the Comp and turn off its visibility.



4 Open the Effect Controls window (Effect> Effect Controls).

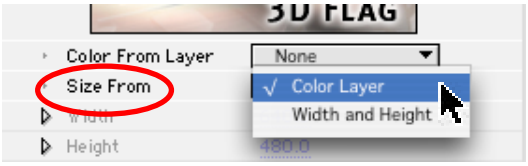
5 Locate the Color From Layer menu and select "United Kingdom.jpg."

Your Comp window should now look like the image below.

Notice how, when the new image was selected, not only did the flag color change, but the size of the flag changed too. The British flag has a different aspect ratio than the Red Cross flag. It is wider than the Red Cross flag. The 3D Flag plug-in automatically adjusts the size of the flag to compensate for this.

The Size From Parameter

With the default settings, the layer you choose for the color will also dictate the size of the flag. This is because the Size From parameter is set to "Color Layer," meaning the size of the flag comes from the same layer that the color comes from.



This is very convenient. Big images make big flags. Small images make small flags. Also, when choosing different flag images, the shape of the flag will automatically adjust so that the flag has the correct proportions.

There will be times, however, when you want more control over the size of the flag. The next section, Manually Resizing a Flag, discusses how to choose your own flag size.

Manually Resizing A Flag

Overview

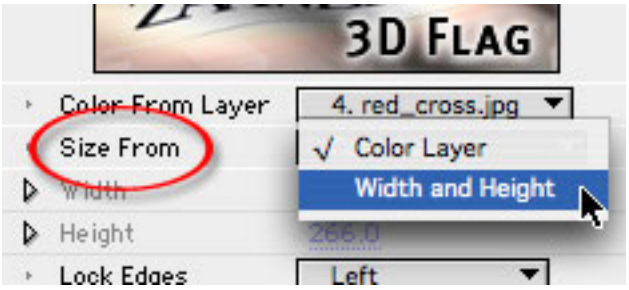
As you use the 3D Flag plug-in, you'll likely find a situation where the flag's color layer should not dictate the flag's size. For instance, if you have to create 10 identical animations, but your 10 flag images are all different sizes, you wouldn't want the flag to change size as you selected each image. The Width and Height parameters allow you to set the size of the flag, no matter what the size or shape of the flag's color layer is.

Setting Width And Height

You'll notice that by default the Width and Height parameters are grayed out. This is because the Size From parameter is set to "Color Layer." Let's change that. As always, we'll start with our Quick Start project.

1 Open the "Quick Start.aep" project.

2 In the Effect Controls window, locate the Size From parameter and select "Width and Height" from the menu.



The Width and Height parameters become dark. Notice that the Width and Height parameters are already set to the color layer's size (in this case, 400x266).

Let's make this flag half its current size.

3 Since the current width is 400, we'll want to change it to 200. Find the Width parameter and change it to 200.

4 Notice how the flag adjusts to a size of 200x266, almost making a square flag.

You have a lot of freedom when setting your flag size.

5 Since the current height is 266, make it half the size by setting Height to 133.

This makes the flag 200x133, half its original size. Ok, it's really a quarter of its original size, but you know what I mean.

The flag looks like it's farther away from the camera, but it's really just smaller.

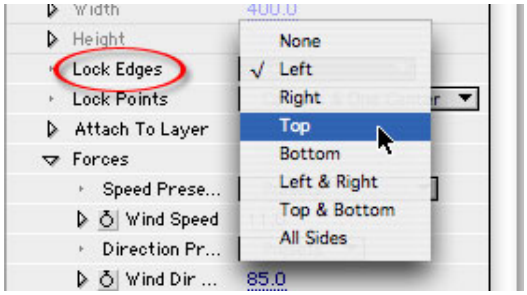
Now that you can set the color, shape and size of your flag, let's learn how to lock different corners and edges of the flag to achieve different looks. The next section, Locking Points - Making A Hanging Banner, demonstrates how to change a waving flag into a hanging banner.

Locking Points - Making A Hanging Banner

Overview

By default, a 3D Flag is locked in three places: the top left corner, the bottom left corner, and the left center point. The rest of the flag is free to react to the forces in the scene (that is, flap).

You may change which points on the flag are locked by changing the Lock Edges and Lock Points parameters.



Caption Text

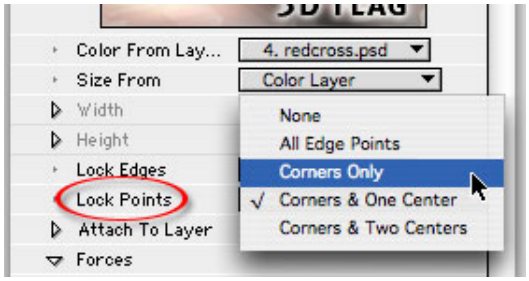
Making a Hanging Banner

In this section, we'll demonstrate how to change which points on a flag are locked. Starting with our Quick Start file, let's make a hanging banner with a just a few clicks.

1 Open the "Quick Start.aep" project.

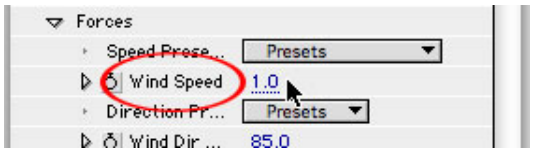
2 Our flag is currently locked on the left side. Since we want this banner to hang vertically, we'll want to lock the top edge.

In the Effect Controls window, find the Lock Edges parameter and select "Top."



Notice how the wind blows the flag differently when the flag is locked at its top points.

3 We'd like to imagine this banner held just by the corners, so locate the Lock Points menu and select "Corners Only."



4 At this point, the flag held in the right places, but the default wind speed is too fast. To settle things down, lower the Wind Speed vlaue until the flag doesn't look like it's being affected too much by the wind. A Wind Speed of 1 should do the trick. We'll discuss wind in more detail in the next chapter.

We let the wind blow very softly, and let gravity do most of the work.

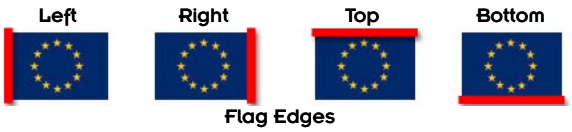
By hanging the banner from just the two top corners, we get a nice drooping in the center. Watch the animation in the 3D Flag Options window to see how the slower wind speed affects the banner.

Read below for more information on locking edges and points, or continue on to the next section on Creating A Pennant, where we show you how to create a flag with non-rectangular shape.

Lock Edges

You can choose which edges are affected by the Lock Points parameter by setting the Lock Edges parameter.

You may choose a single edge, or a combination of edges.

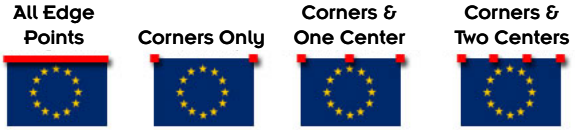


Flag Edges

Lock Points

For the selected locked edges, you may choose which points along those edges are locked.

Besides “None,” you have the four choices shown in the image above.



Lock Points

Creating A Pennant

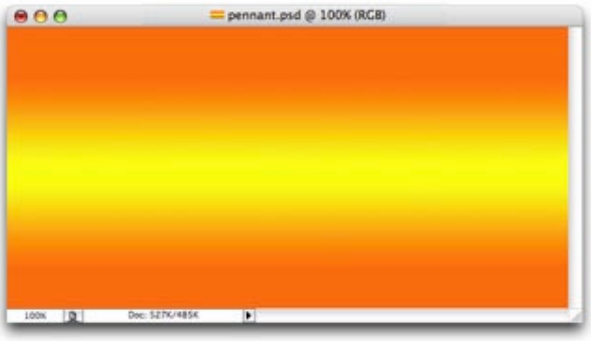
Overview

So far, we’ve seen how to make rectangular flags, but the 3D Flag software can make flags of any shape, such as pennants and streamers. It can also create curved flags and even flags with holes and cut-outs. All of this magic is done by adding an alpha channel to your color layer. In this section, we’ll show you how to create a pennant.

Preparing The Flag

In order to make a non-rectangular flag, the flag image must be created with an alpha channel. This is a fourth channel, in addition to the red, green, and blue channels, that specifies where the transparent areas exist.

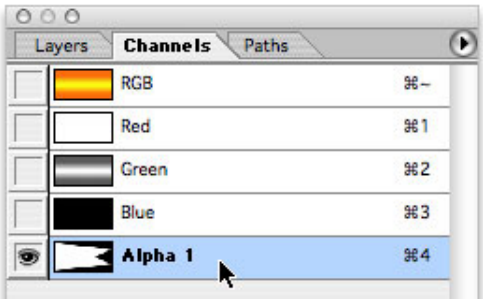
There are many ways to create an image with an alpha channel, even within After Effects, but this example uses an image created in Adobe Photoshop.



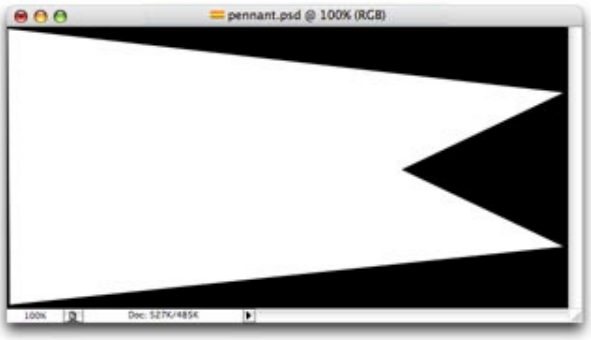
To see what an alpha channel looks like, do the following:

1 Open the “Pennant.psd” file in Photoshop. This file can be found in the “Tutorial Images” folder located inside of the “Flag Tutorials” folder. If you don’t have Photoshop, just read this section. You’ll see what you need to see here.

2 The image should look like the picture below.



3 Where is the transparency? At this point Photoshop is only showing you the RGB color. To see the alpha channel, open the “Channels” palette (Window> Channels).



4 Click on the “Alpha 1” channel. The image changes to show the alpha channel for the image.

The white area represents where you will see the flag. The flag will not be visible in the black areas. By drawing on the alpha channel you can create a flag of any shape.

Making The Pennant

Creating a non-rectangular flag is as simple as choosing a layer that has black in the alpha channel.

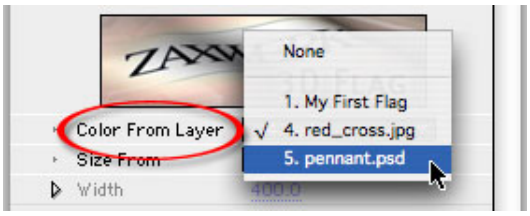
1 Open the “Quick Start.aep” project.

2 Set the background color of the Comp to medium gray. Select Composition> Background Color and then use the color picker to select a medium gray color.

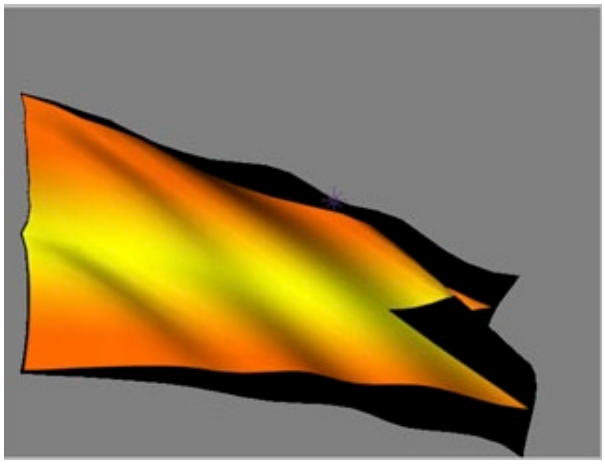
3 Import the image called “Pennant.psd” found in the “Tutorial Images” folder within the “Flag Tutorials” folder. This is the same image you looked at in Photoshop.

4 Add the image to the Comp and turn off the visibility.

5 In the Effect Controls window, find the Color From Layer menu and select “Pennant.psd.”



Your flag will change into a pennant.



Choosing The Right Quality Setting

1 When the Layer Quality switch is on the Draft setting, the alpha channel affects the color of the flag but not the shape.

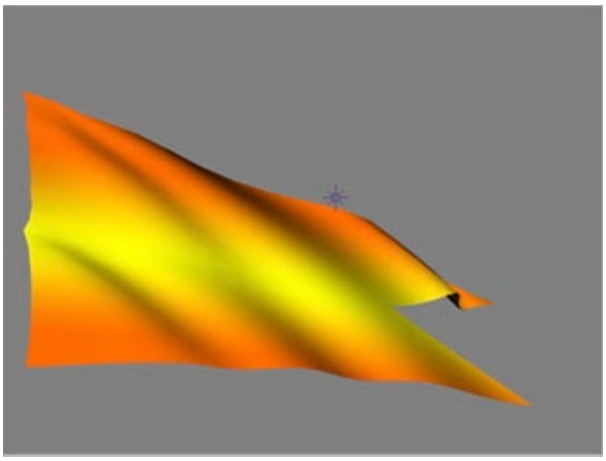
2 Set the layer Quality switch for the “My First Flag” layer to Best quality.

3 The black parts will disappear and you will have a perfect pennant.

The next chapter on Wind and Gravity will discuss how to use forces to make your flag wave in different directions.

Wind and Gravity - Use the Force

The motion of a flag is what gives it character.
This chapter discusses the forces that give a flag its motion.
The parameters in the Forces section of the Effect Controls window, let you craft your flag to make it look like it’s naturally reacting to wind and gravity.



This chapter will require you to view the flag animation once parameters have been changed. Be sure to familiarize yourself with how to view the flag animation in real-time in the 3D Flag Options window.

- The Need For (Wind) Speed
- Instant Billowing & Gusting
- Changing The Wind Direction
- How To Animate Wind Direction
- Earth Or Moon: Gravity And Slow Motion
- Turning A Flat Card Into A Flag

The Need For (Wind) Speed

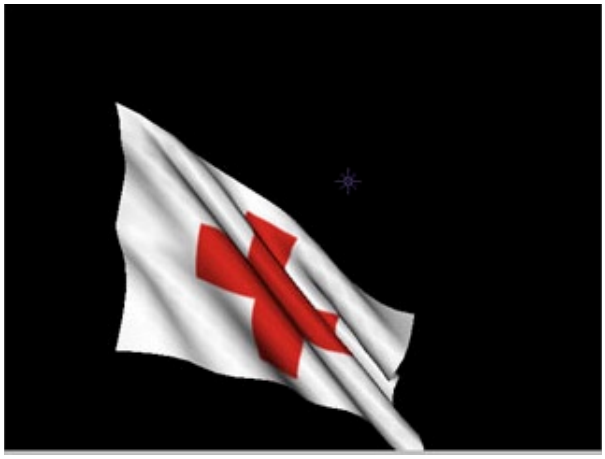
Overview

This section will show you how the Wind Speed parameter affects a flag's motion.

This section assumes that you have read the Quick Start chapter and can create a Comp with a 3D Flag in it.

Making A Light Breeze

The 3D Flag plug-in has a default Wind Speed of 11. This speed causes the flag to flap at a good rate. There will be times when a slower breeze is more appropriate for your scene.



To slow the pace down, do the following:

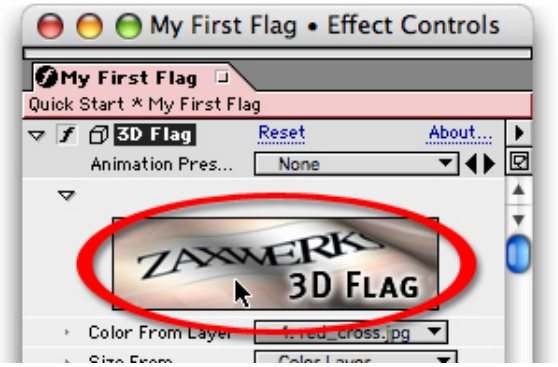
1 Open the "Quick Start.aep" project.

2 In the Effect Controls window, find the Wind Speed parameter. Lower the speed value until the flag is drooping at about a 45 degree angle. A value of 5 should work.

Notice how the flag droops. Since less wind is being applied to the cloth flag, gravity has more effect.

3 To see the results of this change in real-time, open the Options window by clicking on the 3D Flag logo in the Effect Controls window.

4 When you're done watching the flag, click the OK button to close the Options window.



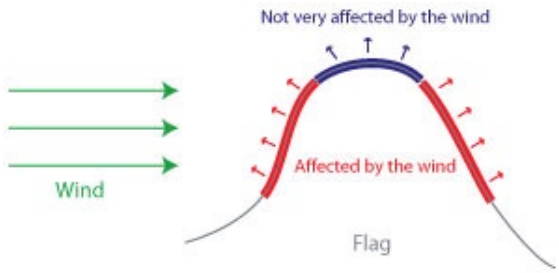
By animating the Wind Speed value you can get the flag to dance. Quick changes in wind speed make the flag lift and fall.

How Wind Affects The Flag

Wind does not affect all parts of the flag equally. Those portions of the flag that face the wind (towards or away) will be blown more strongly than the portions of the flag parallel to it.

This is one of the reasons flags undulate in the wind. Portions that face the wind are blown to the side. This flattens out the part that was facing the wind and causes the next section of the flag to bend. This flattening and bending cycle continues down the length of the flag creating a wave.

The diagram below shows how wind affects the flag, depending on how directly the flag is facing the wind.



In the next section, Instant Billowing & Gusting, you'll learn how to quickly create animated wind to give the flag some great-looking character.

