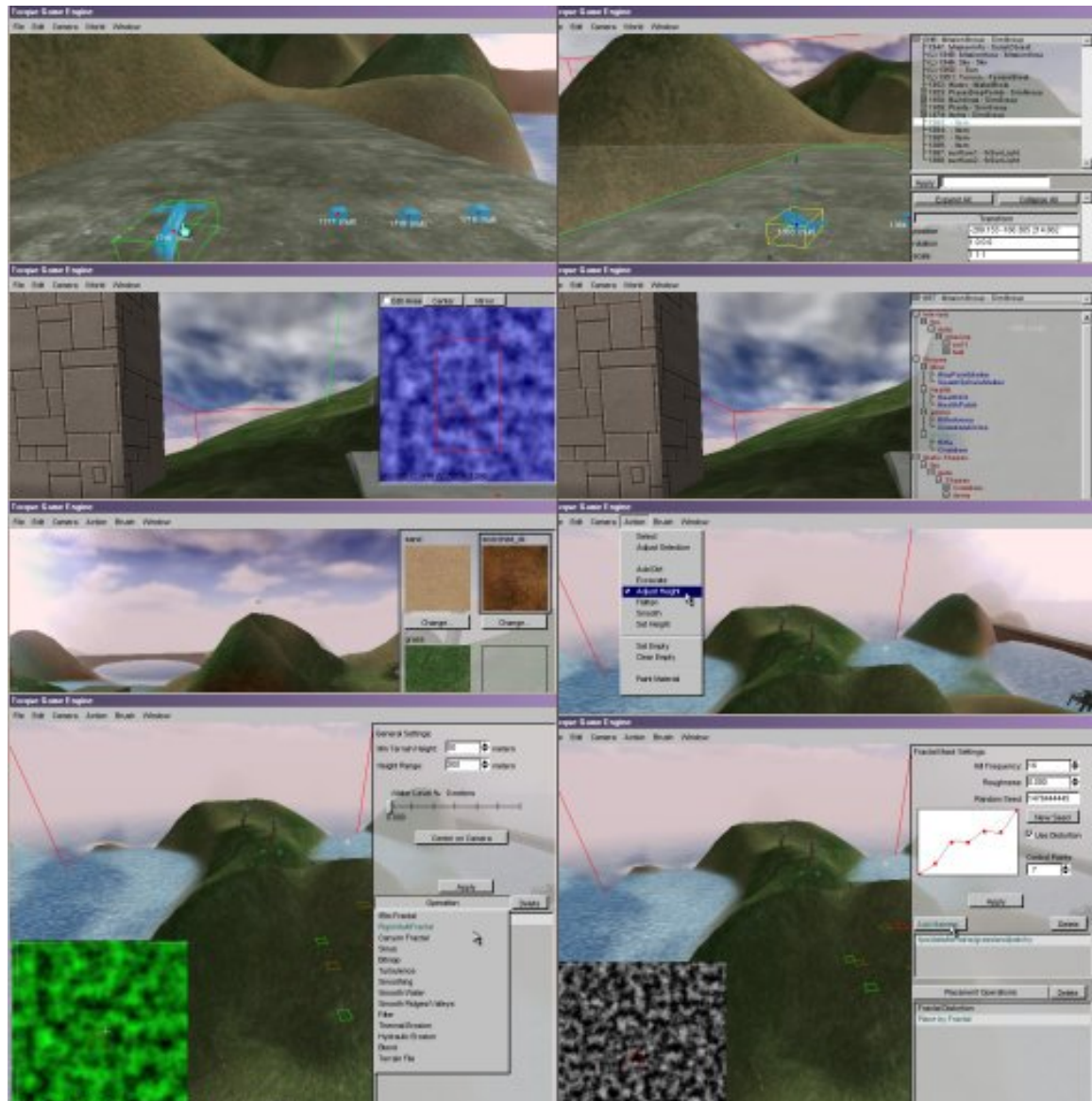


Basic Training



“All right people, what are you waiting for, breakfast in bed? Another glorious day in the corps. A day in the Marine Corps is like a day on the farm. Every meal's a banquet. Every paycheck a fortune. Every formation a parade. I love the corps!”
- Sgt A. Apone, Aliens

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Torque's Basic Editors Overview

Torque includes two basic editors, the Mission Editor and the GUI Editor. The Mission Editor is further broken down into eight **tools**. In the following pages, I will be using short names for the individual tools wherever it does not create ambiguity.

Editors	Start Editor	Description
Mission Editor (ME)	<i>F11</i>	This editor is comprised of eight sub-editors, each one allowing you to modify and save various aspects of a specific mission. This editor can be used to edit existing missions or to create new ones.
GUI Editor (GE)	<i>F10</i>	This editor allows you to modify existing GUIs and to create new GUIs, using a simple drag-and-drop interface.

Tools	Start Tool	Description
World Editor (Manipulator)	<i>F2</i>	This tool allows you to translate, rotate, and scale objects that have already been placed in the world.
World Editor Inspector (Inspector)	<i>F3</i>	In addition to providing all the capabilities of the World Editor, this editor allows you to view and modify properties of individual mission objects.
World Editor Creator (Creator)	<i>F4</i>	In addition to providing all the capabilities of the World Editor, this tool allows you to place new objects in the current mission.
Mission Area Editor (Area Editor)	<i>F5</i>	This tool allows you to adjust the boundaries of the current mission as well as provides a means to mirror the current terrain.

(Terrain Editor)	<i>F6</i>	This tool allows you to manually adjust the height of the mission map as well as to define whether portions of the map 'exist'.
Terrain Terraform Editor (Terraformer)	<i>F7</i>	In addition to providing all the capabilities of the Terrain Editor, this editor allows you to load images as terrain files as well as to apply various algorithmic filters to the terrain.
(Terrain Texture Editor)	<i>F8</i>	In addition to providing all the capabilities of the Terrain Editor, this tool allows you to select any number of textures and apply them using a set of algorithms to determine blending and placement.
Terrain Texture Painter (Terrain Painter)	Window Menu -> Terrain Texture Painter	In addition to providing all the capabilities of the Terrain Editor, this tool allows you to select and subsequently to apply up to 6 different textures to the terrain.

The Mission Editor Tools

Let us tackle the Mission Editor Toolset first as it has the most components and is the most likely place to start for creating a simple MOD or a new game.

As we investigate and learn how to use each of the Mission Editor tools, please use the provided mission ‘Basic Training’¹ as current mission.



Before you experiment with the editors on any existing mission, you should back it up first. The easiest way to do this (for now) is to create a backup copy of the entire ‘egt/missions’ directory. Please do this before proceeding.

Mission Editor Basics





Before leaping into the Mission Editor Tools, let us review some basics that hold true for all of the tools. We will review the user interface devices. Subsequently, we will discuss the mechanics of movement and viewpoint control, as well as object selection, translation, rotation, and scaling.

World Editor Devices

In this guide I refer to the cursors, menus, and other graphical elements that you will encounter in the editors as ‘Devices’. Simply stated, these devices provide meaningful feedback to you regarding what action can or should be taken. The terms below are mostly of my own invention with the exclusion of the appropriately named ‘gizmo’.

¹ If you do not know how to load/run the mission, please refer to Introduction → GETTING STARTED → Running the Sample Missions.

Cursors

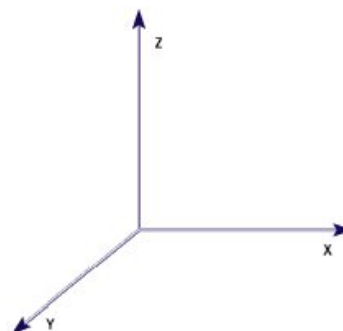
 No Select Cursor	When the cursor looks like this, it means that the cursor is not over a selectable object. In other words you are pointing to an 'empty' space.
 Select Cursor	When the cursor looks like this it means that the cursor is over a selectable object or group of selectable objects.
 Grab Cursor	When the cursor looks like this, it means that you have selected an object(s) and are holding down the left mouse button. You have grabbed the object(s).
 Rotate/Scale Cursor	When the cursor looks like this, it means you have successfully selected an axis of the gizmo in either rotation or scaling modes. It also appears when you have successfully selected a bounding box face for scaling.

The Gizmo and Gizmo Mouse Popup Scales




The graphic on the right represents the gizmo. Subsequent screenshots will show the gizmo in action, but for the purpose of discussing it's use, this representation will be simpler to talk to.

The gizmo is a device that is activated when you select one or more objects. It displays three traditional X-Y-Z axes. Individual axes are selectable and afford the ability to translate, rotate, and scale.

By default, a gizmo-axis is dark-cyan when not selected and light-cyan when the cursor is over it or when it has been 'grabbed'.



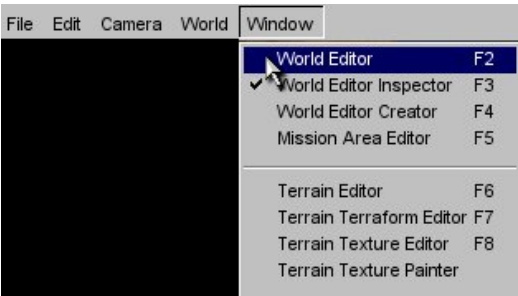
The Gizmo

<p>This scale shows the current position of the object's centroid when you use the gizmo to translate an object.</p>	 <p>Gizmo Translation Scale</p>
<p>This scale shows the current degrees of rotation around the selected axis when you use the gizmo to rotate an object.</p>	 <p>Gizmo Rotation Scale</p>
<p>This scale shows the current height, width, and depth of a object when you use the gizmo to scale it. <w,h,d> correspond to the <x,y,z> axes of the gizmo.</p>	 <p>Gizmo Scaling Scale</p>

Menus and Windows

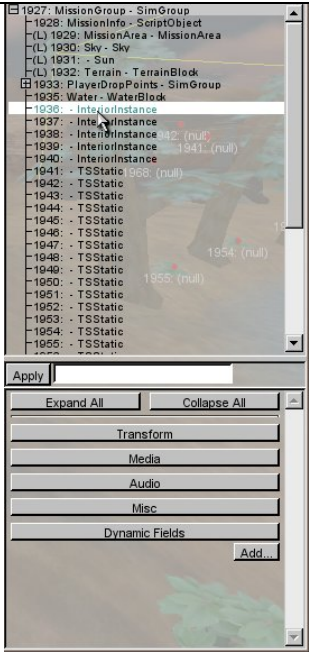
The World Editor provides a set of traditional menus for selecting the current tool as well as other features.

Note: I'll cover all of the menu options below in 'World Editor Menus'.



World Editor Menus

Several of the tools have windows that appear on the right side of the screen. Although these windows have many similarities it will be better if I explain them individually. I will do this in the respective tool sections below. Note: The bottom portion of the windows shown is from the HEAD release and looks slightly different from the 1_1_2 and prior releases. Similar groups of fields have been grouped in drop-down frames. In 1_1_2 and before, all fields and buttons are in the same frame, which gets a little hard to read/search sometimes.



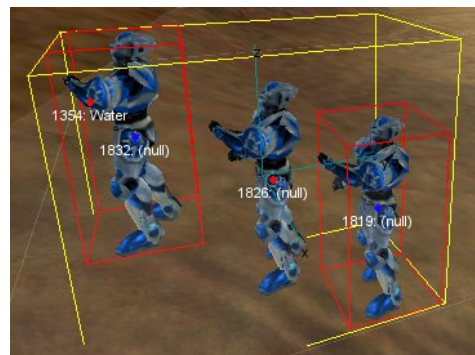
Tool Windows

Selection Boxes

When selecting a previously unselected object, the selection cursor lets you know when you can select something, and this selection box (green) shows which previously unselected object will be selected.



Once you have successfully selected an object, the object will be shown with a red selection box and a yellow selection box. The red box is object aligned, while the yellow box is world aligned. The purpose of the yellow box is to show which objects are selected as a group, and will therefore be affected by any actions you take. The red boxes are to show which individual objects in the group selection box are actually part of the selection. Notice that in the picture on the right, the leftmost and rightmost characters are selected, while the middle character is not.



Once you have successfully selected an object, the object will selection box will turn blue if your cursor passes over it.

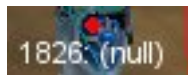
Note: This is not true for drag-select.



The Handle and Level Grid



Selected Handle



Unselected Handle

Every object in the world displays a handle. The handle has two labels next to it:

1. **A number** signifying which object this is in the mission object list.
2. **A name.** If the name is *(null)*, no name has been assigned to this object. Names are optional, but very useful for scripting purposes.



Level Grid

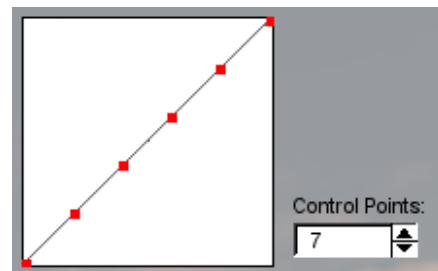
When an object is selected, a faint grid will appear. The grid is parallel to the world's X-Y plane and passes through the selected object at the handle. When multiple objects are selected, the plane passes through the group handle which is located at the axis crossing point for the group gizmo.

This device can be used like a ruler for placing objects accurately. Unfortunately, there is no vertical equivalent.

Scale Devices

You will see this device while editing the terrain and while adjusting terrain parameters. The premise of this device is simple. The 2D scale (line with red dots) represents parameter in two dimensions. Depending on the application, the horizontal spacing may represent elevation, radius, etc. The vertical spacing may represent opacity, blending factor, strength of action, etc. The red dots on the lines are 'Control-Points'. These points can only be moved vertically. All scale interfaces come with a spin box to add or remove control points, thereby increasing horizontal 'resolution'.

Note: *You are better off typing in the value you want, because the spinner changes do not take affect unless you edit the textbox.*




The Scale Device

Mission Editor Mechanics

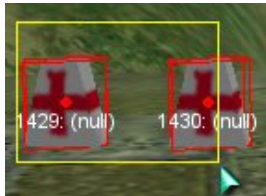
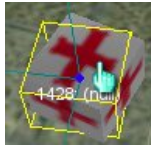
Now that we've familiarized ourselves with the various devices available in the mission editor, let's discuss the mechanics of how we manipulate objects in the mission using the mouse. We'll talk about how to move around the mission, switch camera modes and viewpoints, how to select objects and how to use the mouse to manipulate positions, rotation, and scale via the gizmo.

Default Movement and Viewpoint

Moving Around	W, A, S, D, SPACE BAR (Up, Left, Down, Right, Jump)
Looking Around	 + Mouse Motion
Zoom	E Zooms in when held.
Basic Character Viewpoint (play mode only)	TAB Toggles: <ul style="list-style-type: none">• First Person (1st POV)• Third Person (3rd POV)
Camera	ALT + C Toggles: <ul style="list-style-type: none">• Current Character POV (1st or 3rd)• Free Camera
Camera Movement Speed	SHIFT + 1 ... SHIFT + 7 (slowest ... fastest) When camera viewpoint is selected, you may adjust the rate at which the camera moves by pressing the shift and number keys.
Drop Character at Camera Position	F7 (play mode only) ALT + W (mission editor mode only) CTRL + F7 (mission editor mode OR play mode)
Drop Camera at Character Position	ALT + Q (mission editor mode only)

Object Selection and Translation

Object (Un)selection



(on object)

Selects:

- Previously unselected object



(on object)

Selects:

- Previously unselected object

DeSelects:

- Previously selected object



(on empty space) + Drag

Selects:

- Previously unselected objects in the 'drag-box'
- Previously selected objects stay selected

Drag-box needs to enclose an objects handle [depicted by red dots] to select object.

Object Translation (w/o using Gizmo)



+ Drag

Translates:

- Single previously unselected object
- Single previously selected object
- Multiple previously selected objects

Using the Gizmo

As described above, the gizmo is the aptly named three-axis device that appears when you select either a single object or a group of objects.

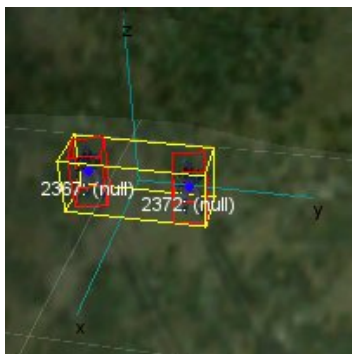
The gizmo has three individually selectable ‘handles’ that run along the major axes X, Y, and Z. These handles gives you the ability to translate, rotate, and scale objects.

Gizmo translations and rotations can be applied to single or multiple selected objects. Rotations are always about the gizmo axis which is the handle for single selected objects and the group-handle for multiple selected objects.

Gizmo scaling can only be applied to a single selected object.




Single Object Gizmo




Multiple Object Gizmo

Translation

-  (on gizmo axis)
- Drag left/right for X and Y axis, up/down for Z axis.


World Axis Translation

- **SHIFT** +  (on gizmo axis)
- Drag left/right for X and Y axis, up/down for Z axis. Gizmo aligns to world axis and confines translation along selected world axis.

