

Hyper Textures for visual scene enhancement



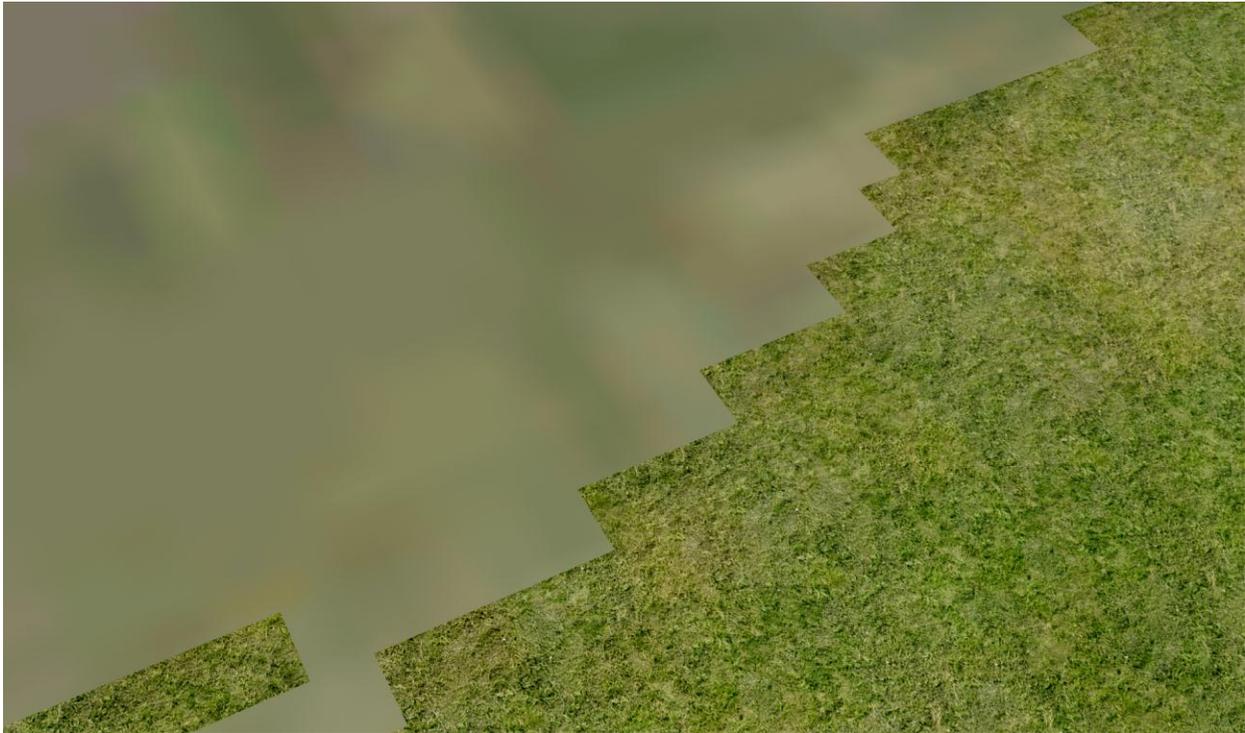
Christian Yelle

Presagis

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The use of Hyper Textures to better enhance a visual scene.

- the basic idea is that, since geospecific textures are rarely high-resolution enough, you can render additional high-frequency detail with geotypical textures, to avoid having a big blurry surface



