

# INFINITO

BUILD YOUR UNIVERSE

USER'S GUIDE 1.1

## Introduction

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Thank you for purchasing INFINITO, I hope you will have a lot of fun using it.

INFINITO is a DAZ Studio 3/4 plug-in that allows to create stunning, detailed 3D terrains and to easily populate them using the props available in your DAZ Studio libraries.

INFINITO will definitely revolutionize the way you work with DAZ Studio, bringing innovative tools and infinite possibilities.

The interface is user-friendly and extremely easy to use: you will enjoy experimenting with the TERRAFORM module, fiddling with all the options and parameters available; and after that, sculpting the terrain with your mouse and POPULATE it just painting and brushing single or multiple props, or even deploying ecosystems automatically.

You can even design your sky dome interactively, tweaking all sun light and air scattering properties, and have it procedurally generated in a second, even with stars.

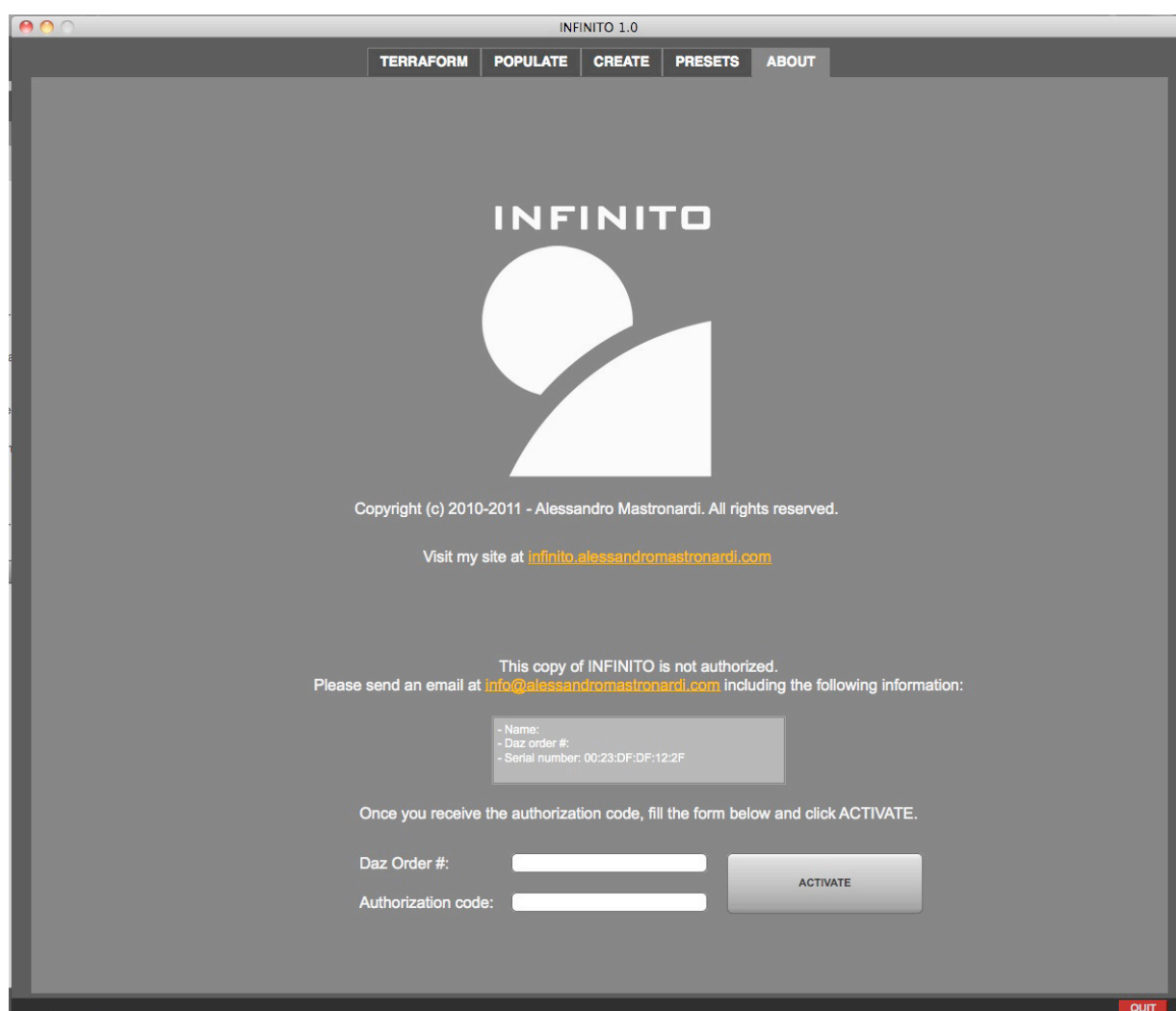
Finally, when you are satisfied with it, you will just click the CREATE button and see INFINITO creating your Daz scene automatically for you!

No more hours spent exporting and importing terrain models or textures from external applications, manually positioning props, figuring proper height and rotation angles. INFINITO will do that for you!

## Installation and Activation

INFINITO runs on both Mac OSX and Windows (DS3 and DS4, 32 and 64 bit versions).  
When you purchase the plug-in from DAZ 3D you will receive an installer program.

1. Run the installer program that is appropriate for your OS (Mac OSX or Windows) and your version of Studio (32 or 64 bit). Note that you must match the version of the plug-in with Studio; use INFINITO 32 bit for 32 bit Studio and INFINITO 64 bit for 64 bit Studio.
2. If this is the first time that you're installing any version of INFINITO, you will need to activate this plug-in. To activate INFINITO, start Studio and run INFINITO from the **Create menu** (you will find an action called "**New INFINITO Scene Objects**"; the plugin will load and display a screen similar to the one below:



Send an email at [info@alessandromastronardi.com](mailto:info@alessandromastronardi.com) including your DAZ order number, and the serial number displayed in the screen above. You will be e-mailed an authorization code in return (it should take maximum 8 hours for receiving it). Please make sure to configure your e-mail account to allow to receive e-mails from [info@alessandromastronardi.com](mailto:info@alessandromastronardi.com).

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Once you have authorization code, fill the form and click ACTIVATE. Studio will then close; just reopen it and it's done: you can now run INFINITO and have fun!



## Overview

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INFINITO interface is organized in 6 sections:

1. The **TERRAFORM** section, where you will generate terrains combining several types of noise maps, color gradients, or even load custom height map images or OBJ files.
2. The **POPULATE** section, where you will be able to access to the props in your libraries, add those to the terrain as you like and modify their position, rotation and scale. You can even sculpt and deform the INFINITO-generated terrain visually. Starting from 1.1 release, there is also a SKY DOME module allowing to interactively setup and design a sky dome, eventually with stars.
3. The **CREATE** section, which allows to generate the Studio scene as defined in INFINITO.
4. The **PRESETS** section, which allows loading and saving terrain presets, and already contains a huge amount of pre-made ones.
5. The **SETUP** page, where you can enable/disable Poser libraries to be used within INFINITO, and other settings.
6. The **ABOUT** section, that handles the plugin activation, contains all the contact information and links to the INFINITO home page.

All these sections will be discussed more in detail later.

The noise maps generated by INFINITO are computed using coherent-noise algorithms, which produce smooth pseudo-random 3D values in the range [-1, +1].

The particularity of coherent noise, aside from generating smooth values that are very suitable for terrain maps, is that passing in the same input value will always return the same output value. Because of that, coherent-noise functions run very fast.

The INFINITO noise maps are also cached internally in order to achieve maximum performance.

## INFINITO features

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### TERRAFORM SECTION

- DAZ Studio 3 and 4 plugin, 32 and 64 bit, Mac OSX and Windows
- Infinite terrain generation (both geometry and texture map) thanks to coherent pseudo-random noise maps (2 input nodes, 2 deformer nodes, 1 combiner node, 55 gradient maps, 2 independent color gradient controls)
- 10 different input noise types (Flat, Billow, Checkerboard, Cylinders, MultiFractal, Perlin, Spheres, Voronoi, Gabor Convolution, Image). Each input noise type has up to 8 parameters to tweak
- 8 different deformer types (Abs, Clamp, Curve, Exponent, Invert, Round Edge, ScaleBias, Terrace)
- Possibility to load custom height map images (JPEG, PNG, BMP XPM formats supported)
- Possibility to load external terrain .obj files
- Possibility to pan and zoom the noise map
- Turbulence and erosion algorithms (thermal, improved thermal, hydraulics, smooth terrain) to enhance INFINITO generated terrain detail and complexity
- Save and load back terrain presets
- User defined terrain sizes (square side, minimum and maximum height)
- Possibility to enable and disable automatic noise preview updates

### POPULATE SECTION

- OpenGL interactive preview window with camera and light controls
- Terrain geometry generated by INFINITO can be interactively sculpted and deformed in real-time with the mouse, with the possibility to change the brush size and intensity
- Possibility to choose props from your Studio libraries and “paint” those directly on the terrain, along the terrain normal or the vertical axis (or in intermediate values through the related slider)  
INFINITO automatically “plants” objects at the proper height, perfectly matching the terrain profile
- Possibility to deploy a full ecosystem in a click, specifying the number of instances of a certain prop (only on INFINITO generated terrains)
- Possibility to apply random transformations (position, scale, rotation) to props being deployed on the terrain
- Possibility to apply angle randomization only on the vertical axis, or to snap angles.

- Possibility to specify a minimum distance between items
- Possibility to automatically relocate and reposition items after a terrain deformation
- Possibility to edit a single item's properties (position, scale, angles, vertical offset). Position is easily changed dragging the selected prop around with the mouse. In this case, INFINITO will also automatically set the object at the proper height, following the terrain profile
- Possibility to delete a single object, all the objects, or deleting objects one by one from the last one loaded to the first
- Possibility to load and apply a reference texture to the terrain in order to assist deploying objects
- Possibility to load and apply a texture mask to the terrain, allowing to deploy objects only on areas where pixel colors are not 100% black (RGB: 0,0,0)
- Possibility to improve display performance by enabling bounding boxes and degraded terrain geometry during camera operations
- Possibility to stack objects on top of each other
- Possibility to setup and design your sky dome interactively, tweaking sun light and air scattering properties, and even adding stars
- VBO (Vertex Buffer Objects) support allows to save CPU usage and have a faster and performing environment

## CREATE SECTION

- Possibility to choose the size of generated texture map [512-16384 pixels-wide]. 16384 pixels-wide textures will most likely require a 64bit OS and plug-in version.
- Possibility to enter a terrain group name (objects deployed will be parented to the terrain)
- Possibility to apply a random morph percentage to props with available morph channels
- Possibility to add the dynamic skydome designed in the POPULATE section
- Possibility to enable high resolution subdivision levels for INFINITO generated terrains
- INFINITO DS4 versions will clone and transform identical objects when the Studio scene is created, reducing the time required for this process dramatically
- Possibility to automatically generate normal maps for INFINITO terrains, enhancing terrain detail and lighting at render time

## PRESETS SECTION

- Possibility to load and save terrain presets, which are easily recognizable by preview thumbnails

## SETUP SECTION

- Possibility to temporarily enable or disable Poser libraries to use within INFINITO
- Possibility to enable/disable Vertex Buffer Objects support

## TERRAFORM: overview

This section is the core of INFINITO, the place where you will generate your terrain by mixing different kinds of noise maps and gradients. The interface and workflow are very intuitive, and the possibilities endless.