Rotation

- **ALT** +  (on gizmo axis)
- Drag left/right

Scaling (single object only)

- **CTRL + ALT** +  (on gizmo axis)
- Drag left to grow
- Drag right to shrink

Scaling using bounding box planes

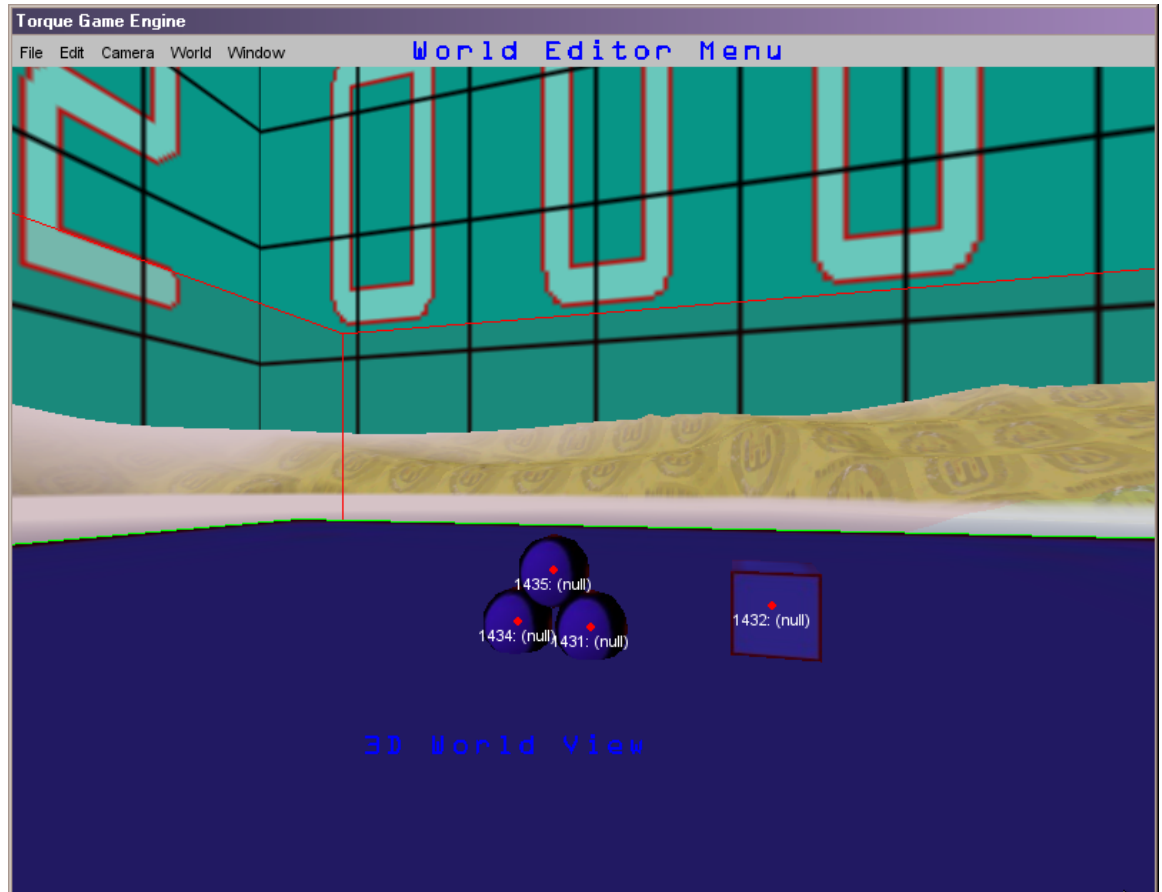
While experimenting, I accidentally discovered that there is another way to scale objects with the mouse. Not only is this method slightly more intuitive, but it doesn't require the use of the gizmo! Try this:

1. De-select all objects.
2. Find the object you wish to scale and select it.
3. Press and Hold: ***CTRL + ALT***
4. Click a bounding box plane and drag the mouse to scale. You'll notice that the selected side of the bounding box is filled with a medium blue hash.

And, that is all there is to it! Below is an image that shows a selected bounding box face.



World Editor (Manipulator)



Starting The Manipulator

1. Start the Mission Editor by pressing **F11**
2. Start the Manipulator by pressing **F2**

The 3D World View Window

The real benefit of the Manipulator tool comes from the fact that you can traverse the world and the 3D World View is not blocked by any dialogs or menus (except for the Mission Editor Menu), giving you an almost-full screen view while you manipulate objects via mouse and hot-keys. Upon examination, it can be seen that this tool is very plain (likely as intended). In the sample view above, we can see the world and its contents. As well, we can apply all standard mouse manipulations as described in 'Mission Editor Basics'.

World Editor Menus

All World Editor Tools have a top menu containing the same elements. However, in some tools, certain menu selections will be disabled. The following tables give a brief description of each menu and the menus' choices. Some options descriptions will be deferred till we discuss the specific tool that is affected by said option.

File Menu

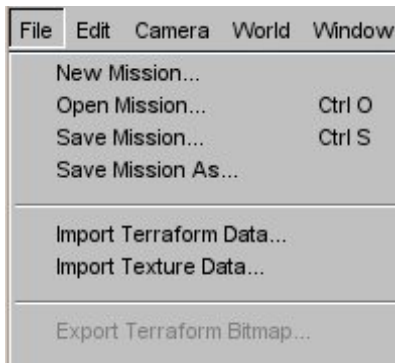
New Mission...

Clicking this option will generate a new mission based on preset values which can be found at 'example\egt\data\newmission.mis'. This generates the same mission every time.

WARNING: *This wipes wipe out the current mission. If done at all, it should be done once and only once, before editing.*

Open Mission... (**CTRL+O**)

Brings up a dialog to allow you to load an existing mission. Currently, I suggest that you do not use this method to switch back and forth between missions while editing. Instead, I suggest editing one mission per session (i.e. per run of the SDK).



Save Mission... (**CTRL+S**)

This saves your current mission.

Save Mission As...

As with 'Save Mission...', this allows you to save your mission, but in this case, you can specify a name and (existing) directory for the mission file.

Import Terraform Data...

This choice allows you to load the 'terraform' data from another mission. Basically, this replaced the current height-map with a selected mission's height-map data. Terrain texturing is unchanged.

Import Texture Data... **BROKEN**

This choice should allow you to load the 'texture' data from another mission, but alas, it does not work.

Export Terraform Bitmap...

This choice is enabled by the Terraformer tool. We will discuss it there.

Edit Menu

Undo (**CTRL+Z**)

Undo the last operation.

WARNING: *This DOES NOT undo all operations, so back up early and often.*

Redo (**CTRL+R**)

Redoes last operation. As with undo, this does not apply to all operations.

Cut (**CTRL+X**)

Copy (**CTRL+C**)

Paste (**CTRL+V**)

Standard cut-copy-paste. Can be applied to single and multiple objects.



Select All (**CTRL+A**) **BROKEN**

Selects all objects (shapes and interiors) in the mission.

Select None (**CTRL+N**)

- Deselects all objects (shapes and interiors) in the mission. **BROKEN**
- B. Deselect previously selected terrain. This does work.

Relight Scene (*ALT+L*)

Causes the engine to relight the current terrain and apply shadow maps. This trips a lot of beginners up. I will discuss this further when we learn about adding interiors.

World Editor Settings...

This brings up the World Editor Settings Dialog. (Discussed below.)

Terrain Editor Settings...

This feature relates to the Terrain editor and will be discussed there.

World Editor Settings (left column)

Render Plane

Show plane when objects are selected

Render Plane Hashes

Show hashes when objects are selected.

Render Object Text

Show objects' names and IDs.

Render Object Handle

Show objects' handles (red dot).

Render Selection Box

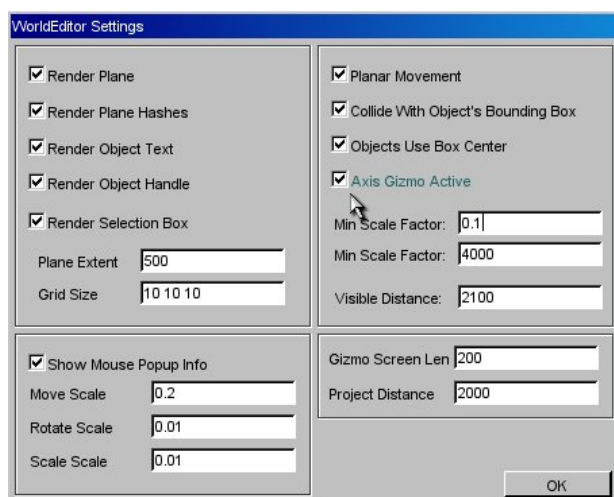
Show selection boxes.

Plane Extent

Length by width dimensions of plane (floating point OK).

Grid Size

Hash spacing for grid (floating point OK).



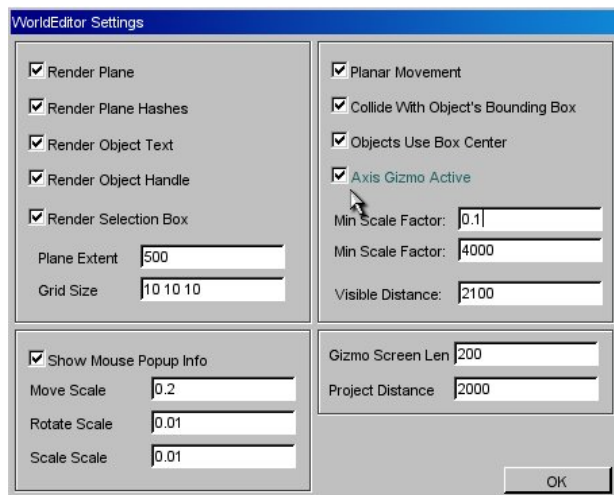
Show Mouse Popup Info

Show mouse popup scales when moving-rotating-scaling.

Move Scale Rotate Scale Scale Scale

These values increase or decrease mouse sensitivity for individual mouse actions (move, rotate, scale).

World Editor Settings (right column)



Planar Movement

Checked – Object will move along plane when dragged.
Unchecked – Object will attempt to follow terrain when dragged.

Does not apply to vertical gizmo drags.

Collide with Object's Bounding Box

If checked, object can be selected by placing cursor anywhere on objects bounding box.

Objects Use Box Center

If checked, handle is in object center, otherwise at lower limit of object bounding box.

Axis Gizmo Active

Enable gizmo.

Min Scale Factor (Max) Scale Factor

Determine min and max multiple by which objects can be scaled from original size.

Visible Distance

Min distance within which
object handles are
visible/selectable.

*This has nothing to do with visible
distance during game play. Examine
the SKY object for that.*

Gizmo Screen Len

Gizmo axis length in screen
pixels.

Project Distance

Ray-length for selection cursor.

World Editor Settings (Editing Tips)

The parameters on this very compact dialog are meant to assist you when you are editing a mission. Their main purpose is to make your life easier. In that vein, here are some common editing problems and solutions:

Problem	Solution
Having difficulty placing objects within a specific distance of each other.	Adjust the plane extent to twice the distance you require (distance from centroid/handle). Then, set grid size to 1/10 th multiple of distance of interest. Now you can use the grid like a ruler. Example: If you wish to place an object 0.9 meters from another: <ul style="list-style-type: none">• Set extent to 2.0• Set grid size to 0.1
Too many labels visible.	<ul style="list-style-type: none">• Disable 'Render Object Text' (Good)• Reduce 'Visible Distance' (Better)
Having difficulty scaling exactly.	Example: If you want to scale an object to 2.75 times its original size: <ol style="list-style-type: none">1. Set 'Min Scale Factor' to 1.02. Set 'Max Scale Factor' to 2.753. Scale the object and Viola, exactly 2.75!
You find yourself accidentally selecting objects that are far away.	<ol style="list-style-type: none">1. Reduce 'Project Distance' (Good)2. Reduce 'Visible Distance' (Better)
Your bots keep falling through the terrain when you drag them.	<ol style="list-style-type: none">1. Uncheck 'Planar movement'.2. Uncheck 'Objects Use Box Center' Your bots should now follow the terrain when you drag them.

World Menu

World	Window
Lock Selection	Ctrl L
Unlock Selection	Ctrl Shift L
Hide Selection	Ctrl H
Show Selection	Ctrl Shift H
Delete Selection	Delete
Camera To Selection	
Reset Transforms	
Drop Selection	Ctrl D
Add Selection to Instant Group	
Drop at Origin	
Drop at Camera	
✓ Drop at Camera w/Rot	
Drop below Camera	
Drop at Screen Center	
Drop at Centroid	
Drop to Ground	

Lock Selection

Disable mouse actions (drag, rotate, scale) on current selection(s).

This does not prevent changes via the inspector window although a little (L) will show up in the world editor tree.

Unlock Selection

Re-enable mouse actions on current selection(s).

Hide Selection

Hide (i.e. do not render) current selection(s).

Show Selection

Un-hide previously hidden object(s).

Use the Inspector to select these objects. They have a little (L) next to them in the world editor tree.

Delete Selection

Delete current selection(s).

Camera to Selection

Move camera to centroid of current selection(s).

Reset Transforms

- Un-rotate selected objects that are rotated (i.e. align to objects' default alignment.)
- Un-scale selected objects that are scaled (i.e. scale all objects' dimensions to 100% of default scale.)
- Works for multi-select.

This is not the same as UNDO.

Drop Selection

Make currently selected object(s) drop according to drop current rule (see below).

This may cause selected subterranean objects to rise to the surface.

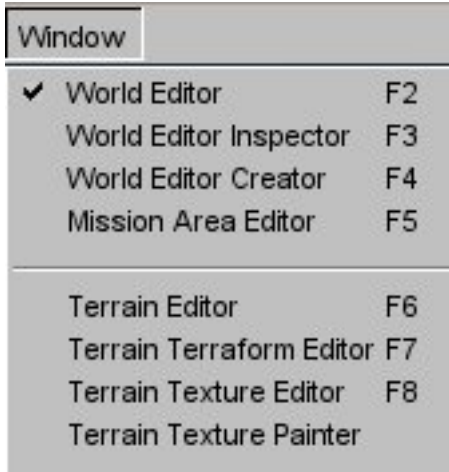
Add Selection to Instant Group

We will discuss this feature when we discuss the Inspector.

Drop at ...

We will discuss these below.

Window Menu



This menu is probably the most easily understood. It allows you to select which of the Mission Editor Tools you wish to use. The only important thing to remember is that you must use this menu to select the ‘Terrain Texture Painter’ tool since there is no hot-key for it.

‘Drop At XYZ...’ Modes

In the World Menu Drop-down, there is a group of ‘Drop at xyz...’ radio-selections (only one can be selected). Before you start placing objects in the Creator, you should understand what these settings are going to do for you.

Drop at Origin	This causes new or pasted objects to be created at the World Origin.
Drop at Camera	<p>This causes new or pasted objects to be created at the current location of the current camera. You could think of there being three cameras.</p> <ol style="list-style-type: none">1. One in the character’s head during 1st POV viewing.2. A second in the following camera position during 3rd POV.3. And, the third being the actual free floating camera. <p>I’ve included an image below showing an object dropped in 1st and 3rd POV to clarify this.</p>
Drop at Camera w/Rot	<p>This is supposed to do the same as ‘Drop at Camera’ with the addition that the object will have the camera’s rotation.</p> <p>BROKEN and MAY CRASH EDITOR</p>

Drop below Camera	In this mode, new objects are created somewhere below the current camera.
Drop at Screen Center	<p>This is the default ‘drop at’ mode. I think this mode’s title is a bit of a misnomer. Although I haven’t looked at the code (shame on me), it seems that this behaves more in the following fashion:</p> <ul style="list-style-type: none">• Cast ray from camera eye• On collision with object bounding box, water, or terrain, drop the object at point of collision.• If ray extends beyond ‘Project Distance’ (set in World Editor Dialog), drop object at camera eye (position).
Drop at Centroid	<p>This <u>would</u> be a very useful placement option. It <u>should</u> allow you to select multiple objects and have the newly created object placed in the virtual centroid of the group.</p> <p>BROKEN and MAY CRASH EDITOR</p>

Drop to Ground

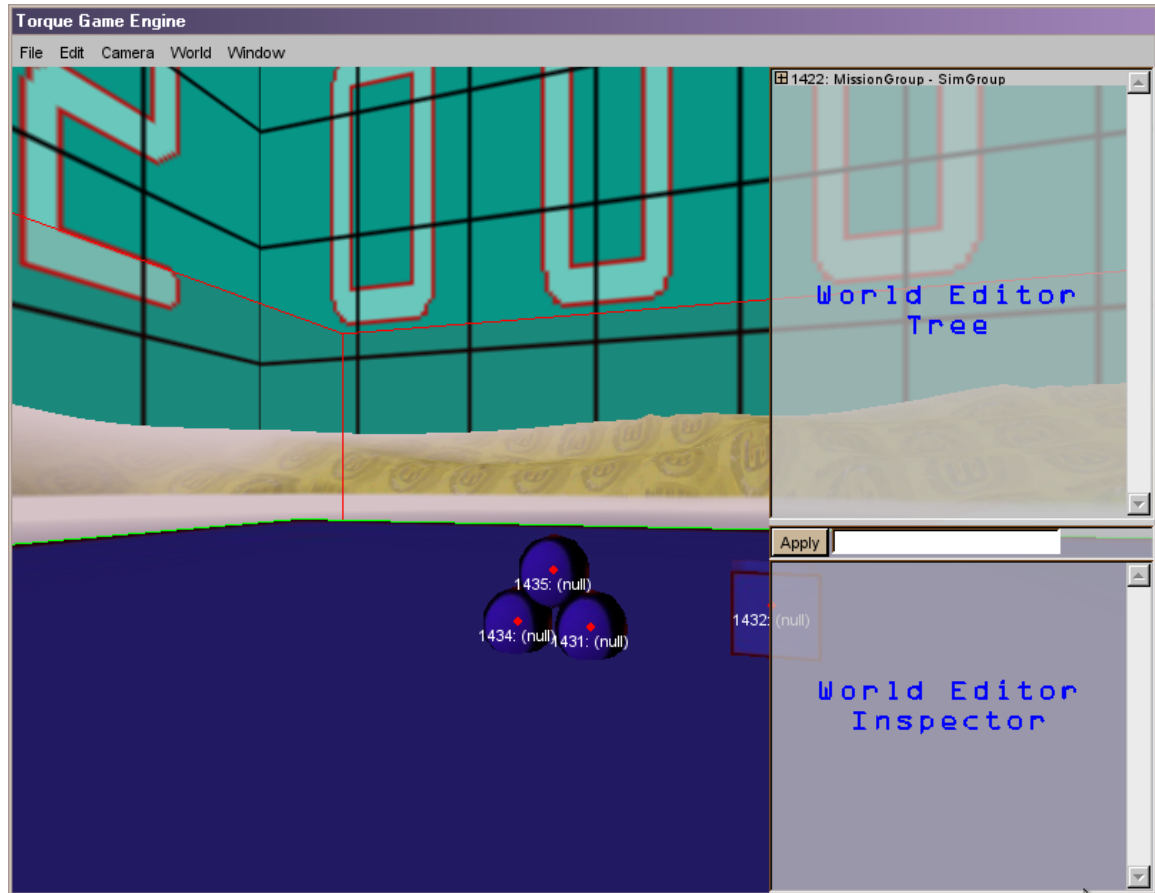
The official docs aren't clear on this, but my assumption on this mode the first time I saw it was that object should be dropped to the ground below the camera. No luck. Objects are dropped to the ground at Mission center. I wouldn't use this if there is any possibility that there could be an overlapping interior at the mission center, because dropping another interior there will crash the editor.

BROKEN and MAY CRASH EDITOR



Drop at Camera (Ouch!!!)