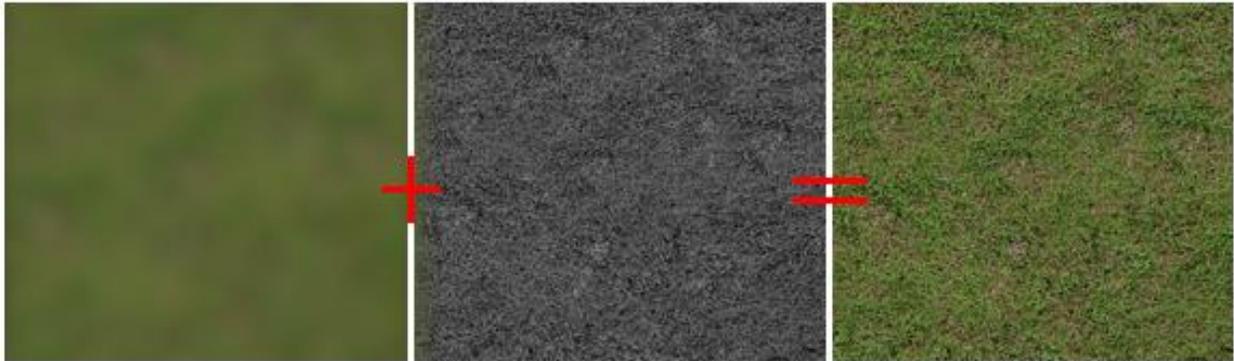
The difference between 2m resolution base texture & enhancement with Hyper Texture

Creating a Detailed Texture

First up, what is a Hyper Texture? A Hyper Texture is a high resolution external image that is placed over the top of a regular texture and its real life scaling factor. This gives the impression of small details when you get up close to a texture instead of the usual blurred image you get when the texture fills the screen. Hyper Textures are also commonly called: Detail Textures, Micro Textures and Macro Textures. We use here the terminology Hyper Texture for it is the default Vega Prime naming convention.

Now you will need to create a Hyper Texture to use in your scene. The ideal size for a Hyper Texture is 128x128 pixels. The recommended maximum size is 256x256 pixels but they can be larger but results can become unpredictable. Hyper Textures are best made with the grayscale pallet, but they can be colored also. When creating your image remember that the color 128 128 128 on the RGB (red, green, blue) scale will be completely transparent. Brighter shades create highlights and darker shades create shadows. To avoid blotchy and ugly looking Hyper Textures, always try to remain close to the middle gray color when making shadows and highlights, as very white and very black shades will cover the base

texture and look more like paint on your base texture. Hyper Textures are applied to **CDB Materials**. The engine will automatically render the detail on the visible parts of the texture and not over the transparent color

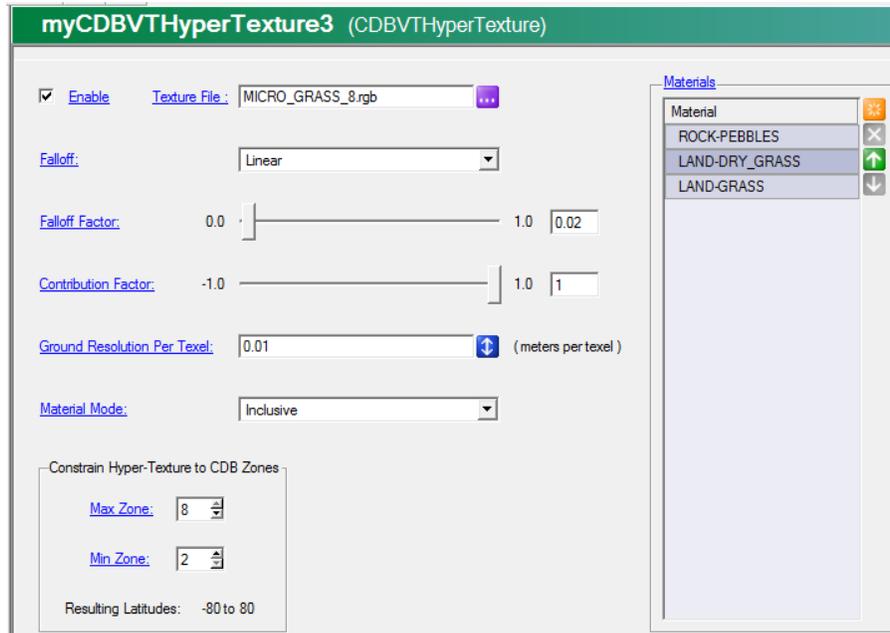


The original texture + The Hyper Texture = More in-game detailing and atmosphere

Implementing Hyper Textures

Now that we have a Hyper Texture, we can use it in our scene. You can either create your Hyper Texture from scratch or go to your `\Presagis\Vega_Prime\Resources\data\textures\hyper` to use one of the Hyper Texture provided with the product.