This is how the TERRAFORM section looks once you start INFINITO:

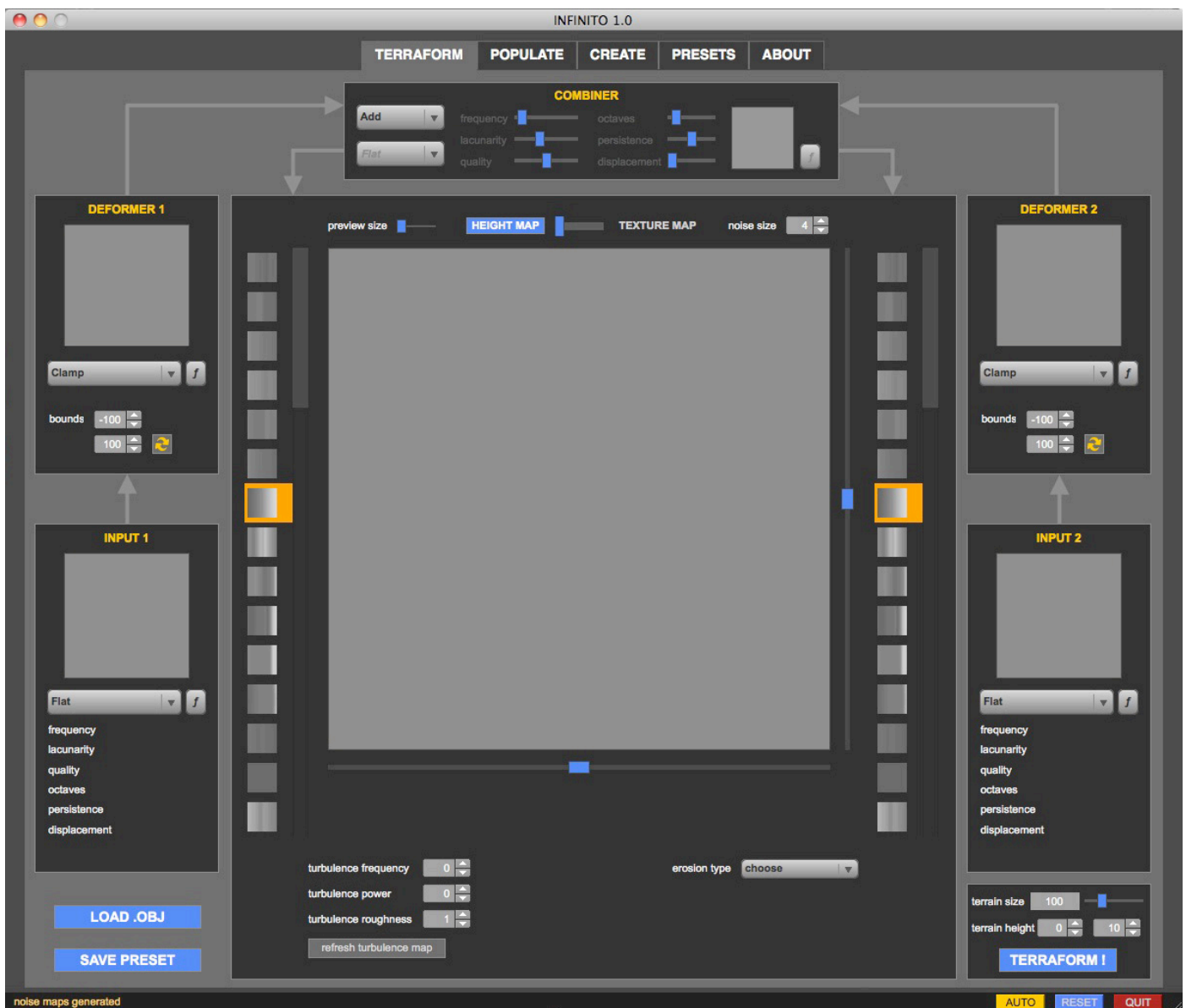


Figure 1: TERRAFORM section at startup

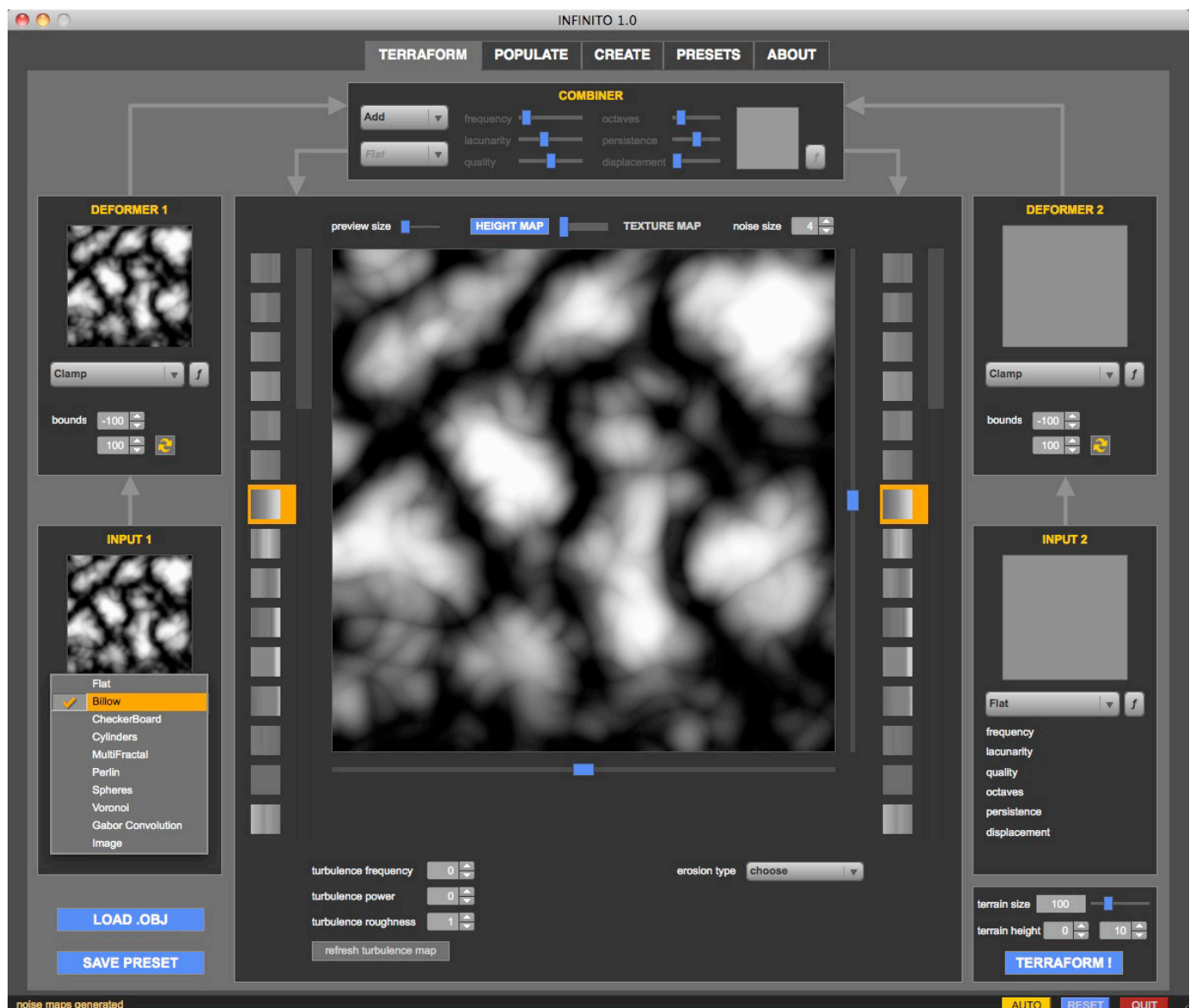
As you can see from the grey arrow flow indicators, the INPUT1->DEFORMER1 and the INPUT2->DEFORMER2 branch nodes are combined together to produce a height map, and afterwards you can apply turbulence and/or erosion algorithms.



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So, what is a height map? A height map is a black and white image where the brightness value of a given point represents the height/altitude of that point: white is the highest, black is the lowest and the shades of gray are values in-between. Bump and displacement maps, as used in 3D rendering software including DAZ Studio, are types of height maps. Height maps are used in a similar way in INFINITO to determinate the relief of our terrain; when we look at the height map, it's as if we looked at our terrain from above. The terrain mesh will later be generated by INFINITO from this height map.

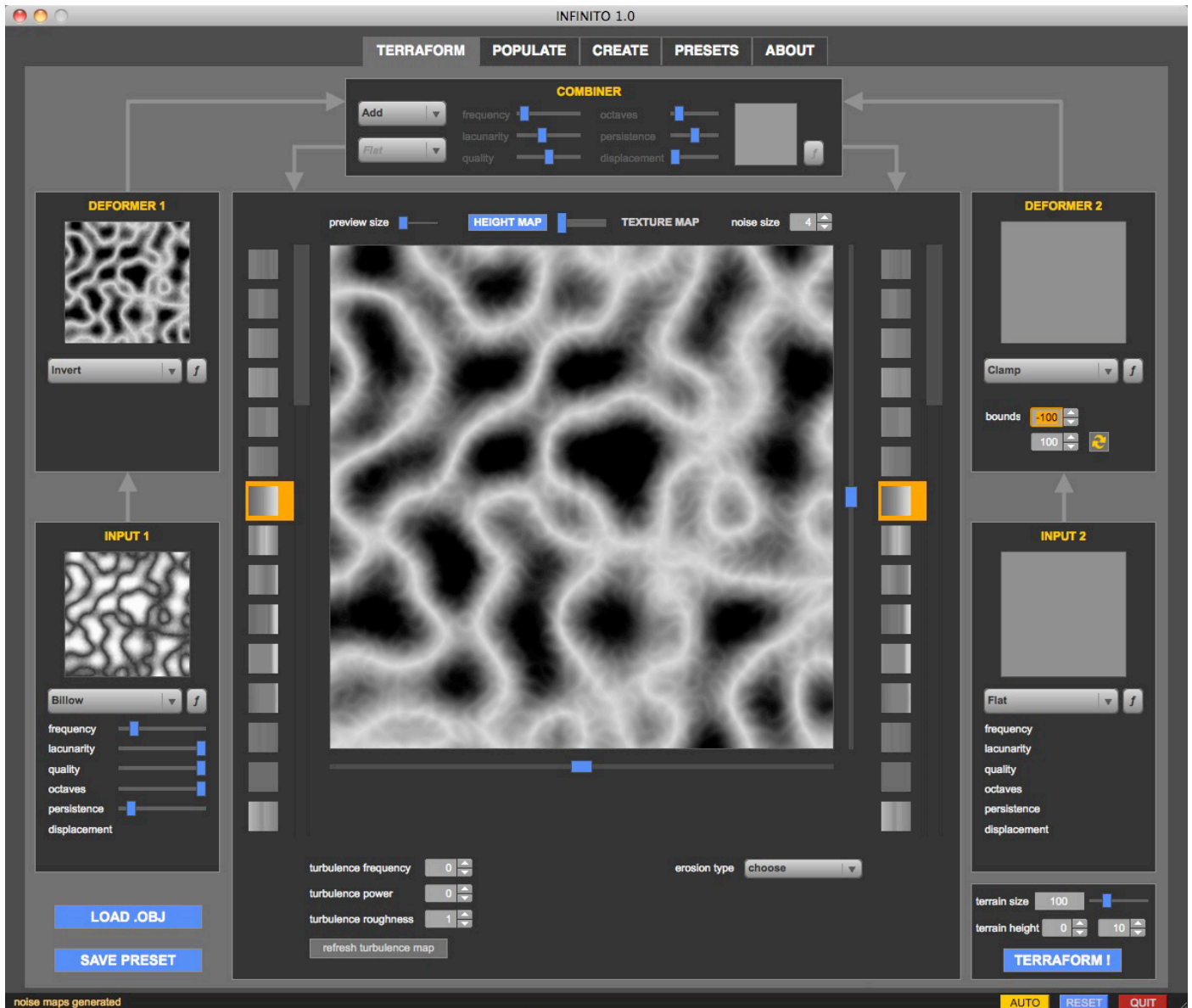
Let's create a simple height map. Click the INPUT1 combo box and choose a "Billow" noise type (**Figure 2**). As you do it, you will notice that the DEFORMER1 node inherits the output of the INPUT1 node, and broadcasts the output to the COMBINER node, finally producing our height map (**Figure 2**).