World Editor (Inspector)



Starting The Inspector

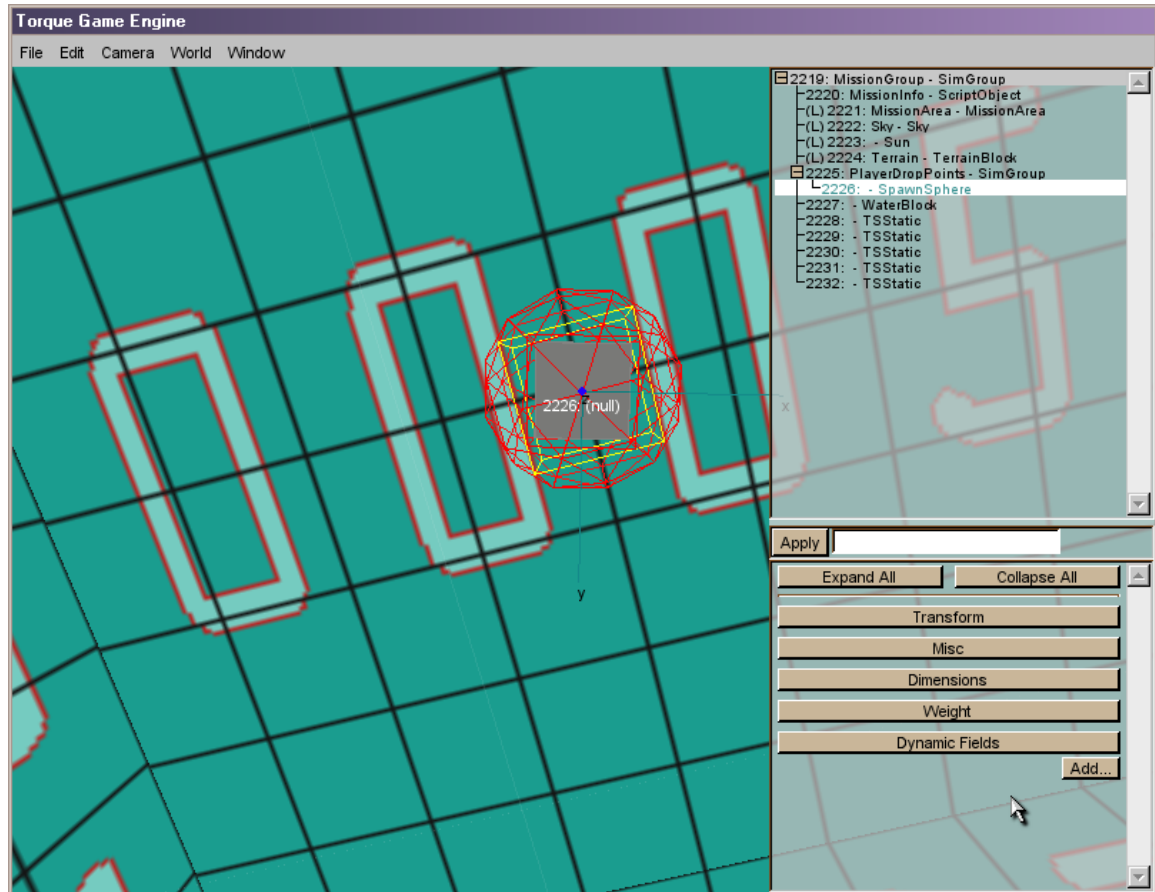
1. Start the Mission Editor by pressing **F11**
2. Start the Manipulator by pressing **F3**²

Examining The Inspector

The Inspector tool allows you to select an object and manipulate all of its script-exposed parameters via text boxes, spinners, radio-buttons, checkboxes, etc. These parameters will vary based on the object. Later in this guide, we will examine specific parameters for water, terrain, the character, the sky, etc. Now, for the purpose of learning about this tool, we will work with a simpler object, namely the SpawnSphere. The purpose of this object is unimportant at this time. The key thing is that it is easily located and manipulated.

² The Inspector is the default tool when you start the Mission Editor for the first time during an SDK session.

To begin, look directly overhead. You should see a gray object. Select it and you should have a view similar to this:



Taking a quick inventory of the screen elements, we see the *World Editor Menu* at the top, the *3D World-View* window which takes up nearly two-thirds of the screen, the *World Editor Tree* window in the upper right, and finally the *World Editor Inspector* window in the lower right.

World Editor Tree

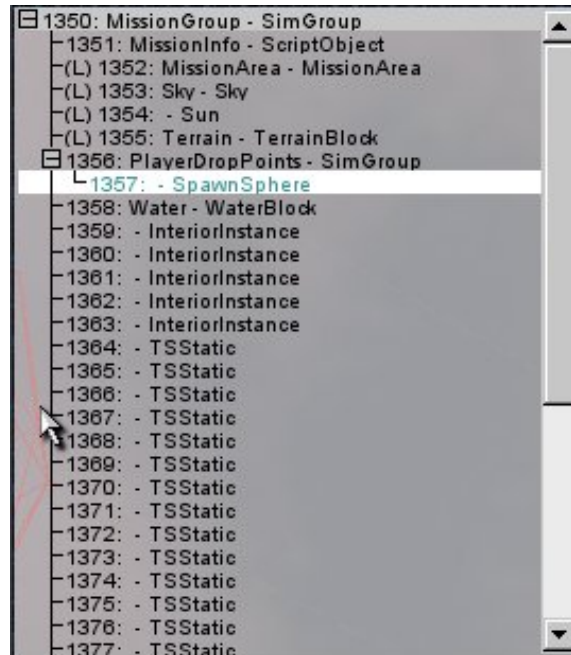
Before we jump into the relatively straightforward *World Editor Inspector* let's discuss the *World Editor Tree* and some important organization features it provides.

First, expand the list in the *World Editor Tree Window*. The initial list is completely collapsed which doesn't do us a lot of good when we're trying to manipulate objects.

1. Expand the MissionGroup SimGroup by clicking the [+] next to the text '####: Mission Group – SimGroup'. *Numbers may vary from illustration.*
2. Expand the PlayerDropPoints SimGroup.

You should now have something similar to this →

(If for some reason the SpawnSphere entry is not highlighted, please click on it once to select it.)

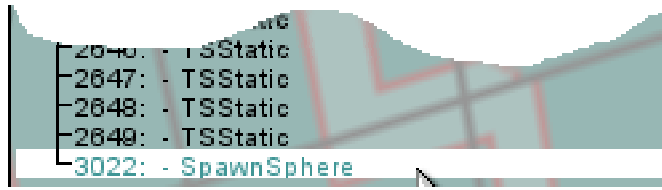


SimGroups

At this point, you may be asking, “what is a SimGroup?” Subsequent chapters in the *Tech School* section will get into the nitty gritty details about SimGroups, SimSets, and SimObjects. For now we’ll simply describe SimGroups as a means by which the engine organizes objects. This is both useful from an organization sense, i.e. knowing where to find things while you are editing, and equally useful, for scripting purposes. By pre-defining a consistent set of SimGroups and by organizing your objects within them, your current job as a mission/level designer will be greatly simplified. Your script writers will thank you too. If that is your job to, then pat yourself on the back. Good Job!

As can be seen from the current view of the *World Editor Tree* SimGroups can be nested within SimGroups as well as can particular entities (SimObjects). In fact, every mission entity is present in this list and will be found nested within a SimGroup.

So, how exactly do we place objects within a SimGroup? Let’s find out. First, make a duplicate copy of the SpawnSphere. We already have it selected, so all you need to do is type: **CTRL+C** (to copy) followed by **CTRL+V** (to paste). Alternately, you can use the Edit Menu → Copy/Paste operations. Now that you’ve created a new SpawnSphere, you need to locate it in the *World Editor Tree*.

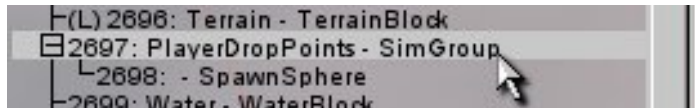


Hmm? If you've followed the instructions above, you will find the new SpawnSphere at the bottom of the tree. Hmmmm...., now we would much rather have it in the *PlayerDropPoints – SimGroup* with the rest of the SpawnSpheres. So, let's manually move this one to the correct spot and then learn how to place objects in the right SimGroup the first time.

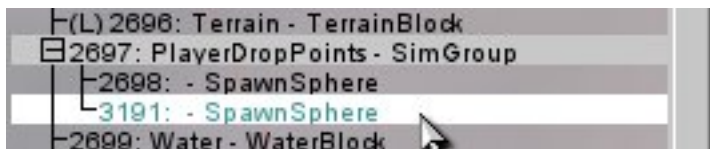
Moving Existing Objects Into A SimGroup (Add-Group or Instant Group)

The new SpawnSphere should already be selected, but if it isn't, please click on it to select it. Now, use the slider on the right side of the *World Editor Tree Window* and find the *PlayerDropPoints-SimGroup*. Select this as the *Add-Group* through the

key/mouse combination: **ALT+** . The Add-Group should now be selected with a gray background:



Now, select the menu item: *World*→*Add Selection to Instant Group*. Viola! The SpawnSphere is in the *PlayerDropPoints – SimGroup*.







Creating Objects in a Pre-existing SimGroup(Add-Group)

OK, so that was a hassle. How do we get objects to place in the correct SimGroup when we create them? Simple. You already have a SpawnSphere in your copy-buffer and you already have the *Add-Group* selected (see above). Paste another Spawn sphere and it should show up in the *PlayerDropPoints – SimGroup*. Easy as pie! The trick to select your instant group before pasting objects and they will automatically be placed in that SimGroup.



World Editor Key Stroke/Mousing List

Here is a summary of operations you make do on SimGroups and Objects with the mouse and key combinations.

<i>ALT+</i> 	ON SIMGROUP	Set current Add-Group
<i>CTRL+</i> 	ON SIMGROUP	(Un)select all members in simgroup.
<i>CTRL+</i> 	ON OBJECT	(Un)select object(s).
<i>SHIFT+</i> 	ON OBJECT	Select multiple objects.

World Editor Inspector Window

OK, now let’s address the *World Editor Inspector*. This is of course, the window from which this tool gets its name. The purpose of this window is to allow you to ‘inspect’ and modify parameters for individual objects. If you play around a bit and click on different objects, you will begin to see that different object types have different

parameters. For now, we'll address the more common values, adding new values, and finish off with some tips on using the interface effectively. We will leave a detailed inspection of individual objects' parameters for the 'Specific Mission Objects' chapter in Tech School.

Inspector - Common Fields

By far, the most common fields are:

- Position (X,Y,Z) – Three floating point values representing the coordinates of the selected object in world space.
- Rotation (X_m,Y_m,Z_m,A) – Four floating point values where the first three are multipliers and the fourth value is the angle (in degrees) of the rotation(s).
 - Example: rotation **0 1 0 90.0** means the object is rotated 90 degrees about the y-axis, relative to the world-axis.
- Scale (X_m,Y_m,Z_m) – Three floating point values representing a relative scaling. The values act as multipliers of the object's default dimension(s) in the indicated axes.
 - Example: scale **1 1 2** means that this object will be twice as tall as the default when loaded into the world.
 - Note: These values correspond indirectly to those you see when mouse-scaling. Mouse scaling values are actual world dimension.
- shapeName (shapes only) – This parameter's name is a misnomer. It actually gives the relative path and filename of the selected shape.
- interiorFile (interiors only) – This parameter gives the relative path and filename of the selected interior.
- *Object Name* – There isn't actually a parameter tag for 'Object Name', but there is an editable text-field for it. The text-field is located to the right of the Apply button (see image below). You can type just about anything (no spaces allowed, so my text in the illustration is bad...) in this field and click apply to name your object. Note: Objects can be given the **same name**. We'll leave further discussion of object naming for a later chapter. Just remember, this is how you change it from the inspector.

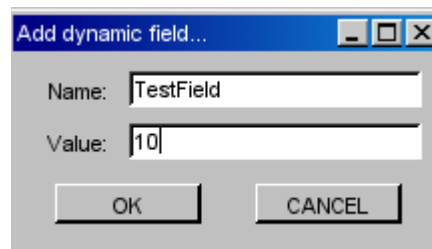


Object Name Field

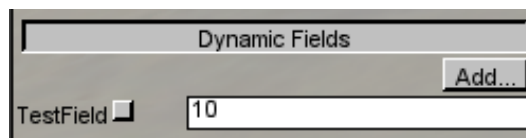
Inspector –Dynamic Fields

I won't explain what dynamic fields are yet, but rather explain a way they can be added. I will however say that dynamic fields are an important feature related to scripting and that you are very likely to use them. That said,

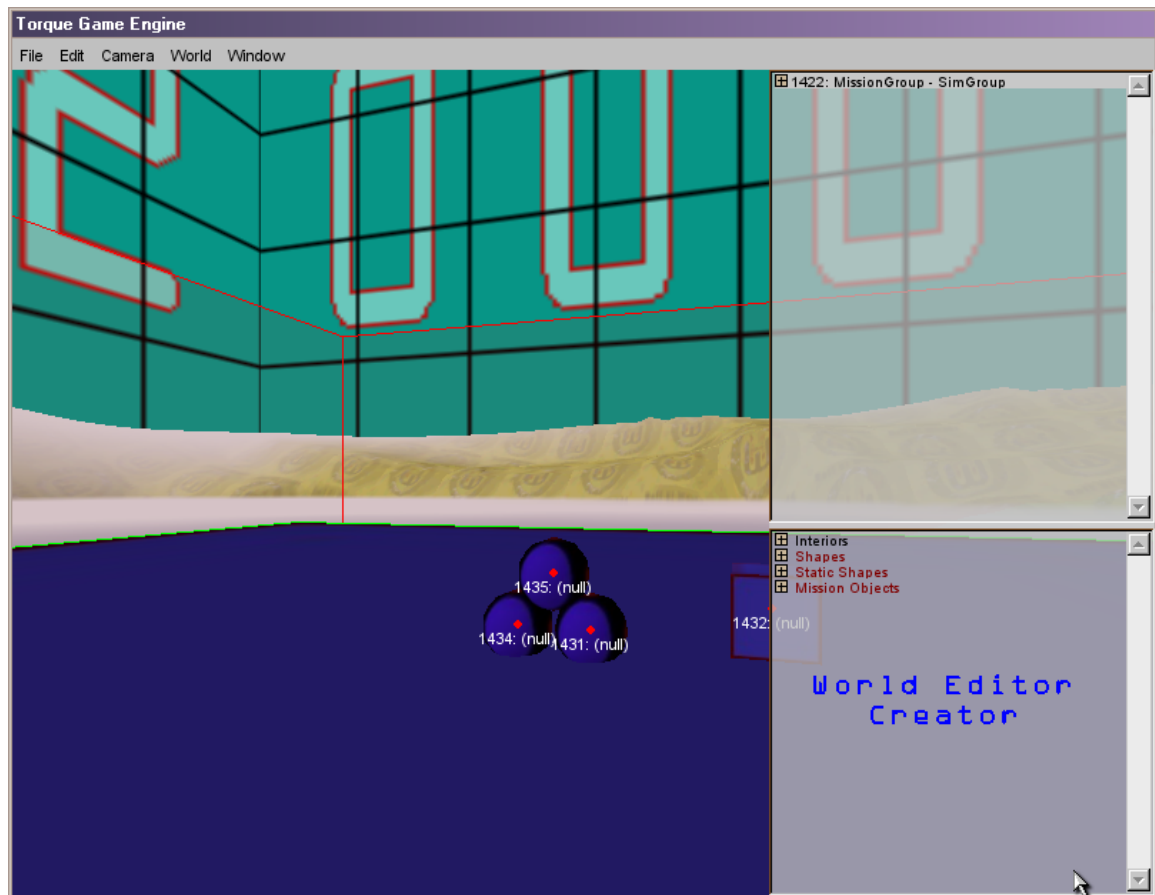
- To Add a Dynamic Field
 - Select the object which you wish to add a field to.
 - Click the ADD button found in the Dynamic Fields section of the world editor inspector window.
 - In the dialog pops up (below), give the field a meaningful and unique name and an initial value.



- To modify the value of a Dynamic Field
 - Same as changing the value of any other field. Just modify the contents of the text-field next to the Dynamic Field name and click APPLY.
- To delete the Dynamic Field
 - Click on the check-box next to the Dynamic field (see picture below) and the field will be removed permanently. This cannot be undone.



World Editor Creator (Creator)



Starting World Editor Creator

1. Start the Mission Editor by pressing **F11**
2. Start the Manipulator by pressing **F4**

World Editor Creator Window

This tool is used to create (or place) new content. From the *World Editor Creator* we can select objects to insert into our current mission.

The top-level folders are:

- Interior – Buildings and other interiors.
- Shapes – Animatable shapes.
- Static Shapes – Lightweight inanimate shapes.
- Mission Objects –
 - Environmental stuff like the sky, sun, water.
 - Mission stuff like MissionArea, Triggers, and Cameras.
 - System stuff like SimGroups.

Placing (Creating) New Objects

Creating new objects is very like pasting objects. Simply,

1. Move to the location in the mission area where you would like to place the object.
2. Look approximately where you want to place the object (there is no pre-placement positioning feedback unfortunately – i.e. X does not mark the spot...).
3. Find the object you wish to place by looking in the World Editor Creator Tree.
4. Click once on the object in the list.

Once an object is placed in the world, you can freely manipulate its position, rotation, and scale via the mouse. If, however, you want to change object parameters, you'll need to switch back to the Inspector.

Creator Tips

There will be a FAQ later in the appendix that deals with common stumbling blocks, but I'm going to list a few issues here because they are so very common, and this is a natural place to discuss them.

Q: “I placed an INTERIOR and the textures did not show up. Why?”

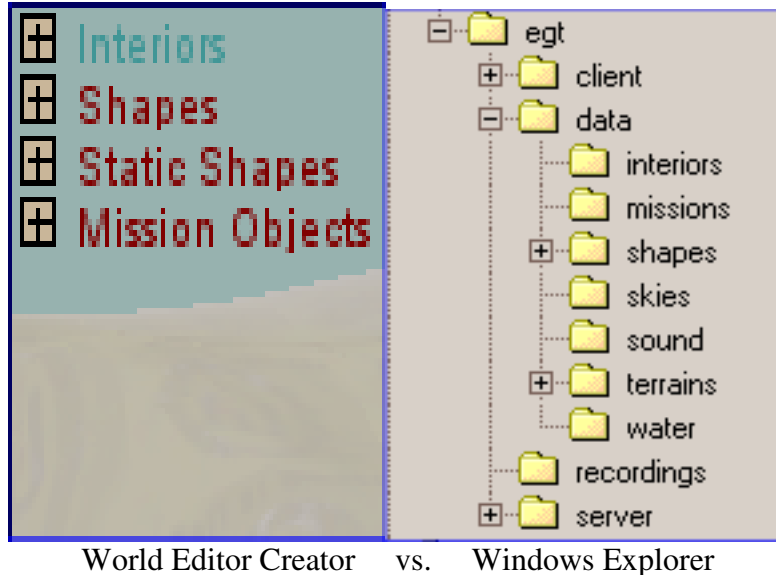
A: Unlike SHAPES, the INTERIORS do not immediately display their textures when inserted into the world. They have to be processed by the lighting stage (remember the message ‘*Lighting Mission...*’ when starting the mission?). Once you have placed an INTERIOR, press **ALT+L** to re-light the scene. This may take a few seconds, depending on the complexity/size/density of the mission.