In Terra Vista, let's have a look at the Hyper Texture settings:



Material: Adds a material for which this hyper-texture may or may not be applied based on the material mode. If the material mode is inclusive, the hyper-texture will be blended with any fragment that is determined to be a material associated with this hyper-texture. If the material mode is exclusive, the

hyper-texture will not be applied for added materials. A material will only be added if the hyper-texture is not configured and the material is a valid CDB base material (see the file vpCDBMasterBaseMaterialTable for the list of base materials and associated material indices).

Falloff: Sets the falloff factor for this hyper-texture. A value of 0 will result in no scaling of the falloff function (none, linear, exponential, and exponential squared), whereas the falloff rate will increase as the value approaches 1. The default value is 0.3, and values will be clamped to the range [0, 1]. The falloff factor will have no effect if the falloff is set to FALLOFF_NONE or if the hyper-texture has been configured.

Falloff Factor: Sets the falloff function of the hyper-texture relative to distance from the eye-point, where the maximum contribution is indicated by the falloff and contribution factors and the minimum value is 0. The default falloff is linear, and the falloff can only be set prior to configure.



On the left: A falloff value set to: 0

on the right: A falloff value set to: 1.0

Contribution Factor: Sets the contribution factor for this hyper-texture, which represents the maximum amount the hyper-texture should alter the Virtual Texture based on the falloff function. The Value will be clamped between -1.0 and 1.0, with 0.8 being the default. A value of 1.0 will modify the Virtual Texture as much as possible at the head of the falloff function. A value of 0 will not modify the Virtual Texture at all. Negative values cause an inverse effect of the hyper-texture on the Virtual Texture, much like a photo negative. The contribution factor can only be set prior to configure and will have no effect after the hyper-texture has been configured.



On the left: A Contribution Factor value set to : 0

On the right: A Contribution Factor value set to : -1.0



On the left: A Contribution Factor value set to : 1 On the right: The default Factor value set to : 1.0

Ground Resolution per Texel : Sets the ground resolution of the hyper-texture in meters per texel, where the hyper-texture is repeated as necessary to cover the entire database. The default value is 0.125, which means that any given texel of the hyper-texture will cover approximately 0.125 square meters of the database. The minimum value will be clamped to 0. The hyper-texture will maintain the same resolution in world space across different LODs of the Virtual Texture. Note that setting the ground resolution to 0 will prevent the hyper-texture from affecting the VT color imagery; however, the overhead incurred by the hyper-texture will remain

Material Mode : Sets the material mode that indicates how this hyper-texture will be applied based on the materials in the material table. If set to MATERIAL_MODE_INCLUSIVE, this hyper-texture will be applied only to those materials in the material table. If set to MATERIAL_MODE_EXCLUSIVE (the default), this hyper-texture will be applied to all materials not in the material table of this or any hyper-texture associated with a given VT technique or CDB zone. Note that a hyper-texture may not be applied to a particular material if configuration is unsuccessful or if dictated by the associated VT technique

You need to repeat the process with every texture in your base that you want it to apply to. This can mean a long tedious process but the rewards are well worth it. You can also use different Hyper Textures on different CDB Materials. Want a tile effect on your concrete ? What about a rough rock look on your rock faces? Just change what Hyper Texture to use on each surface.

The good thing about Hyper Textures is that you do not need to recompile a base if the Hyper Texture looks wrong in your SeGen output, it is done in real-time. Make changes in Vega Prime that you want and reload the scene. Vega Prime re-loads the Hyper Textures used every time an .ACF loads.