*Figure 2: we just created a Billow noise map*

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You'll notice also that there are several sliders that you can use to alter the Billow noise map, and several kinds of DEFORMER options as well. For example, you could increase the *frequency* of the Billow noise, producing a denser map, or the *lacunarity* to have a more detailed and "grainy" output. Then you could maybe invert the output values by choosing the "Invert" option in the DEFORMER1 combo box (**Figure 3**), or apply a terrace effect.



**Figure 3:** we altered some parameters of the Billow noise INPUT1 node and applied an Invert effect with DEFORMER1

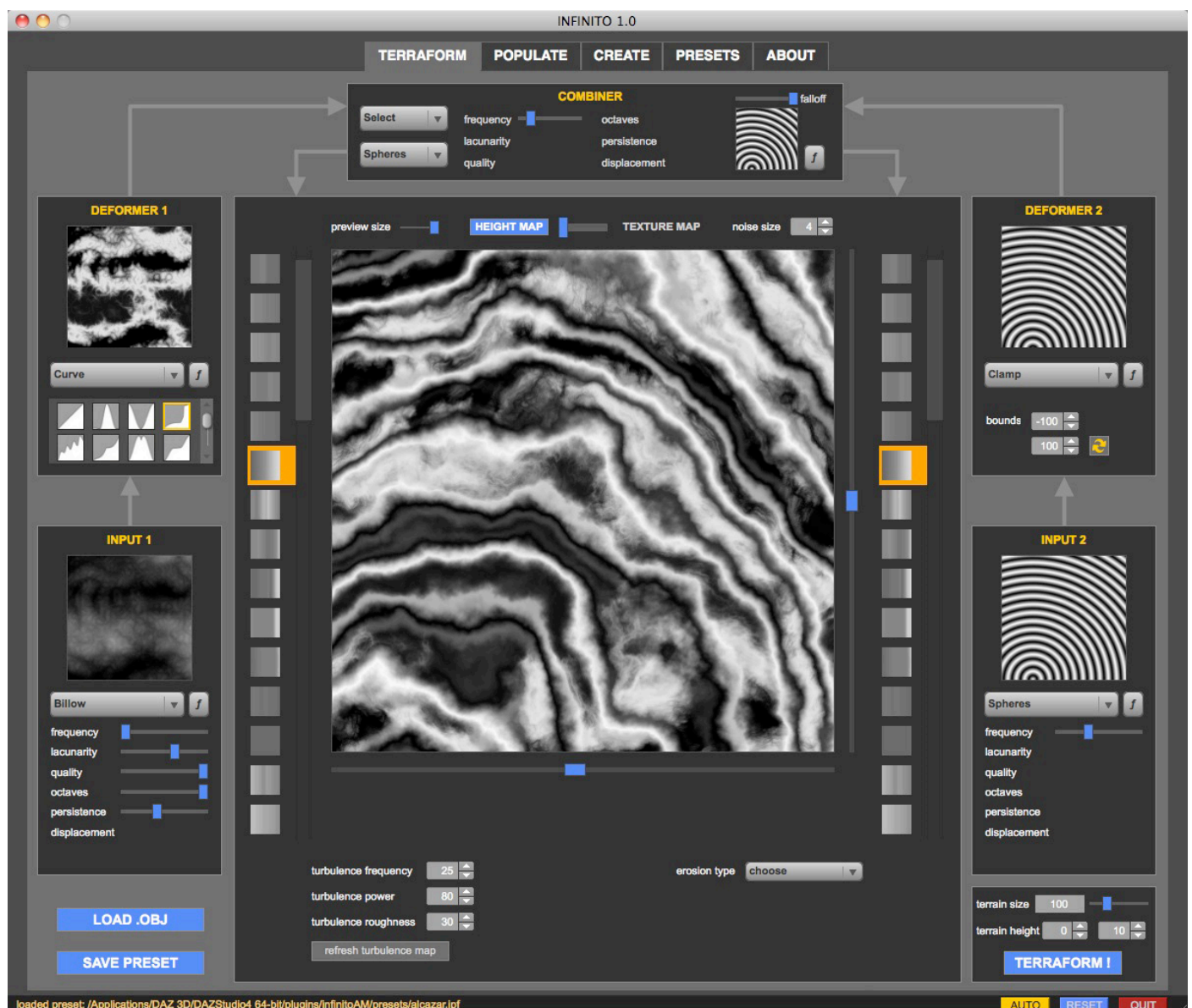
It's a very simple and intuitive process, and the number of combinations and options that will allow you to create an incredible variety of terrains.

Until now we worked only on the left input nodes (**INPUT1** and **DEFORMER1**), but we can create more complex maps by also using the right input nodes (**INPUT2** and **DEFORMER2**).

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As you can see in **Figure 4**, I produced a more complex height map by using again a Billow noise map at **INPUT1**, and applying a Curve effect at **DEFORMER1**; on the right input side, I used a Spheres noise map at **INPUT2** and a Clamp effect at **DEFORMER2**. The outputs of **DEFORMER1** and **DEFORMER2** are mixed in the **COMBINER** node (in this case the **COMBINER** is mixing the outputs using a Spheres noise map mask). Finally, I applied a Turbulence effect (under the height map viewport) to add more detail and complexity to the final map.

**Remember that darker tones mean lower altitudes, brighter tones mean higher altitudes.** That way, in this example, we created a sort of noisy canyon-like map.



*Figure 4: height map generated using both left and right input nodes and turbulence effects*

Now that we have created our height map, we might want to check how the related texture map looks like: drag the slider over



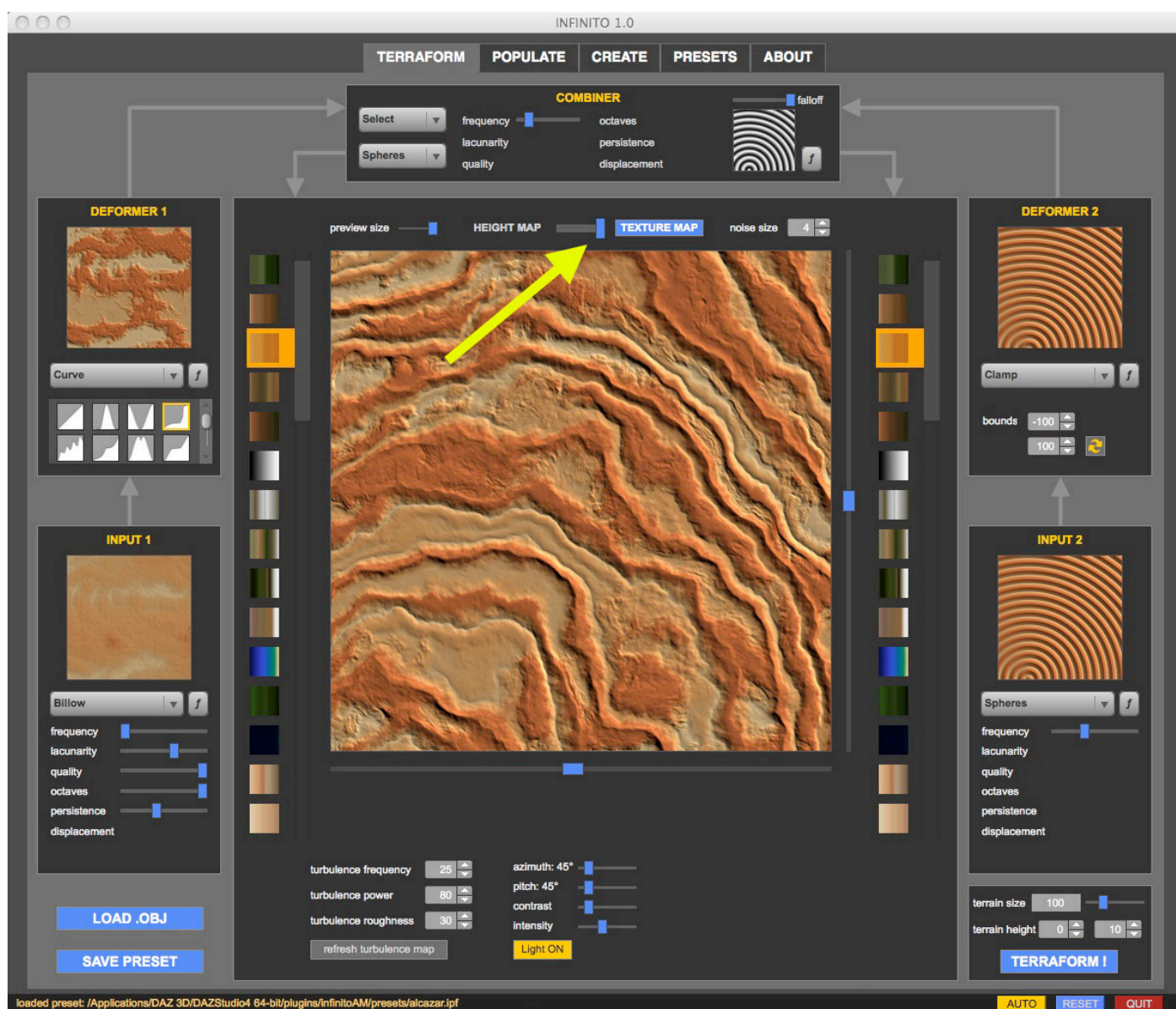
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the height map viewport towards the right as shown in **Figure 5**, to set in to the **TEXTURE MAP** position: INFINITO is now displaying how the texture map will look like!

Remember that height map and texture map are linked, so each modification to the input nodes done in **HEIGHT MAP** mode will bring changes in the **TEXTURE MAP**, and vice versa.