Q: “How can I accurately place my objects the first time?”

A: Initial object placement is determined by line of sight. There are three basic placement cases. In the first two cases, a ray is cast from the eye of the camera/player until it hits the bounding box of another Mission Object or the Terrain/Water. In either of these cases, the object is placed at the point of collision. The third case is when the eye of the camera/player is aimed at the sky. In this case, the ray-cast fails (no-collision) and the object is placed at root of the ray (i.e. where you are looking from). Regarding bounding box collisions. I wouldn't count on those always working. I've had many cases where the ray collided with the ground instead of the intended target in front of the ground. Just get used to the idea that you will have to finesse things into the right location after placing them.

Adding Object to Creator Tree

If you have been exploring the 'example/fps' directory, you may have noticed a similarity between the layout of the directories and the Creator's hierarchy. That is because there is a dependency (mostly for interiors). A more thorough discussion of this will be given in *Tech School*.



Although a complete discussion on adding new interiors and shapes is beyond the scope of this section of the guide, I will outline the most basic steps required to get new INTERIORS and SHAPES into the Creator Tree.

Adding Interiors To Creator Tree

Torque needs the following files to create an Interior:

- DIF – Once an interior has been properly generated, there will be a file named `interior_name.dif`, where *interior_name* is whatever you chose to name your interior object.
- Graphic File(s) – A non-transparent interior will have at least one graphic file. By default, the graphic files used for the interior need to be located in a directory above the interior's DIF file or in the same directory as the DIF file.

Example:

1. In the directory: 'example\egt\data\interiors\abcshack' you will find a file named `abcshack.dif`. Make a copy of this file and rename it: `myabcshack.dif`.
2. Completely exit the SDK, re-load it, and start the Mission Editor mission again.
3. Now, in the Creator Tree, under 'Interiors→egt→data→Interiors→abcshack' you will see a new Interior named: 'myabcshack'. Try placing it.



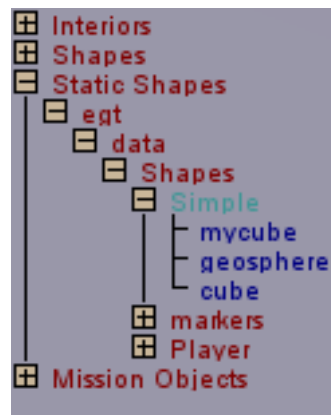
Adding Shapes To Creator Tree

Torque needs the following files to create a Shape:

- DTS – Once a shape has been properly generated, there will be a file named shape_name.dts, where shape_name is the whatever you chose to name your shape object.
- Graphic File(s) – A non-transparent shape will have at least one graphic file. By default, the graphic files used for the shape need to be located in the same directory as the shape's DTS file.
- DSQ(s) (optional) – For an animated shape created in Max (does not apply to shapes created with Milkshape), there is a third type of file, containing animation data. For simplicity sake, this will not be discussed here, other than to note that they may exist. By default, the DSQ file(s) used for the shape need to be located in the same directory as the shape's DTS file.

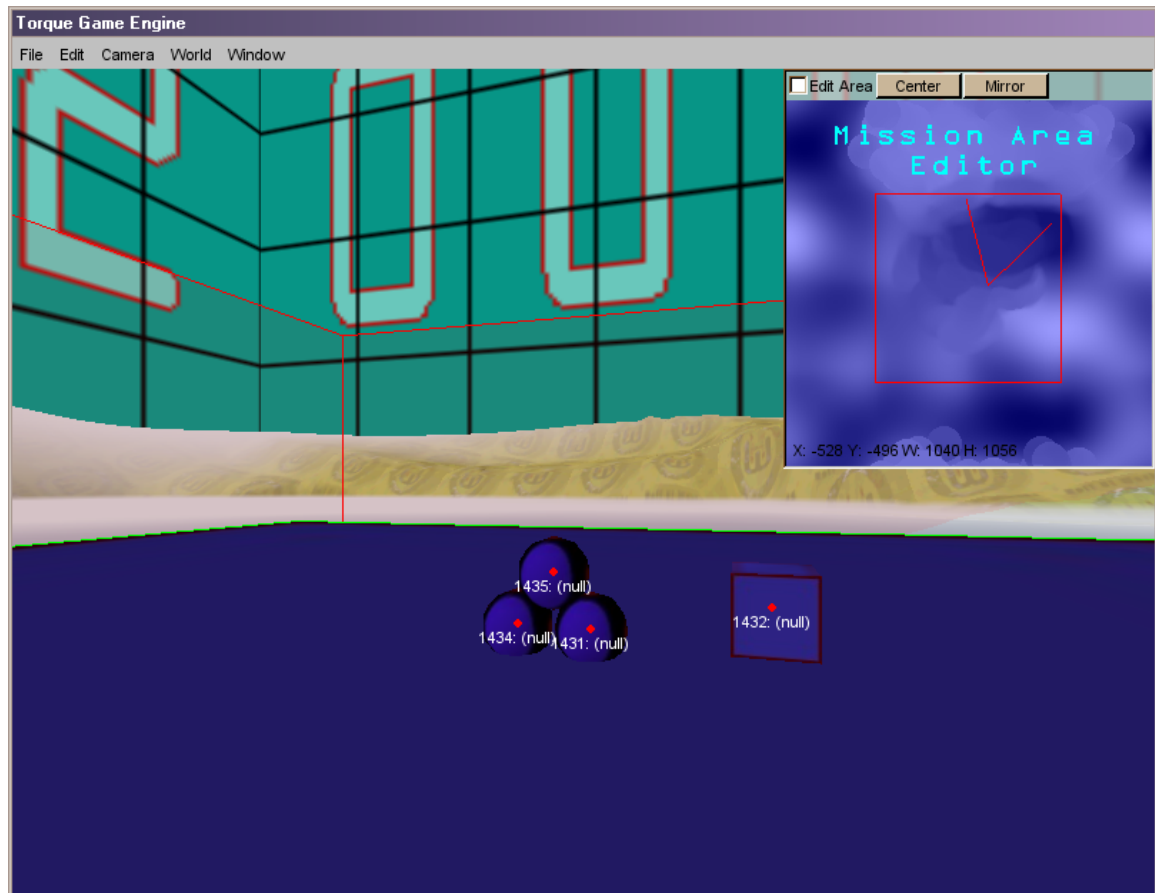
Example:

1. In the directory: 'example\egt\data\shapes\Simple' you will find a file named cube.dts. Make a copy of this file and rename it: mycube.dif.
2. Completely exit the SDK, re-load it, and start the Mission Editor Mission again.
3. Now, in the Creator Tree, under
'Static Shapes→egt→data→Shapes→Simple' you will see a new Shape named: 'mycube'. Try placing it.



You might be wondering why the object showed up in 'Static Shapes' instead of 'Shapes'. Objects under Static Shapes are lightweight objects. Additionally, you can do some scripting to create objects with animations and other characteristics. They will show up under Shapes. You'll learn more about this in the 'On The Job Training' chapter. For now, let us move on to the Mission Area Editor.

Mission Area Editor (Area Editor)



Starting The Area Editor

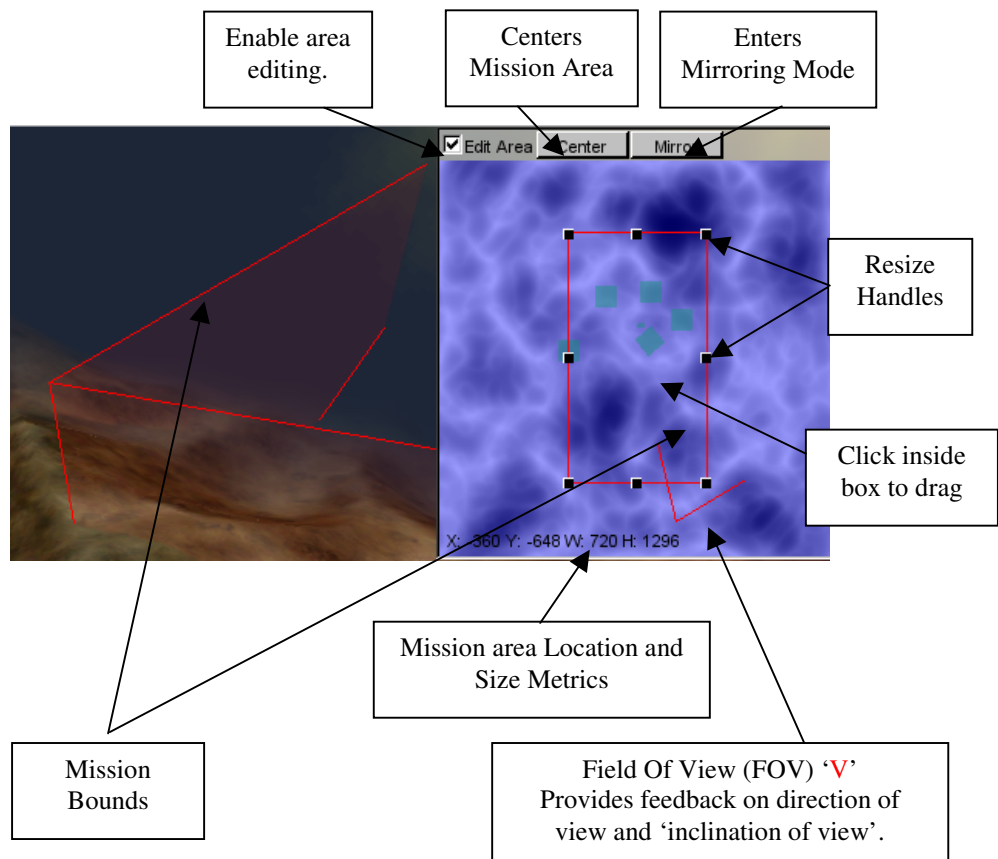
1. Start the Mission Editor by pressing **F11**
2. Start the Area Editor by pressing **F5**

The Mission Area Editor Window

In the upper right corner of the screen, you will see a blue and white image. This image represents the mission map. The Area Editor provides the ability to select the size and location of the mission bounds (or area). Strangely, it also provides a terrain editing feature. It should be noted that manipulating the mission area seems to have some side-effects. In particular, when you re-center the mission area, it tends to move the existing interiors and shapes in the mission. The problem is that this movement seems to be inconsistent. So, my advice is, if you are going to adjust your mission area, do it before you place a significant number of objects in your mission, or you may be very upset at the outcome. Now, let's take a look at the parts of the editor and explain how it works.

Editing the Mission Area

The Mission Area Editor is very simple to use. Simple click the 'Edit Area' checkbox and handles will appear on the mission area box. Now drag and resize to your heart's content. You will be able to see the effect of your changes in the 3D World View Window also. One thing to keep in mind is that the image is inverted. That is, the top of the image is what most would consider 'South', the bottom 'North', and the left and right respectively 'West' and 'East'. This could quickly become cumbersome to remember, so the creators of the Area Editor provided a device to give you a better hint as to where you are looking when you edit. The device I'm speaking of is the Field Of View (FOV) 'V'. Look at the labeled example below:



Before moving on there are a couple of things that you should know:

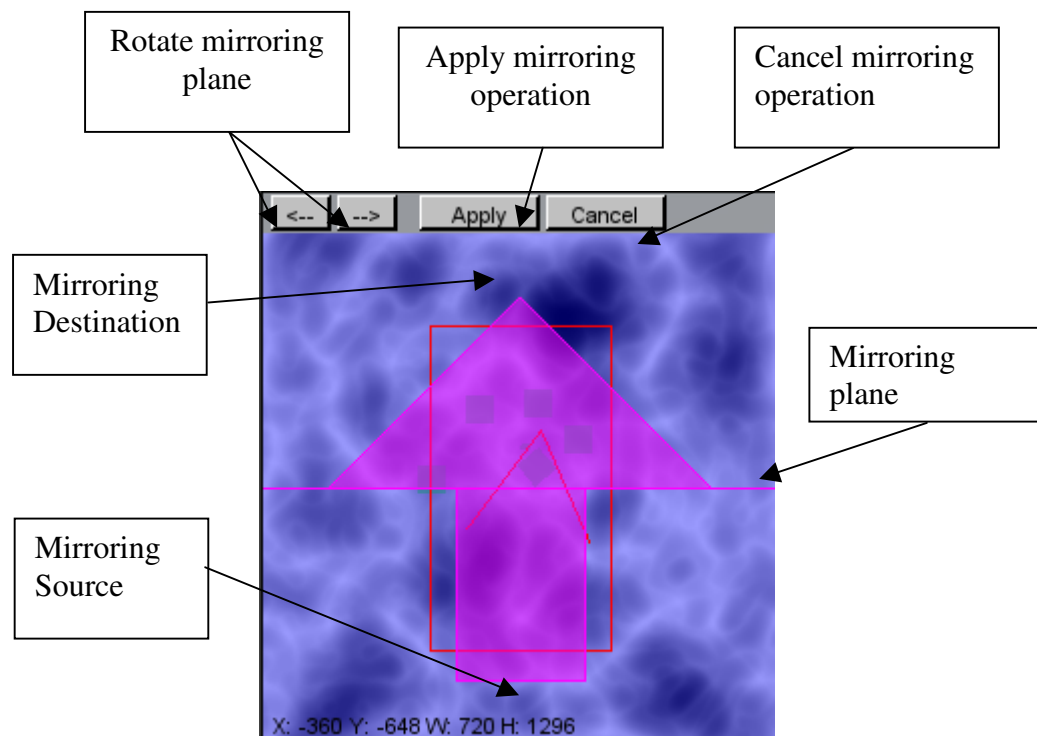
1. You can use the area editor window to rapidly relocate your character/camera. Simply be sure that the Edit Area button is NOT checked and click in the window. Your character/camera (depending on view mode) will 'jump' to that point.

2. The Area Editor has (what I consider) a small bug. If you have made modifications to your terrain using the Terraformer or the Terrain editor, those changes will not automatically be reflected in the Area Editor image. To 'refresh' the image do this:
 - a. Make your terrain changes.
 - b. Start the Area Editor and make sure 'Edit Area' is checked.
 - c. Drag the mission area off center.
 - d. Re-center by clicking the 'Center' button. The updated terrain should now be reflected in the Area Editor image.

The moral of this story is, "Edit your terrain topography first, then edit your mission area. And!!! Do all this before placing interiors or shapes."

Mirroring the Mission Area

As I mentioned above, the Area Editor also provides what I would label a 'terrain editing feature'. Namely, the ability to mirror the terrain. This is very useful if you wish to create a balanced (in terms of terrain obstacles) mission area. To use this feature, click on the 'Mirror' and you will see the image below.

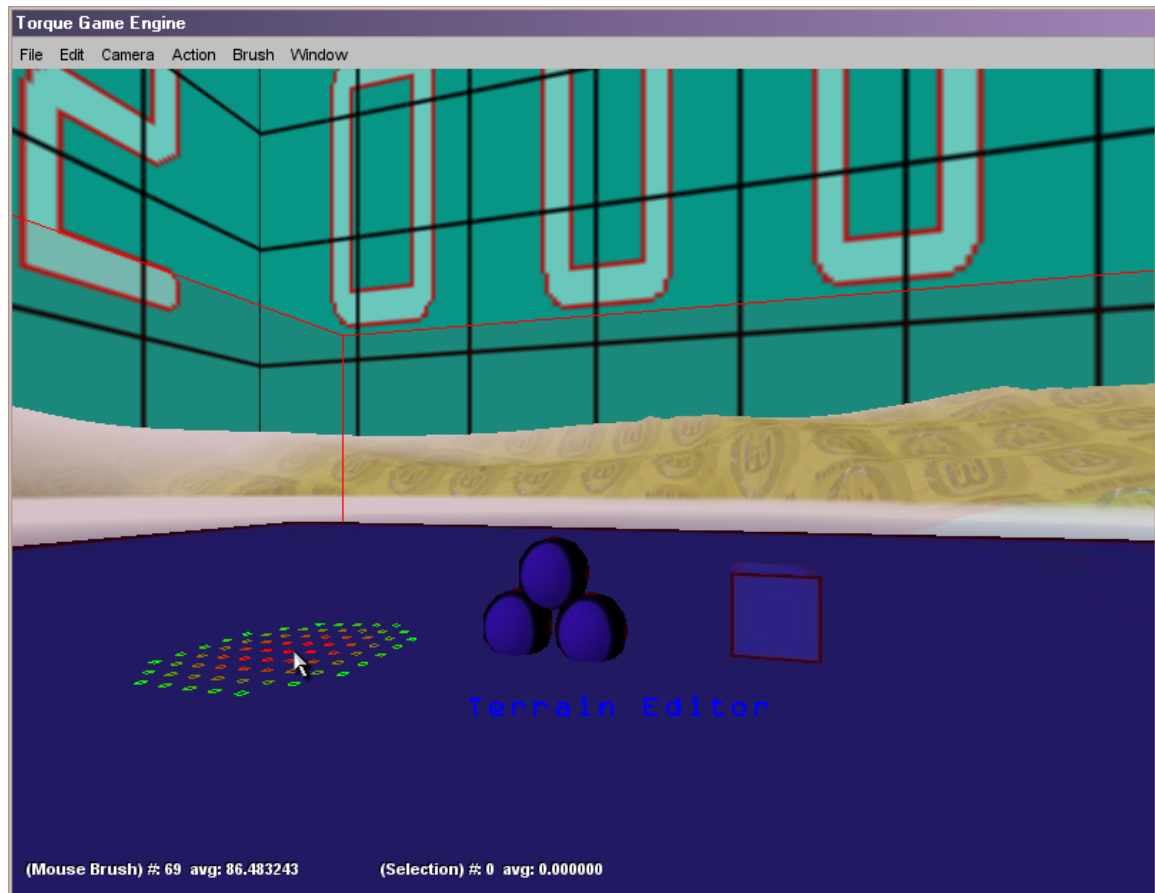


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The premise of this tools is simple:

- Select the orientation of the mirroring plane (with ← → buttons)
- Click Apply to mirror-copy the Source onto the Destination.

Terrain Editor



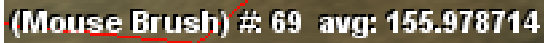
Starting The Terrain Editor

1. Start the Mission Editor by pressing **F11**
2. Start the Terrain Editor by pressing **F6**

The Terrain Editor Window

When you start the Terrain Editor, you will see a shot like the one above. This looks very much like the view in the Manipulator, for the fact that there are no windows obscuring your view. However, if you look closely, you'll notice some odd squares following your cursor around while you move your mouse. These squares are yet another Torque user interface device, the purpose of which is to give you feedback on what terrain area will be affected when you choose to manipulate it and to some degree how it will be affected. Before we jump right into learning how to edit the terrain, let us look at the other two devices on the screen.