Keep in mind

Using Hyper Textures also has a massive impact on the quality of your base's lighting if used correctly. Because of the difference between light and dark shades and how they create highlights and shadows, you can use this to simulate, more appropriately, the material surface. For example, metal reflects much more light than concrete and therefore, looks brighter than concrete, even if the two materials are right next to each other in the same lighting conditions. Normally, Vega Prime cannot discern between different materials like Creator material table can but clever use of Hyper Textures can help simulate these conditions. By making metal Hyper Textures brighter than normal, you 'lighten' the base

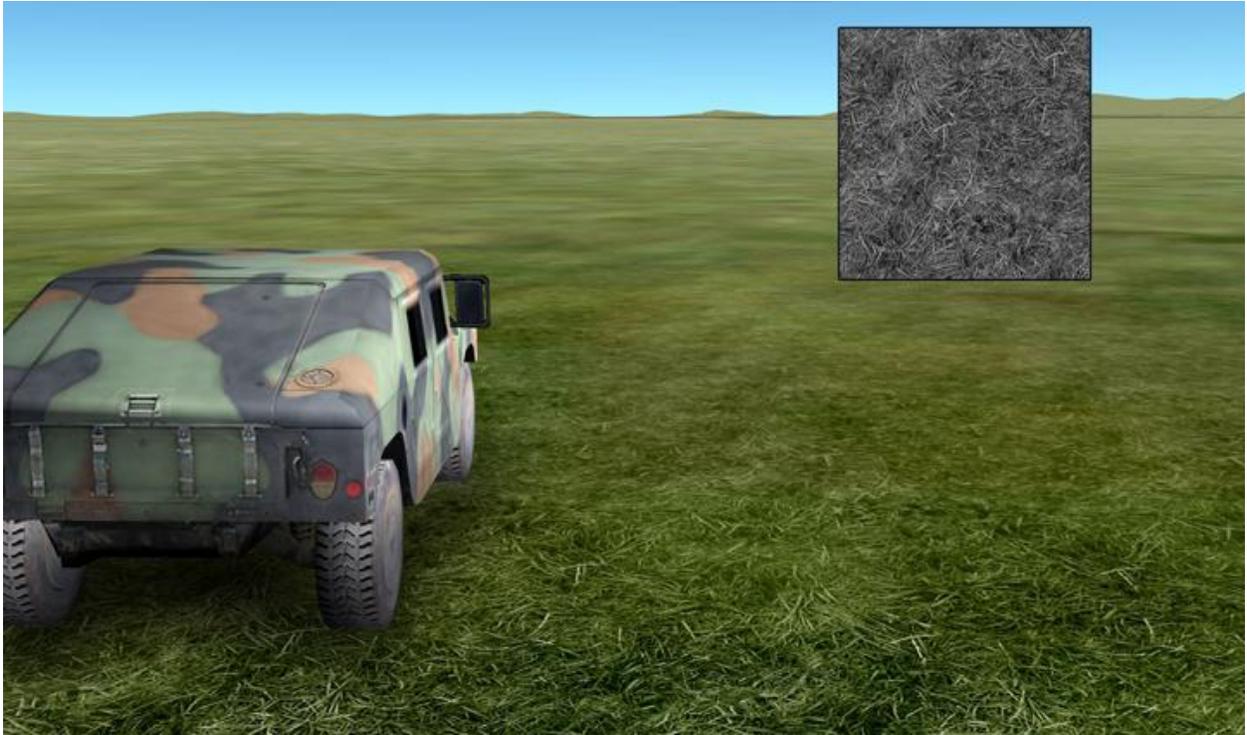
texture, because brightness values are also overlaid by Hyper Textures. Again, apply a darker detailed texture to a dark concrete surface. Now, when the base is lit, the metal looks brighter than the concrete, which is much more realistic.