However, **erosion effects are applied only to the HEIGHT MAP**, while **baked lighting effects are applied only to the TEXTURE MAP**.

We'll discuss this more in detail later.



**Figure 5:** this is how our terrain texture map looks.

Notice the slider that allows switching the current map mode from **HEIGHT** to **TEXTURE** and vice versa

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One particularity of the **TEXTURE MAP** mode is the use of independent color gradients for the left and right input nodes. That allows to create very detailed and diverse results. For example, you could mix a plains-like gradient with a rocky one and produce a headland-type terrain, as shown in **Figure 6**.



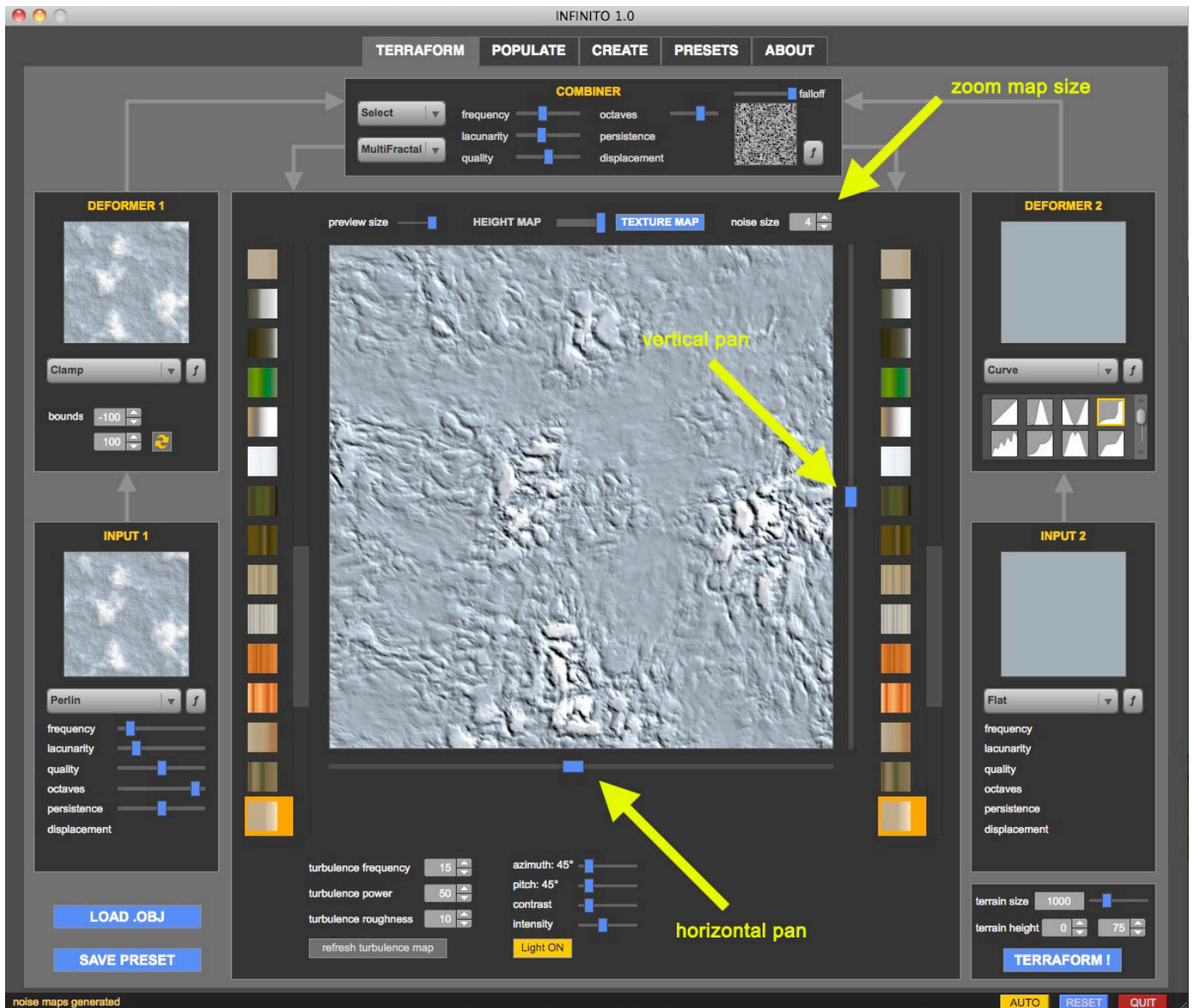
**Figure 6:** using two different color gradients allow to create very detailed and diverse textures

Aside from the sliders and parameters to alter the INPUT, DEFORMER, COMBINER, TURBULENCE and EROSION nodes, there are other important controls that allow to pan and zoom on the noise map (note that these features don't work if you are using an Image node type, because those have a fixed size). They will be explained more in detail next.



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Take a look at **Figure 7**: the highlighted horizontal and vertical sliders allow to “pan” the noise map just as if you were moving a camera around from the top view; while the “noise size” spin box allows to “zoom in/out” the noise map (higher values mean zooming out, lower values mean zooming in).

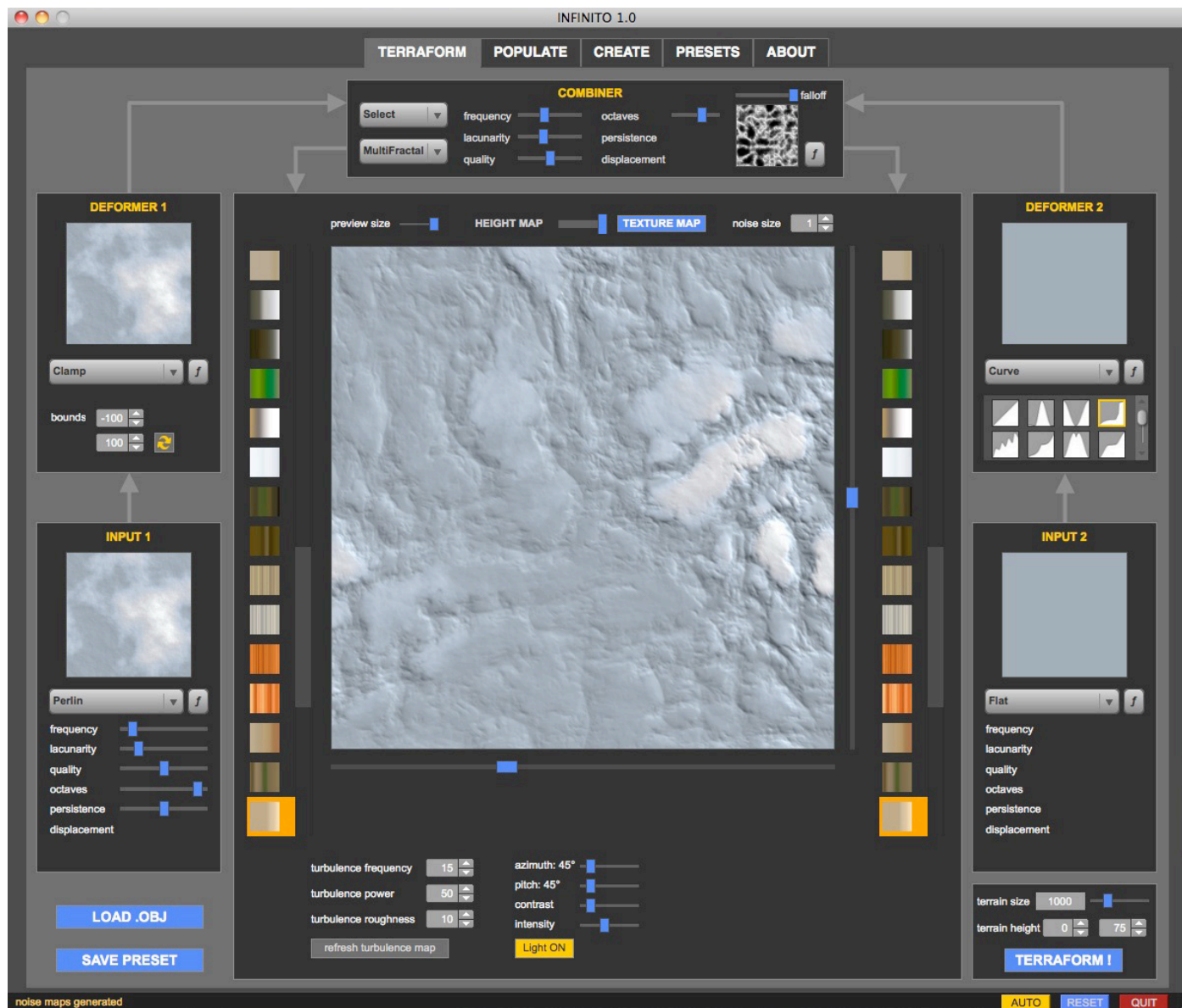


**Figure 7:** noise maps can be zoomed or panned just as if you were moving a camera over a real terrain, from top view

As an example, I changed the noise size from 4 to 1 (thus zooming in on the noise map), and I panned the noise map towards the left.

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See the result in **Figure 8**: the terrain is now closer to the camera and it actually shows another location.



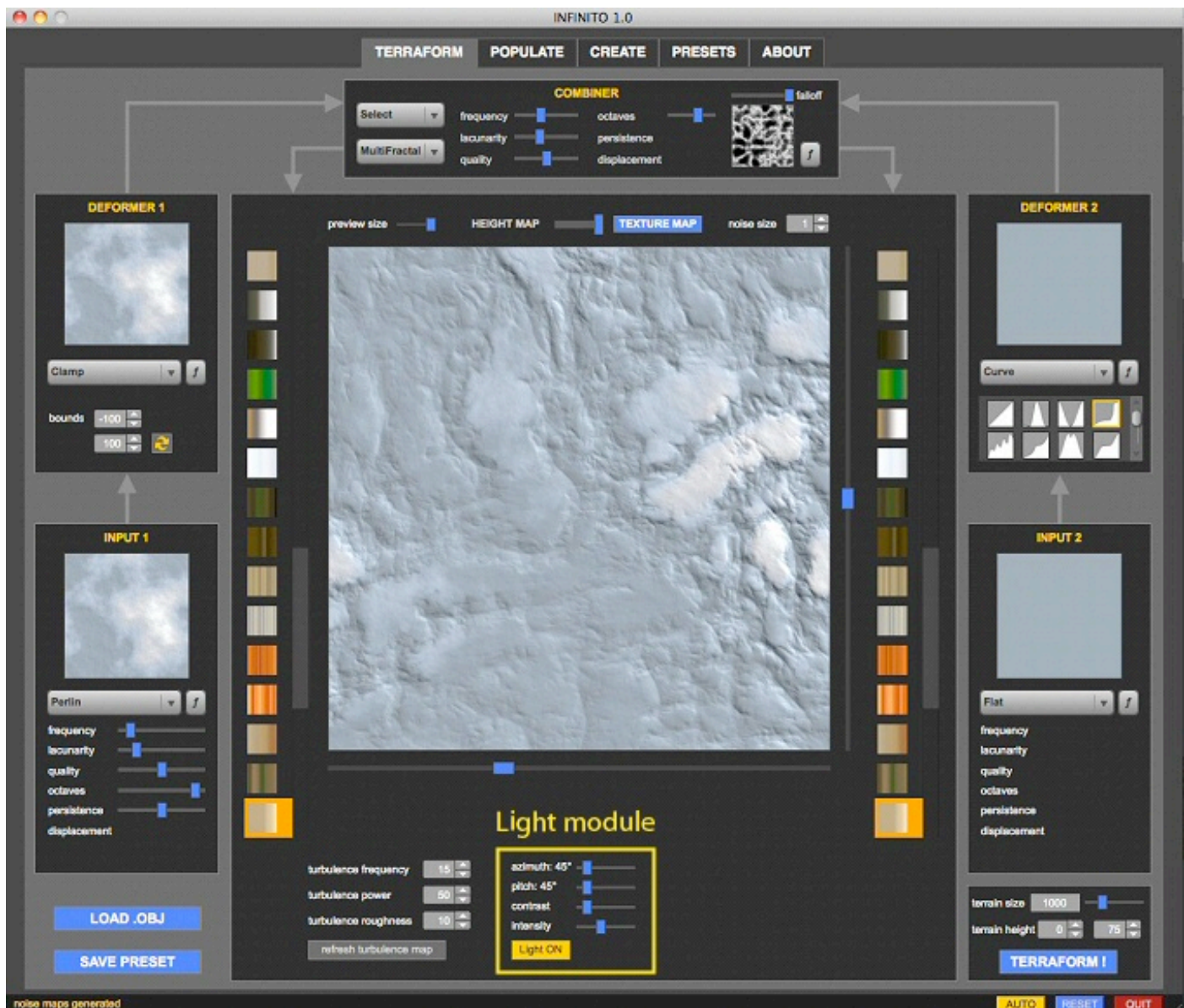
**Figure 8:** compare this to Figure 7. This is the resulting noise map after panning and zooming.  
Notice how the children noise maps are automatically updated as well!

