In Chapter 13 I mention some of the difficulties with controlling particle based hair solutions. Just like clockwork as soon as the manuscript was submitted to the publisher Hash added a new feature that allows for fantastic control of fur properties with very little fuss.

This control is based on a new type of decal I will cover the basics of what it is and how it works here and follow up with a full tutorial and discussion on the am-guide.com website. (remember to check the site.txt file on this disk for the Password that will let you get into the Readers area where this and other tutorials can be found.)

You will first need a model and a basic hair system applied to it, I recommend starting simple with a sphere and a default hair system and working on learning the tools before moving on to more ambitious projects. once you have the object and hair system created, apply a decal to the model, this decal will be the control for the hair system.

If you bring up the pull down menu for the type of decal in addition to the types that we discussed in chapter 11 you will find two new types the one that interests us here is the "Other..." type.

Selecting Other as the type of decal presents a new property for the decal: Properties Driven. this property can be used to control any number of aspects of fur.   Bring up the contextual menu for the Properties Driven and choose Add Property, this will create a property that you can use to define how to effect the fur.

The pull down menu for the Property will list all the aspects of the hair system that the decal is capable of controlling. This is a new feature and likely to change as time goes on, but for the moment we are presented with the following types of properties:

> •**Thickness.** Uses the Luminance or greyscale value of a decal to indicate the thickness of the hair system on the model, those areas that are black are thicker than those that are white, with grey values transitioning between the two.

> •**Length.** Uses the Luminance or greyscale value of the decal to indicate the length of the hair system. the areas of the decal that are white will be longest while black may not show any length at all.

> •**Stiffness.** Uses the Luminance or greyscale value of the decal to indicate the stiffness of the hair. White areas are at full stiffness while black areas will show none.

•**Kinkiness.** Uses the Luminance or Greyscale value of the decal to add kink to the hair system, again white areas will have the greatest amount of kink to them while black will have none.

•**Kink Scale.** Uses the Luminance or Greyscale value of the decal to adjust the scale of the Kink on the hair system. A white value will have the highest scale where black areas will have the lowest.

•**Normal Delta.** This is a very complex property that is used to control the direction that the hair system will move, this is similar to using forces except that is is not a global change. So we can use the Normal delta property to 'comb' hair. This is not, a simple greyscale map type though, rather it uses a complex interaction for all four channels of a image to determine which direction to push the hair. Randy at hash inc. explains it like this:

It is a way to allow for the combing of hair. Although very difficult to paint, the red component of the image controls the Normal's delta in the X direction, and the Blue value in the Y.

Eventually we will be allowing you to comb the hair in the interface, and this map will be built for you.

Red
0 = Tweak 90 degrees left
128 = Do nothing
255 = Tweak 90 degrees right

Blue
0 = Tweak 90 degrees down
128 = Do nothing
255 = Tweak 90 degrees up

As you can see, this only allows for 255 possible X or Y tweaks. To increase this resolution, the Green component can cycle from 0-255 for each Red value. Allowing for 65535 different tweakages. Similarly the Alpha can do so for each Blue value. This would be really difficult to paint, but we will use it when we allow combing in the software.

This can allow for a great deal of control, as you might imagine, but for the most part you will want to find a more simple method of controlling the hair.

•**X.** Uses the greyscale value of the decal to bush the hair in the X

direction. This works in much the same way that a bump map works, with black bending the hair -90 in the x-axis, white bending it 90.

•**Y** Uses the greyscale value of the decal to bush the hair in the Y direction. This works in much the same way that a bump map works, with black bending the hair -90 in the y-axis, white bending it 90.

As you can see the X and Y properties mirror the Red and Blue Channel tweaks provided with the Normal Delta type of maps, but they are far easier to paint and understand, but remain limited to the 255 levels of X and Y tweaks. For combing these become a more immediately practical method.

•**Diffuse Color.** This is probably the easiest of the properties to understand as it simply uses the color of the decal on the surface of the model to determine what the color of the hair that is emitted will be. this allows for the creation of complex patterns and markings for animals.

The hair system that these decals drive should be applied to the base level of the model, rather than on a named group, you might think that this would mean that the entire model would be covered in hair, and if you didn't use a Other... type decal then you would be correct. However, as soon as we apply a decal and make it of the Other type then only the areas of the model that have the decal applied to them will emit hair. This makes it easy to create hair that will follow a natural hair line for humans for instance, which when coupled with the combing ability makes the use of particle hair for humans more possible.

The basics are very simple to grasp and the usefulness of this feature will only increase over time, again please check the readers section of the companion site (http://www.am-guide.com) where I will be covering this and other topics in greater depth. As Randy said they are working on adding tools to give us more control over fur and if those tools become available in the 2002 subscription of A:M they will be covered on the site.