Advanced Features

Now, after a bit of experimenting, you can manipulate the power of Hyper Textures for greater purposes. One use is for a cool sand effect. Want to have a nice glowing effect for your sand and improve its appearance? Create a full color sand texture and use it as a Hyper Texture over your sand base texture. This goes for all Hyper Textures, they do not have to be grayscale images, color Hyper Textures will also overlay their color properties to the textures and because Hyper Textures are not heavily reliant on lighting for their appearance, unlike normal base textures, they can create a glowing effect. This is not applicable for all uses, however, use at your own discretion.



Colored Hyper Texture set to a small scaling factor for detailing

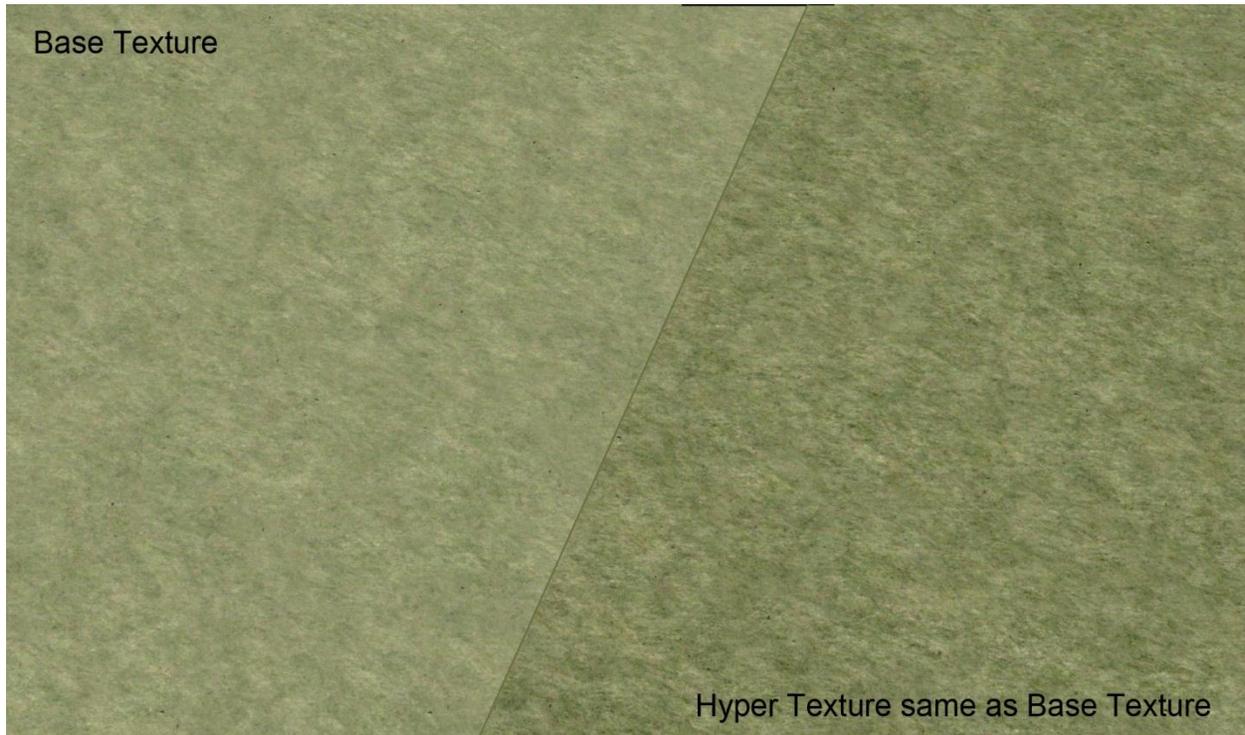


Use of a Grayscale Hyper texture



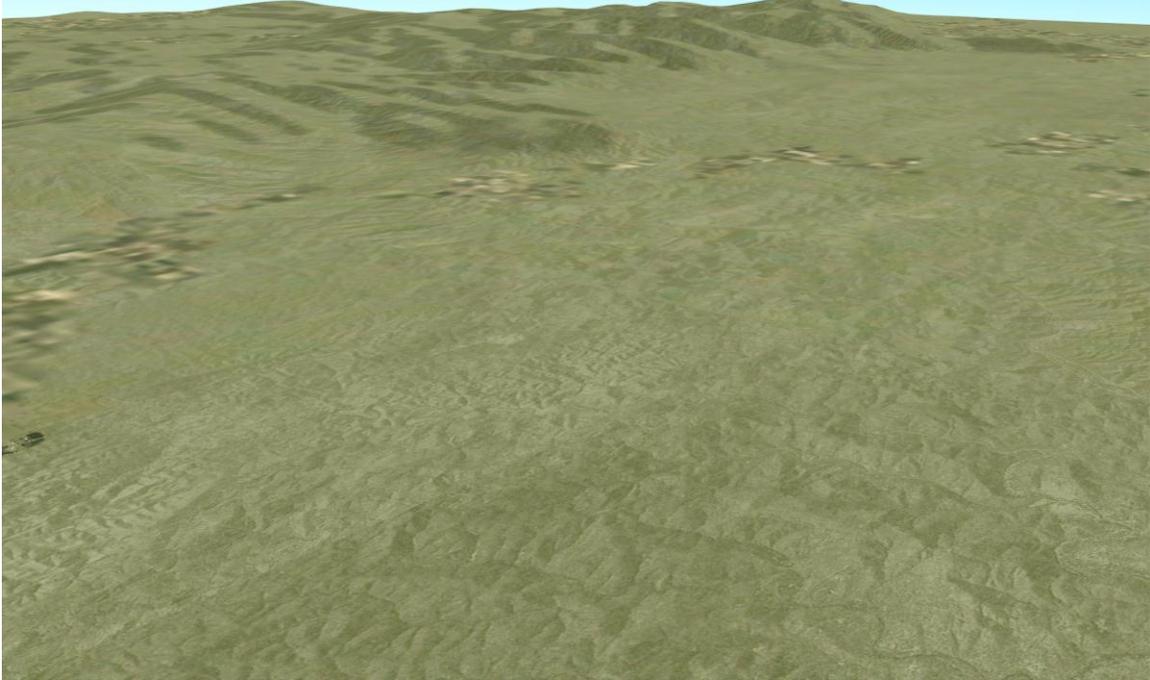
Use of the same Hyper Texture but colored, notice the blending difference

Using a rough looking base texture? Extract the texture from the wad and convert it to a grayscale Hyper Texture and use a scale of one to one in your [Vega Prime Settings](#). This will greatly improve the look of the base texture by adding a small amount of depth and highlight to your base texture.