Another important feature available in TEXTURE MAP mode are the lighting controls. These controls are very useful to have a better preview of our terrain, enhancing the relief and bumps. You can set the azimuth, pitch, tune lightness and contrast to your liking, and even switch light off.

A particularity of these light controls, however, is that you can even “bake” the lighting if you like so that the texture map produced by INFINITO will already comes with shadows and highlights 'painted in'. The way to do that is simply to use the **Light ON/OFF** button, which is turned on by default.



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**Figure 9:** The Light module allows to see the relief detail of the height map better.  
It also allows to 'bake' the lighting into the terrain texture.

In the next chapter I'm going to describe the noise map, erosion and turbulence options more in detail, as well as the remaining controls of the TERRAFORM section.

## TERRAFORM: noise maps, turbulence and erosion options

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In this section we are going to explore all the different INPUT noise types, the DEFORMER actions that you can apply, how the COMBINER node works and how to apply TURBULENCE and EROSION effects.

Let's start with the INPUT noise node!

### INPUT NOISE MODULES

**Flat:** this node outputs a constant 0 value. This noise module is not useful by itself, but it is often used in combination with other noise modules.

**Billow:** this module outputs three-dimensional noise that resembles a "wavy" and "billowy" water surface. It's particularly useful to create bumpy and irregular surfaces.

**CheckerBoard:** this module outputs unit-sized blocks of values alternating between -1.0 and +1.0 (100% black and 100% white). Even if it's not particularly spectacular, it can be used in combination with other noise modules and turbulence effects in order to create very interesting variations.

**Cylinders:** this module outputs concentric cylinders centered on the origin. These cylinders are oriented along the y-axis similar to the concentric rings of a tree. Even if it's not particularly spectacular, it can be used in combination with other noise modules and turbulence effects in order to create very interesting variations.

**MultiFractal:** this module outputs 3-dimensional multifractal noise and is perhaps the most used in terrain generation algorithms. Comes with several custom options that allow a wide range of different outputs.

**Perlin:** this module generates a noise map that is the sum of several coherent-noise functions of ever-increasing frequencies and ever-decreasing amplitudes. It's perhaps the most known and famous kind of noise used in computer graphics.

**Spheres:** this module outputs concentric spheres centered on the origin. Even if it's not particularly spectacular, it can be used in combination with other noise modules and turbulence effects in order to create very interesting variations.

**Voronoi:** a Voronoi cell is a region containing all the points that are closer to a specific *seed point* than to any other seed point. These cells mesh with one another, producing polygon-like formations. This module, used in combination with other noise modules and turbulence effects, produces really nice and peculiar outputs.

**Gabor Convolution:** in image processing, a Gabor filter, named after Dennis Gabor, is a linear filter used for edge detection. Frequency and orientation representations of Gabor filters are similar to those of the human visual system, and they have been found to be particularly appropriate for texture representation and discrimination. In the spatial domain, a 2D Gabor filter is a Gaussian kernel function modulated by a sinusoidal plane wave. The Gabor filters are self-similar: all filters can be generated from one mother wavelet by dilation and rotation.

This noise module (featuring **isotropic** and **anisotropic** options) can be quite slow to render but personally I find it quite fascinating.

**Image:** this node is not a noise module itself, but it allows to load an external grayscale image and use it in combination with other noise modules. It's extremely useful to load height maps produced from other terrain-generation software. You could even use image maps that you created in a painting/2D app!

Most of the noise modules used in INFINITO share the same parameters, explained here below:

**Frequency:** this value sets the frequency of the first noise octave. Higher values mean a lower wavelength and a more "chaotic" and "crowded" noise map.

**Lacunarity:** this parameter specifies the frequency multiplier between successive octaves. The effect of modifying the lacunarity is subtle; you may need to play with the lacunarity value to determine the effects.

**Quality:** this value can be set to fast, standard or best. Noises rendered at "best" setting have no "creasing" artifacts but of course take more time to be computed. This parameter affects both the preview of the height map in the viewport and the terrain mesh when it's created by INFINITO.

**Octaves:** the number of octaves controls the amount of noise detail. The higher the number of octaves, the longer the calculation time.

**Persistence:** this parameter controls the roughness of the noise map. Higher values produce rougher noise.

**Displacement:** this parameter, found only in the **Voronoi** module, controls the range of random values to assign to each cell. The range of random values is +/- the displacement value.

The **MultiFractal** module has three specific parameters called **Offset** (to reduce/increase ridges intensity), **Gain** (to reduce/increase the propagation of isolines) and **Octave Weight** (to reduce/increase octave persistence).

## DEFORMER MODULES

These modules are used to apply mathematical functions to input noises in order to modify the output.

**Abs:** outputs the absolute value of the output value from a source module.

**Clamp:** clamps the output value from an input module to a range of values delimited by a minimum and maximum value.

**Curve:** this module maps the output value from the input module onto pre-defined curve. This initial release of INFINITO contains a total of 17 different curve presets that allow to generate an incredible variety of terrain deformations.

**Exponent:** this module maps the output value from a source module onto an exponential curve.

**Invert:** this module inverts the output value from a source module.

**Round Edge:** this module rounds the edges of a source module.

**ScaleBias:** this module applies a scaling factor and a bias to the output value from a source module.

**Terrace:** this module maps the output value from a source module onto a terrace-forming curve, in a similar way to that of the Curve deformer.



## COMBINER MODULE

The combiner node, as the word implies, combines the left and right output nodes to produce the final height map.

This task is controlled by seven different modules (Add, Max, Min, Multiply, Pow, Blend, Select), as explained below.

**Add:** this module outputs the sum of the two output values from two source modules.

**Max:** this module outputs the larger of the two output values from two source modules. In other words, the brightest of the two color values seen in the DEFORMER previews for a given point on the maps will be kept to make the final height map.

**Min:** this module outputs the smaller of the two output values from two source modules. In other words, the darkest of the two color values seen in the DEFORMER previews for a given point on the maps will be kept to make the final height map.

**Multiply:** this module outputs the product of the two output values from two source modules.

**Pow:** this module raises the output value from a first source module to the power of the output value from a second source module.

**Blend:** this module outputs a weighted blend of the output values from two source modules given the output value supplied by a control module. It is a little like blending the two images seen in the DEFORMER previews by using an opacity mask, which is created using the same methods than in the INPUT modules explained previously.

**Select:** this module outputs the value selected from one of two source modules chosen by the output value from a control module. What is the falloff control about?

## TURBULENCE MODULE

The turbulence module randomly perturbs the coordinates of the noise map generated by the COMBINER. Internally, a turbulence module uses a low-octave Perlin noise to randomly change these coordinates.

Turbulence is a key factor in order to increase the realism of the resulting terrain height map, and is controlled through the following parameters and controls:

**Frequency:** determines how often the coordinates of the input value changes.

**Power:** determines the magnitude of value changes.

**Roughness:** determines the roughness of the changes to the displacement amount. Low values smoothly change the displacement amount. High values roughly change the displacement amount, producing more "noisy" changes.

**Refresh Turbulence Map Button:** clicking this button will scramble the seed used by the turbulence Perlin noise map, thus generating a new array of random values.

Remember that:

- Low frequency and low power produce very little change to the height map.
- Low frequency and high power produce a "washed out" version of the original height map.

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- High frequency and low power produce a noisy version of the original height map.
- High frequency and high power produce a very noisy terrain height map with very little resemblance to the original height map.