The Over Vertex Brush Scale

A screenshot of a game interface element, likely a HUD or console, showing the text "(Mouse Brush) # 69 avg: 155.978714". The text is white on a dark, semi-transparent background. A red circle is drawn around the words "Mouse Brush".

I'm sure someone will correct my naming, but for now I'll refer to the text beside the label (Mouse Brush) as the 'Over Vertex Brush Scale'. The purpose of this 'scale' is two-fold:

1. It shows how many vertices are currently under the brush. In the image above, we have 69 blocks under the brush.
2. It shows the average elevation of the vertices under the brush.

The Normal Brush Selection Scale

A screenshot of a game interface element, likely a HUD or console, showing the text "(Selection) # 0 avg: 0.000000". The text is white on a dark, semi-transparent background.

Again, I'm sure someone will tell me my naming choice is incorrect, but for now I'll refer to the text beside the label (Selection) as the 'Selected Brush Scale'. The purpose of this 'scale' is two-fold:

1. It shows how many vertices are currently 'selected'. (We'll learn about selecting below.)
2. It shows the average elevation of these 'selected' vertices.

Editing

There are two basic modes for editing via the Terrain Editor:

1. **Brush Mode** – The default mode, which I like to think of as 'Brush Mode', is a free floating 9x9 vertex brush. You can adjust the shape and hardness of the brush as well as change its size of by rough increments. In addition, this mode provides several operations.
2. **Selection Mode** – The second mode, which I use less frequently, but which can do things that you cannot do in Brush Mode, is what I like to think of as 'Selection Mode'. In this mode, you select arbitrary blocks of terrain. Then, you can perform a single operation upon them, which is to modify their height via mouse movement.

Editing in Brush Mode

I think it is fair to say that most of your editing is going to be in Brush Mode, and because it is the default mode, I'll discuss it first. As mentioned previously, you can modify the brush shape, hardness, and size. The illustration below describes the details, which are modifiable in the Brush Menu.

The diagram illustrates the Brush Menu interface, which is divided into two tabs: 'Brush' and 'Window'. The 'Brush' tab is active, showing a list of brush options. The 'Window' tab is also visible. The 'Brush' tab contains the following options:

- Box Brush
- ✓ Circle Brush
- ✓ Soft Brush
- Hard Brush

Below these options, there is a section for brush sizes, each with a corresponding Alt key shortcut:










- Size 1 x 1 Alt 1
- Size 3 x 3 Alt 2
- Size 5 x 5 Alt 3
- ✓ Size 9 x 9 Alt 4
- Size 15 x 15 Alt 5
- Size 25 x 25 Alt 6

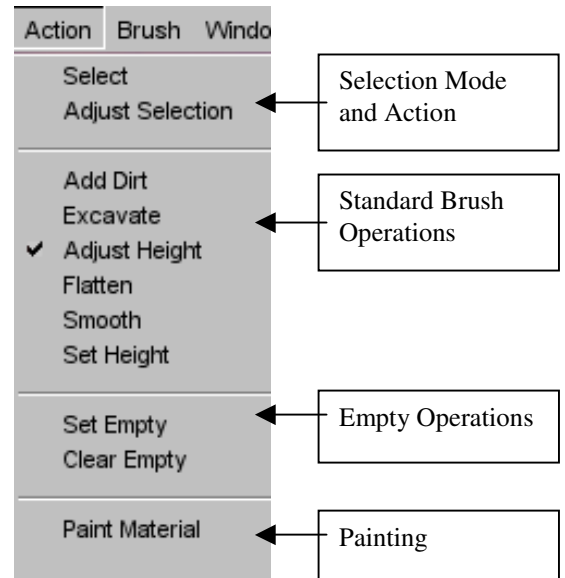
Three callout boxes provide additional information:

- Brush Shape** - There are two basic shapes:
 - A Box, or
 - A Circle (roughly)You may select one or the other.
- Size** - As can be seen, you may select one of a select set of brush sizes. Take note of the keyboard shortcuts.
- Brush Hardness** - Hardness is a figurative way of describing the strength of the brush's affect. This will be described in depth below, but for now consider a hard brush as applying 100% action, while a soft brush may be variable across its diameter. You may choose either Hard or Soft.

OK, now that we know about basic brush manipulation, what about the operations? Let us take a look at the action menu on the next page.

Basic Brush Editing Actions

Operation	Meaning
Add Dirt (*)	 lowers terrain under brush.
Excavate (*)	 raises terrain under brush.
Adjust Height (*)	 temporarily selects vertices under brush. Mouse Up – raises, Mouse Down – lowers vertices.
Flatten	 sets all vertices to brush to average height of vertices under brush. Hint: Look at the Over Vertex Brush Scale.
Smooth (*)	 does a nearest neighbor elevation average on vertices under brush.
Set Height	 sets all vertices to pre-selected height. (see ‘Terrain Editor settings below for setting this value.)
Set Empty (**)	 This ‘removes’ the terrain between the outer edges of the brush.
Clear Empty (**)	 Puts terrain back in spots where it was previously ‘removed’.
Paint Material	 paints vertex with currently selected ‘texture’. (See: ‘Terrain Texture Painter’ chapter)







(*) – This action is affected by brush hardness settings.

(**) – Not a vertex operation per se. These operations modify the block of terrain between a set of vertices.

Selection in Brush Mode

Alright, so what about this other mode, Selection? There isn't really much to it. To get into 'Selection Mode', just open the action menu and click 'Select'. Now, you can select terrain as follows:

Action	Result
 Previously Unselected Vertex	Selects vertex.
 Previously Selected Vertex	May increase strength of action (see discussion of brush hardness below) if the selection cursor has a stronger value than currently selected vertex's action strength.
CTRL +  Previously Selected Vertex	De-selects vertex.

Having selected the terrain blocks that we wish to modify, we can open the action menu and click 'Adjust Selection'. Now, we can  and drag up-down to raise-lower the elevation of the selected blocks.

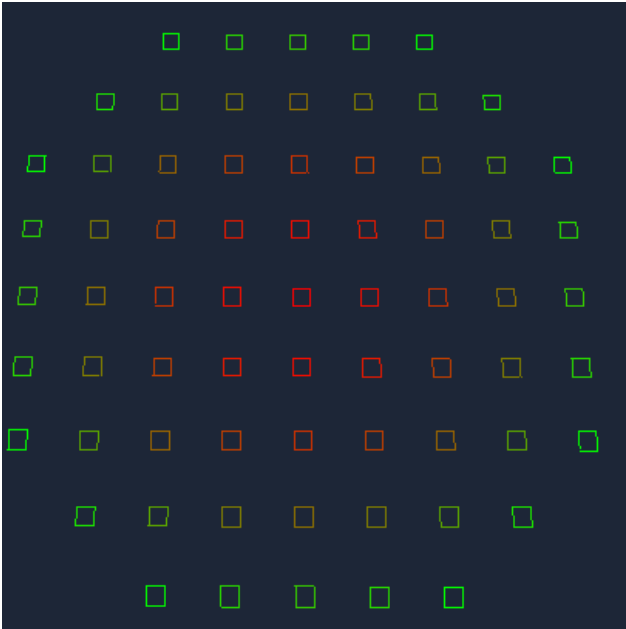
To leave selection mode, select any other operation in the action menu. Also, once selected, vertices stay selected, regardless of mode. If you wish to de-select all selected vertices press **CTRL + N** or click 'Select None' in the Edit menu.

Brush Hardness

Brush hardness has been mentioned several times but not completely explained. When the brush hardness is set to Soft, the action strength along the diameter of the brush can be modified. In simple terms, if the strength of action is set low, then the value change for that part of the brush is also low. Vice versa, if the strength of action is set high, the value change for that part of the brush will be high. This attenuation is in relation to the movement of the mouse. The brush gives strength of action feedback through coloration. Brush coloration is a continuous scale from RED to GREEN. You can manipulate this hardness in the Terrain Editor Settings dialog found under the Edit Menu.

Color	Relative Hardness (Strength of Action)
RED	Hardest (100%)
ORANGE	Hard (> 50%)
YELLOW	Soft (< 50%)
GREEN	Softest (Almost 0%)

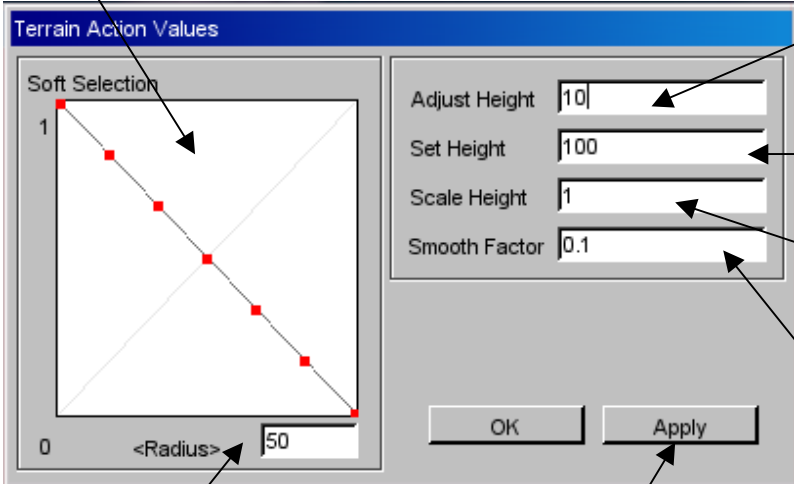
For example, the brush below is hard in the middle progressing to soft on the edges.



Terrain Editor Settings

Earlier, I deferred a discussion of these settings. Now is the time to understand them. In addition to being able to adjust brush shape, hardness, and size, the ‘Terrain Editor Settings...’ Dialog, found under the Edit menu, gives us some additional control.

This spline scale modifies the hardness of the brush.
Left is center.
Right is outer edge.



The screenshot shows the 'Terrain Action Values' dialog box. On the left is a 'Soft Selection' graph with a diagonal line and red control points. Below the graph is a '<Radius>' input field with the value '50'. On the right are four input fields: 'Adjust Height' (10), 'Set Height' (100), 'Scale Height' (1), and 'Smooth Factor' (0.1). At the bottom are 'OK' and 'Apply' buttons. Arrows point from text boxes to these elements.

Adjust height increment.

Elevation for set height operation.

Scale height increment.

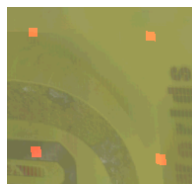
Smoothing factor – Lower values are less aggressive.

<Radius> seems to imply that there is a way to affect the brush radius. Unfortunately, this only applies to Selection Mode. (See below)

Click APPLY to make changes take affect.
OK does nothing. Think of it as CANCEL.

Selection and <Radius>

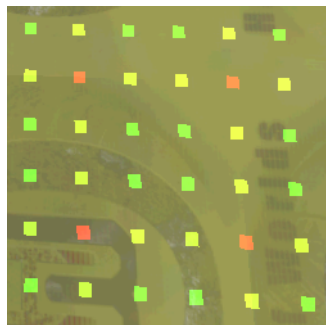
I had a bit of difficulty understanding <Radius> when I was learning about the engine. So, instead attempting to explain it with words, I'll give a pictorial example that should clear it up. In the following sequence, I have changed to Selection-Mode and am using a 1x1 brush. I then selected a single vertex and then opened the 'Terrain Editor Settings...' dialog.



<Radius> == 1

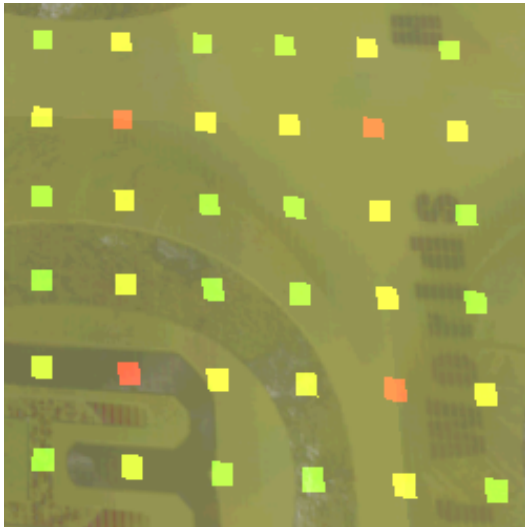


<Radius> == 8



<Radius> == 12

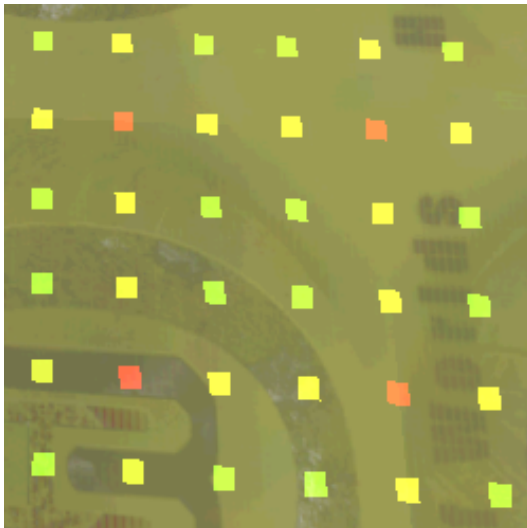




<Radius> == 14



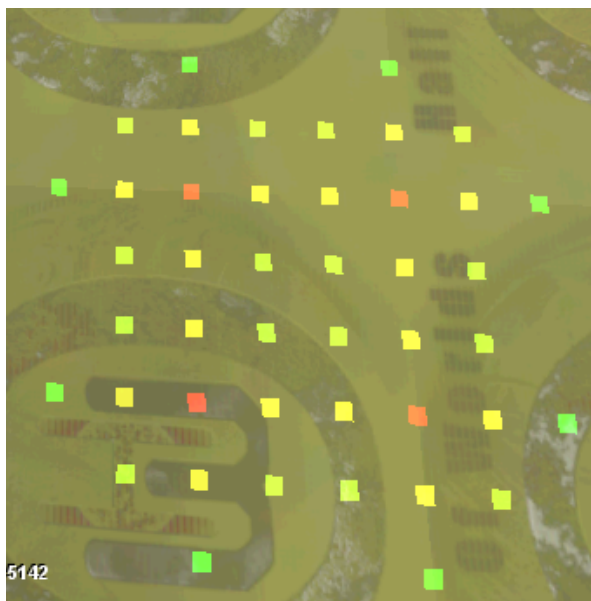
Slight increase in strength of action
(greens becoming more yellow).



<Radius> == 15



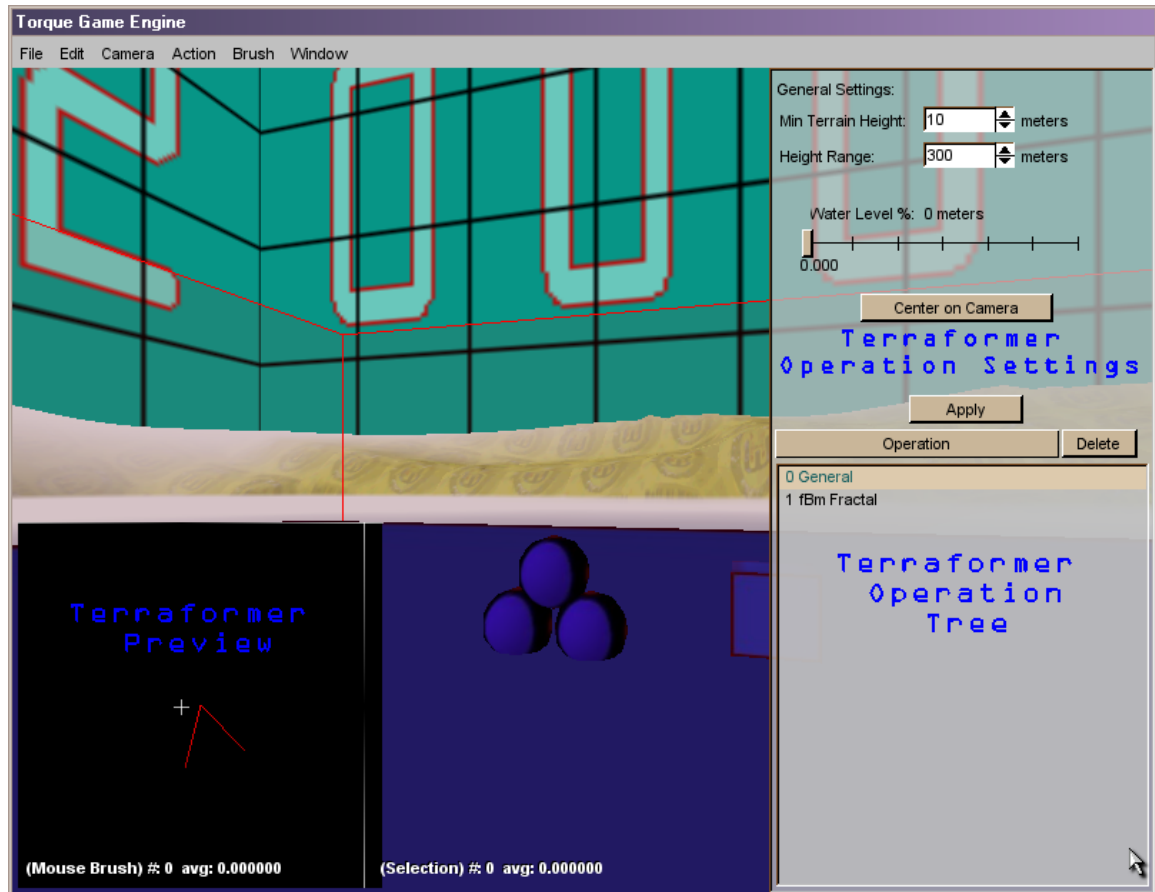
Larger increase in strength of action.
Now previously green selections are
almost entirely yellow.



<Radius> == 16



Terrain Terraform Editor (Terraformer)



Starting The Terraformer

1. Start the Mission Editor by pressing **F11**
2. Start the Terraformer by pressing **F7**

The Terraformer (An Overview)

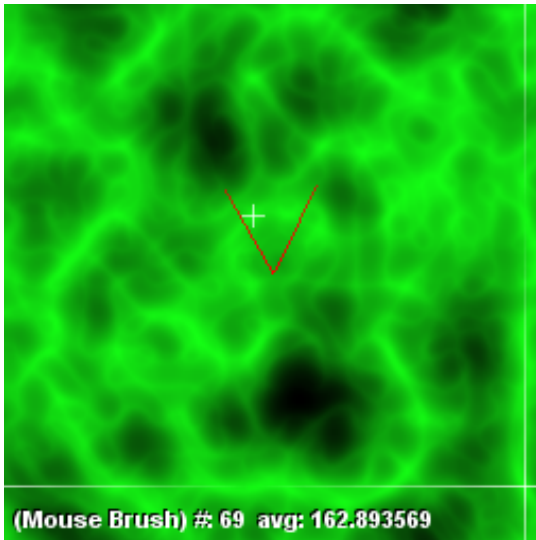
Of all the in-game editor tools, the Terraformer is probably the most elaborate and complicated one. The shortest definition one could give this tool is, “a tool to algorithmically build terrains”. You may ask, “Why would I want to use this tool to build my terrains?” The number one reason I can think of is: It is a fast way to create interesting terrains.