Overview

If you leave the Wind Speed set to a constant speed the flag's animation will start to look repetitive. To make things more interesting, 3D Flag has a built-in wind pattern generator.

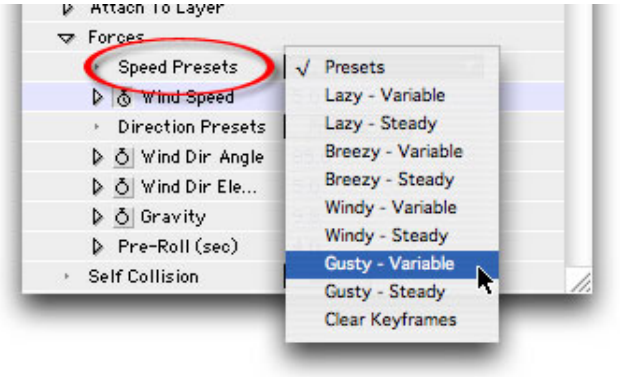
The wind pattern generator will automatically create keyframes for the Wind Speed parameter. This allows you to quickly create varying wind speeds, making your flag animation look much better. You access the wind pattern generator by picking a preset from the Speed Presets menu.

Creating Gusts

The wind pattern generator is really quite amazing. With it you can create everything from calm breezes to near-hurricane type forces. You should take some time to see what each setting does. For this particular example we will create a gusting style of wind.

1 Open the "Quick Start.aep" project.

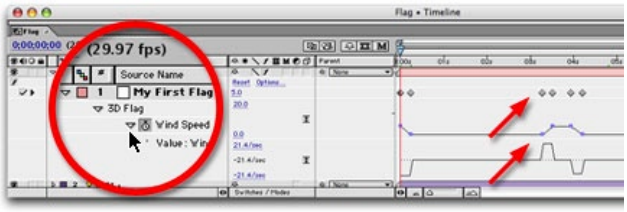
2. In the Effect Controls window, locate the Speed Presets menu and select "Gusty - Variable."



Caption Text

This will cause any existing Wind Speed keyframes to get cleared, and dozens of new ones to be created. Way more keyframes than you would want to create by hand!

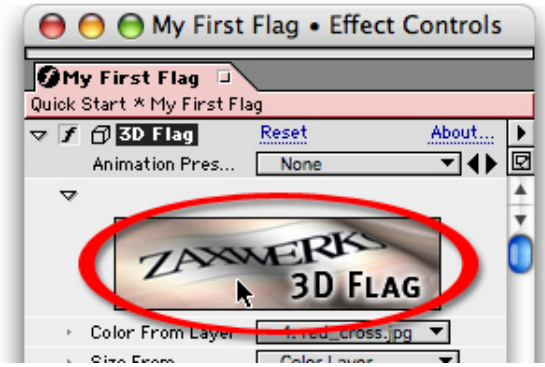
3 Open the Wind Speed animation graph in the Timeline window to see how the wind is no longer constant.



Your animation will look different than the image above because the wind pattern generator uses random numbers when generating keyframes.

You may edit these keyframes as you would any animation graph, or you may generate a new set of keyframes by selecting another preset from the Speed Presets parameter. You can even select the same preset over and over to create different random variations of the same wind style.

4 To see how the wind now affects the flag, view the new animation within the Options window by clicking on the 3D Flag logo.



5 When you're done watching the flag, click the OK button to close the Options window.

Clearing Keyframes

Now that you've automatically created Wind Speed keyframes, you can clear the keyframes with one command.

1 In the Speed Presets menu, select "Clear Keyframes."

All of the keyframes for the Wind Speed parameter are deleted and the Wind Speed is set back to the default value of 11.0.

So far, the wind has been blowing to the right. Let's learn how to change that in the next section, Using Wind Direction Presets.

Changing The Wind Direction

Overview

So far, we've only seen the wind blow to the right. This section will discuss how to change the wind direction by using the Direction Presets menu.

Using Wind Direction Presets

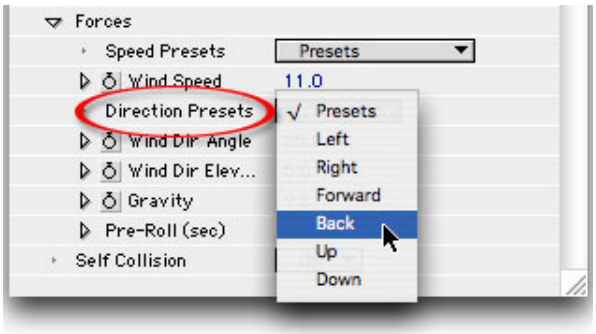
The 3D Flag plug-in comes with several wind Direction Presets. You can use the presets to quickly choose different wind directions.

NOTE: The direction presets do not cause the wind to blow in absolute directions. That is, a "Right" blowing wind also blows a little to the back and a little up. This allows the wind to act more naturally within the scene. Absolute angles don't always provide the best looking wind.

In this example, you'll learn how to change the wind direction from the default of "Right" (wind blowing toward the right) to "Back" (wind blowing toward the back).

1 Open the "Quick Start.aep" project.

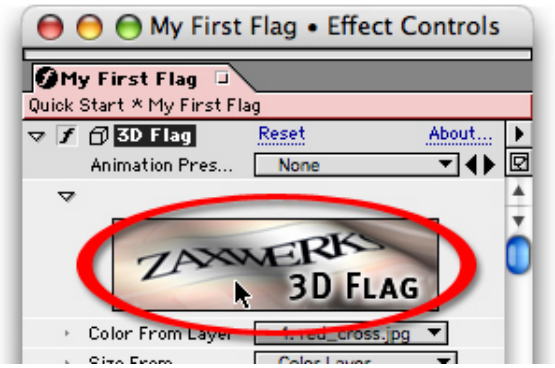
2 In the Effect Controls window, find the Direction Presets menu and select "Back."



This will change the Wind Dir Angle and Wind Dir Elevation parameters, making the wind blow towards the back of the scene.

3 To see how the wind direction now affects the flag, open the Options window by clicking the 3D Flag logo.

4 When you're done watching the flag, click the OK button to close the Options window.



While you can manually set the Wind Dir Angle and Wind Dir Elevation parameters, as you'll see in the next section, How To Animate Wind Direction, the Direction Presets menu gives you easy access to common wind directions.

How To Animate Wind Direction

Overview

The 3D Flag plug-in uses two parameters to determine the wind direction: Wind Dir Angle and Wind Dir Elevation. We'll show how these two values specify a direction. We'll also discuss ways to animate a changing wind direction.

How Wind Direction Is Calculated

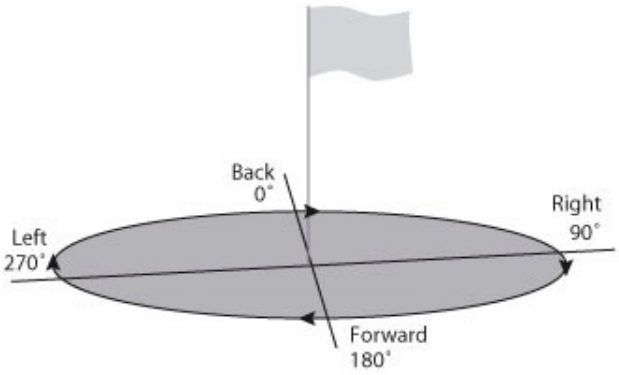
Wind Dir Angle and Wind Dir Elevation are two angle values that 3D Flag uses to calculate the wind direction.

You can imagine Wind Dir Angle representing a rotation from the left to right. Wind Dir Elevation represents a rotation up and down.

Both angles are in degrees.

The image below shows how the Wind Dir Angle parameter goes from 0 degrees to 360 degrees. This parameter determines whether the wind blows to the left, to the right, towards the back of the scene, or towards the front of the scene.

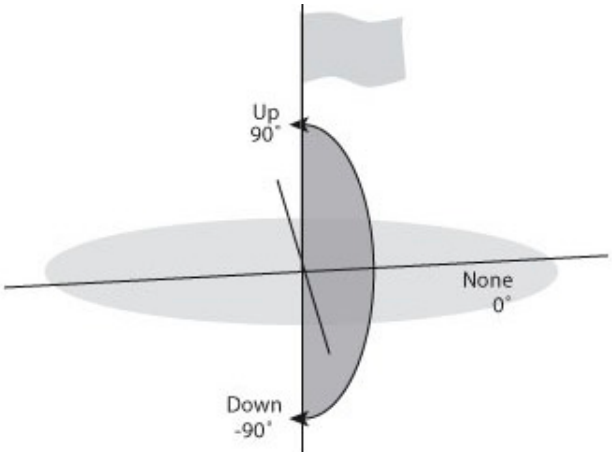
Imagine standing with your arm pointed straight ahead. That's 0 degrees (Back). As you rotate your arm and body to the right, you'll get to 90 degrees (Right). Keep going and you'll have turned around 180 degrees (Forward). Continuing around, you'll hit 270 degrees (Left) before getting back to 0 degrees (which is also 360 degrees).



Wind Dir Angle

The next image shows how Wind Dir Elevation can raise the wind direction towards the sky or lower it towards the ground.

Imagine standing with your arm pointed at the horizon. That's 0 degrees (no elevation). As you raise your arm, you increase elevation in the positive direction. You'll eventually point straight up, 90 degrees (Up). As you lower your arm, elevation get more and more negative. You'll eventually point straight down, -90 degrees (Down).



Wind Dir Elevation

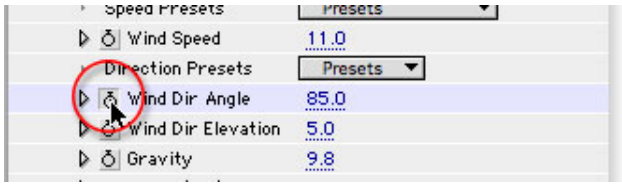
Using these two values, you can make your wind point in any direction.

Animating Wind Direction

Let's make our flag rotate all the way around, starting to the right, and rotating clockwise.

1 Open the "Quick Start.aep" project.

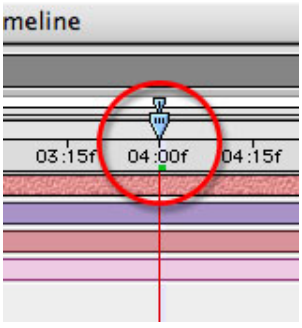
2 In the Effect Controls window, find the Wind Dir Angle parameter. Turn on keyframing for that parameterby clicking on the stopwatch icon next to the parameter name.



This sets a keyframe at time 0:00, with a value of 85.

NOTE: Remember in the last section when we told you that the Direction Presets did not use absolute directions? That's why the Wind Dir Angle is 85 and not 90. 0, 90, 180, and 270 would be absolute directions. 85 is just a little off.

3 Now move the time marker to 4 seconds, time 4:00.

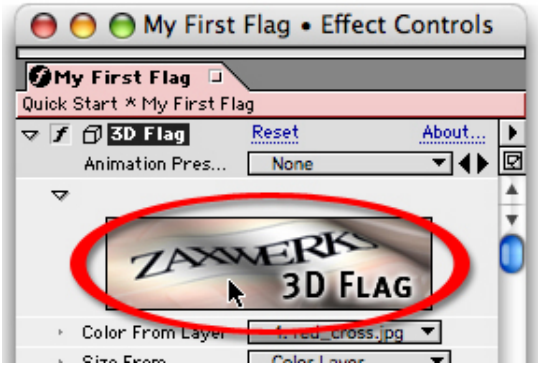


4 We want our flag to rotate once around. Click on the Wind Dir Angle value and drag to the right.

As the angle increases, you'll see the flag rotating around its fixed points in a clockwise direction. Once the flag has made it back to the right, let go of the mouse button.

The Wind Dir Angle should be about 445, which is one full rotation: 85 degrees + 360 degrees. Another keyframe is created at time 4:00 since we changed the parameter value.

5 To watch the flag rotate around its locked points, open the Options window by clicking the 3D Flag logo in the Effect Controls window.



6 When you're done watching the flag, click the OK button to close the Options window.

Now that we've seen how wind affects the flag, let's learn about gravity in the next section, Earth Or Moon: Gravity And Slow Motion.

Earth Or Moon: Gravity And Slow Motion

Overview

Newton told us about gravity. We learned that an apple falls at the same rate as a grape. We also learned that objects accelerate as they fall. And we were taught that objects fell at about 9.8 m/s^2.

This section discusses how 3D Flag uses gravity to make a flag drop naturally, and how we can set gravity to a value other than 9.8 to simulate other environments, like being on the moon, or under water.

The Pull Of Gravity

The flags that 3D Flag creates are made up of a grid of points. Each point has a weight (a mass), and gravity pulls each point downward using the standard gravity equation mentioned above.

Gravity is different than wind speed because wind affects each point on the flag differently. Gravity, by contrast, affects each point on the flag equally.

So, while wind is blowing the flag in one direction, gravity is tugging it down. The two forces work together to create a natural look.

Putting A Flag On The Moon

As you may know, the moon doesn't have as much gravity as the earth. Astronauts float as they leap from point to point. In fact, the moon has only 1/6 of the gravity of earth, so objects only fall about 1.6 m/s^2.

We can simulate a flag on the moon by setting Gravity to 1.6 and by slowing down our Wind Speed.

1 Open the "Moon.aep" project found in the "Flag Tutorials" folder. This project has a United States flag in it. We'll change our forces to make it look like the flag is on the moon, similar to the image above.

2 Since we're putting this flag on the moon, we'll need to change the amount of gravity in the scene. In the Effect Controls window, locate the Gravity parameter and change its value to 1.6. The gravity in the scene is now 1/6 of what it used to be.

The flag doesn't change that much because the wind was already blowing pretty strong to the right.

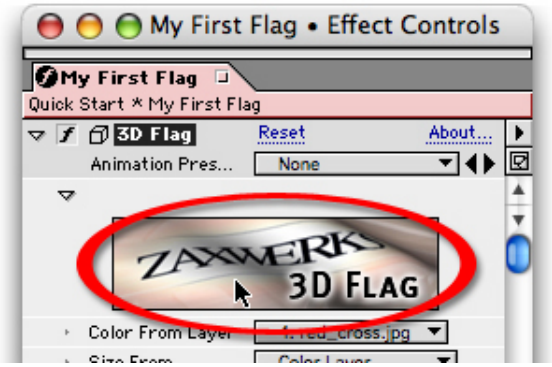
3 Since the moon doesn't really have wind, but does have some small wind-like force, let's slow our Wind Speed way down, making it blow just enough to keep the flag upright.

In the Effect Controls window, find the Wind Speed parameter and lower its value until just before the flag starts to droop. A value of 2 should look about right.

4 Watch the new animation by clicking the 3D Flag logo, in the Effect Controls window, to open the Options window.

Notice how everything seems slower. The wind is very slow, but the gravity is low too, so the flag stays up.

5 Click the OK button to exit the Options window.



Slow Motion

Let's go one step further and find out how to put a flag into slow motion. We'll use the same principals discussed above. We'll lower Wind Speed and Gravity, making sure that the gravity is really low, and that the wind speed is just fast enough for the flag to keep its shape.

1 Locate the Gravity parameter and lower it way down, setting it to around 0.2. This gravity will pull down on the flag just a little bit.

2 Now lower the Wind Speed parameter way down. We want the wind speed to be as slow as possible, but to allow the flag to keeps its shape. A value of 0.5 should work.

3 Now play back the animation in the Options window again. Notice how everything moves very slowly. The lower the wind speed and gravity, the slower the motion.

You can combine Wind Speed and Gravity to simulate some interesting environments.

There is one remaining Forces parameter that we have not discussed. In the next section, Using Pre-Roll To Find The Perfect Wave, we'll see how the Pre-Roll parameter can help us start our animation at the right moment.

Making A Flat Card Turn Into A Flag

Overview

Here's an interesting effect. You can start with the image looking like a flat card, and then turn it into a flag as the user watches! How can you create such magic? It is all a matter of creatively using the Pre-Roll feature.

A 3D Flag simulation always starts with the flag in a neutral, flat state. That is, before wind , gravity, or anything else can change the look of the flag, it begins upright and flat, as shown here.

The reason your never see this state is because the Pre-Roll value is set to 4 seconds. This means that the flag simulation runs for 4 seconds before you ever see the first frame.

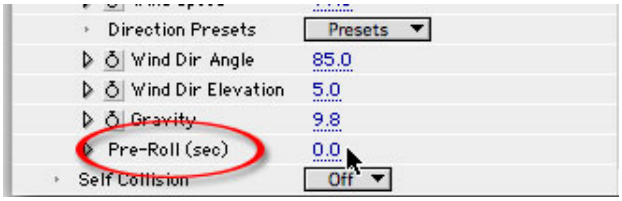
By setting the Pre-Roll value to 0 the flag will look like a flat card.

Creating The Card

Let's see what happens to our flag if there is no pre-roll. That is, let's see how wind and gravity affect the flag from its default position.

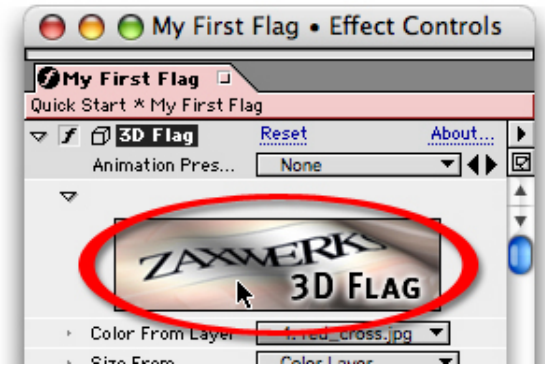
1 Open the "Quick Start.aep" project.