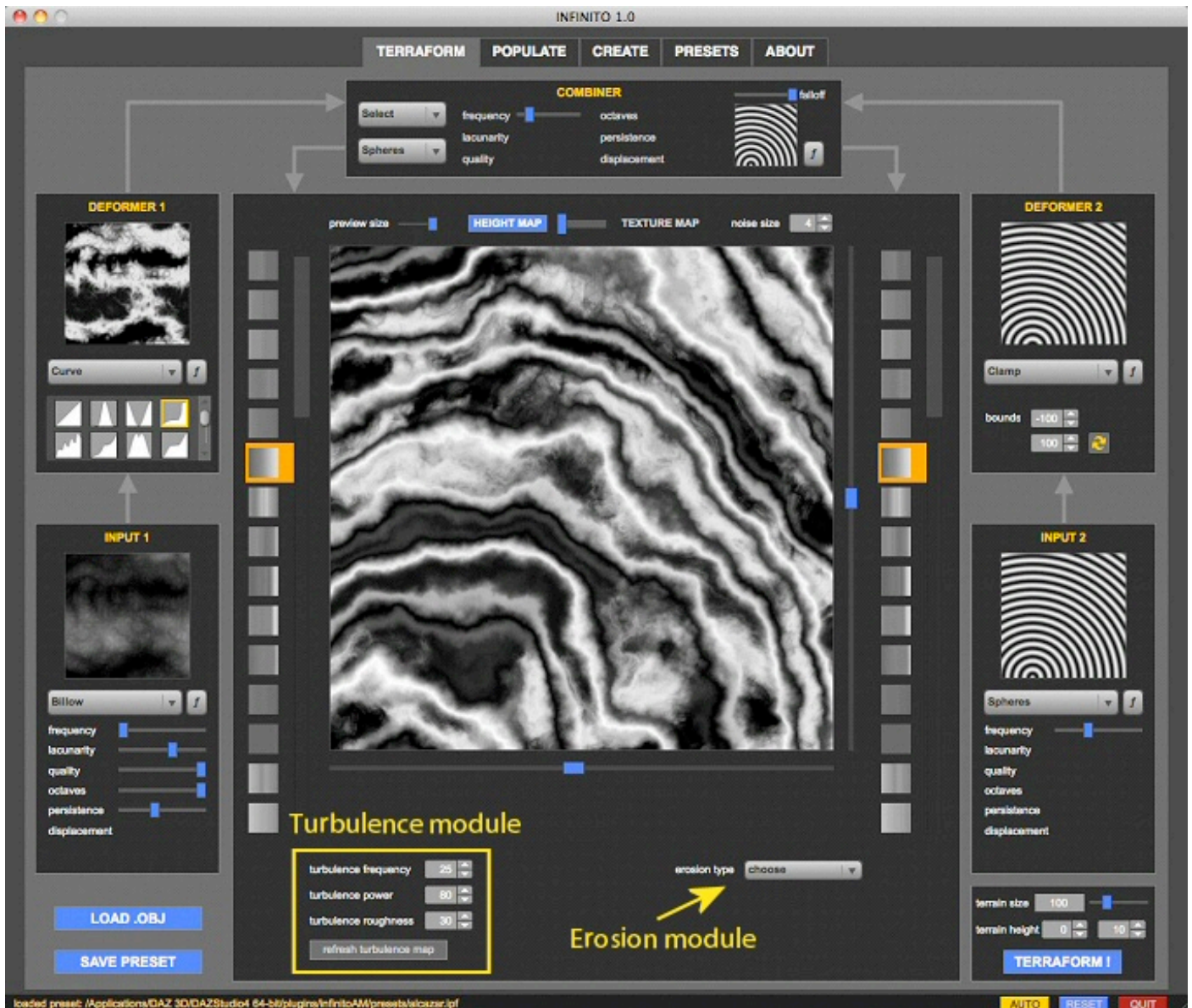


Figure 10: The Turbulence and Erosion modules.

## EROSION MODULE

This module, only available in **HEIGHT MAP** mode (thus affecting only the height map generation, not the texture map that the terrain will have), allows to either apply one of three different erosion algorithms, or smooth the terrain. The algorithms have one parameter in common, the number of iterations. The higher this number is, the bigger the erosion impact on the terrain.

**Thermal erosion:** effect caused by temperature changes, causing small portions of the material to crumble and pile up on the bottom of an incline. Typical values range from 1 to 10.


**Improved thermal erosion:** this algorithm, still experimental, produces smoother thermal erosion. Typical values range from 1 to 100.

**Hydraulics erosion:** this algorithm simulates the detachment of terrain particles by raindrop impact and their removal downslope by water flowing overland as a sheet instead of in definite channels or rills. This mode includes four different parameters:

- **rain amount:** the amount of rain dropped per pixel at each iteration [1-100]
- **solubility:** the amount of sediment a unit of water will erode [1-100]
- **evaporation:** the amount of water evaporated per pixel at each iteration [1-150]
- **capacity:** the amount of sediment that a unit of water can hold at each iteration [1-100]

Use values higher than 100.

**Smooth terrain:** performs a simple nearest neighbor average, thus smoothing adjacent pixels.

**IMPORTANT:** Note that when a control requires the input of a numeric value, you need to refresh the noise map to see the changes in the height map previews. To refresh the height map previews, use the buttons marked with this symbol: . Also note that if you choose to terraform the terrain after a change in one of the controls' numeric values, these changes will be taken into account during terrain generation even if you didn't refresh the height map preview.

## TERRAFORM: generate a procedural terrain or load an external .obj

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Once you are done playing with noise maps, turbulence, erosion, gradients, and you are satisfied with your height map and texture map preview, it's time to go 3D!

All procedural terrains generated by INFINITO are square, so all you need to do is to set the terrain side length in meters (you can use the slider to choose a preset size from 10m to 100000m), or type the value yourself in the terrain size spin box, and set the minimum and maximum terrain height (always in meters) in the apposite spin boxes.

After that, click the "**TERRAFORM !**" button: INFINITO will generate the preview terrain and texture map and will automatically enter the **POPULATE** section.

However, as many of you requested, you can even skip the procedural terrain creation process and load an external .obj file to use as terrain: just click the "**LOAD .OBJ**" button and INFINITO will ask you to browse an .obj file and choose a percentage scale.

Once you click OK, INFINITO will load the file and automatically enter the **POPULATE** section displaying the custom terrain in the OpenGL viewport.

Now that we explored the **TERRAFORM** section, it's time to move to the **POPULATE** section and do more interesting things with our terrain!



## POPULATE: overview

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POPULATE is the section that makes your terrain come alive: you will be able to deform it interactively (if it's an INFINITO procedural terrain) by just using your mouse, and populate it by loading and mixing the props available in your Studio libraries, deploying those by simply "painting" over the terrain.

These processes are so intuitive and entertaining that you will probably guess how it works without reading any further...

The POPULATE section is organized in a large interactive **OpenGL viewport**, which will allow us to display and manage all our 3D objects, a **Props Library** control on the right, which we will use to browse through our Studio libraries and load the props, and a series of **Populate Controls** on the bottom.

We are going to explore all of this right now.


### OpenGL viewport

As you enter the POPULATE section, you will notice that the terrain is already displayed in the viewport. The camera can be controlled using the following commands:

**Move/pan camera:** <ALT><MIDDLE MOUSE BUTTON> or <ALT><RIGHT MOUSE BUTTON> or use the vertical and horizontal viewport sliders

**Rotate camera:** <ALT><LEFT MOUSE BUTTON>

**Zoom camera in and out:** <MOUSE WHEEL> or <PAGE UP><PAGE DOWN>. Keeping <SHIFT> pressed will increase wheel speed 5 times.

**Reset camera:** click the "reset camera" button . If you are in EDIT mode and you have selected an object, the camera will relocate and aim to it.





### Props Library







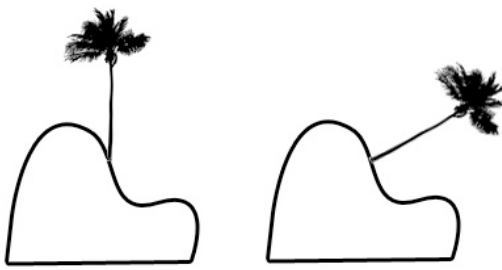
INFINITO automatically references and links to the Poser format directories listed in your DAZ Studio Content Directory Manager. You can easily browse through all the folders; one mouse click on a prop shows this prop's information, while double-clicking actually loads the prop and makes it ready to be deployed on our terrain.

Please note that at this time, INFINITO only supports props in a .pp2 format. However, you can easily export objects from Studio in a .pp2 format supported by INFINITO by using the free PP2 Exporter script available here:  
<http://forum.daz3d.com/viewtopic.php?t=127437>



## Populate Controls

<b>TERRAIN MODE</b>	<p>In this mode you can deform and sculpt an INFINITO procedural terrain interactively, using the mouse. The semi-transparent green sphere indicates the terrain area that will be modified. You can decrease or increase this area by using the “brush diameter” slider, and adjust the stroke intensity using the “eco instances / brush int.” slider.</p> <p><b>&lt;LEFT MOUSE BUTTON&gt;</b> will raise the terrain; <b>&lt;SHIFT&gt;&lt;LEFT MOUSE BUTTON&gt;</b> will lower the terrain. You can set whether terrain can be lowered below the minimum height or not by using the control </p>
<b>PAINT MODE</b>	<p>This mode is automatically activated every time you load a prop (by double-clicking on an item in the <b>Props Library</b>). <b>You can deploy one prop at a time by left-clicking on the terrain:</b> INFINITO will automatically place the prop at the exact location where you clicked, perfectly matching the terrain profile so that the object will be positioned at the proper height. You can also <b>“paint” multiple items in a single stroke by just keeping the left mouse button clicked and moving it on the terrain.</b></p> <p>Another cool feature available in PAINT MODE is the possibility to automatically deploy a full ecosystem in a single click: type the number of instances of a certain prop in the “eco instances” spin box, set the “brush diameter” (which sets the size of the area [in meters] that will be filled with the items) and <b>create the ecosystem by simply using &lt;SHIFT&gt;&lt;LEFT MOUSE BUTTON&gt; on the desired terrain spot.</b></p> <p>In the blink of an eye, the number of props specified will be deployed on the terrain, at the proper height and within the area size specified.</p>
<b>EDIT MODE</b>	<p>This mode allows to edit and transform the items deployed on the terrain. Once in EDIT MODE, all you need to do is to select an item by simply clicking on it in the viewport: as you’ll notice, the selected item will be highlighted with a red color, and then you can just use the <b>&lt;LEFT MOUSE BUTTON&gt;</b> and drag it around to change its location.</p> <p>To deselect an item, simply click with the left mouse button anywhere else in the viewport canvas.</p> <p>When an item is selected, you can easily delete it by pressing the <b>&lt;CANC&gt;</b> key, or change its rotation angles, scale and vertical offset by using the seven spin box controls adjacent to the EDIT MODE button (see <b>Figure 11</b>).</p>
	Delete currently selected item.
	Delete all the items in the scene and deselect current prop from the library
	Delete items chronologically (one item each time it is clicked, from the last one to the first one deployed)
	Load and display a reference terrain texture map to help placing items more precisely. The adjacent checkbox switch the reference texture on or off.

	
	Load and apply a mask texture map to the terrain. Areas covered with black pixels (rgb: 0,0,0) will not accept any item deployment. The two adjacent checkboxes respectively switch the mask visualization and the mask itself on or off.
	Suppose you already deployed some items on the terrain, and later you decide to raise or lower some parts of terrain: some of the items will be covered and other will be popping in the air. Clicking this button will adjust the items' height automatically, with their origin set to match correct terrain height again.
	This button enables and disables bounding boxes for all props, and use a low-subdivision terrain mesh during camera operations (while you move, rotate, zoom). As you camera operations end, the scene is displayed back at full quality. This is an incredibly useful feature that will ensure high performance and a responsive graphic interface even with a very complex scene.
	In TERRAIN MODE, this button will enable or disable the possibility to lower the terrain below the minimum height specified in the TERRAFORM section.
	This button will enable or disable the possibility to "stack" items on top of each other. When is disabled, objects will be placed on the terrain and will "ignore" other items. When is enabled, you will be able to create, for example, rock formations or pile of objects.
vertical (Y axis) – normal	<p>This slider will determine the orientation of an object when it's placed (PAINT MODE) or moved (EDIT MODE) on the terrain. See the following image to understand the difference between vertical and normal.</p> <div style="text-align: center;">  <div style="display: flex; justify-content: space-around; width: 100%;"> <span>vertical</span> <span>normal</span> </div> </div> <p>When you are deploying or moving items with the slider set to vertical (Y axis), they will be oriented as if pointing towards the sky (vertical axis); on the other hand, if the slider is set all the way to normal, the items are oriented along the terrain normal (i.e. an imaginary ray that is perpendicular to terrain surface). For a more detailed explanation check out this link: <a href="http://en.wikipedia.org/wiki/Surface_normal">http://en.wikipedia.org/wiki/Surface_normal</a></p> <p>You can also set this slider to intermediate values so that you will be able to customize the percentage of normal or vertical orientation and create a more diverse ecosystem.</p>
brush diameter	This slider allows to set the size of the brush used to deform and sculpt the terrain in TERRAIN MODE, or the size of the area used in the automatic deployment of a full ecosystem when in PAINT MODE (see the