I must admit, I struggled with this part of the guide. I wanted to provide in-depth coverage of all of the topics I discuss, but at the same time, I wanted to complete the guide in a reasonable amount of time. Considering the fact that you wouldn't get any benefit from this guide if I didn't complete it rapidly, I have decided to describe this tool generally. That said, I'll give the following details about the Terraformer:

1. Description of Terraformer windows.
2. Summary of all operations.
3. Run-down on how operations are applied.
4. Brief descriptions of the individual operation interfaces.
5. A list of important 'Terraformer factoids'.

The Terraformer Preview Window

If you are reading this guide from front to back, this will be the first time that you have seen this particular window. You'll note that it is similar to the 'Mission Area Editor Window'. In fact, this window displays very similar data. For the purpose of this discussion, we'll focus on the following aspects:



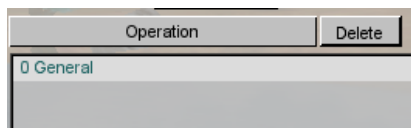
1. Center Marker – There is a faint white '+' in the preview window. This marks the center of the map. Every time you apply Terraformer operations, this is where the camera will be moved to.
2. FOV Marker – There is a red 'V' which is always in the center of the window. This shows your current Field Of View. i.e. area in your view relative to the map.
3. Boundary Marks – In addition to the center marker, there are faint horizontal and vertical lines, representing the boundaries of the current heightmap.
4. Heightmap Image – Although it may not be obvious at first, the image in the preview window is a translation of the heightmap. The funky coloring can be interpreted very easily. The darker an area is, the lower it is. Likewise, the lighter an area is, the

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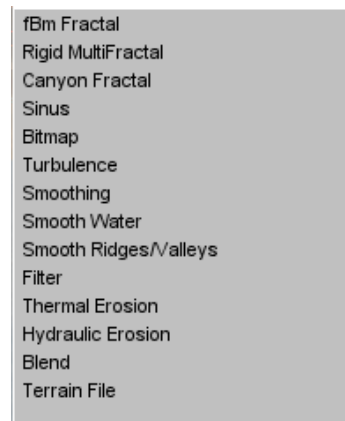
higher it is.

Terraformer Operations Tree

In the lower right corner of the screen, you will find the Terraformer Operations Tree. There is a button labeled 'Operations' clicking on this will bring up a pull-down menu with all the operations. When you select an operation, it is added after the currently highlighted operation (so you can insert new operations into the middle of a list of existing operations).



Terraformer Operations Tree



Terraformer Operations Pull-down

Terraformer Operations

Each of the Terraformer operations has its own settings. These can be accessed in the upper right window. Before we cover these, let's quickly enumerate and describe the general properties of the operations.

In his Tribes Editing guide, 'Editing Maps and Missions in Tribes 2', Tim Hammock appropriately categorizes the operations as either 'Generators' or 'Filters'. In addition, I would like to add the category 'Base'. The following tables give a summary of the Base, Generator, and Filter operations:

Base	Summary
General	This is the default operation. It cannot be removed from your list of operations. The values set in this operation are used by subsequent generators and filters.

Generators	Summary
fBm Fractal	The random fractional Brownian motion generator (if you were wondering what the acronym means) is a basic terrain generator. It produces rolling hills with various steepness based on settings. It tends to produce smoothly topped hills, but can produce jagged peaks.
Rigid MultiFractal	Another fractal based generator, this tends to produce hills with serrated (or sharp) peaks.
Canyon Fractal	This fractal based generator produces a series of troughs (canyons). It can produce shallow to deep canyons that run straight or twist.
Sinus	This generator would probably be impossible to get a handle on without the code. However, a quick peek shows that this generator creates terrain by iteratively adding the scaled sum of a sine and cosine pair with some basic noise for flavor. Huh? Forget it. The description isn't entirely correct and even if it were it wouldn't mean much. Just remember that, ignoring the noise element, all terrains produced with this

	generator have the same base shape. Your choice of settings will determine how this shape is applied to progressively smaller sections of the terrain. I'll give more details below.
Terrain File BROKEN	This operation should allow you to import a previously created terrain file, but currently it does not work.
Bitmap	This operation allows you to import an image file as your terrain heightmap.

Filter	Summary
Turbulence	This filter erodes and ‘re-deposits’ terrain features and kind of reminds me of the smudge brush applied algorithmically. It seems to erode more than it re-deposits. Both of these actions are done in a swirly turbulent (therefore the name) fashion. This filter significantly alters the look of your terrain.
Smoothing	This is a simple nearest-neighbor averaging filter. It will tend to remove jagged areas in your terrain.
Smooth Water	This is like the smooth filter, but is limited to smoothing terrain that is at or below the level of global water height (set under General filter). No smoothing is done for features above the waterline.
Smooth Ridges/Valleys	As the name implies, this filter affects specific regions based on their characteristics. Plateaus with jagged edges will be rounded at the edges while retaining their original steepness. Deep dimples in valleys will be filled in. How much depends on settings.
Filter	This filter allows you to adjust groups of ‘like elevations’ globally. In other words, terrain heights are divided into discretely modifiable groups, from lowest elevation to highest elevation.
Thermal Erosion	This is a very aggressive eroding filter. You can rapidly remove materials from sloped areas of your terrain with this. The official docs say this uses a ‘thermal erosion’ algorithm.
Hydraulic Erosion	This is a very weak eroding filter. The official docs say this uses a ‘hydraulic erosion’ algorithm.

Filter	Summary
Blend	This cool filter allows you to combine two existing operations via a set of mathematical operations. We'll play with this later.

How Operations Are Applied

Operations are applied to the Terrain in the order they appear in the list, top to bottom. This means, if you apply two generators in a row, the second generator's results are the only ones that will be seen. More interestingly, you can apply filters in different orders for different results. The best way to learn about these operations is to experiment. That said, I'll give a quick run-down of the various operations' settings and the set you loose.

Operations' Settings

General

General Settings:

Min Terrain Height: 50 meters

Height Range: 300 meters

Water Level %: 0.000

Center on Camera

Apply

Operation Delete

- **Min Terrain Height** (0..500) – Defines the lowest possible point in the map. Tools and generators will not be allowed to create terrain elevations lower than this.
- **Height Range** (5..500) – Defines the maximum difference between min-height and max-height. Therefore, max elevation == *min height + range*.
- **Water Level** – Is a global value used as input to subsequent filters. It does not place water.
- **Center on Camera** – Sets the map origin to the current location of the camera.

fBm Fractal

fBm Fractal Settings:

Hill Frequency: 9

Roughness: 0.000

Detail: Normal

Random Seed: 1648921061

New Seed

Apply

Operation Delete

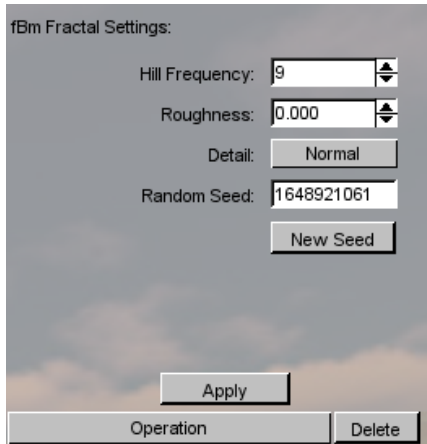
- **Hill Frequency** (1..24) – Indirectly determines number of hills. Higher values create more hills.
- **Roughness** (0.0..1.0) – Determines roundness of hills. Lower values tend to create more rounded hills, while higher values create taller and more pointy hills. i.e. steeper slopes
- **Detail** (Very Low..Very High) – In terms of visual results, higher values produce more jagged peaks (knife edges).
- **Random Seed** – Seed that feeds into random portion of generator. Using the same value for subsequent generations produces same sequence of numbers.

- **New Seed** – Creates a new seed.

Tips:

- If, your height range is large (say 350+), you will tend to have jagged hills, regardless of other settings.
- With a default height range (300), Very High Detail will tend to create knife edged hills, even for low Hill Frequencies (8).

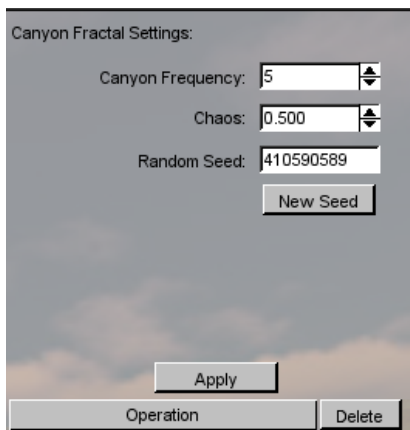
Rigid MultiFractal

A screenshot of the 'fBm Fractal Settings' dialog box. It features a background image of a cloudy sky. The settings include: 'Hill Frequency' set to 9, 'Roughness' set to 0.000, 'Detail' set to 'Normal', and 'Random Seed' set to 1648921061. There are 'Apply', 'New Seed', 'Operation', and 'Delete' buttons.

- **Hill Frequency** (1..24) – Indirectly determines number of hills. Higher values create more hills.
- **Roughness** (0.0..1.0) – Determines roundness of hills. Lower values tend to create more rounded hills, while higher values create taller and more pointy hills. i.e. steeper slopes
- **Detail** (Very Low..Very High) – In terms of visual results, higher values produce more jagged peaks (knife edges).
- **Random Seed** – Seed that feeds into random portion of generator. Using the same value for subsequent generations produces same sequence of numbers.

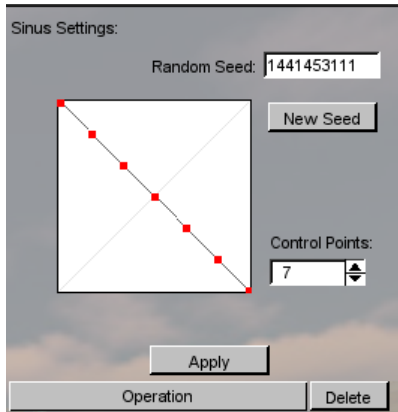
- **New Seed** – Creates a new seed.

Canyon Fractal

A screenshot of the 'Canyon Fractal Settings' dialog box. It features a background image of a cloudy sky. The settings include: 'Canyon Frequency' set to 5, 'Chaos' set to 0.500, and 'Random Seed' set to 410590589. There are 'Apply', 'New Seed', 'Operation', and 'Delete' buttons.

- **Canyon Frequency** (4..10) – Number of canyons to produce.
- **Chaos** (0.0..1.0) – A value of zero will produce very artificial looking and straight canyons. A value of one will produce squirrely features, almost unrecognizable as canyons.
- **Random Seed** – Seed that feeds into random portion of generator. Using the same value for subsequent generations produces same sequence of numbers.
- **New Seed** – Creates a new seed.

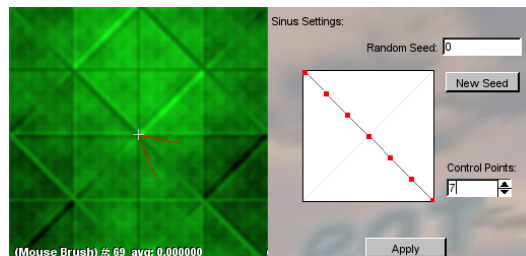
Sinus



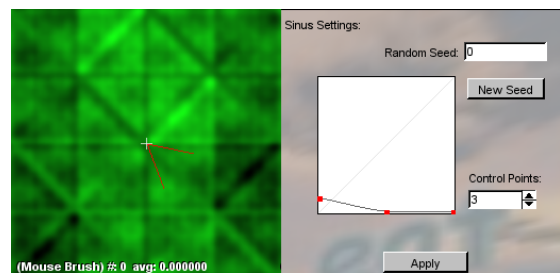
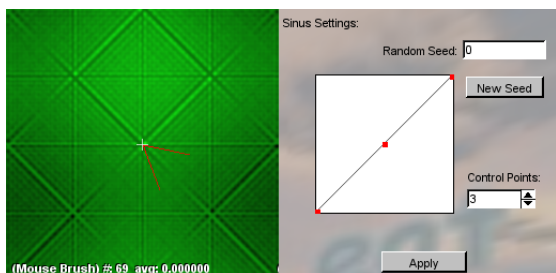
- **Scale** (on..off)– In this instance, the scale doesn't provide quite appropriate feedback. Although it implies there are ranges of values for each control point, values are either on or off. Dragging a control point to the bottom turns it off. Any other vertical position is on.
- **Random Seed** – Seed that feeds into random portion of generator. Using the same value for subsequent generations produces same sequence of numbers.
- **New Seed** – Creates a new seed.
- **Control Points** – Controls number of points on

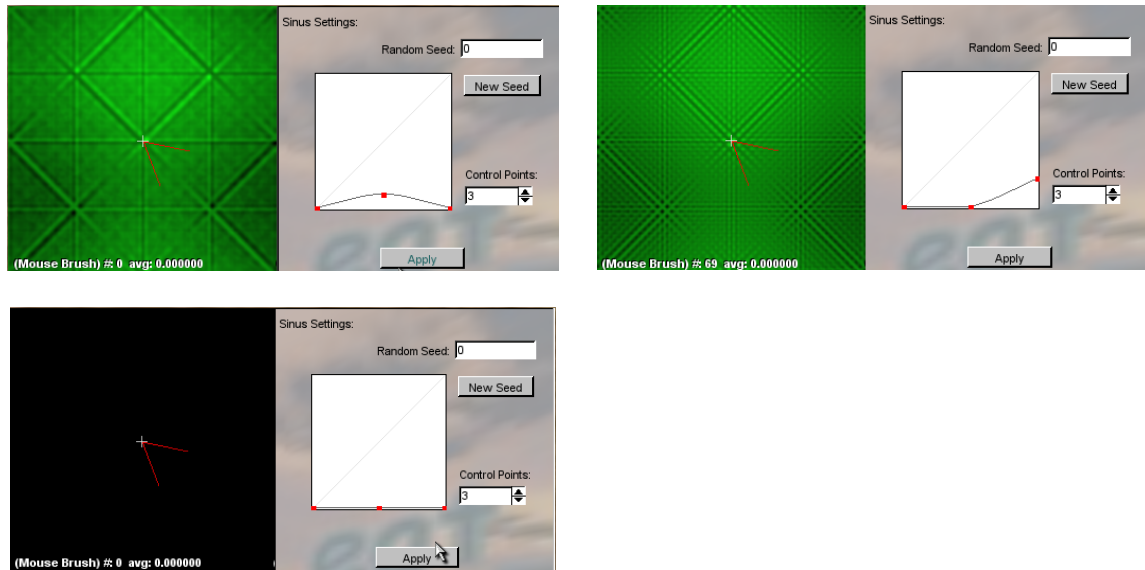
scale. (Remember, this has a bug. Type the values in instead of using the up-down buttons). More control points mean more detail. i.e. Higher levels of sub-division and iteration.

As mentioned before, this generator builds the terrain using a combination of sinusoidal values and noise. If you want to see the underlying structure, set the seed to 0. Now, poking around with the control points will produce something like this:

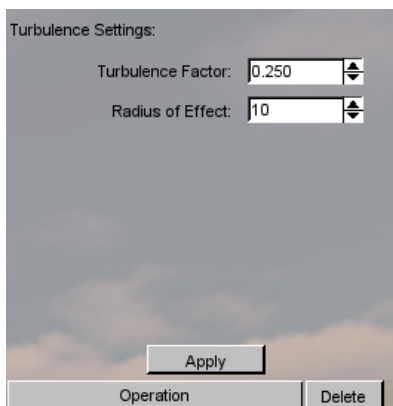


Now set the number of control points to 3. Notice that the overall structure is still recognizable:



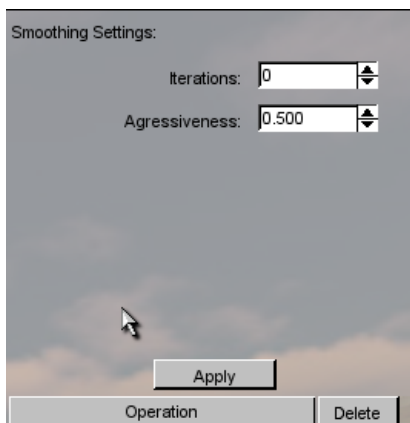


Turbulence



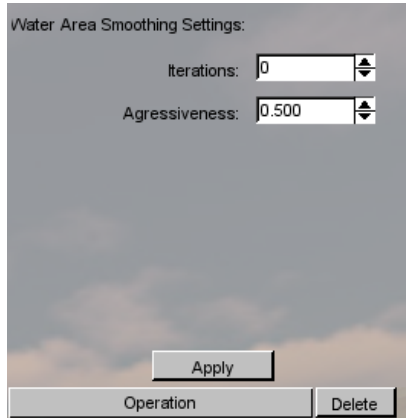
- **Turbulence Factor** (0..1.0) – Determines strength of action. Lower values mean less displacement and less variation in height. Higher values mean vigorous ‘swirling’ and modifications to height.
- **Radius of Effect** (1..40) – Determines filter size. I believe 1 equals a 3x3 filter, 2 equals a 4x4 filter, etc. up to a 42x42 filter.

Smoothing



- **Iterations** (0..40) – Determines number of smoothing passes to run.
- **Agressiveness** (0.0..1.0)– A relative factor, determining how much material to remove.

Smooth Water



Water Area Smoothing Settings:

Iterations:

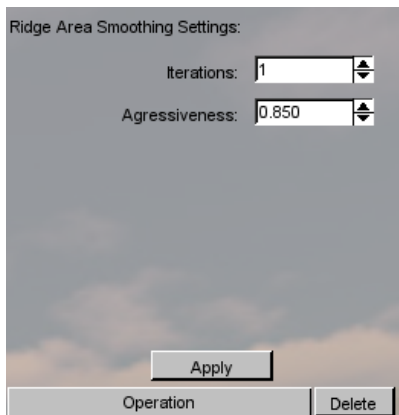
Agressiveness:

Apply

Operation Delete

- **Iterations** (0..40) – Determines number of smoothing passes to run.
- **Aggressiveness** (0.0..1.0)– A relative factor, determining how much material to remove.