2 In the Effect Controls window, locate the Pre-Roll parameter and set it to 0.



Notice that the flag is now a flat rectangle, with no forces yet applied to it.

3 View the animated flag within the 3D Flag Options window by clicking on the 3D Flag logo in the Effect Controls window.

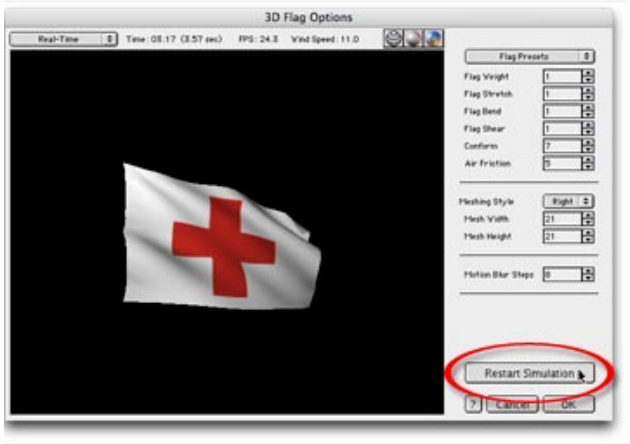


Notice how the flag begins to drop due to gravity, but then the wind forces it to the right. After a few seconds, the flag settles into a nice undulation.

4 While still in the 3D Flag Options window, click the Restart Simulation button.

This will restart the flag animation from the first frame after the pre-rolling is done. That is, if Pre-Roll were set to 4 seconds, the first frame of the animation playback would be just after 4 pre-rolled seconds.

In our current example, Pre-Roll is 0 seconds, so restarting the animation puts the flag back in its default position. You can watch the wind and gravity make the flag undulate again.



Adding More Magic

When you preview the animation in real-time you can see that the card turns into a flag pretty fast. To make the transition more graceful you should lower the Gravity. Like we learned in the previous section lowering the gravity keeps the flag from dropping so fast. By setting Gravity to a low value such as 1 or even .2, the effects of gravity will be minimized and the transition from card to flag will be more magical.

By lowering the wind speed the transition will become especially slow. If you really want to make it look cool, animate the wind speed from 0 up to 11 over a 10 second period. This will cause the wind take effect very slowly and then ramp up to a full billow and gale.

Sometimes, when animating a "drop effect" such as this, you need the fabric of the flag to be more loose and rubbery. This is especially the case when you are suspending the flag from above like you would for a banner.

The next chapter, Changing Flag Attributes, will demonstrate how to use the 3D Flag Options window to customize the cloth of your flag. The next chapter will show you that not all flags have to look the same.

This chapter demonstrates how to use the 3D Flag Options window.

The first few sections will show you how to change your view of the
flag and control the playback of the animation.

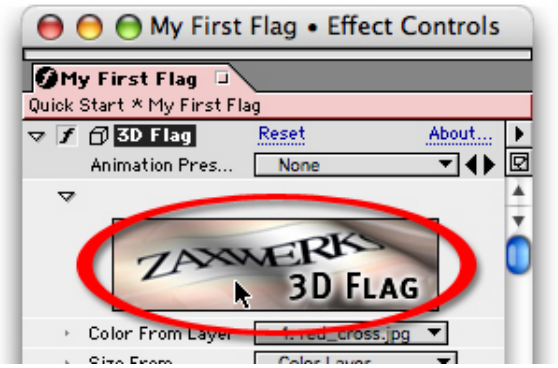
Subsequent sections will give examples of how changing flag parameters
can create different types of flags.

- Opening The 3D Flag Options Window
- Changing Your View Of The Flag
- Controlling Animation Playback
- Changing The Mesh Density
- Choosing Between Right And Left Meshing
- Making A Rubbery Flag With Presets
- Changing A Flag's Weight
- Understanding Stretch, Bend, And Shear
- Get The Wrinkles Out With Conform
- Using Air Friction To Slow Things Down
- How To Make Flags Look Large

Opening The 3D Flag Options Window

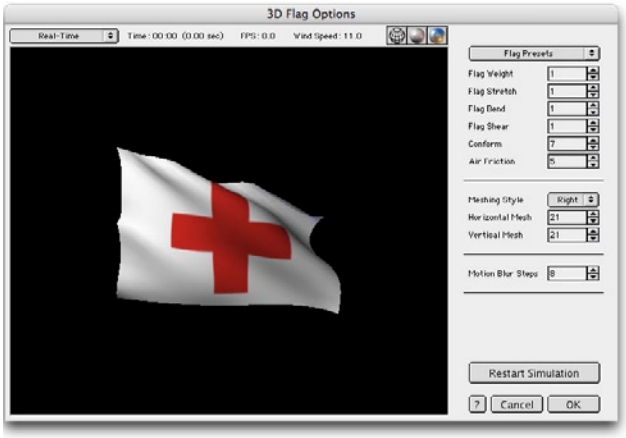
Overview

The 3D Flag Options window serves two purposes:
1 It displays the flag animation in real-time, allowing you to control the playback and view the flag from any angle.
2 It contains controls for specific attributes of the flag that you can change to shape how the flag reacts to wind and gravity.



Opening The Options Window

To open the Options window, click the 3D Flag logo at the top of the Effect Controls window.



The Options window will be displayed.

Read the next section, Changing Your View Of The Flag, for instructions on how to rotate the flag and show the flag in wireframe mode.

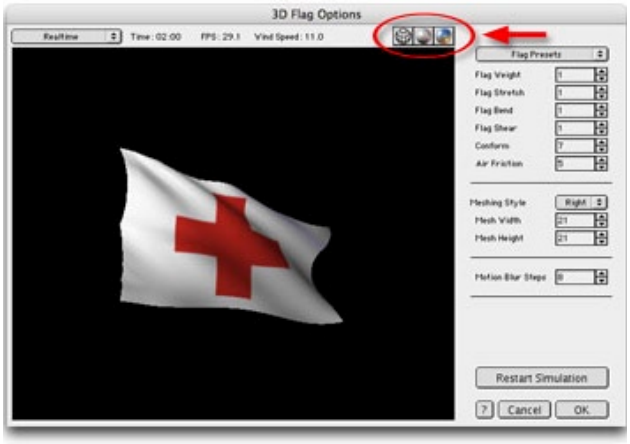
Changing Your View Of The Flag

Overview

The 3D Flag Options window initially displays the flag centered on the screen. Depending on the wind and gravity settings, this may not hold true over the course of the animation.

This section shows how to change the view in the 3D preview window. It also shows how to display the flag in wireframe mode.

This section refers to the 3D preview window of the 3D Flag Options window.



The 3D Flag Options window uses OpenGL to display the flag in real-time. Depending on your computer's graphics card, the playback may or may not be smooth.

This section also refers to the three display buttons at the top of the 3D Flag Options window.

Changing The 3D View

There are three ways to change the view of the flag in the 3D preview window:

1 Rotate the flag (Rotate).
2 Move towards or away from the flag (Zoom).
3 Move the flag up, down, left, or right in the view (Pan).

You can do each of these operations by clicking and dragging the mouse within the 3D Preview window. Depending on the operation, you'll need to hold down a different key while dragging. The following chart shows which key controls which operation.

Hold Down Key	Dragging Left/Right	Dragging Up/Down
<none>	Rotates Left/Right	Rotates Up/Down
Shift	<nothing>	Zooms In/Out
Command (Mac) Control (Win)	Moves Left/Right	Moves Up/Down

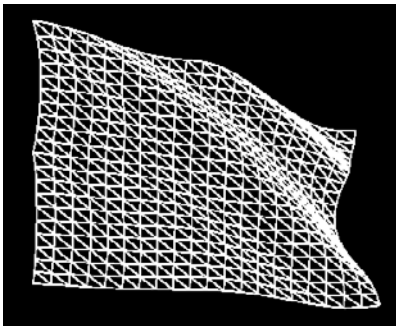
Open the 3D Flag Options window and become familiar with the flag view controls by clicking and dragging in the 3D preview window while holding down different keys.

Changing The Flag Display Mode

By default, the flag in the 3D preview window is colored by the image selected in the After Effects project. This is but one of three ways to display the flag in the preview window.

Wireframe Display Mode

To enable Wireframe display mode, click on the Wireframe icon above the preview window.



This will display the flag in wireframe mode, showing how the flag is constructed out of triangles.

Shaded Display Mode

To enable Shaded display mode, click on the Shaded icon above the preview window.

This will show the flag in shaded mode -- solid white, and without textures.

Textured Display Mode

To enable Textured display mode, click on the Textured icon above the preview window.

This will show the flag in textured mode, showing the flag with the current color image.

In the next section, Controlling Animation Playback, you'll learn how to start, stop, and step through the animation in the preview window.

Controlling Animation Playback

Overview

When the 3D Flag Options window is first displayed, the animation begins playing. If wind or gravity are animated, their affect on the flag is shown.

The orientation of the flag is based on the current position and rotation of the flag in the After Effects Comp when the 3D Flag Options window is opened. For example, if your Comp is at time 5 seconds, and your flag is rotated 45 degrees, the flag in the 3D Flag Options window will be rotated 45 degrees. We'll discuss ways to move and rotate your flag in the next chapter on Flagpoles.

This section shows you how to control your flag animation.

You may pause, restart, and step through the animation using your keyboard. You may also switch between Real-Time playback mode and Frame-By-Frame playback mode.

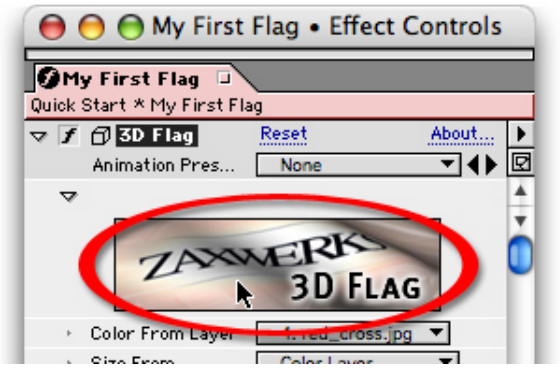
Playback Is Always 30.0 FPS

The 3D Flag Options window always strives to play the animation back at 30.0 frames per second, regardless of the frame rate of the After Effects Comp.

Therefore, previewing an animation from a 10 FPS Comp will look the same as previewing an animation from a 30 FPS Comp.

If you'd like a more accurate playback of your Comp, you can always do a RAM Preview (Composition> Preview> RAM Preview), or render your project to a movie file.

Switching Playback Modes



The 3D Flag Options window can play the animation using one of two modes:

- Real-Time Playback Mode
- Frame-By-Frame Playback Mode

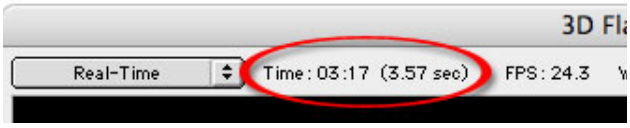
Let's switch an animation playback from Real-Time mode to Frame-By-Frame mode.

1 Open the "Quick Start.aep" project.

2 Open the Options window by clicking the 3D Flag logo in the Effect Controls window.

3 Watch the Time field change. By default, it is running in real-time, so one second of animation is played in one second of real time.

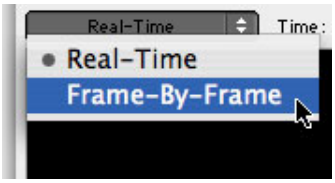
4 Now find the playback menu in the upper left corner of the Options window. Select "Frame-By-Frame."



The animation will restart. Once again, watch the Time field. It is no longer updating in real-time. Depending on your computer and graphics card, it will either be updating slower or faster than real-time. Notice how the flag animation is running at a different speed as well.

5 When you're done watching the flag, click the OK button to close the Options window.

With Frame-By-Frame playback, each frame of the 30.0 FPS animation is displayed, no matter how long it takes to calculate and display that frame.



Real-Time Playback Mode

This mode, the default playback mode, will show the animation in real-time. That is, one second of animation will be shown within one second of real time. If your computer's CPU or your computer's graphics card is unable to display the animation at 30.0 FPS, frames will be dropped in order to keep the time correct.

Playback may be choppy using this mode, but you'll be able to see how the flag reacts to the forces in the scene as they occur.

Frame-By-Frame Playback Mode

The Frame-By-Frame playback mode does not worry about displaying the animation in real-time. It will show each frame (at 30.0 FPS) as quickly as it can.

This mode is useful to see how every frame of an animation will look, so that you can notice subtle details that may be missed if frames are dropped in Real-Time mode.

Controlling Playback

There are 3 keys and one button that can be used to control the animation playback: the spacebar, the left arrow key, the right arrow key, and the Restart Simulation button.

Spacebar

You may press the spacebar to stop and start the animation at any time.

Left Arrow Key

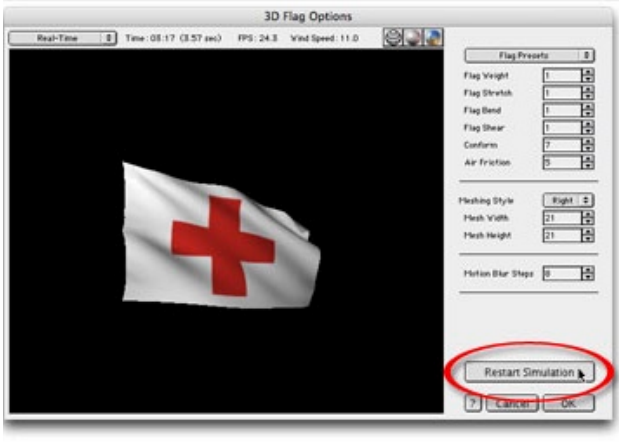
When the animation is paused, pressing the left arrow key will step back one frame in time (approximately 0.033 seconds). If you hold the Shift key while pressing the left arrow key, the animation will step back 10 frames.

Right Arrow Key

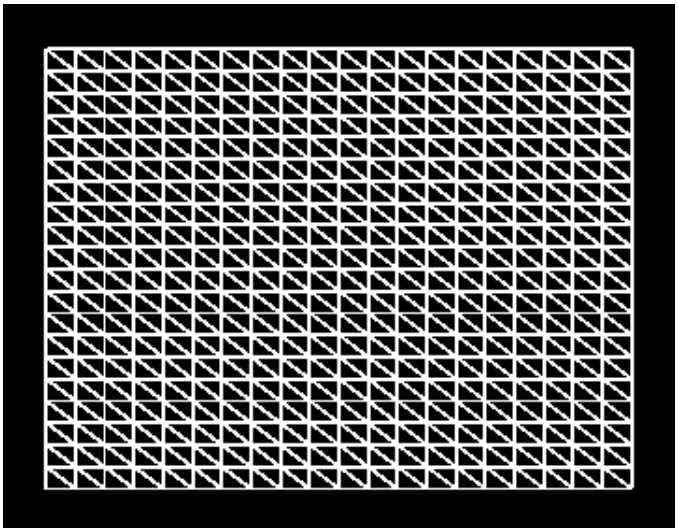
When the animation is paused, pressing the right arrow key will step forward one frame in time (approximately 0.033 seconds). If you hold the Shift key while pressing the left arrow key, the animation will step forward 10 frames.

Restart Simulation Button

At any time, you may press the Restart Simulation button to start the animation at time 0:00. This start time is the first frame after pre-rolling.



In the next section, we'll begin changing flag attributes, starting with the flag mesh, in How To Determine The Best Mesh Size.



Changing The Mesh Density

Overview

A flag is a grid, or mesh, of points connected together to create a set of triangles.

You can specify how many points are in the mesh by using the Horizontal Mesh and Vertical Mesh controls in the 3D Flag Options window. This section shows you how to change the flag mesh density.

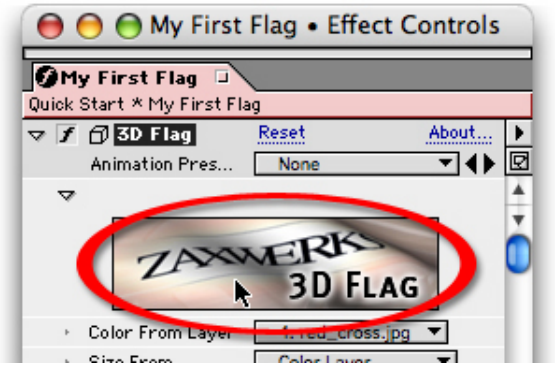
Showing The Flag in Wireframe

Changing your flag's mesh size is done by setting the Horizontal Mesh and Vertical Mesh values in the 3D Flag Options window. Changing these values do not change the size of the flag.

1 Open the "Quick Start.aep" project.

2 In order to better see the flag's mesh, you'll want to view the flag in its default position. In the Effect Controls window, find the Pre-Roll parameter and set it to 0.

3 Next, open the Options window by clicking the 3D Flag logo in the Effect Controls window.



4 Pause the animation by pressing the spacebar.

5 Change the view mode to Wireframe by clicking on the Wireframe icon.

Lowering The Mesh Density

Now that we can see our flag in wireframe mode, let's change our mesh density to be much smaller than it is by default.