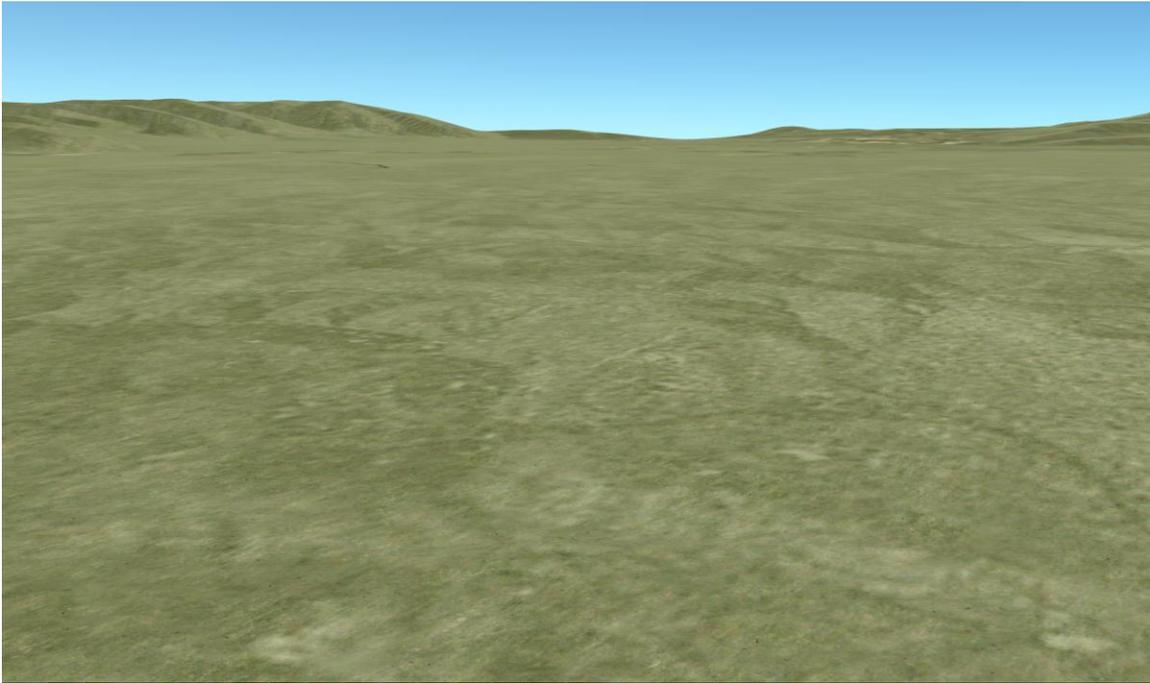


Use of Base Texture (left) without Hyper Texture & addition of same texture but grayscale as Hyper Texture on top of base texture. This is what we often call usage of a Macro Texture.

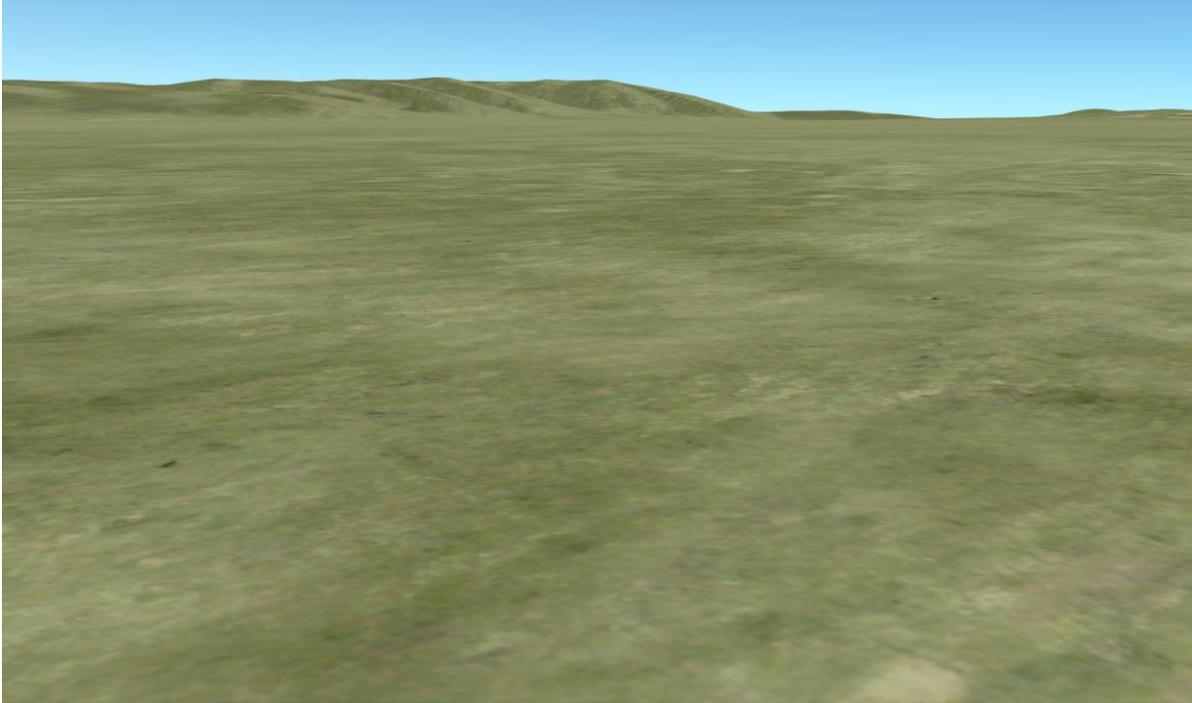
A Macro Texture is actually a regular Hyper Texture, but used differently. The Hyper Texture is generally used to add detail on a very small scale usually used for ground applications or helicopter simulation. But to enhance a Scene made more for High Flight, Commercial Simulation and fast Jet, we can use a bigger detail texture and set the texel size to match our base resolution texture, this application will then overlay this larger Hyper Texture to the scene set by the [Ground Resolution Texel](#) set at a larger value. This will add depth at a higher point of view.