Smooth Ridges/Valleys



Ridge Area Smoothing Settings:

Iterations:

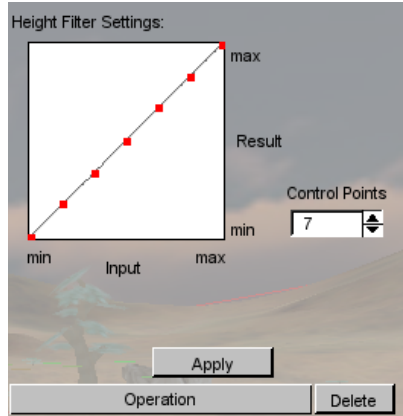
Agressiveness:

Apply

Operation Delete

- **Iterations** (0..40) – Determines number of smoothing passes to run.
- **Aggressiveness** (0.0..1.0)– A relative factor, determining how much material to remove.

Filter



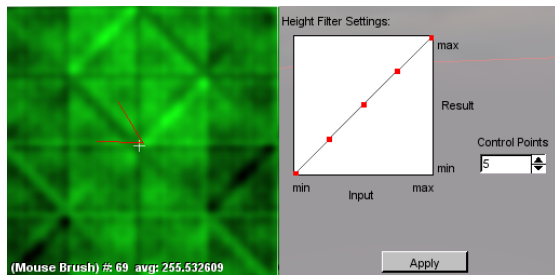
- **Scale** – Each control point corresponds to a specific height (see below for calculation). Subsequent applications change these values.
- **Control Points** – Determines how many elevation bands there are.

You can make significant and rapid changes to your terrain with this filter. Understanding how this works can be kind of tricky. At first, you might think that the ranges will be based on the min-height and height-range set in the General settings. This may or may not be true. If your current terrain extends to the lowest and highest points, then, Yes. However let's say your min-height is set to 0, but your lowest elevation is 100. Also, height-range is set to 200, but your highest elevation is only 200 (i.e. half the range). Then, the elevation bands are determined as follows:

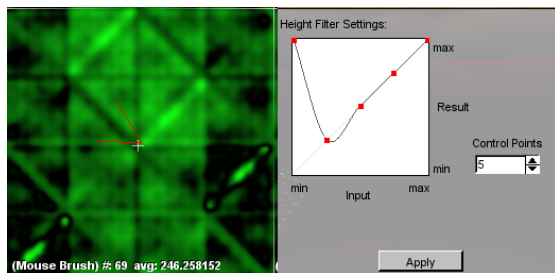
- Lowest Elevation: 100 meters
- Highest Elevation: 200 meters
- Control Points: 5
- Width of each elevation band: $(200-100)/5 == 20$ meters
- Resultant Elevation Bands (left-to-right in scale):

Control Point 1	Control Point 2	Control Point 3	Control Point 4	Control Point 5
100..119 meters	120..139 meters	140..159 meters	160..179 meters	180..200 meters

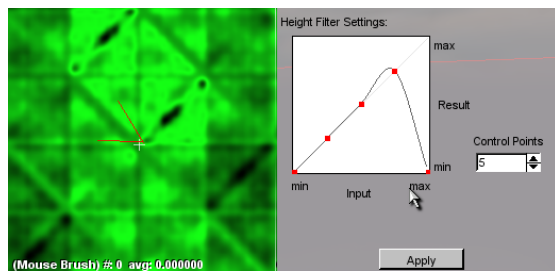
Moving a control point is like grabbing all elevation in that band and raising or lowering it by a relative amount. Additionally, I believe that there is a push-pull relationship between bands of elevation. That is, by modifying one band, you also (slightly) modify all other elevation bands. Below are some sample changes so you can judge for yourself. Whatever the case, this tool rapidly changes the face of your terrain, so caution is the word.



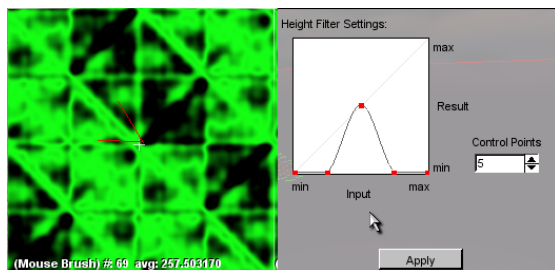
Note: By default, the scale comes up looking like this (only it has seven control points). If left like this, NO CHANGES will be made.



Here we raise the low elevation band as much as possible. Remembering that lighter values are higher elevation, notice that some previously dark regions are now very light. Also, notice that overall, the total elevation of the map seems to have been lowered. Interesting...

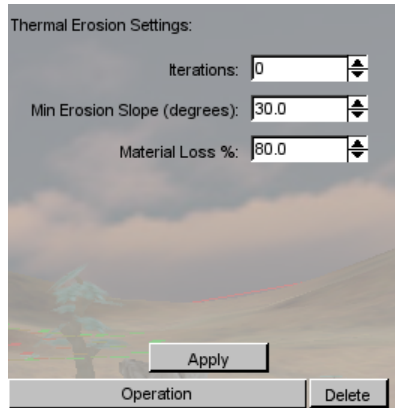


Here we lower the high elevation band as much as possible. Lo and behold, previously high areas are now completely dark, but what else has happened? The reset of the map seems to have raised. Even more curious...



In this example, we've lowered all bands except for the middle band. As can be easily seen, we've basically said, "make the middle band the highest range."

Thermal Erosion

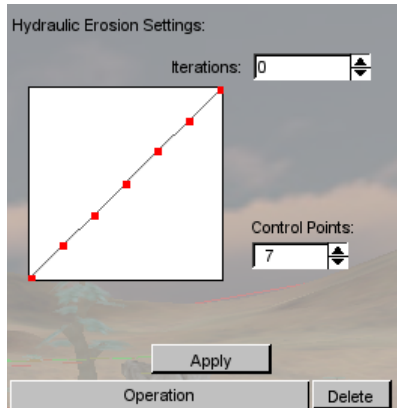


- **Iterations (0..50)** – Determines number of smoothing passes to run.
- **Min Erosion Slope (0.0..89.0 degrees)** – Defines a cut-off slope value. What this is saying is, do not apply this erosion to slopes with a current value lower than that set here. i.e. if a slope has a 15 degree inclination and this value is set to 45, no changes will be made to that part of the map.
- **Material Loss (0..100)** – What relative percentage of material should be removed per pass.

Tips:

- For multiple iterations, I believe that if a slope falls below the min-erosion-slope, erosion no longer affects that area.
- The material loss value is a bit misleading. 100% loss doesn't mean, "set this value to lowest height". Instead it means something like, "set this value to lowest nearby height".
- This is a very vigorous filter, quickly removing large quantities of material.

Hydraulic Erosion

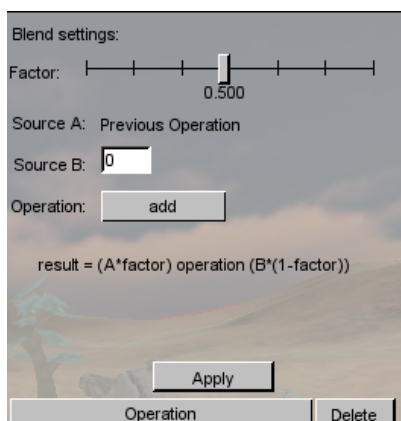


- **Scale** – No effect.
- **Iterations (0..50)** – Determines number of erosion passes to run.
- **Control Points** – No effect.

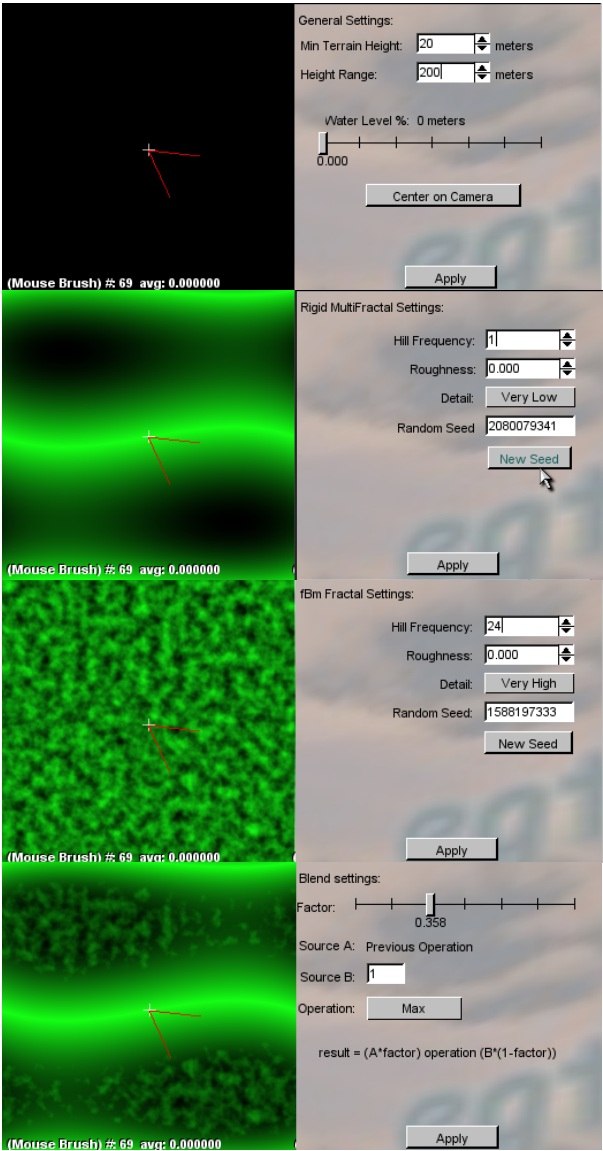
Tips:

- This is one of those cases, where having access to the code shortens research drastically. The scale (filter) is passed in to the erosion method, but not used. So, whatever changes you make to it are going to be ignored. Since control points are part of the same mechanism, you can ignore these too. The only thing you need to modify is iterations.
- This sweet little filter seems to fill one duty. Erode the channels, or low points, between steep hills. I'm sure it erodes wide flat basins too, but the effects are not as noticeable. You've got to admire the person who coded this. To write an algorithm that consistently targets a specific terrain feature for erosion? Brilliant!

Blend



The parameters to this filter, modify the blending equation above the 'Apply' button. Easy as pie. Just remember, Source A is always the operation prior to this blend. (Yes, it can be a blend of a blend of a...well you get the idea). I've reproduced sweet little experiment originally done by Zear in his guide below to show what this filter is capable of.



Step 1
Min Height: 20
Height Range: 200
Water Level: 0

Step 2
Hill Frequency: 1
Roughness: 0.000
Detail: Very Low
Seed: 2080079341

Step 3
Hill Frequency: 24
Roughness: 0.000
Detail: Very High
Seed: 1588197333

Step 4
Factor: 0.358
Source B: 1
Operation: Max

Loading A Bitmap

I have purposely deferred a discussion of loading your own bitmaps till the end. Of all the questions I see asked over and over in the forums, one of the most repeated is, “How do I load a bitmap as my terrain?”. As you would imagine, doing this is relatively simple. Unfortunately, as checked in, the HEAD (and 1_2) versions of Torque are not set up to do this. You need to make the following change:

- Locate the directory: ‘example\common\editor’
- create a new sub-directory named: ‘heightScripts’ (may be all lowercase for Unix)

From now on, if you want to use a bitmap for your terrain, just copy it to ‘example\common\editor\ heightScripts’ before starting the SDK and it will be available. I say before because the SDK builds a list of the files in this directory when it loads, so adds that happen subsequently to starting the SDK will not be seen.

Please note, although loading a bitmap seems to imply a BMP you can only use PNG files.

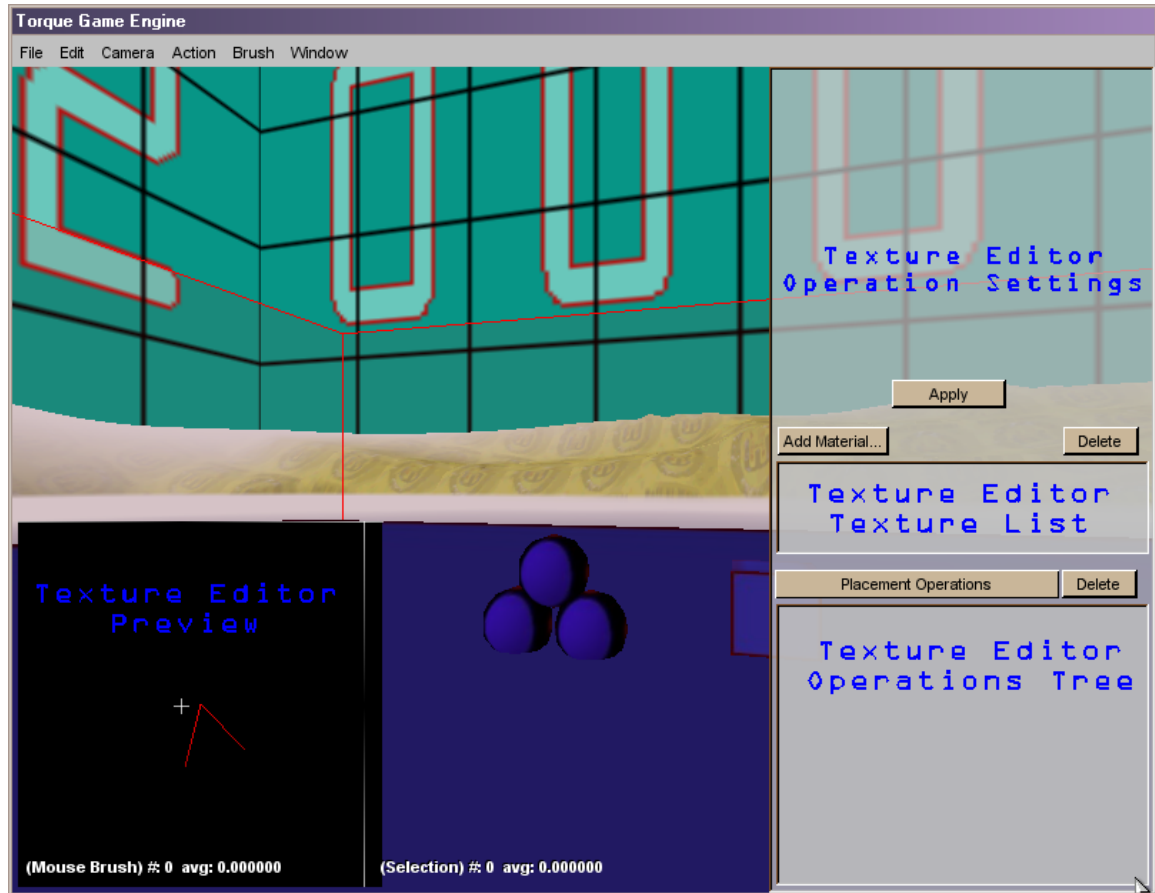
Loading A Terrain File

Currently this feature is BROKEN.

Terraformer Factoids

- Need for loading bitmaps as terrains 'example\common\editor\heightscripts' (see 'Loading A Bitmap' above)
- Please note that Tim Zear has produced a Tribes™ 2 to 'Editing Maps and Missions' which has a great section on the Terraformer among other topics.
- ***Rick Overman*** did much of the work on the Terrain Generator code (As stated in thread ...qt=445. If you think this is the coolest thing since sliced bread or if you want some real data on how it works, you might ask him.

Terrain Texture Editor



Starting The Terrain Texture Editor

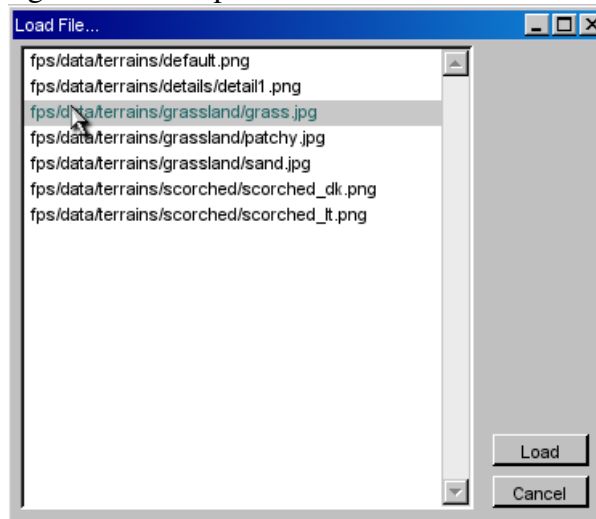
1. Start the Mission Editor by pressing **F11**
2. Start the Terrain Texture Editor by pressing **F8**

The Terrain Texture Editor Preview Window

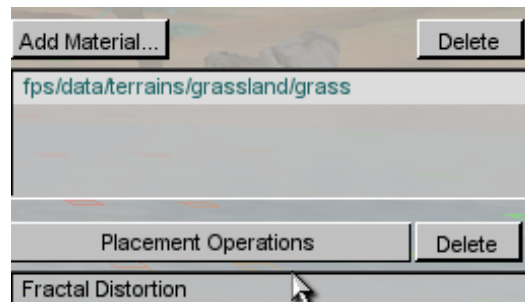
After the Terraformer, the Terrain Texture Editor is probably the second most complicated tool in the mission editor tool kit. Again, we're faced with an array of operations which can be performed, based on various factors and settings. When all is said and done, this tool's main goal is to allow us to place textures on our terrain via selection algorithms and calculations. The end result of said placement can be a very natural or un-natural looking landscape. Like the Terraformer, we have the Preview Window, Operations Tree, and Settings Window. In addition, we have a Textures List, snuggled in-between the settings window and the operations tree.

The Texture Editor Textures List (Loading Textures)

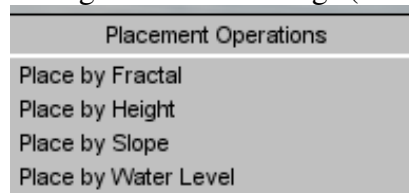
Before we can start texturing our terrain, we need to decide which textures will be part of our palette. To load a terrain, simply click the ‘Add Material...’ button and select a terrain from the dialog that comes up:



The Terrain Texture Editor places our textures in layers. The first (top-most) texture in the Texture List is the base layer. This is the texture that is visible if no other textures get applied to a point on the terrain. In this case, we have selected the ‘grass’ texture as our base texture:



Subsequently added Materials are always placed at the end of the list. These textures are applied based on an algorithm and settings (or Placement Operations):

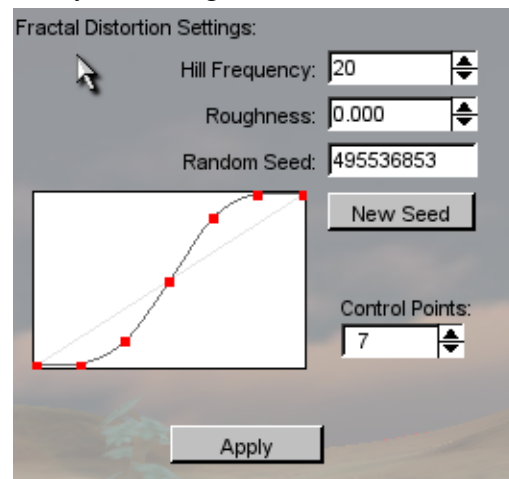


In the case that two textures (besides the base texture) are applied to the same pixel on the terrain, they are blended.