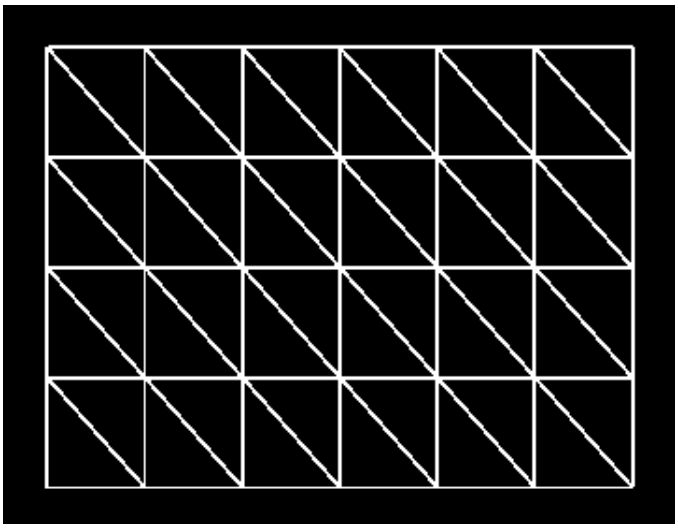
1 Change the Horizontal Mesh value to 7.

Notice how the animation pops back to time 0:00, showing the flag in its default position. When flag attributes are changed, the flag must be rebuilt so that the effect of wind and gravity can be recalculated. This is why you set Pre-Roll to 0. When changing your mesh density, you can get a good look at how your flag is being constructed.

2 Change the Vertical Mesh value to 5.

Notice how the flag's size didn't change. The mesh density only affects how many rows and columns there are in the flag. It doesn't affect the size of the flag.

Your mesh should now look like the image below.



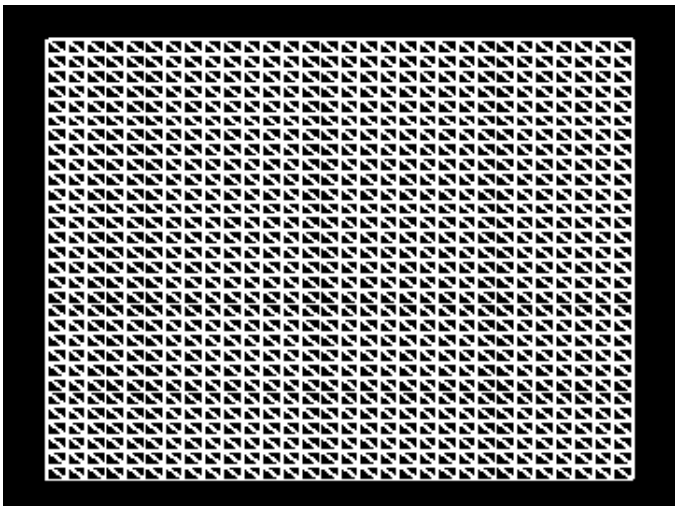
This mesh is a lot less dense than the default 21x21 mesh. Therefore, wind and gravity will move it differently than the default mesh.

3 Change back to Textured mode.

4 Now play the animation by either clicking the Restart Simulation button or pressing the spacebar.

Notice how wind and gravity still move the flag, but the resulting movement is less dramatic. This is because there are far fewer points to be affected by wind and gravity. This flag looks like it's made out of a very stiff material, such as paper.

Increasing The Mesh Density



Now, let's make the mesh much more dense.

1 Pause the animation by pressing the spacebar.

2 Turn on Wireframe mode.

3 Change Horizontal Mesh to 31.

4 Change Vertical Mesh to 31.

Your mesh should now look like the image below.

Dense, indeed.

5 Now switch back to Textured mode.

6 Play the animation by pressing the spacebar.

Depending on your computer speed and your graphics card, the animation may play back slowly. You may wish to switch to Frame-By-Frame mode.

Notice how this flag contains a lot more detail than the 7x5 mesh. It has more folds and looks more grand, as if were made of a very loose material, like silk.

7 When you're done watching the flag, click the OK button to close the Options window.

You may have noticed that the flag mesh is made into triangles by a diagonal line going from the upper-left corner to the lower-right corner of each mesh grid rectangle. In the next section, Choosing Between Right and Left Meshing, you'll learn what factors would cause you to change that meshing from "Right" to "Left."

Choosing Between Right And Left Meshing

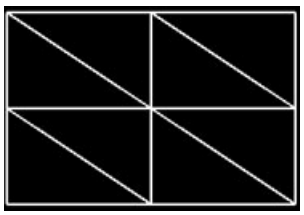
Overview

Each mesh grid rectangle is converted into two triangles by connecting two opposite corners.

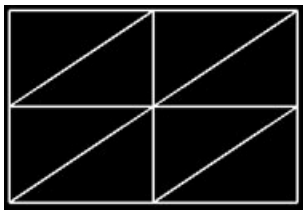
By default, the top-left corner is connected to the bottom-right corner. This is called "Right" meshing.

You may also choose "Left" meshing, which connects the upper-right corner to the lower-left corner.

The two images below show the difference between "Right" meshing and "Left" meshing.



Right Meshing



Left Meshing

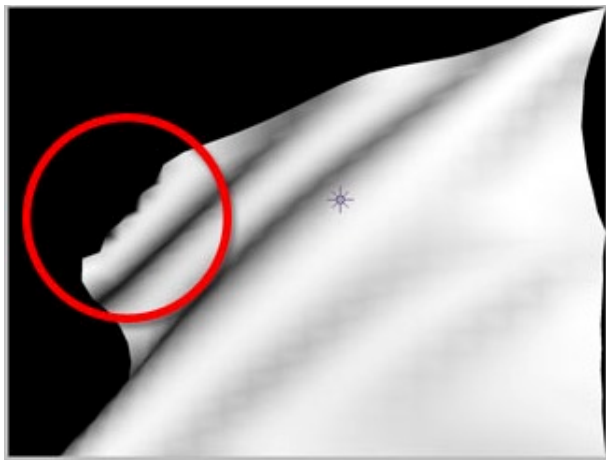
What Bad Meshing Looks Like

The Meshing parameter in the 3D Flag Options window determines in which direction the flag geometry is created. Choosing the right meshing direction is important, as this section will demonstrate.

1 Open the “Quick Start.aep” project.

1 In the Effect Controls window, find the Color From Layer parameter and select “None.” This action will remove the “Red Cross.jpg” image from the flag and make the flag larger (640x480, the size of the layer the 3D Flag plug-in was applied to).

2 Locate the Lock Edges parameter and select “Right.” This will cause three of the points on the right side of the flag to be locked into place. The left points are no longer locked.



Where did the flag go? Since the wind is still blowing to the right, the flag is blowing off screen. Let’s fix that.

3 From the Direction Presets menu, select “Left.” This will make the wind blow to the left, causing the flag to blow back into the frame. We now have flag that is locked on the right edge blowing to the left.

Immediately, we can see a reason why the default “Right” meshing does not work for this scene.

The stair-step effect is an artifact of the way the flag mesh is built. To fix this, we’ll switch the direction of our meshing.

Fixing Bad Meshing

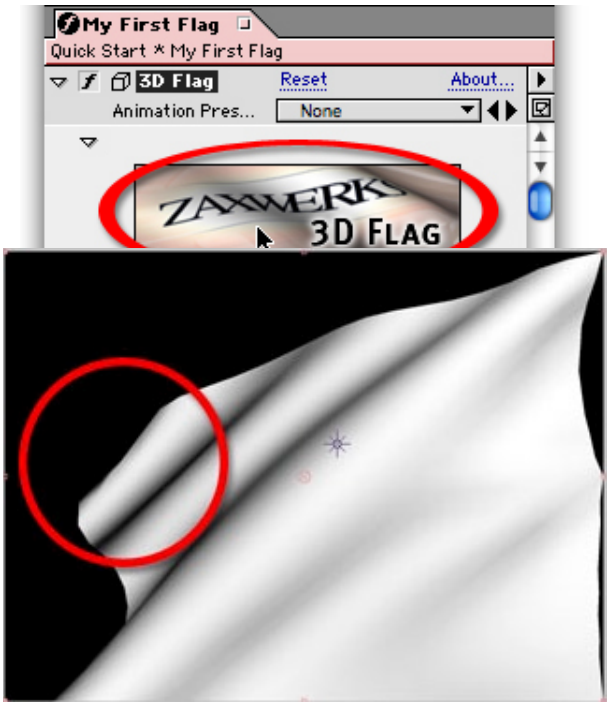
1 Open the Options window by clicking the 3D Flag logo in the Effect Controls window.

As the animation plays, you can see the bad meshing all over the flag.

2 Pause the animation by pressing the spacebar.

3 Locate the Meshing menu and select “Left.” This will change how the flag geometry is created, smoothing out the look of the flag.

4 Click the OK button accept the change in settings and to exit the Options window.



The “Flag” Comp looks much better now. You now know that a left-blowing flag probably needs “Left” meshing.

Choosing The Correct Meshing Direction

As you’ve seen, the meshing direction can dramatically change the look of the flag. Depending on which points on the flag are locked and which direction the wind is blowing, “Left” meshing may look better than “Right” meshing.

NOTE: As a general rule, you should see if you animation looks fine with the default meshing. If it doesn’t, try switching the meshing direction.

The table below advises which meshing may work best when a particular flag edge is locked.

Locked Edge	Wind Direction	Suggested Meshing
Left	Any	Right
Right	Any	Left
Top	Right Left Forward Back	Right Left Right Left
Bottom	Right Left Forward Back	Left Right Right Left

Now that you've learned how to change a flag's mesh settings, we will show you how to change other flag parameters. We'll start with Flag Presets in Making A Rubbery Flag With Presets.

Making A Rubbery Flag With Presets

Overview

Each flag has several parameters that determine how it reacts to forces like wind and gravity. These parameters can be changed to make a flag stretchy or rigid, loose or stiff.

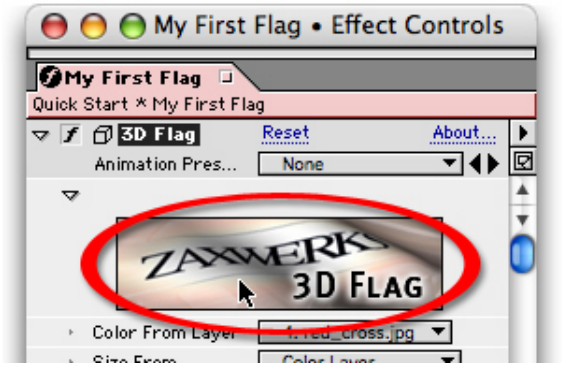
The 3D Flag plug-in has several presets that will automatically set these parameters to create different flag looks. This section will show you how to select a Flag Preset.

Making Your Flag Rubbery

The default flag corresponds to a preset called "Stiff Flag." These flag parameters produce a flag that keeps its shape, but will still react well to the wind. You can make the flag rubbery by selecting the "Rubbery Flag" preset.

1 Open the "Quick Start.aep" project.

2 Open the Options window by clicking the 3D Flag logo in the Effect Controls window.



Notice how the flag reacts to the wind and gravity. It stays upright and undulates in the wind.

3 Pause the animation by pressing the spacebar.

4 Locate the Flag Presets menu and select "Rubbery Flag."

Selecting a preset will modify the six parameters below the Flag Presets menu.

Notice how the flag is now elongated.

The "Rubbery" parameters allow certain aspects of the flag to stretch more than the default "Stiff Flag."

5 Now click the Restart Simulation button. As the animation plays, notice that the flag stretches and pulls more than you've seen before.

6 When you're done watching the flag, click the OK button to close the Options window.

There are other Flag Presets that give the flag different looks. Each preset will create a flag that will react to wind and gravity in a different way.

In the next section, Changing A Flag's Weight, you'll learn about how a flag's weight affects how the flag responds to the wind.

Changing A Flag's Weight

Overview

The 3D Flag Options window allows you to change a flag's weight. While there is usually little reason to change the weight of the flag, it's good to understand how weight affects the flag animation.

Weighing Your Options

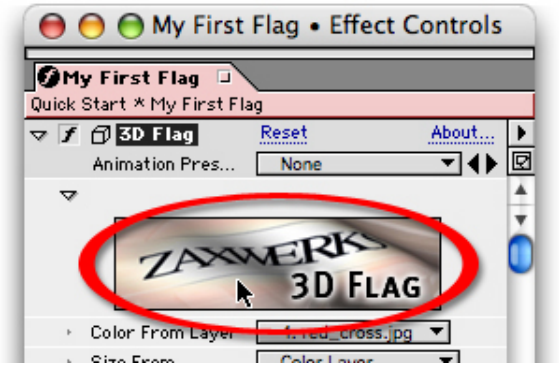
When modifying a flag's weight, remember two things:

- The lighter the flag, the more it reacts to the wind.
- The heavier the flag, the less it reacts to the wind.

Let's see how doubling the flag's weight affects our "Quick Start" flag..

1 Open the "Quick Start.aep" project.

1 Open the Options window by clicking the 3D Flag logo in the Effect Controls window.



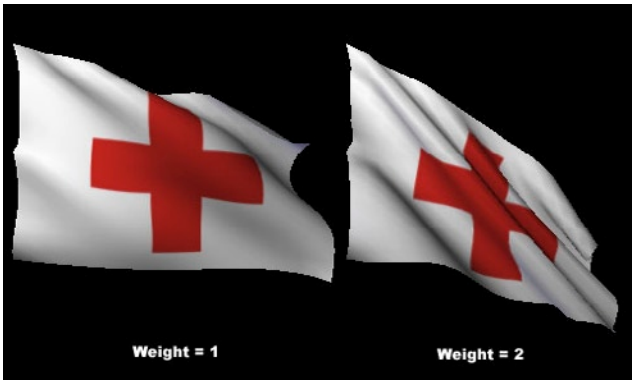
2 Pause the animation by pressing the spacebar.

3 Set Flag Weight to 2. This makes every point on the flag twice as heavy.

4 Play the animation by clicking the Restart Simulation button. The flag seems to be less upright than before. The wind doesn't affect it as much.

5 When you're done watching the flag, click the OK button to accept the change to the flag's weight and to close the Options window.

You may set a flag's weight to simulate different cloth materials. In the next section, Understanding Stretch, Bend, And Shear, we'll learn about some important flag parameters that will greatly affect how a flag reacts to the environment.



Understanding Stretch, Bend, And Shear

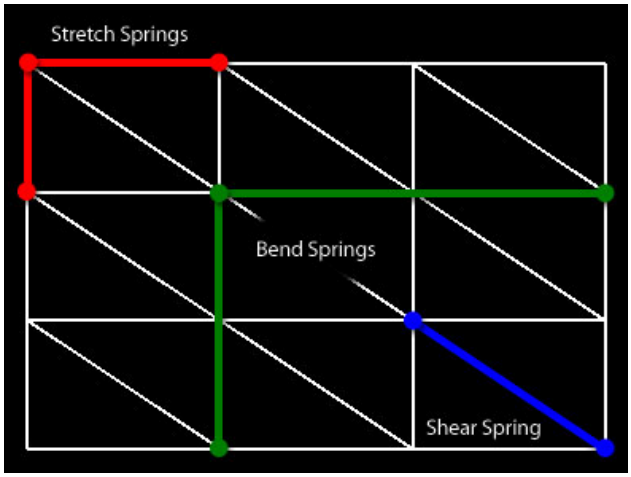
Overview

Each flag is created by a series of springs connected to the points in the flag mesh. The springs push and pull on each other, allowing wind and gravity to make the mesh look like cloth.

Three of the most important parameters that affect the flag's reaction to the environment are Flag Stretch, Flag Bend, and Flag Shear.

The reason these parameters are discussed together is because they are parameters that control the springs in the flag mesh.

Anatomy Of A Flag Mesh



Flags react to the environment because of calculations made to the springs that connect mesh points. There are three types of springs, and each type of spring can be controlled separately.

The diagram below shows how each spring is constructed.

Stretch Springs

These springs connect adjacent mesh points, horizontally and vertically.

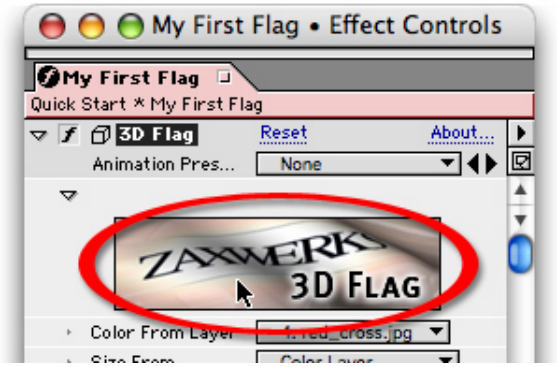
Bend Springs

These springs connect every other mesh point, horizontally and vertically. Bend Springs overlap each other.

Shear Springs

These springs connect mesh points on the diagonal.

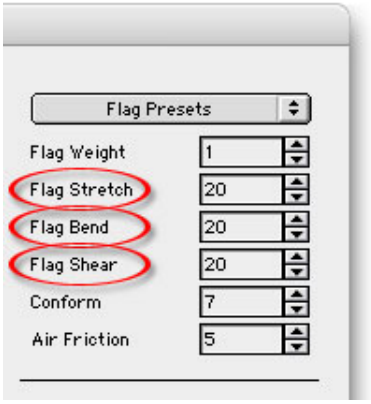
Stretch, Bend, And Shear Parameter Values



The Flag Stretch, Flag Bend, and Flag Shear values range from 0 to 100. They represent how much each spring can extend, as a percentage. The allowed extension is only a goal -- it is not guaranteed. As the springs push and pull against each other, some springs may end up out of range.