This high altitude view is a SeGen Cropland Feature, with the rest of the scene using only one repeating texture, with the enhancement of a Hyper texture set to a large value, with a small contribution factor.

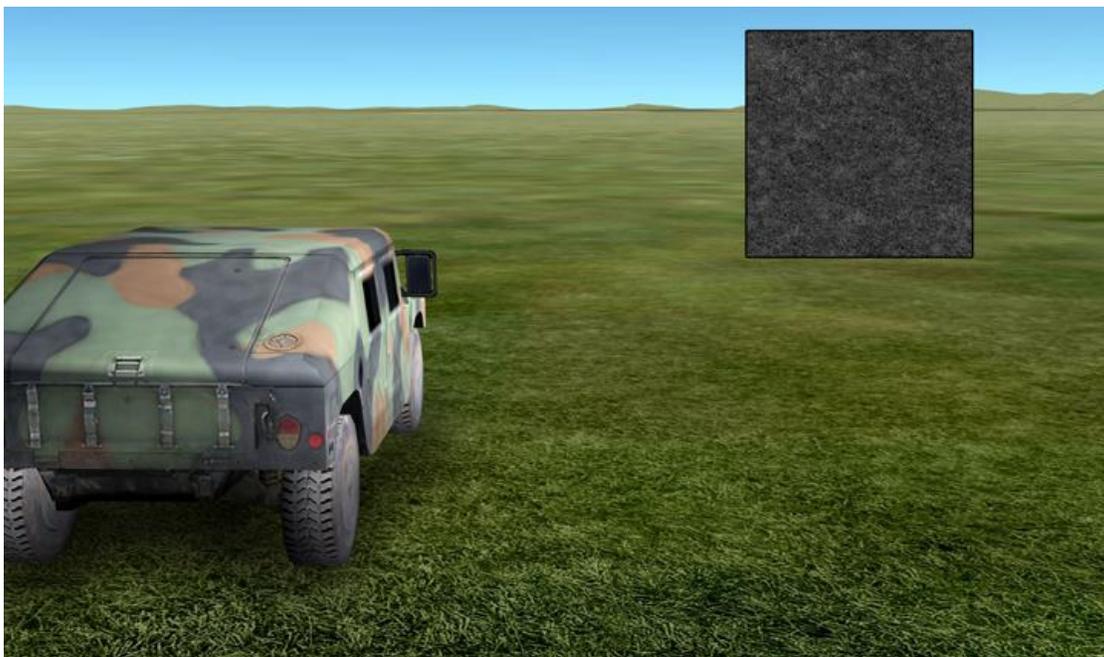


Near Ground view of above



Ground view of above

Here are some other examples of Hyper Textures in a scene:



Use of the Grayscale Hyper Texture to add detail



Use of the Hyper Texture to add detail and color shifts



Near Ground view of 2m resolution texture with Hyper Texture enhancement