	PAINT MODE section detailed previously).
eco instances / brush int.	This spin box sets the number of instances of the selected prop to be created during the automatic deployment of a full ecosystem when in PAINT MODE (see the PAINT MODE section detailed previously). In TERRAIN MODE, it sets the intensity of the brush used to deform and sculpt the terrain.
Distance	This spin box, whose values are expressed in centimeters, sets the minimum distance between a new item and the existing ones. It's useful to avoid overlapping items or objects too close to each other. Default distance is set at 100 centimeters (1 meter).
eco angle / scale randomize	These spin boxes set the range of angle and scale randomization to be applied when deploying props. For example, if you set eco angle to 20 and scale to 40, the items will be oriented in a range along the normal or the vertical axis (according to the related slider) plus a random angle ranging from -20° to +20°, and will be scaled down or up by a percentage ranging from -40% to +40%. The two adjacent check boxes will respectively apply angle randomization only on the Y axis (thus affecting only the heading of the object) and restrict Y angles to only 0°, 90°, 180° and 270° (useful if you create cityscapes, in order to have a more geometric disposition).
openGL light pitch	This slider sets the openGL light pitch in the preview window. It doesn't affect terrain or texture generation in any way.
openGL light azimuth	This slider sets the openGL light azimuth in the preview window. It doesn't affect terrain or texture generation in any way.
openGL light intensity	This slider sets the openGL light intensity in the preview window. It doesn't affect terrain or texture generation in any way.
camera speed	This slider sets the camera movement speed/sensitivity.

## Reminder of POPULATE key strokes and mouse helpers:

**Move/pan camera:** <ALT><MIDDLE MOUSE BUTTON> or <ALT><RIGHT MOUSE BUTTON> or use the vertical and horizontal viewport sliders

**Rotate camera:** <ALT><LEFT MOUSE BUTTON>

**Zoom camera in and out:** <MOUSE WHEEL> or <PAGE UP><PAGE DOWN>. Keeping <SHIFT> pressed will increase wheel speed 5 times.

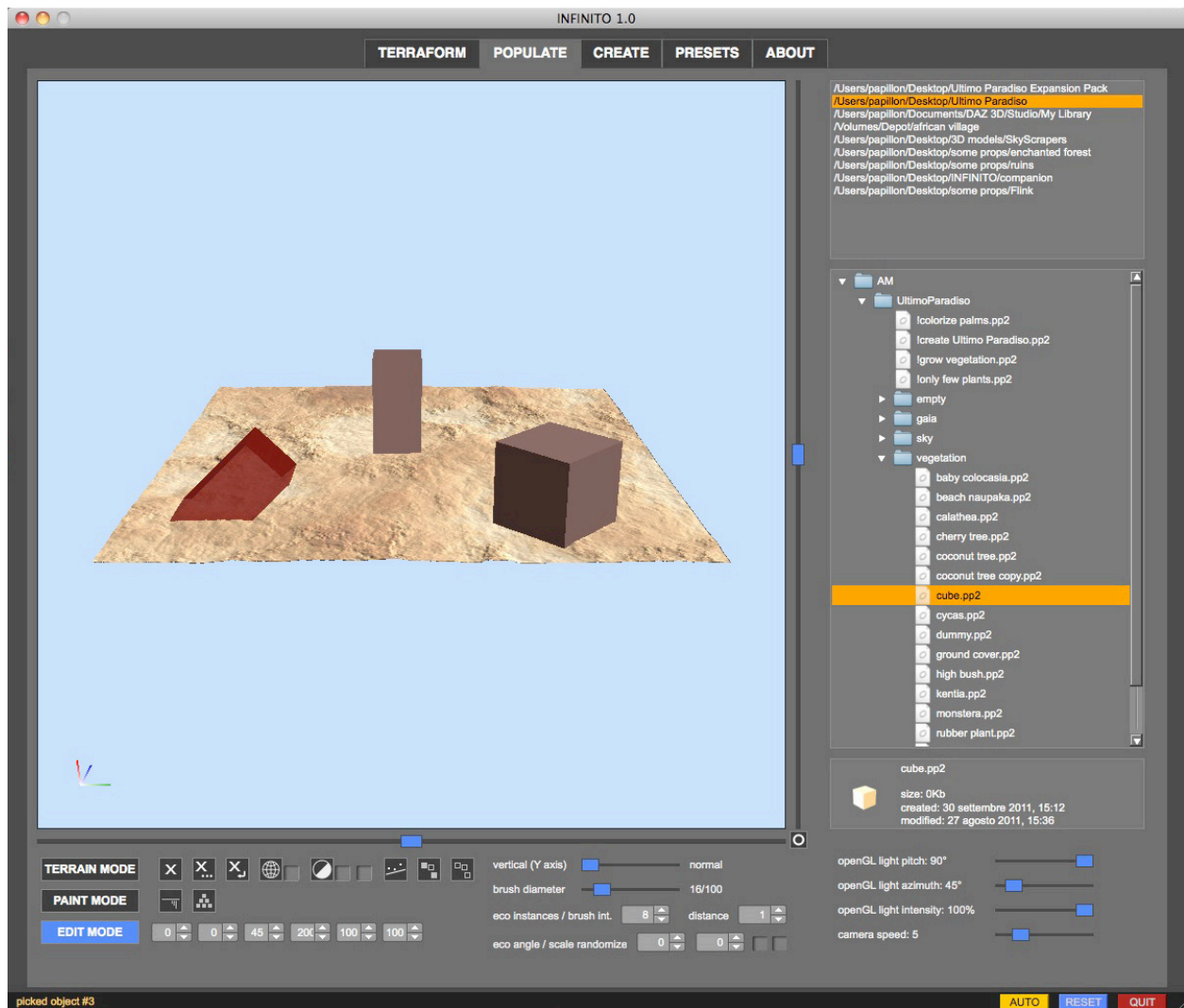
**Delete selected object:** <CANC>

**Deploy Ecosystem:** <SHIFT><LEFT MOUSE BUTTON> with PAINT MODE on

**Raise Terrain:** <LEFT MOUSE BUTTON> with TERRAIN MODE on

**Lower Terrain:** <SHIFT><LEFT MOUSE BUTTON> with TERRAIN MODE on

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**Figure 11:** item properties such as rotation angles and scale can be changed easily by using the related spin box controls

## POPULATE: sky dome module

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INFINITO allows to generate a procedural sky dome using accurate Rayleigh scattering equations, and export it to DAZ Studio through the CREATE section.

Click the SKY DOME button and use all the available sliders to setup and tweak its appearance.

As I said, all the parameters used (except the RGB gamma sliders) are compliant to Rayleigh scattering equations and allow to produce a realistic output: for example, increasing the **turbidity** will produce a more “foggy” or polluted look, decreasing it will produce a more clear and terse sky; **backscatter light** will simulate the scattering of light particles backward respect to their original direction, and so on.

Decreasing the sun pitch below 20° will automatically trigger the star dome and allow to use the **star intensity** and **star population** setting.

You can reset all the parameters to default clicking the “**reset sky dome**” button at anytime.

Make sure also to view the tutorial video available at:

[http://www.youtube.com/watch?v=wHHiguq2iNM&list=PL035DFBDC4F089E25&index=2&feature=plpp\\_video](http://www.youtube.com/watch?v=wHHiguq2iNM&list=PL035DFBDC4F089E25&index=2&feature=plpp_video) to have a brief information about this module and see how to use all the controls.



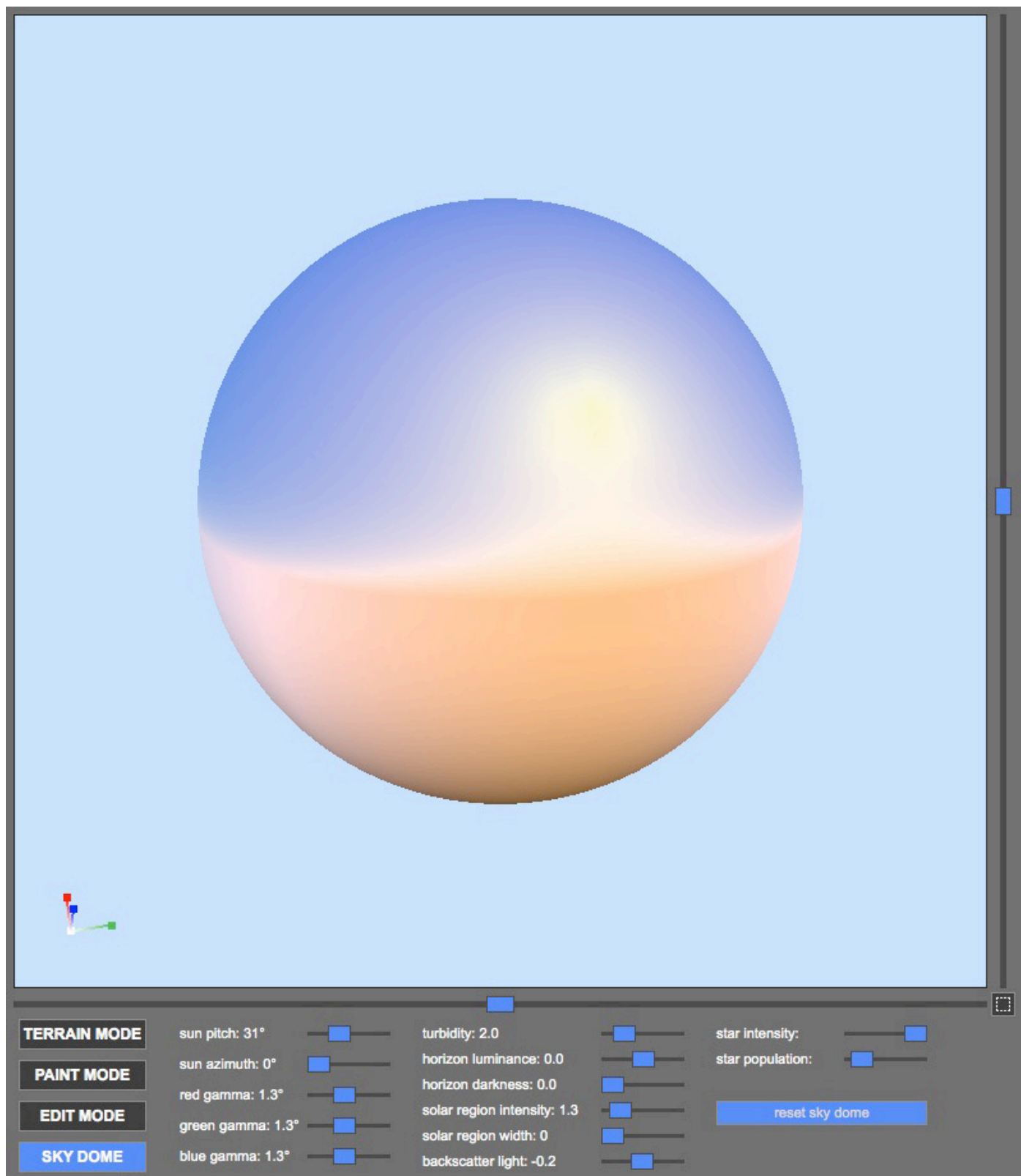


Figure 12: sky dome module in action, aiming to a sunset condition



## CREATE: let's build our Studio scene!

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The CREATE section is very simple: all you have to do is choosing a Terrain texture size (from 512 to 16384 pixels-wide), type a Terrain group name and, if you have a quite complex scene, enable the DS Bounding Boxes option so that once the DS scene is created, it will display all the objects with a bounding box style, which allows to manage the scene more easily.