This constant pushing and pulling gives the flag its shape, causing undulation and ripples over the surface of the flag.

Small Values Are Highly Effective



You won't have to set the Flag Stretch, Flag Bend, and Flag Shear values very high for them to be effective. In fact, values over 20 (percent) may create flags that stretch too much to be useful.

Allowing The Flag To Stretch, Bend, and Shear

Let's see what happens when you change the Flag Stretch, Flag Bend, and Flag Shear values to allow the flag to expand up to 20% of its size.

1 Open the "Quick Start.aep" project.

1 Open the Options window by clicking the 3D Flag logo in the Effect Controls window.

2 Pause the animation by pressing the spacebar.

3 Find the Flag Stretch, Flag Bend, and Flag Shear parameters and set each to 20.

You may have to wait while the flag is recalculated after each parameter change.

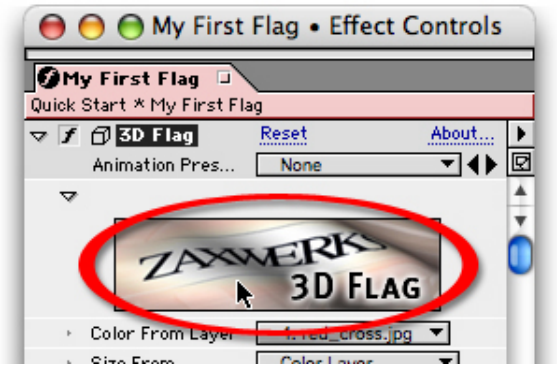
Notice how the flag is now stretched out.

4 Play the animation by clicking the Restart Simulation button. Notice that the flag is pushed and pulled more by the wind and gravity.

5 When you're done watching the flag, click the OK button to close the Options window.

You may need to experiment a bit with the spring parameters to find values that fit your needs.

We can gain more control over the shape of the flag with the Conform parameter. The next section, Get The Wrinkles Out With Conform, will discuss this useful parameter.



Get The Wrinkles Out With Conform

Overview

In the last section, we mentioned that Flag Stretch, Flag Bend, and Flag Shear percentage values were only goals for the spring system. Due to the way the flag simulation works, the springs may push and pull each other outside of the desired ranges. The Conform parameter can be used to better enforce the goal of the spring parameters. That is, it can further constrain the springs to create a more accurate system.

A side effect of this constraint is that it will make the flag appear more stiff, keeping the flag more upright. This can make the flag have less folds while flapping in the wind.

Life Without Conform

The default flag has a Conform value of 7. This mean the spring system tries 7 times as hard to make the flag mesh conform to the goals of Flag Stretch, Flag Bend, and Flag Shear than if Conform were set to 1.

Let's see what happens when we remove the Conform calculation.

1 Open the "Quick Start.aep" project.

1 Open the Options window by clicking the 3D Flag logo in the Effect Controls window.

2 Pause the animation by pressing the spacebar.

3 Set Conform to 1. This tells the spring system to not care about how out of range the springs are.

Notice how the flag no longer holds its shape in the wind.

4 Play the animation by clicking the Restart Simulation button. Notice that the stretched areas continue to be pulled. There isn't anything preventing this since Conform is 1.

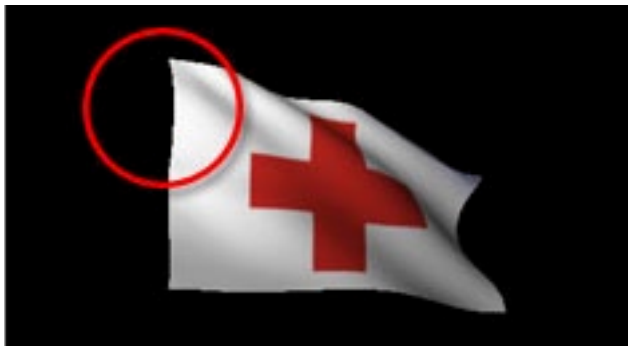
Setting A High Conform Value

Let's say we want our flag to be rather stiff. We want the wind to blow through the flag, but we don't want it to be too springy. We can set Conform to a high value to achieve this goal.

1 Pause the animation by pressing the spacebar.

2 Change Conform to 20. The system will now try 20 times as hard to keep the flag's shape.

3 Play the animation by clicking the Restart Simulation button. The flag now holds its shape much better, allowing little stretching.



The real-time playback may be more choppy than when Conform was set to 1. This is because calculating each flag frame when Conform is 20 requires more effort.

4 When you're done watching the flag, click the OK button to close the Options window.

Usually, Conform values in the range of 1 to 20 are sufficient.

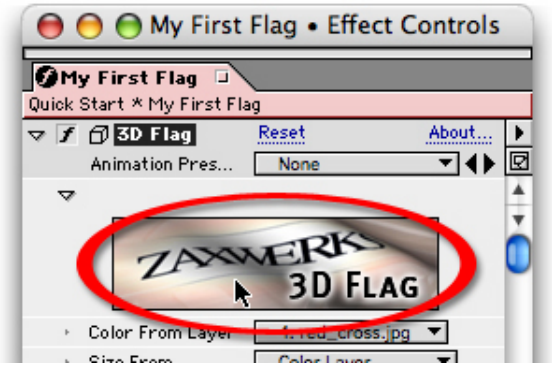
There is one more flag parameter to discuss. The next section, Using Air Friction To Slow Things Down, will show how to use Air Friction to gain more control over your flag's behavior.

Using Air Friction To Slow Things Down

Overview

We don't live in a vacuum. Well, I don't live in a vacuum. And this means that, in my world, there are all sorts of particles and dynamic forces that cause friction to a flag blowing in the wind. Therefore, a flag will never move quite as much as the wind would like it to.

The Air Friction parameter can be used to control how the flag reacts to the environment (wind, gravity, etc.). With no friction, the flag may blow wildly, even with a light wind. With a lot of friction, the flag may not respond to wind or gravity very much.



In general a small amount of Air Friction will help keep the flag under control.

Removing Friction

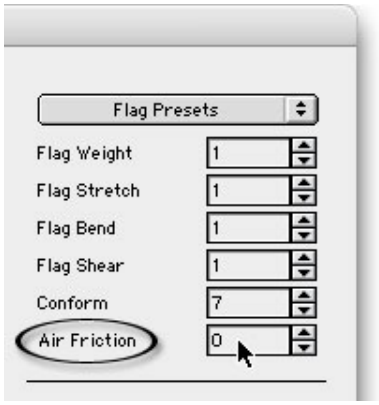
The default value for Air Friction is 5 (percent). This means that, at each frame, the flag will only undulate about 95% of what wind and gravity tell it to.

Let's see how the flag reacts when there is no friction.

1 Open the "Quick Start.aep" project.

1 Open the Options window by clicking the 3D Flag logo in the Effect Controls window.

2 Pause the animation by pressing the spacebar.
3 Set Air Friction to 0. This allows the flag to fully respond to wind and gravity.



4 Play the animation by clicking the Restart Simulation button.

Notice that the flag flaps about quite a bit more than when Air Friction was 5. This is because there are less constraints on the flag's movement.

Adding A Lot of Friction

Now let's see what happens when we set the air friction to a high value.
1 Pause the animation by pressing the spacebar.
2 Change Air Friction to 50. This means that the flag will only respond to about 50% of what it's requested to do. It would take a lot of wind to overcome that.
3 Play the animation by clicking the Restart Simulation button. The flag now undulates slowly, as if it's struggling just to move.
4 When you're done watching the flag, click the OK button to close the Options window.

Depending on the size of your mesh, a higher Air Friction can create more folds in the flag as it undulates.

Usually, Air Friction values in the range of 0 to75 are sufficient.

Now that you've learned about the different parameters that affect a flag's look, How To Make Flags Look Large will show you how to use the different parameters to create flags that look big.

How To Make Flags Look Large

Overview

The default flag looks and acts like what we might consider a normal sized flag, one that is a few feet wide and a few feet tall.

With a few tweaks to the flag parameters, you can make your flag look large, ready to be attached to a flagpole dozens of feet high.

Lookin' Large

The key to a flag looking large hinges on how it reacts to the environment:
- It cannot look too stiff.

Large flags require a lot of material, and large sheets of material are loose.
- It cannot look too erratic.

Large things take a long time to change, so a quickly flapping flag just won't be convincing.
- It should have several folds in it.

Large sheets of cloth fold easily.
- It should not be too upright.

Big flags are heavy and easily pulled down by gravity.
- The wind should not blow through it too quickly.

Even a good-paced wind will take longer to get through a large flag than a small flag.

A Big Layer Equals A Big Flag, Right?

No, it doesn't. There are many reasons not to use a big After Effects layer as your flag color layer, but the top two are:

1 Memory usage.

If you use a 4,000x3,000 layer as your color layer, the 3D Flag plug-in will create a flag image of that size. The memory required to hold an image that large in RAM is roughly 48 Megabytes! Compare that to a 640x480 image that only requires about 1.2 Megabytes.

2 It's not the size, it's the parameters.

An enormous color layer would still generate a flag with the default Horizontal Mesh and Vertical Mesh values of 21x21. These two parameters are key when making a flag look large.

Changing The Environment

We'll create a large-looking flag from our "Quick Start.aep" project. That flag is only 400x266, but we can modify just a few parameters and make it seem much larger.

1 Open the "Quick Start.aep" project.

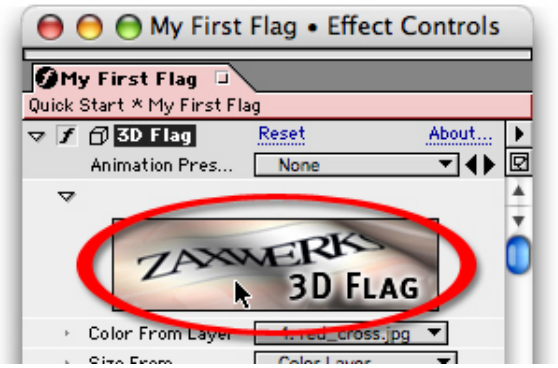
2 In the Effect Controls window, turn down the Wind Speed parameter so that the flag moves more slowly. A value of 5 should work well. A slower moving flag simulates how wind will take longer to move across such a large flag.

3 Find the Lock Points menu and select "Corners Only." Large flags are usually not bound in the center. They are either tied along the entire edge, or just at the corners.

Changing Flag Attributes

Now that we've adjusted the wind speed and which points of the flag are locked, let's adjust specific flag attributes to make are flag seem grand.

1 Open the 3D Flag Options window by clicking on the 3D Flag logo in the Effect Controls window.



2 Pause the animation by pressing the spacebar.

3 We want our flag to have many folds in it as the wind blows through it, so we'll increase our mesh density. Set Horizontal Mesh to 41. Set Vertical Mesh to 31. Setting these two values higher than the default of 21 will add complexity to the mesh, and that's exactly what you're looking for.

Now that you have a large mesh, you need to adjust a few other parameters to make sure the flag acts large.

4 A dense mesh may need some help in keeping its shape, so we'll set Conform to a higher value, such as 10. Since the mesh is so large, it is more likely to look too springy, so a larger Conform value will help.

5 Finally, we don't want the flag to react too quickly to wind or gravity, so we'll set Air Friction to 75. We want the flag to look really sluggish, as if it is so heavy, that it must struggle to stay upright.

6 Play the animation by clicking the Restart Simulation button. The flag may not play back well in real-time on your computer since the mesh is so large. Notice the number of folds in the flag, and notice how gravity seems to be pulling the flag down.

7 Click the OK button to close the 3D Flag Options window.

To view the full animation, either do a RAM Preview (Composition> Preview> RAM Preview) or render the scene out to a movie.

Making A Flag Look Small

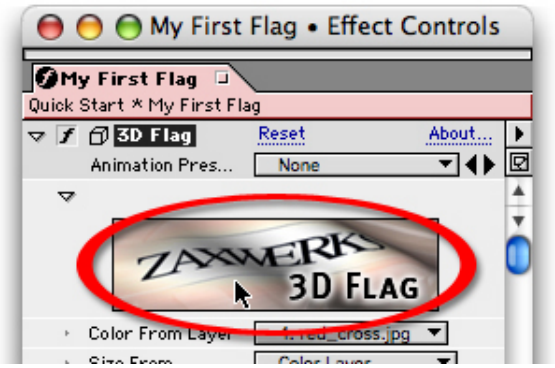
By using nearly the opposite technique described above, we can make a flag look small. The key is to minimize the mesh size (not the flag size).

Let's make a flag that looks similar to the small, plastic flags that you may find at a car dealership or a grocery store.

1 Open the "Quick Start.aep" project.

2 Little flags are usually so stiff, that the entire side of the flag is mounted to a thin flagpole. In the Effect Controls window, find the Lock Points parameter and select "All Edge Points."

1 Open the Options window by clicking the 3D Flag logo in the Effect Controls window.



2 Pause the animation by pressing the spacebar.

3 We don't want many folds in our mesh, so a small mesh density will work well. Set Horizontal Mesh to 5 and Vertical Mesh to 2. These values will allow the flag to flap back and forth, but not up and down.

4 To add a little more rigidity, set Air Friction to 10. This will help keep the flag under control, so that it doesn't flap too quickly. We want it to look like it's made of plastic, after all.

5 Play the animation by clicking the Restart Simulation button. The flag moves back and forth, but can't do much else since the mesh is so simple.

6 When you're done watching the flag, click the OK button to close the Options window.

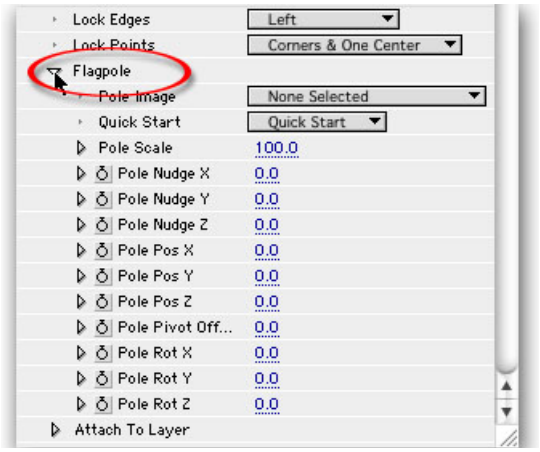
This "little" flag acts very different than the "large" flag, even though they're technically the same size in the scene. What differentiates them is the complexity of the mesh that the flag is made from, along with a few other parameters. This is an important concept to remember when customizing your own flags.

Now that you've seen how to set up and modify your flags, we'll teach you how to attach the flag's locked points to another After Effects layer, allowing you to place your flags on pictures of flagpoles and even move them around the scene. The next chapter is on Flagpoles.

Overview

Every flag needs a flag pole. Inside of After Effects there are two methods of creating flag poles. the Fast-&-Easy way and the Harder-but-more flexible way. This section will show you the Fast & Easy method. The harder method is explained in the next section called Placing Your Flag In A 3D Scene.

The Flagpole Menu



The Fast & Easy method uses the Flagpole menu. Find the Flagpole control and turn down the twirly arrow to reveal all of the Flagpole controls.

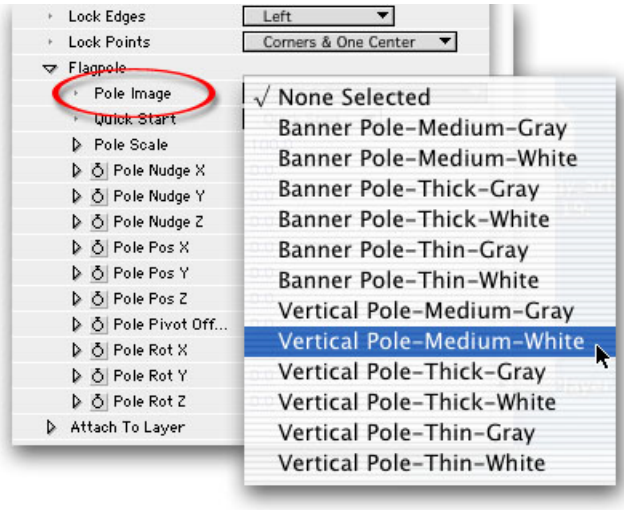
At first glance there are a LOT of controls. You need all of these controls to move and wave a flag in 3D space. However, you almost never use them all at once and if you take a look at them you'll find they all make sense.

We said this was going to be fast and easy flagpoles didn't we? OK, then let's skip all of these controls for now, and get right to the good stuff.

Creating The Flagpole

1 Find the Pole Image menu.

2 Click on the menu and choose the "Vertical Pole - Medium - White" option.



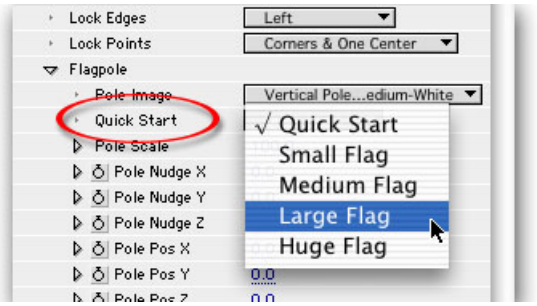
This will create a pole from the Flag Poles folder that comes with the program. If your Pole Image menu says there are no Flag Pole images, then you didn't install the program correctly. Go back to the Installation Instructions and follow them exactly.

Auto-Positioning The Flag And Pole

At this point the Flagpole isn't positioned at the side of the flag and there's black around the edges. No problem...

1 Find the Quick Start menu, which is located below the Pole Image menu.

2 Drag to the "Large Flag" option and let up on your mouse button.



This will cause the flag and flagpole to be auto-repositioned so they now look like a proper combination. You can do the same thing yourself by adjusting the Nudge and Position controls but this sure was a lot easier wasn't it?

Removing The Black From The Flagpole Edges

To clean up the edges of the flagpole, render the animation at Best Quality, or set your layer or Monitor window to Best Quality.

What Else Can You Do With A Flagpole?

- You can use the Pole Position controls to move the flag to other positions on the screen.
- You can also use the Pole Rotation controls to wave the flag back and forth. Normally you think of a wave as a side to side thing (Z rotation). However a really cool look is to rotate the flag back and forth around the X axis. This is the in-out axis which gives you a cool 3D look.
- If the flag needs to rotate around a different point, use the Pole Pivot Offset to slide the pivot point along the length of the flag.
- If you need to adjust the position of the flag on the flagpole, use the pole Nudge controls.

If you need more control than the Flagpole parameters can provide, then you can always use the Attach To Layer option. This

technique lets you use any image in After Effects as a flagpole. It also lets you use the standard AE 3D controls to move the flagpole around. This is very useful when you need to combine a flag with other AE 3D layers. The next section , Placing A Flag In A 3D Scene, walks you through a project where you use the Attach To Layer features.

Attaching Your Flag To A Flagpole

Overview

So far, the flags you've created have remained in the center of the screen. In this section, you'll attach a flag to a layer that looks like a flagpole. Flagpoles can be used to position your flag in a scene as well as move your flag around the scene.

The next few sections will use a lot of what you've learned so far.

Setting Up The Scene

Let's say you have a picture of a house and you'd like to decorate it with a flag to celebrate a holiday. In this example, you'll open a scene that has a 3D flagpole layer attached to a picture of a house. You'll attach a flag to the flagpole and make the flag hang from the pole.

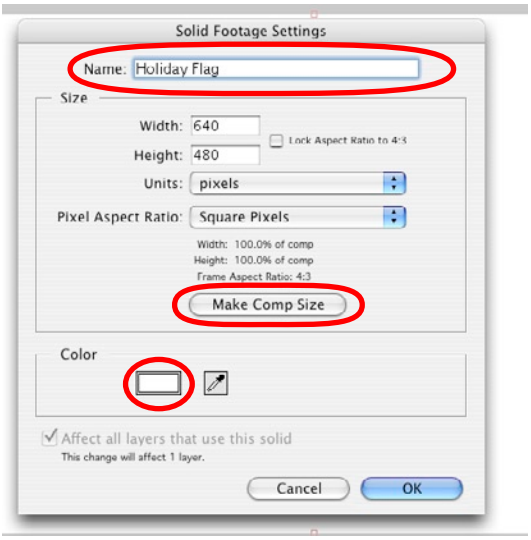
1 Open the "House.aep" project.

Your Comp window should look like this.

This scene has a picture of a house as a background. There is a 3D flagpole in the pole holder next to the window, as the red arrow shows.

Let's add a flag to this scene.

2 As you may remember, we always add the 3D Flag effect to a layer that is the same size as the Comp, so let's create a new Solid (Layer> New> Solid) for the flag effect.



Name the Solid "Holiday Flag." Make sure the Solid is the same size as the Comp by clicking the "Make Comp Size" button. Make the Solid white.

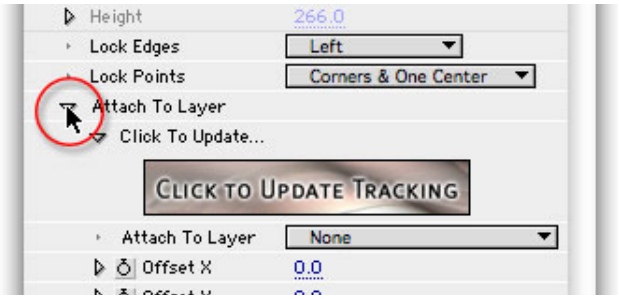
3 Click the OK button to create the Solid and add it to the project. Your scene will now be covered by the new Solid.

4 Add the 3D Flag effect to the new Solid by selecting Effect> Zaxwerks> 3D Flag.

The Solid will turn into a flag. There is an image of an American flag in our project already. Let's make the flag use that picture for its coloring and its size.

5 In the Effect Controls window, find the Color From Layer parameter and select "USA.jpg." Your flag will now look like an American flag.

Attaching The Flag To The Pole



We're now ready to start integrating the flag into the scene.

1 In the Effect Controls window, open the Attach To Layer twirly.

2 Find the Attach To Layer menu and select "Flagpole.tga." This will put the flag in the same place as the flagpole. It is even rotated the same way as the flagpole.

But it doesn't quite look right, does it? The edge of the flag isn't attached to the pole.

When a flag is attached to a flagpole, the center of the flag is placed at the center of the flagpole. In the next section, Handling Alignment Issues With Offsets, you'll learn how to use offsets to adjust the position of the flag on the flagpole.

You may wish to save this scene since we'll be using it in the next section.

Handling Alignment Issues

Overview

In the previous section, you attached a flag to a flagpole, one that had been positioned and rotated to fit into a scene. You saw that the default attachment location wasn't quite right.

In this section, you'll learn how to align your flag with the layer you're attaching it to.

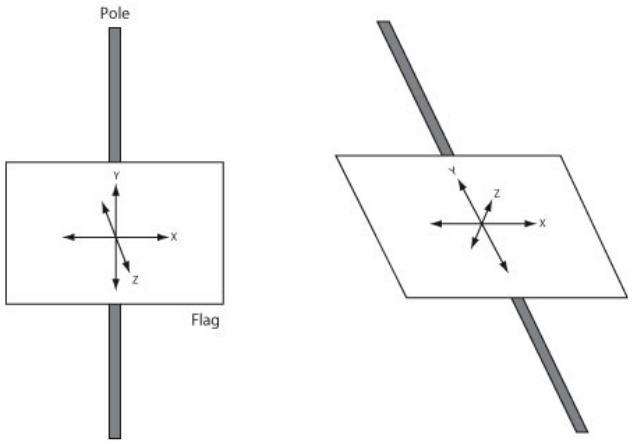
This section uses the results of the previous section. If you don't have that scene available, you may start with "House With Flag. aep" in the "Flag Tutorials" folder.

By default, a flag attached to a 3D layer will be centered on that layer. Note that factors such as which edges are locked and which direction the wind is blowing will affect how this may look.

Offsetting The Flag

3D Flag has three controls that will allow you to offset the flag on the flagpole. You may move the flag in the X, Y, or Z direction.

NOTE: When offsetting a flag, X always means shifting the flag left or right along the flagpole, regardless of the orientation of the flagpole. Y always means up or down. Z always means in or out. The image below demonstrates this.



Aligning The Flag To The Pole

Let's offset the flag so that the locked points on the left edge line up with middle of the flagpole. We'll do this by shifting the flag to the right.

1 Select the "Holiday Flag" layer in the Timeline window.

2 Open the Effect Controls window (Effect> Effect Controls).

3 Find the Offset X parameter. Click on the default value of 0.0 and drag to the right (that is, scrub the value to the right).

Notice that as the Offset X value increases, the flag shifts to the right.

4 Continue offsetting the flag to the right until the left edge of the flag lines up with the flagpole.

Your Offset X value should be around 200, which is half the width of the flag image. This makes sense. To shift the left edge of the flag to the center of the flagpole, we moved it over by half its width.

5 We'd like the flag to sit a little higher on the pole. Locate the Offset Y parameter and scrub that value, making the Offset Y value larger. Notice that increasing the Offset Y value moves the flag up the flagpole.

Continue increasing the value until the top of the flag sits just below the top of the flagpole. A value of 20 should be about right.

At this point, the flag is properly aligned to the pole.

6 As a final step, we'll remove the wind from the scene so that the flag hangs from the pole. Locate the Wind Speed parameter and set it to 0.

Since we aligned the locked points on the flag to the flagpole, turning off the wind allowed the flag to hang while the locked points remained attached to the pole.

Your scene is now complete.

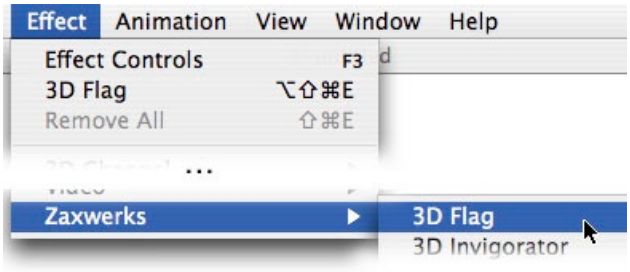
You have just learned how to offset your flag so that the locked points of the flag are aligned with the flagpole. Once aligned, the locked points on the flag remained fixed to the flagpole, even when the wind speed changed. In the next section, In Sync: Animating The Flagpole, you'll see that the locked points will stay with the flagpole even when the pole is animated.

In Sync: Animating The Flagpole

Overview

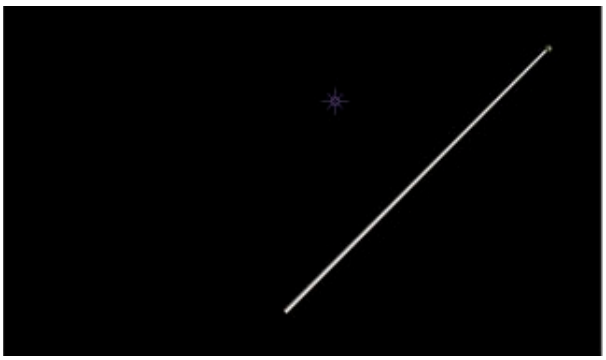
In this section, you'll see how the locked points on a flag remain attached to an animated flagpole while the rest of the flag follows. You'll also learn how to use the Click To Update Tracking button to keep your flag in sync with the flagpole animation.

Setting Up The Scene



Let's say you're creating an animation of a flagpole that waves back and forth. You'll need to animate the pole and then attach a flag to it. Follow the instructions below to get your scene ready.

1 Open the "Animated Flagpole.aep" project. This scene has a flagpole that rotates back and forth.



Let's add a flag to the scene and attach it to the flagpole.

1 Create a new Solid (Layer> New> Solid) for the flag effect. Name the Solid "Animated Flag." Make sure the Solid is the same size as the Comp by clicking the "Make Comp Size" button. Make the Solid white.

Click the OK button to create the Solid and add it to the project. Your scene will now be covered by the new Solid.

2 Add the 3D Flag effect to the new Solid by selecting Effect> Zaxwerks> 3D Flag.

The Solid will turn into a flag. There is an image of a British flag in our project already. Let's make the flag use that picture for its coloring and its size.

3 In the Effect Controls window, find the Color From Layer parameter and select "United Kingdom.jpg." Your flag will now look like a British flag.

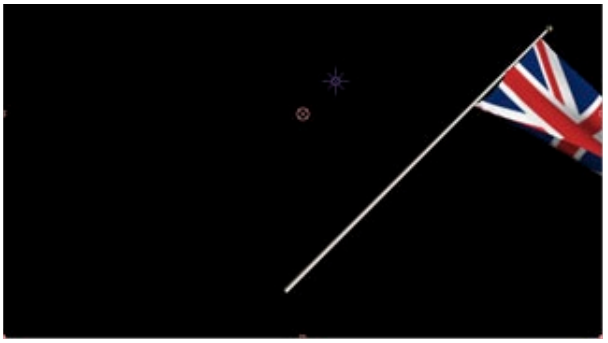
Let's attach the flag to the flagpole.

4 In the Effect Controls window. locate the Attach To Layer parameter and select "Long Flagpole.tga."

The flag is now attached to the flagpole, but it needs to be aligned.

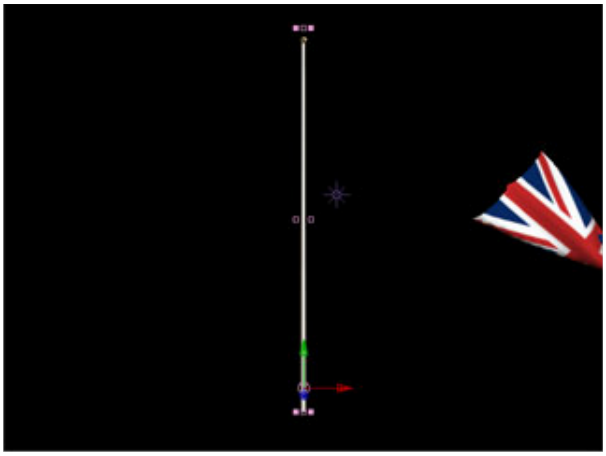
1 In the Effect Controls window, find the Offset X parameter and increase the value until the left edge of the flag is aligned with the center of the pole. We want the locked points on the flag to line up with the pole. The value should be around 200.

2 Now find the Offset Y parameter and increase the value until the flag sits just below the top of the pole. The value should be around 600.



Do a RAM Preview (Composition> Preview> RAM Preview) to see the flag animate with the pole. Majestic, isn't it? Notice how the locked points stay attached to the animated pole while the rest of the flag follows.

Adding Another Keyframe



This animation has three keyframes. The pole rotates left, then right. Let's make it rotate to the left again, causing the pole to be straight up at the end of the animation.

1 Select the "Long Flagpole.tga" layer in the Timeline window. This is the animated flagpole. It has Orientation keyframes at times 0 seconds, 2 seconds, and 4 seconds.

2 Set the Time marker to time 5 seconds.

3 Using the Rotation tool, rotate the flag to the left until it's straight up. You should rotate the Z value back to 0 degrees. A keyframe will be automatically set since we changed the value of the Orientation.

We've added a keyframe, but the flag has not kept up with the flagpole as we've rotated it.

We need to tell the flag to update based on the new animation. It's time to use the Click To Update Tracking button.

Updating Tracking

There is a mismatch between the location of the flagpole and the flag. Let's correct this problem.

1 Select the "Animated Flag" layer in the Timeline window.

2 Open the Effect Controls window (Effect> Effect Controls) and find the Click To Update Tracking button. Click the Click To Update Tracking button.

The flag will now snap into place, in its correct position and orientation.

3 Play the new animation from the start by doing a RAM Preview (Composition> Preview> RAM Preview). Watch the flag rotate back and forth.

The Click To Update Tracking Button

The Click To Update Tracking button is used to synchronize a flag to its flagpole.

When animating a flagpole, the 3D Flag plug-in isn't always notified when the flagpole has moved. Clicking the Click To Update Tracking button will tell the flag to get into its proper position.

If you see that your flag is not in sync with your flagpole, click the Click To Update Tracking button.

As you've been working with 3D Flag, you may have noticed that the flag can sometimes intersect itself, creating a flag that doesn't look very real. The next chapter, Self-Collision - Adding Realism will discuss a way to make your flag scenes more realistic.

Overview

Without any special constraints, a flag is free to intersect itself as it flaps around. This section will demonstrate how you can use the Prevent Self-Intersection parameter to add realism to your flag's animation.

A Demonstration Of Self-Intersection

Let's say you have a flag flapping in the wind, and the wind dies down, but then it picks up again. The flag will droop as the wind subsides, but it will begin undulating again once the wind speed increases. We'll see that such a scenario can cause self-intersection.

1 Open the "Intersection.aep" project. This scene has a Swedish flag with an animated Wind Speed parameter. The wind dies down and then picks up. As this happens, we'll see that the flag intersects itself.

2 Set the time marker to time 0:20 (the 20th frame, less than 1 second).

Notice the self-intersection. As the wind dies down, the flag droops, causing the flag to overlap itself.

3 To see the animation in action, open the Options window by clicking the 3D Flag logo in the Effect Controls window.

Watch the animation play. Press the Restart Simulation button to start the animation over. You can see several frames where the flag intersects itself.

4 Once you've finished viewing the animation, press the OK button to close the Options window.

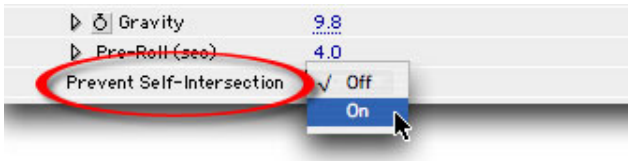
Removing Self-Intersection

To fix the self-intersection problem, we'll use the Prevent Self-Intersection parameter.

1 Select the "Intersection Flag" layer in the Timeline window.

2 Open the Effect Controls window (Effect> Effect Controls) for that layer.

3 Find the Prevent Self-Intersection parameter at the bottom of the Effect Controls window and select "On."



The scene will recalculate, and then the Comp window will show that the flag no longer intersects itself.

4 Open the Options window to view the new animation.

NOTE: Since Prevent Self-Intersection is on, the Options window will display the animation in Frame-By-Frame mode. It will also play slower than normal, since it requires extra CPU power to do the self-intersection calculations.

When you're done viewing the animation, press the OK button to close the Options window.

The Prevent Self-Intersection parameter can be used to fix situations where a flag intersects itself. While using the parameter can solve many of your self-intersecting problems, it may not fix every situation, as you'll see in the next section, Advantages And Limitations.

Advantages And Limitations

Overview

While the Prevent Self-Intersections parameter can be used in many situations to prevent a flag from penetrating its own surface, it has its limitations. This section discusses when this parameter works best. It also describes this parameter's shortcomings.