You can also choose if you want to add the sky dome designed in the POPULATE section, and if you want to apply a random morph percentage to props with available morph channels, in order to create an even more diversified Studio scene.

There is also an option to enable high resolution subdivision levels for your INFINITO generated terrain, allowing to have even more detail once Studio scene has been generated!

Another cool feature introduced with 1.1 release, is the possibility to generate procedural normal maps for INFINITO terrains, which will enhance terrain lighting and details. Just choose a map size, the bump height and that's it!

Finally, click "**CREATE DAZ SCENE !**" and watch INFINITO generate a full working DS scene before your eyes.

Depending on the complexity of the terrain and the number of props used, generating the DS scene may take different amounts of time.

**Notes:** the DS4 plug-in version will create a scene much faster than the DS3 one because identical props will be cloned and transformed rather than reloaded from the disk each time.

Also, Normal Maps and High Resolution SubD level are meant to be used alternatively at render time, and not enabled at the same time.

## SETUP SECTION

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In this section you can temporarily enable or disable the Poser libraries to be used within INFINITO, allowing to have less items cluttering the POPULATE library widget, and using only the ones that you really need.

You can of course re-enable libraries on-the-fly, without the need of restarting INFINITO.

There is also a checkbox to disable VBO support, in case you have a very old graphic card and the VBO are not working as expected.

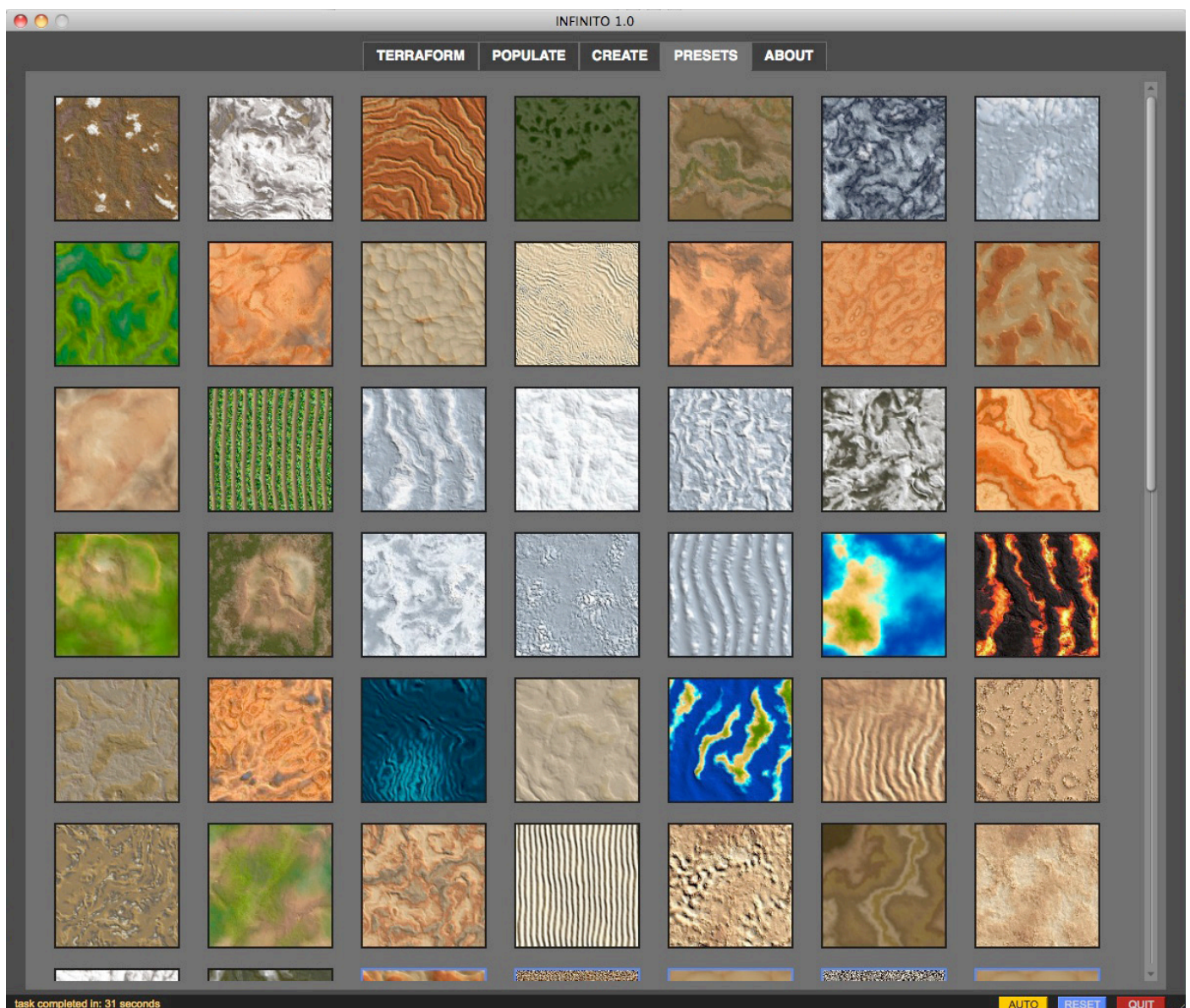
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## PRESETS LIBRARY

The Presets Library is a very useful feature of INFINITO that allows to save your terrain presets and load them back, thus sparing you the hassle to set parameters manually each time.

You can even share your presets with other INFINITO users: browse to your **Documents/DAZ 3D/Studio or Studio 3/InfinitoAM/presets/** folder; that's where your custom presets will be saved.

Each preset is made of two files, an .ipf (which contains all the parameters data), and a thumbnail .jpg file.



Note that custom presets can be distinguished from built-in ones because of the blue preview border.

Also, hovering the mouse on a thumbnail will display the path name of the preset.

## Useful links

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- <http://infinito.alessandromastronardi.com/> The official home page of INFINITO.
- <http://www.youtube.com/user/mastronardialex> My YouTube Channel includes video tutorials about INFINITO features and more.
- <http://www.facebook.com/pages/Infinito-Daz-Studio-Plugin/237467069636570?sk=wall> The INFINITO Facebook Fan Page.
- <http://www.daz3d.com/i/shop/artistlist?artist=1342301> My DAZ 3D store, where you can purchase INFINITO and more.
- <http://forum.daz3d.com/viewtopic.php?t=171885> The INFINITO release thread on the DAZ 3D forums.
- <http://forum.daz3d.com/viewtopic.php?t=127437> The PP2 Exporter script, which allows to export objects as props in the .pp2 file format directly from DAZ Studio.
- Related concepts:
  - Height maps: [http://en.wikipedia.org/wiki/Height\\_map](http://en.wikipedia.org/wiki/Height_map)
  - Procedural generation: [http://en.wikipedia.org/wiki/Procedural\\_generation](http://en.wikipedia.org/wiki/Procedural_generation)
  - Surface normal: [http://en.wikipedia.org/wiki/Surface\\_normal](http://en.wikipedia.org/wiki/Surface_normal)
  - Digital Elevation Model: [http://en.wikipedia.org/wiki/Digital\\_elevation\\_model](http://en.wikipedia.org/wiki/Digital_elevation_model)

For any question concerning INFINITO, please feel free to email me at : <mailto:info@alessandromastronardi.com>.



## Online tutorials

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Here is a list of tutorials which will guide you through all INFINITO sections, showing how to use controls properly and explaining all the options and features available.

**INFINITO Tutorial: input node**

<http://www.youtube.com/watch?v=NrfBXEHQsQY>

**INFINITO Tutorial: deformer node**

<http://www.youtube.com/watch?v=NOGdy7Qz6bw>

**INFINITO Tutorial: combiner node**

<http://www.youtube.com/watch?v=R6zAwrAJDiU>

**INFINITO Tutorial: turbulence effect**

<http://www.youtube.com/watch?v=Kvkc7leDpsU>

**INFINITO Tutorial: erosion effect**

<http://www.youtube.com/watch?v=c8Hir4iJWxg>

**INFINITO Tutorial: gradient, pan, zoom and light controls**

<http://www.youtube.com/watch?v=4t1gVNi5ovl>

**INFINITO Tutorial: populate terrain**

<http://www.youtube.com/watch?v=jEWAFT4siJQ>

**INFINITO Tutorial: terrain editing**

<http://www.youtube.com/watch?v=RnJS2keKI7w>

**INFINITO Tutorial: populate section tips and tricks**

<http://www.youtube.com/watch?v=qZINQKNS0eU>

**INFINITO tutorial: vertical vs. normal object deployment**

<http://www.youtube.com/watch?v=SZDifLqqW78>

**INFINITO tutorial: editing objects**

<http://www.youtube.com/watch?v=v7uVOTYED0E>

**INFINITO tutorial: deleting objects**

<http://www.youtube.com/watch?v=Xk2vutrJ3rI>

**INFINITO tutorial: repositioning objects**

<http://www.youtube.com/watch?v=7xC-QLfglBU>

**INFINITO tutorial: using reference and mask images**

<http://www.youtube.com/watch?v=4UfDx48JHhM>

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**INFINITO tutorial: populate section camera and light controls**

<http://www.youtube.com/watch?v=y0JpikciwiM>

**INFINITO tutorial: creating the Studio scene**

<http://www.youtube.com/watch?v=jLkBCPZu3Xk>

**INFINITO tutorial: the presets library**

<http://www.youtube.com/watch?v=UdQWYAyneMY>

**INFINITO tutorial: loading external OBJ's**

<http://www.youtube.com/watch?v=k11KDUkjen0>

**INFINITO 1.1 : introduction**

<http://www.youtube.com/watch?v=8xcD6ApSTJQ>

**INFINITO 1.1 : Skydome**

<http://www.youtube.com/watch?v=wHHiguq2iNM>

**INFINITO 1.1 : Setup tab**

<http://www.youtube.com/watch?v=CdTSUDKUUb8>

**INFINITO 1.1 : Automatic Normal Maps Generation**

<http://www.youtube.com/watch?v=iyd0o9MkW5M>

## Special thanks

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I wish to thank so much Corinne, Marc, Kosta, Alfonso, Marion, Ginevra, Valentino, Sarah, Nelly and Franco for spending countless hours testing INFINITO, helping me out with bugs and issues, giving precious suggestions and insights and correcting the manual.

And special thanks also to the folks from the DAZ programmers team that gave such an excellent support for the SDK.

Thanks to you all!

Alessandro