How Prevention Works

At each frame, the "Prevention Algorithm" puts a force field around the points in the flag. If a flag point tries to enter the force field, it is pushed away.

NOTE: The Prevention Algorithm does not occur during the Pre-Roll process. Therefore, if a flag is self-intersecting at the first frame after pre-rolling, the Prevention Algorithm may not be able to undo the intersection for that frame. It may also have trouble clearing up the intersections in subsequent frames.

Advantages

There are several scenarios where the Prevent Self-Intersections parameter works well. These mostly involve times when the flag briefly overlaps itself in an animation. Turning on this parameter can usually get rid of the self-intersection without greatly changing the animation itself.

The Prevention Algorithm has many advantages.

- It's fast.
- It doesn't change the animation of the flag unless it needs to.
- It can clean up self-intersections in one area of a flag without modifying the other areas of a flag.
- It can prevent multiple intersections at once.

In many situations, you won't have to use the Prevent Self-Intersections parameter. A properly undulating flag usually will not intersect itself. But for those times when your animation just won't look right because a flag is intersecting itself, the Prevent Self-Intersections parameter can be used to make your animation look more realistic.

Limitations

While the Prevent Self-Intersections parameter can be used to great effect in many situations, there are scenarios that it may not handle well, such as:

- Rapidly-moving flags. If the movement between each frame is too great, intersections may still occur.
- Overly-bunched flags. If your flag folds over itself too many times, there may not be a good way to unfurl it.
- Once self-intersection does occur, it may stay that way. The Prevention Algorithm cannot usually fix a self-intersection once it happens.

An Ounce Of Prevention Is Worth A Pound Of Cure

The best way for you to avoid creating a flag with self-intersections is to use parameters that won't cause self-intersection in the first place.

If you've tried the Prevent Self-Intersections parameter and it hasn't worked for you situation, you may want to try one of the following solutions. Each of the items below can be used to help you not have self-intersections in the first place.

- Change the wind speed. A slightly slower or faster wind will change the way a flag flaps.
- Animate the wind speed. This is especially useful if the flag only self-intersects at a few points in time. By setting a few wind speed keyframes around the time of self-intersection, you may be able to get rid of the intersections without changing the overall wind speed for the animation.
- Avoid overly-rubbery flags. Loose flags tend to flap about quite a bit. If you can minimize how high the Flag Stretch, Flag Bend, and Flag Shear values are, you may be able to keep your flag flapping in the wind, and not into itself. A higher Conform value may help as well.
- Keep the mesh size down. Find the minimum Horizontal Mesh and Vertical Mesh values that will suit your needs. An overly-complex mesh will create more folds, and therefore more chances of self-intersection.

The next chapter, Working With Multiple Flags, will discuss ways to make your flags unique. It will also demonstrate how to quickly reuse the animation from one flag to create many animations with different flag images.

Working With Multiple Flags

As you get more advanced with your flag work you may want to create scenes that include multiple flags. This chapter discusses techniques you can use to make each flag look unique, and describes ways to reuse an animation for different flags.

- Why Do My Flags Look Identical?
- Reusing Animation For Different Flags

Why Do My Flags Look Identical?

Overview

In this section, you'll create a scene with two flags. At first, they will look identical, but we'll show you how to make subtle changes so each flag looks unique.

Creating A Scene With Two Flags

This section will show you how to create a scene with two flags, both on the same flagpole.

1 Open the project called “Flagpole Single.aep” found in the “Flag Tutorials” folder. This project was created using techniques discussed in Attaching Your Flag To A Flagpole. The Comp window should look like this image.

In this picture, the flagpole was part of the background image. This flag is attached to a flagpole layer, but that layer is hidden.

2 Turn on the visibility of the “Flagpole” Solid layer.

Now you can see the long, skinny Solid that the flag is attached to. Notice how the “Flagpole” Solid layer has been placed in the scene to cover up the flagpole in the background picture. We use this fake flagpole as our guide, and then turn off its visibility once everything has been oriented properly.

3 Turn off the visibility of the “Flagpole” Solid layer.

Adding A Second Flag To The Flagpole

1 Duplicate the “Top Flag” layer by selecting the “Top Flag” layer in the Timeline window and then selecting Edit> Duplicate.

2 Rename the new layer “Bottom Flag.”

This layer is an exact duplicate of the “Top Flag” layer. This means that the flags are in the same place and are attached to the same flagpole. Let’s make the second flag lower on the pole than the first flag.

3 Open the Effect Controls window (Effect> Effect Controls).

4 Lower the Offset Y value until one flag is below the other. A value of 225.0 should do the trick.

5 In the Effect Controls window, select “Red Crescent.jpg” from the Color From Layer menu. You now have two flags on the same pole.

6 View the first few seconds of the animation by doing a RAM Preview (Composition> Preview> RAM Preview).

7 Notice how the flags move in exactly the same way. Let’s fix this.

Making Flags Unique

While you can probably imagine that changing just about any parameter on one of the flags will make the two flags look different, you’ll still want them to look like they’re part of the same scene. That is, you’ll want them to look like they’re receiving the same wind and other forces. You may also want them to look like they’re made out of the same material. Choosing the right parameters to change is important.

Let’s make the “Red Crescent.jpg” flag similar but different.

1 Select the “Bottom Flag” layer.

2 Open the Effect Controls window (Effect> Effect Controls).

Since these two flags are so close to each other, we can’t change the wind direction, but we can change the wind speed by a small amount. This won’t change the overall look, but will help break up the synchronization of the two flags.

3 Set Wind Speed to 10.5.

4 View the first few seconds of the animation by doing a RAM Preview (Composition> Preview> RAM Preview). The flags aren't as synchronized as they were before, but they still look too much alike. By changing the Pre-Roll value, we can offset how far along in the animation we are. This will add some uniqueness to the "Bottom Flag."

5 Set the Pre-Roll value to 3.0. This will differentiate how many frames are calculated for each flag. This will make the flags look different for a few seconds, but it may not help over longer periods of time, when the flags get into their patterned undulation.

6 View the first few seconds of the animation by doing a RAM Preview (Composition> Preview> RAM Preview). Notice how the flags seem to act independent of one another.

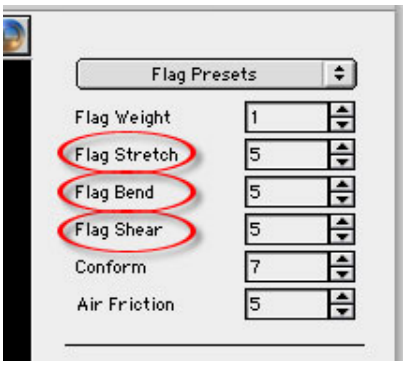
You could probably stop here and have perfectly acceptable results, but let's go a bit further and look at some other ways to make flags different.

Making Flags Even More Unique

1 Open the Options window by clicking on the 3D Flag logo at the top of the Effect Controls window.

2 Press the spacebar to pause the animation. Let's make the flag look like it's made of a slightly different material.

3 Set Flag Stretch, Flag Bend, and Flag Shear each to 5.0.



4 This makes the flag a little more loose and stretchy. More importantly, it will react to the wind differently than the "Top Flag."

Click the OK button to close the Options window.

5 View the first few seconds of the animation by doing a RAM Preview (Composition> Preview> RAM Preview). The flags look like they're reacting to the same wind, but they are flapping in their own unique way.

Deciding Which Parameters To Change

The chart below describes how the different parameters can be used to achieve different looks.

ECW Parameter	How It Can Make Flags Different
Wind Speed	Small differences can help the flags undulate at different rates. Larger differences can make flags look like they're in different parts of the scene (that is, far away from each other).
Wind Direction	Flags can look like they're in different parts of a scene.
Pre-Roll	By having different Pre-Roll values, flag undulations will occur at different times.

In the next section, Reusing Animation For Different Flags, you'll learn how changing a single 3D Flag parameter can facilitate the creation of five animations.

Reusing Animation For Different Flags

Overview

Since 3D Flag allows you to change the layer that the flag color comes from, you can quickly create multiple versions of the same animation.

Let's say you get a job where you need to create five flag animations, each using the flag of a different country. It's OK for each animation to be the same but the flag in each one needs to be different.

Options Window Parameter	How It Makes Flags Different
Flag Stretch/ Bend/Shear	Changes the material of the flag.
Conform	Changes the material of the flag.
Horizontal/ Vertical Mesh	Changes the material of the flag.

Creating The First Animation

The first step is to get together the pieces we will be using and taking a look at those pieces.

We'll use the flag we started with in the previous section to get us going.

1 Open the "Multiple Flags.aep" project which is located inside the "Flag Tutorials" folder.

When the project opens it should look like this image.

This project is very similar to the one we used in the last tutorial. The main difference is that it contains five flags all sitting in the Timeline ready to go. Notice that their visibility has been turned off. We don't need to see them in the Comp window. They just need to be in the Timeline so that we can use them to color the flags.

Since we'll be reusing this animation for five different flags, we'll want to make sure that the flag size does not change when we replace one flag with another. Some of the original flag pictures may be larger than others, but we want all flags to be the same size in the final animation.

2 Select the "Flag Solid" layer.

3 Open the Effect Controls window (Effect> Effect Controls).

4 Find the Size From control and choose the "Width and Height" option.

This will fix the size of the flag to 400 by 210 which is the size of the US flag. Once you fix the size of the flag, using the "Width and Height" option, you can substitute other images and the size of the flag will not change. If the size of the flag changes it takes extra time adjusting the alignment of the flag to the flagpole, so learning how to fix the size of the flag is very useful.

Creating Five Identical Animations

Now that our scene is ready, we'll render five animations in a row. We'll only make a single change to the Flag Solid between each render. Since we're only making a single change each time, there is no need to duplicate the Comp and render out five compositions, although if you'd like to render all five at once you could do it that way.

We're going to assume that you already know how to use the Make Movie command, and how to set your render settings, so the procedure goes like this:

1 Use the Make Movie command.

2 Set the render settings. Remember that you need the Best quality settings in order to get antialiasing and non-rectangular shapes, if you're using these features.

3 Render the movie.

4 After the movie is done rendering, select the "Flag Solid" layer in the Timeline window.

5 Open the Effect Controls window (Effect> Effect Controls).

6 Find the Color From Layer menu and choose the "Australia.jpg" flag. The flag in the Comp window will change into an Australian flag.

Repeat the sequence of steps for each flag. When you are done you will have five identical animations with a different flag in each.

In the next chapter, Other Creative Uses For Flags, you'll discover that 3D Flag can be used to create more than just flags.

Creating A Balloon String With A Thin Flag

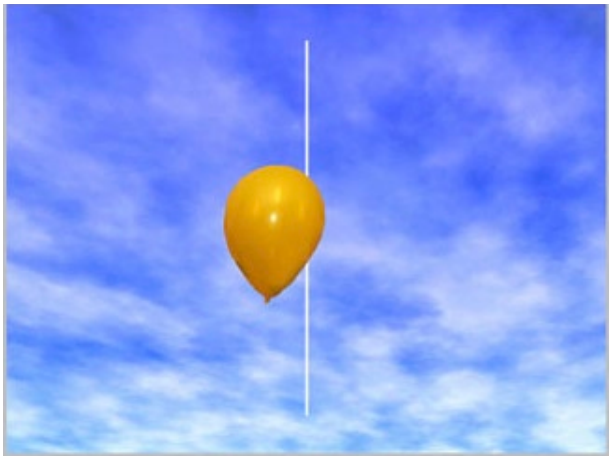
Overview

At its core, 3D Flag simulates springs pushing and pulling points in space. When you lay out a grid of these springy points, you get cloth. String can be simulated with springs as well. This section demonstrates how you can create something that looks and acts like string with a very thin flag.

Setting Up The Scene

1 Open the "Balloon.aep" project in the "Flag Tutorials" folder.

When the project opens it should look like this.



The project consists of a sky background, an animated balloon, and a layer that we'll use to specify the string color and size. There is also a layer (hidden for now) that we'll use as our flag layer. Our goal is to turn the string into a thin flag, and then attach it to the balloon.

Creating The String

We have our string in the scene already. It's a thin Solid. We want to use it to create a flag.

1 Turn off the visibility of the "String Solid" layer. Turn on the visibility of the "Flag Solid" layer. Then, apply the 3D Flag effect to the "Flag Solid" layer. The white layer will turn into a flag.

2 In the Effect Controls window, find the Color From Layer menu and select "String Solid." The big white flag turns into a thin white flag. We now want to make this thin flag look and act like a string.

3 Locate the Lock Edges menu and elect "Top." Then find the Lock Points menu and select "All Edge Points." You'll see the white flag start to look like a long string in the middle of the screen.

4 Let's turn the wind into to a very slight breeze. Set Wind Speed to 1.

Attaching The String To The Balloon

We want the string to be attached to the bottom of the balloon and sway in the wind as the balloon animates across the screen.

1 In the Attach To Layer menu, select "Balloon.tga.". The string will now travel with the balloon. To make the top of the string line up with the bottom of the balloon, we'll use the Offset X and Offset Y parameters.

2 Use the Offset X and Offset Y controls to move the string so that the top of the string hangs from the bottom of the balloon. An Offset X value of -3 and an Offset Y value of -278 should be about right.

The string now follows the balloon as it floats across the screen. The bottom portion of the string sways with the movement of the balloon. Pretty cool, huh?

Making balloon strings is just the start. In the next section, Transitioning Between Two Layers, you'll see how you can take advantage of wind and gravity to transition from one layer to another.

Transitioning Between Two Layers

Overview

This section shows how to create an organic transition between two layers. You'll remove the edge constraints from the flag and let wind and gravity push it across the screen, revealing the layer behind the flag.

Setting Up The Scene

For this example, let's say you're creating a slide show of your trip to Greece and you want to use 3D Flag to transition between two pictures.

1 Open the "Transition.aep" project in the "Flag Tutorials" folder.

When the project opens it should look like this.

2 Select the "Greece1.jpg" layer and add the 3D Flag effect to it (Effect> Zaxwerks> 3D Flag). The layer will become a flag and the Effect Controls window will be displayed.

Since "Greece1.jpg" is the same size as our Comp, and since the contents of the layer is what we want on the flag, we can apply the 3D Flag effect directly to it. This saves us an extra step of having to create an additional Solid that we would apply the effect to.

3 In the Effect Controls window, set Pre-Roll to 0. This will put the flag in its default position, flat against the screen. Since the flag layer is the same size as the Comp, it completely covers the layer behind it. In fact, we can't even tell it's a flag.

4 Find the Lock Edges menu and select "None." Then locate the Lock Points menu and select "None." You just freed the flag so that it can be blown across the screen.

Creating A Transition

By doing the steps above, you've created a flag that will fall off the screen, revealing the "Flagpole Double" layer behind it. Let's turn the "fall" into a "peel" to make the effect more interesting as a transition.

1 Preview the animation by opening the Options window. Notice that the flag just falls towards the ground. With no locked points, the flag is free to react to wind and gravity without constraints. For our purposes, the flag falls too fast, and there isn't enough time for the wind to affect the flag. Click the OK button to close the Options window.

2 Set Wind Dir Angle to 95. This will cause the flag to be blown slightly towards the camera, instead of away from the camera. This will make the flag peel towards the camera.

3 Set Gravity to 1.0. This will allow the flag to fall just a little bit before being blown to the side.

Preview the final animation to see the transition (Composition> Preview> RAM Preview).

By utilizing the cloth-like nature of flags, and by not locking down any of the points on the flag, you can create unique transitions between layers.

In the next section, Animating Text, you'll see how flags can bring your text to life.

Animating Text

Overview

This section will show you how 3D Flag can be used to create animated text, which can add a dynamic element to your scene.

Let's say you are creating titles for a weather station, and want to make your text move like it's being blown by the wind to indicate a storm brewing.

Setting Up The Scene

1 Open the "Weather.aep" project in the "Flag Tutorials" folder.

When the project opens it should look like this.

The scene consists of some text over a background. We want to make the text undulate as if it's mimicking the stormy conditions.

2 Select the "Weather Text.tga" layer and add the 3D Flag effect to it (Effect> Zaxwerks> 3D Flag). The layer will become a flag and the Effect Controls window will be displayed.

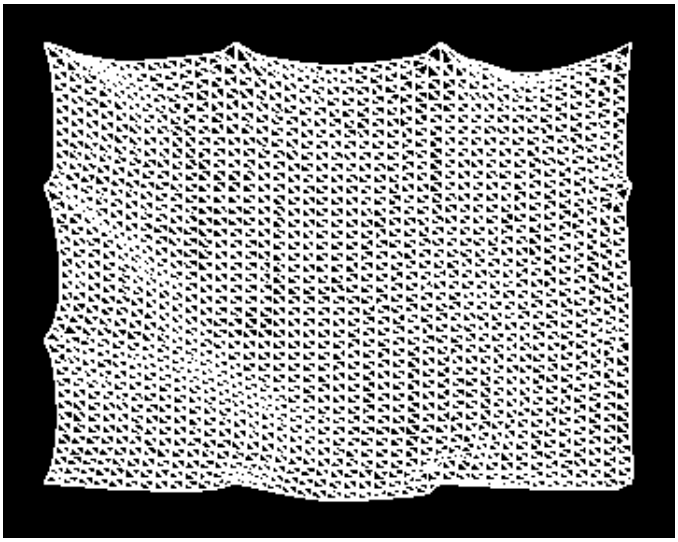
Since "Weather Text.tga" is the same size as our Comp, and since the contents of the layer is what we want on the flag, we can apply the 3D Flag effect directly to it. This saves us an extra step of having to create an additional Solid that we would apply the effect to.

Note that since "Weather Text.tga" has an alpha channel (that is, it has transparent areas), we have set the Quality setting for this layer to Best. This tells the 3D Flag plug-in that the flag won't have a rectangular shape.

3 In the Effect Controls window, find the Lock Edges menu and select "All Sides." The locate the Lock Points menu and select "Corners & Two Centers." This will bind the flag at several points around the edges, but still allow some looseness.

4 Open the Options window by clicking on the 3D Flag logo in the Effect Controls window. The wind moves the text, but not very much. We'd like to make the text undulate more.

Making The Text Undulate More



The key to making the text undulate more is to increase the mesh density. This will allow more folds in the flag as the wind blows through it.

1 With the Options window still open, pause the animation by pressing the spacebar.

2 Click the wireframe ball above the Preview window to view the flag in Wireframe mode.

The edges are bound at the corners and at two places along each edge.
Since the flag is bound on all sides, there's no chance of it flapping too wildly.

3 Set both the Horizontal Mesh and Vertical Mesh to 41. This gives the flag more complexity, thereby allowing it to be affected more by the wind.

4 Click OK. This will accept the changes and close the Options window.

5 Do a RAM Preview (Composition> Preview> RAM Preview). The text now undulates on the screen.

Now that you've seen how binding the edges of the flag can help create dynamic text, the next section, Generating Dramatic Background Elements, will show you how a similar technique can be used to create flowing backgrounds.

Generating Dramatic Background Elements

Overview

By locking down all points along the edge of a flag, you can make the flag completely cover the Comp window. The interior of the flag will still react to wind and gravity, giving you the opportunity to generate dramatic background elements.

Let's say you are creating the titles for an awards show and you want to generate a background that looks like a flowing drape or curtain. We'll use a similar technique as we did in the previous section, only we'll apply it to the background image.

Setting Up The Scene

1 Open the "Awards Show.aep" project in the "Flag Tutorials" folder.

When the project opens it should look like this image.

The red background is pretty boring. Let's make it more dramatic by turning it into cloth.

2 Select the "Red Background" layer and add the 3D Flag effect to it (Effect> Zaxwerks> 3D Flag). The background will become a flag and the Effect Controls window will be displayed.

Since the “Red Background” layer is already the color and size that we want for our background, we don’t have to select anything special in the Color From Layer menu. Note that this technique only works if the background layer is the same size as the Comp.

3 In the Effect Controls window, locate the Lock Edges menu and select “All Sides.” Then find the Lock Points menu and select “All Edge Points.”

The flag edges are now locked to the edges of the Comp window because the “Red Background” layer is the same size as the Comp.

4 Open the Options window by clicking on the 3D Flag logo at the top of the Effect Controls window. It looks ok, but let’s see if we can make it look even more dramatic.

Adding Drama

One way to make the scene more dramatic is to make the flag look large and silky, so the wind creates grand billows across the surface.

1 With the Options window still open, pause the animation by pressing the spacebar.

2 Set Flag Stretch, Flag Bend, and Flag Shear each to 5. This will make the flag loose.

3 Set Horizontal Mesh and Vertical Mesh each to 41. This will allow the wind to create more folds in the flag, making it seem large. The folds will also cause the flag to catch the light better.

4 View the animation by pressing the Restart Simulation button. Undulations now sweep across the flag.

5 Click OK to accept the new values and close the Options window.

The scene is now much more dramatic than it was before. The addition of a realistic, flowing cloth background has added a lot of production value to this graphic.

Between balloon string, text, and background elements, you’ve had pretty good exposure to how the clothy nature of flags can be used for other purposes.

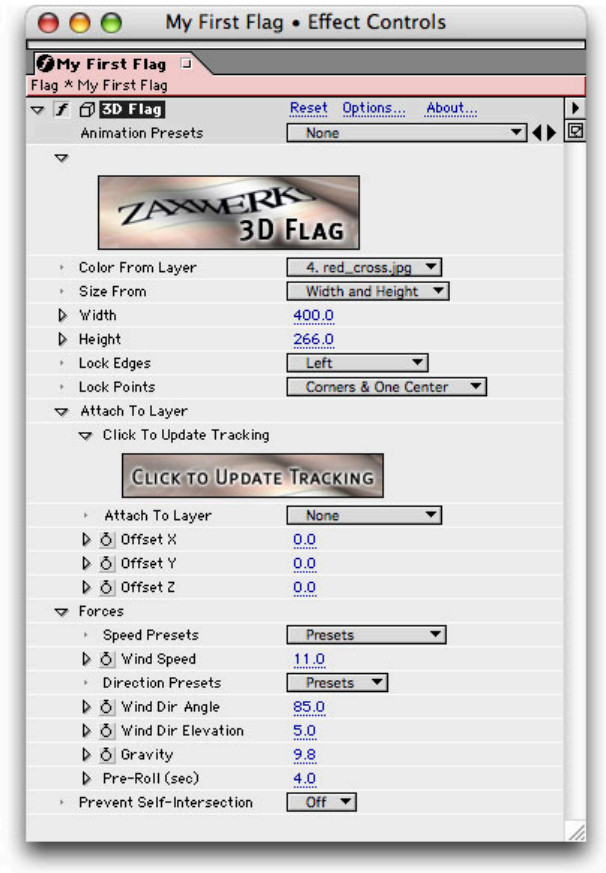
At this point, you should feel comfortable putting flags in your scene and animating them. You should also be ready to find alternative, creative uses for flags.

You may wish to review certain chapters, or you may continue on to the References section, where you can find more details about specific parameters.

The first reference is the Effect Controls Reference.

Effect Controls Reference

Click on one of the parameters or buttons in the picture below for more information on that item.



Parameters And Buttons

Reset

Press this button to change all of the ECW parameters back to their default values.

Options

Press this button to open the 3D Flag Options window. In the Options window, you can view the flag animation in real-time and change flag parameters.

You can learn more about using the Options window in Changing Flag Attributes.

About

Press this button to show the 3D Flag About box, which provides information about the 3D Flag plug-in.

Color From Layer

This parameter shows a list of every layer in your Comp.

When you choose a layer, the flag will use the contents of that layer to color the flag.

You can learn more about this parameter in Coloring The Flag.

Size From

This parameter determines how the flag width and height are determined.

You have the following choices:

- Color Layer - The size of the flag will be based on the size of the layer chosen in the Color From Layer parameter.
- Width and Height - The size of the flag will be based on the values of the Width and Height parameters.

You can learn more about this parameter in Automatically Resizing A Flag and Manually Resizing A Flag.

Width

If Size From is “Width and Height,” the flag will have this width, in pixels.

You can learn more about this parameter in Manually Resizing A Flag.

Height

If Size From is “Width and Height,” the flag will have this height, in pixels.

You can learn more about this parameter in Manually Resizing A Flag.

Lock Edges

This parameter determines which edges of the flag have locked points. The Lock Points parameter determines which points along the chosen edges are locked.

You have the following choices:
- None
- Left
- Right
- Top
- Bottom
- Left & Right
- Top & Bottom
- All Sides

You can learn more about this parameter in Locking Points - Ma king A Hanging Banner and the chapter Other Creative Uses For Flags.

Lock Points

This parameter determines which points along the edges specified by Lock Edges are locked.

You have the following choices:
- None
- All Edge Points
- Corners Only
- Corners & One Center
- Corners & Two Centers

You can learn more about this parameter in Locking Points - Ma king A Hanging Banner and the chapter Other Creative Uses For Flags.

Click To Update Tracking

When the flag is attached to a 3D layer, and you are animating the 3D layer by setting keyframes, the flag may not follow properly.

You can click this button to force the flag into its proper position if the flag and the attached layer are out of sync.

You can learn more about this parameter in In Sync: Animating The Flagpole.

Attach To Layer

This parameter shows a list of every layer in your Comp.

You can attach a flag's locked points to a 3D layer by choosing an item in this menu. Where the attachment layer goes, the flag's locked points go. The rest of the flag will follow.

You can learn more about this parameter in How To Place Your Flag In A 3D Scene.

Offset X

Initially, the center of the flag is attached to the center of the Attach To Layer parameter.

You can set this parameter to shift the flag left and right on the attachment layer.

This value is in pixels.

You can learn more about this parameter in Handling Alignment Issues With Offsets.

Offset Y

Initially, the center of the flag is attached to the center of the Attach To Layer parameter.

You can set this parameter to shift the flag up and down on the attachment layer.

This value is in pixels.

You can learn more about this parameter in Handling Alignment Issues With Offsets.

Offset Z

Initially, the center of the flag is attached to the center of the Attach To Layer parameter.

You can set this parameter to shift the flag towards or away from the attachment layer.

This value is in pixels.

You can learn more about this parameter in Handling Alignment Issues With Offsets.

Speed Presets

By default, wind blows at a constant rate. You can choose an option from this menu to automatically create a set of keyframes that animate the Wind Speed parameter. Each options has a base wind speed value and different periods of constant wind, increasing wind speed, and decreasing wind speed.

When choosing one of these options, any existing Wind Speed keyframes will be cleared and new ones will be created. Random numbers are used to determine where the keyframes are created. Your choices are:

- Lazy - Variable
- Lazy - Steady
- Breezy - Variable
- Breezy - Steady
- Windy - Variable
- Windy - Steady
- Gusty - Variable
- Gust - Steady
- Clear Keyframes - This option will clear any existing Wind Speed keyframes and reset the Wind Speed to 11.0.

You can learn more about this parameter in Using Wind Presets To Create Gusts.

Wind Speed

This parameter determines how strongly the wind blows. The direction of the wind is determined by Wind Dir Angle and Wind Dir Elevation.

You can learn more about this parameter in The Need For (Wind) Speed.

Direction Presets

By default, wind blows to the right (actually, slightly off right).

You may choose an option from this menu to change the Wind Dir Angle and Wind Dir Elevation values.

Your choices are:

- Left
- Right
- Forward
- Back
- Up
- Down

You can learn more about this parameter in Changing The Wind Direction.

Wind Dir Angle

This angle, in degrees around the global Y axis, is the direction that the wind is blowing.

In respect to a default camera in a scene, then:

- 0 degrees is away from the camera (down the global positive Z axis).
- 90 degrees is to the right (down the global positive X axis).
- 180 degrees is towards the camera (down the global negative Z axis).
- 270 degrees is to the left (down the global negative X axis).

You can learn more about this parameter in How To Animate Wind Direction.

Wind Dir Elevation

This angle, in degrees, represents how high or how low the wind is blowing.

- 90 degrees is completely vertical (up).
- 0 degrees has no elevation.
- -90 degrees is completely vertical (down).

You can learn more about this parameter in How To Animate Wind Direction.

Gravity

This parameter determines how quickly points on the flag will be pulled down due to an accelerated gravitational force.

You can learn more about this parameter in Earth Or Moon: Gravity And Slow Motion.

Pre-Roll

This parameter, in seconds, determines how many animation frames are calculated before the first frame of the flag is available for display.

At 0.0 seconds, the flag is in its default position.

Self-Intersection prevention does not occur during the pre-roll period.

You can learn more about this parameter in Using Pre-Roll To Find The Perfect Wave.

Prevent Self-Intersection

When set to “Off,” your flags may intersect themselves.

When set to “On,” 3D Flag tries to prevent the flag from intersecting itself at each frame.

Self-Intersection prevention does not occur during the pre-roll period.

You can learn more about this parameter in Preventing Self-Intersection.

3D Flag Options Window Reference

Click on one of the parameters or buttons in the picture below for more information on that item.

Parameters And Buttons

Preview Window

This window displays the flag animation using OpenGL. The smoothness of the animation playback depends on your CPU and your graphics card.

You may change your view of the flag by clicking and dragging inside the window.

You may use keyboard commands to control the animation playback.

You can find more information about this window in the chapter Changing Flag Attributes.

Playback Mode

You may choose to play the animation in real-time or a frame at a time.

The two options are:

- Real-Time - play the animation in real-time, dropping frames as necessary
- Frame-By-Frame - play every frame of the animation, no matter how long it takes to calculate each frame.

You can learn more about playback modes in Controlling Animation Playback.

Time

This text field displays the current time in the animation. It displays the time as a timecode as well as a number of seconds.

The time does not include pre-roll time. That is, a timecode of "0:00" means the first frame after pre-roll.

You can learn more about using the Time field in Using Pre-Roll To Find The Perfect Wave.

FPS

This text field displays the current animation playback framerate, in frames per second.

Wind Speed

This field displays the current wind speed being applied to the flag in the Preview window.

If the Wind Speed parameter in the Effect Controls window is animated, the animated effect will be shown here.

Wireframe Display Mode

Press this button to show the flag in the Preview window using a wireframe display.

You can learn more about this button in Changing Your View Of The Flag.

Shaded Display Mode

Press this button to display a white, non-textured flag in the Preview window.

You can learn more about this button in Changing Your View Of The Flag.

Textured Display Mode

Press this button to show a textured flag in the Preview window.

The texture used for the flag is the contents of the Color From Layer parameter in the Effect Controls window at the current frame when the Options window is opened.

You can learn more about this button in Changing Your View Of The Flag.

You can learn more about the Color From Layer parameter in Coloring The Flag.

Flag Presets

You may either set the flag parameters individually, or you may select a Flag Preset, which will set the parameters for you.

The options for this menu are:
- Stiff Flag (the default flag)
- Loose Flag
- Limp Flag
- Rubbery Flag

The parameters that are affected by presets are:
- Flag Weight
- Flag Stretch
- Flag Bend
- Flag Shear
- Conform
- Air Friction

You can learn more about Flag Presets in Making a Rubbery Flag With Presets.

Flag Weight

This parameter determines the weight of each point in the flag mesh.

Flags with a large weight won't react to wind as strongly as points with a small weight.

You can find more information about this parameter in Changing A Flag's Weight.

Flag Stretch

This parameter specifies the percentage of length a Stretch spring may expand or compress during the calculation of an animation frame.

You can learn more about this parameter in Understanding Stretch, Bend, And Shear.

Flag Bend

This parameter specifies the percentage of length a Bend spring may expand or compress during the calculation of an animation frame.

You can learn more about this parameter in Understanding Stretch, Bend, And Shear.

Flag Shear

This parameter specifies the percentage of length a Shear spring may expand or compress during the calculation of an animation frame.

You can learn more about this parameter in Understanding Stretch, Bend, And Shear.

Conform

This parameter specifies the number of iterations that are done during the spring calculations in the flag simulator.

The overall result of making this parameter having a higher value is that the flag will conform to its desired shape better.

You can learn more about this parameter in Getting The Wrinkles Out With Conform.

Air Friction

This parameter specifies, as a percentage, how much the animation of a flag slows down during each frame calculation.

A larger value will make the flag look more sluggish, or it may make the flag look like it's moving in slow motion.

You can learn more about this parameter in Using Air Friction To Slow Things Down.

Meshing Style

Flags are constructed from a grid of triangles. The triangles may be built with the diagonal to the right or to the left.

Your rendered flag may look smoother when choosing one meshing style over the other.

You can learn more about this parameter in Choosing Between Right And Left Meshing.

Horizontal Mesh

Flags are, at their core, a rectangular mesh of points. This parameter specifies how many points are in each row.

Larger values will make more complicated flags that can create more folds.

You can learn more about this parameter in How To Determine The Best Mesh Size.

Vertical Mesh

Flags are, at their core, a rectangular mesh of points. This parameter specifies how many points are in each column.

Larger values will make more complicated flags that can create more folds.

You can learn more about this parameter in How To Determine The Best Mesh Size.

Motion Blur Steps

When a Comp is rendered with motion blur (and the layer that has 3D Flag applied to it has motion blur enabled), this parameter specifies the number of sub-frames that are rendered for each frame.

Higher values will produce a better blurred result, but will also take longer to render.

Restart Simulation

Press this button to restart the animation at timecode 0:00.

If the animation is paused when the button is pushed, the timecode will be reset to 0:00 and the animation will be started.

Help

Press this button to display the 3D Flag Help in a web browser.

Cancel

Press this button to close the Options window without saving the values of the flag parameters.

OK

Press this button to close the Options window and accept the changes to the parameters. A new flag will be created based on the new values in the Options window.

The following parameters are used to build the flag:

- Flag Weight
- Flag Stretch
- Flag Bend
- Flag Shear
- Conform
- Air Friction
- Meshing Style
- Horizontal Mesh
- Vertical Mesh
- Motion Blur Steps (used when motion blur is active)

When I make a change it takes a long time for the flag to update.

The 3D Flag software is creating a physics-based simulation of a real world event. When a flag flaps the parts of the flag all interact with each other. This means that something that happens at the beginning of the animation will affect the flapping that occurs at the end of the animation.

When you change a parameter it causes the whole animation to change, so the whole animation has to be recalculated. If your time marker (or play head) is sitting at the beginning of the animation there is not a lot of recalculating that needs to be done in order to show you the flag at the current time. However if your time marker is sitting well into the animation then all of the frames between time 0 and the current time need to be recalculated before the flag can be rendered.

The solution for the time lag you are experiencing is to move the time marker (play head) to time 0:00 or frame 1. Then changes will take the least possible amount of time.

Why is there black around the flag poles?

You are looking at the animation in draft mode. You need to render in Best Quality to make the black disappear from around the flag poles.