Terrain Texture Editor Operations

Fractal Distortion (Base Filter)

Every Texture gets a base filter called ‘Fractal Distortion’ the purpose of this filter is to

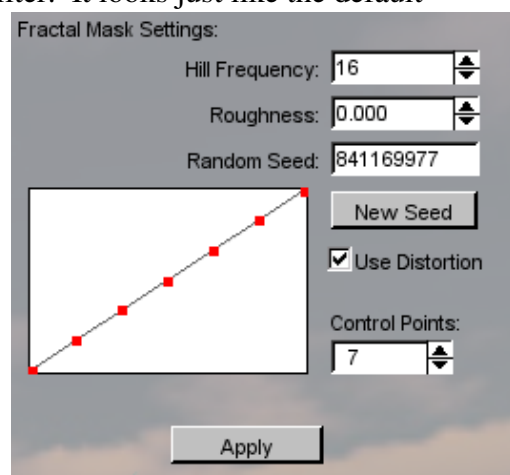


provide randomness to the way the textures are placed. The interface is very similar to the Terraformer’s fBm generator. The major difference is the scale interface. To be honest I don’t have a real clue as to the exact function of this device in this context, but I can hand wave it. I’m guessing that control points are levels of detail and that the vertical scale affects how much of the prior texture(s) show through this texture after blending. i.e. if a point is at the bottom, 100% of the prior texture shows through this texture (this texture not applied) and if a point is at the top, 0% of the prior texture shows through this texture.

Place by Fractal

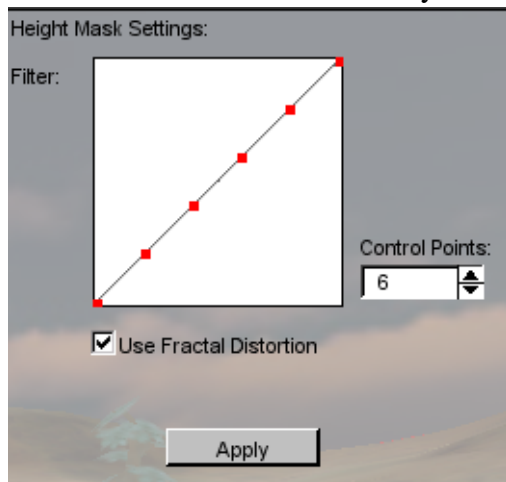
Again, I’m puzzled by the exact function of this filter. It looks just like the default Fractal Distortion Filter with the addition of a checkbox saying we can ignore the default Distortion filter. I think there must be some history here otherwise, why would the designers have provided two fractal filters?

Well, your mileage with this and the prior filter will vary. I suggest that you experiment with them and see what you get. In my opinion, the following filters are more interesting for adding specific texturing affects.



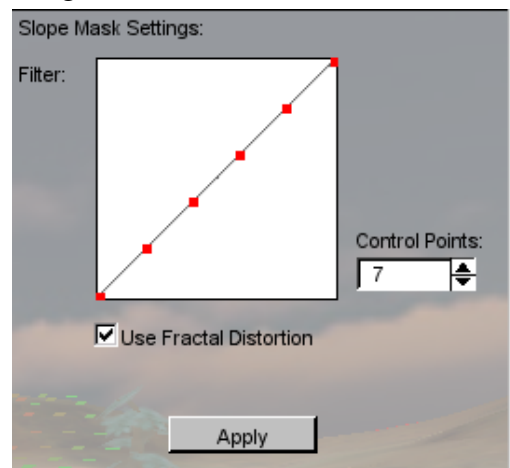
Place by Height

This was the first filter that really made sense to me when I looked at it. The premise of this filter is simple. Basically, it places textures at certain delineated bands (or elevations) and blends them based on the vertical setting for that band. I'll show the result of this in the examples below.



Place by Slope

As with the Height Filter, this filter is relatively straightforward. The left side of the scale represents less steep terrain and the right side represents more steep terrain. Again, the vertical scale is the blending factor.

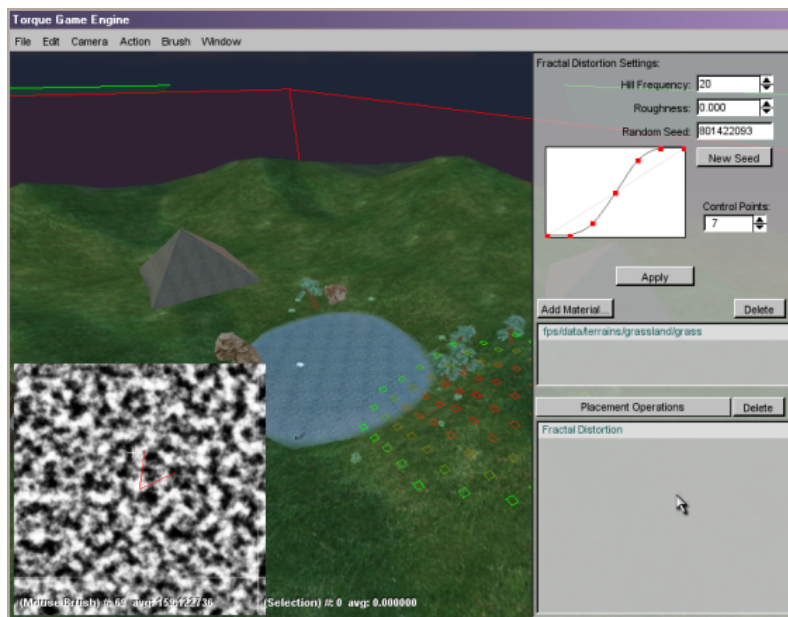


Place by Water Level

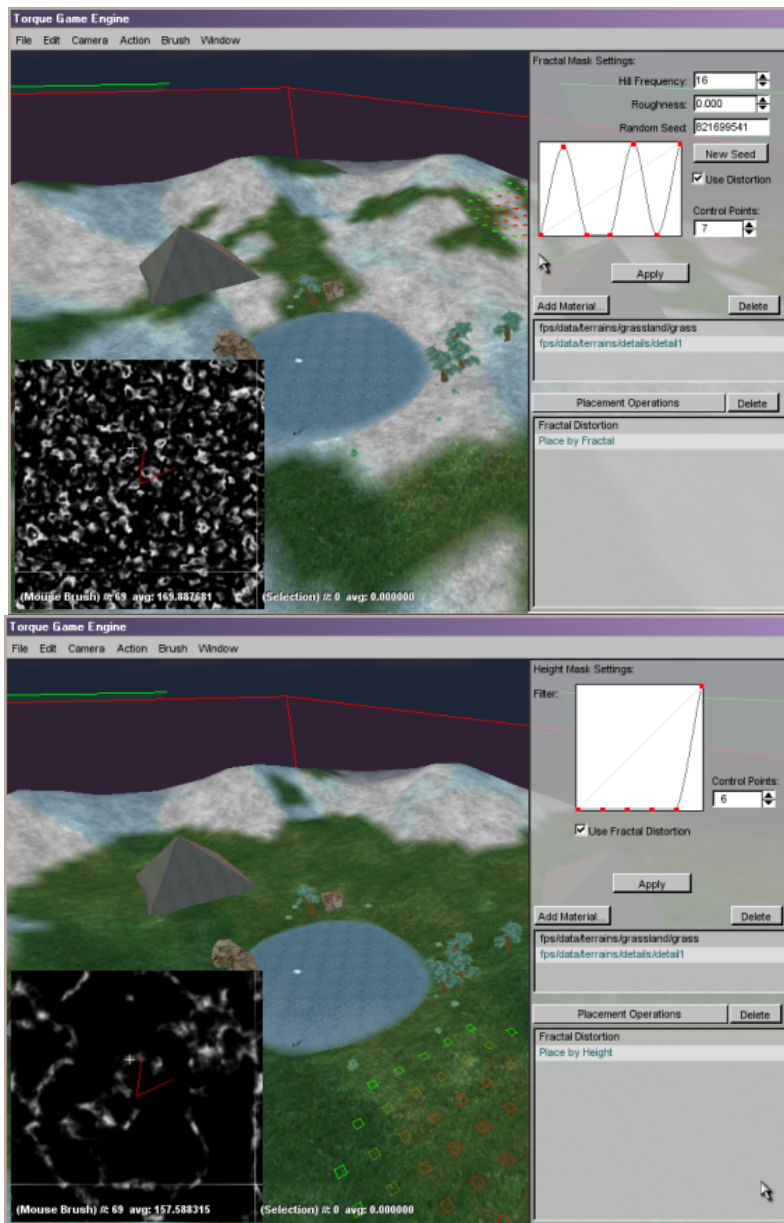
This last filter allows us to place a texture at or below the water level we set in our Terraformer. This is useful if you are building an island or have a large lake, but I suggest avoiding it otherwise. Instead, for smaller bodies of water, you can hand paint using the Texture Painter, which we'll be talking about soon.



Because is said that a picture is worth a thousand words, I'm including some sample pictures of the Terrain Texture Editor in use:

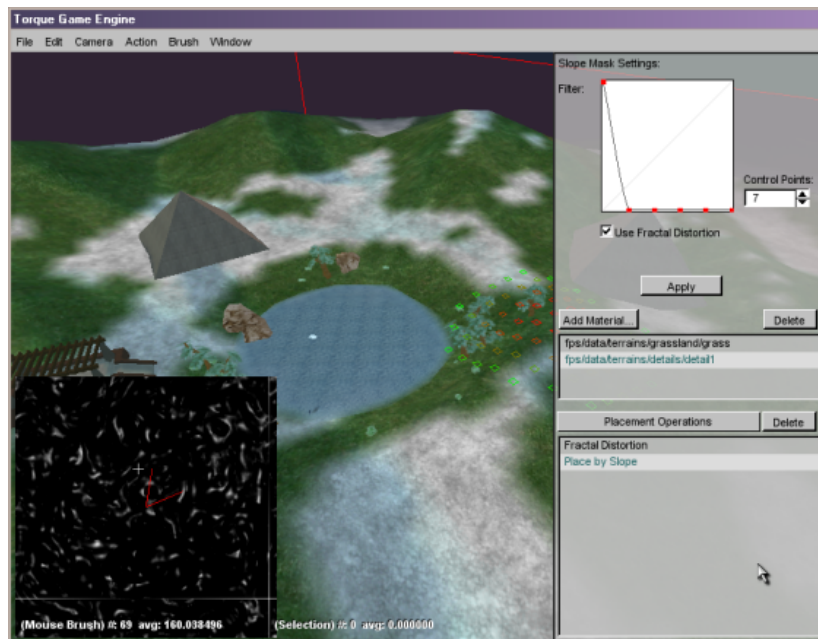


Base layer of grass only.

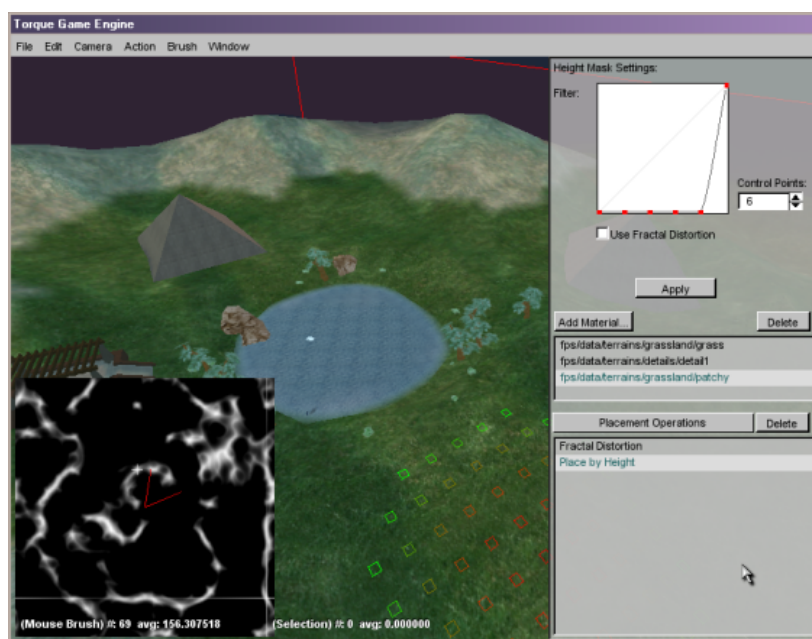


Grass base with detail1 texture placed by Fractal.

Grass base with detail1 applied by height. Notice height setting set to place only at highest elevation band.

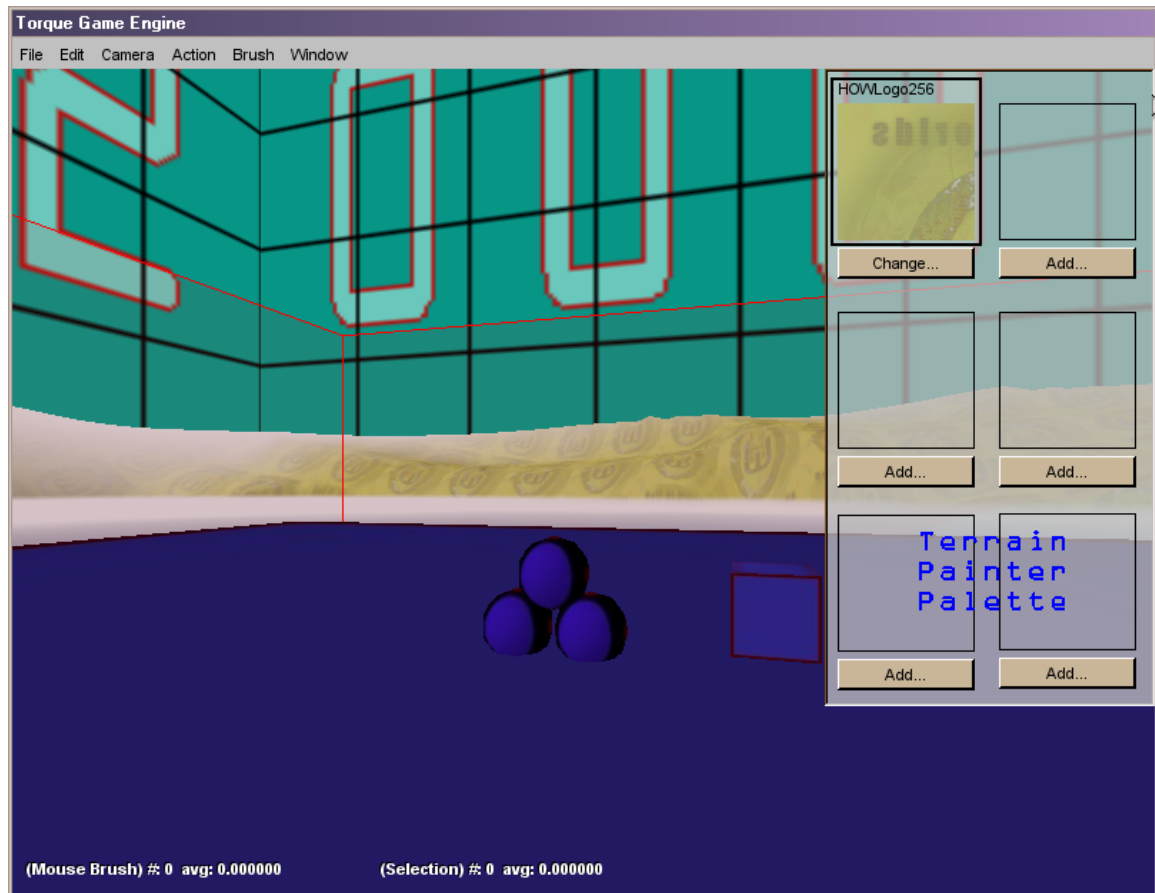


Grass base with detail applied by slope. Notice slope setting set to place only on least steep (flattest) areas.



Grass base with detail1 and patchy set to apply at same elevation (by height). Notice blending of detail1 and patchy.

Terrain Texture Painter (Terrain Painter)



Starting the Terrain Texture Painter

1. Start the Mission Editor by pressing **F11**
2. Select 'Texture Painter' from the Window Menu.

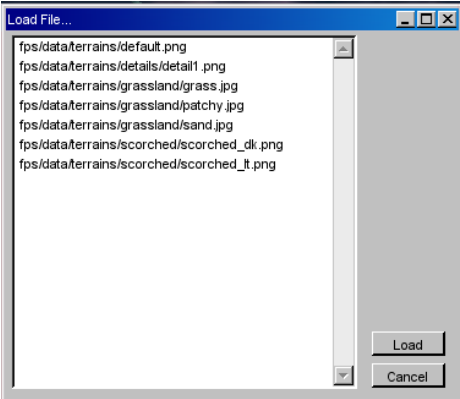
Examining the Terrain Painter

The last of the tools we will examine in this section is the Painter. Among all the tools, this is probably the most straightforward. If you have successfully loaded the Terrain Painter, you will see a something like the image above. Now, if you've used any tools like WorldCraft, Wally, or any of a number of other content creation tools, you will be familiar with the concept of the Terrain Painter Pallet, but just in case...

The Terrain Texture Painter Palette

Currently, the pallet is limited to 6 textures. Also, the palette texture ‘spots’ must be loaded in counter clockwise order. In other words, if you tried clicking on the ‘Add...’ button in the upper right corner right now nothing would happen. Try clicking the ‘Add..’ button in the middle left. Load the WeirdTerrain.png texture.

When you click either an ‘Add...’ button or a ‘Change...’ button, the ‘Load File...’ dialog pops up. If you take a quick look at the paths displayed in the dialog, it will become clear that for a texture to be available to the Texture Painter, it needs to be in the ‘egt/data/terrains’ directory. You can create folders under this and the tool will find your textures there. The tool will automatically find files in either of the following two formats:



- 1. Portable Network Graphics (*.png)
- 2. JPEG (*.jpg)

I strongly suggest using PNG files. This way you can avoid the artifact issues with JPEGs. Also, you should adhere to strict rules regarding the dimensions and color content of your graphic files:

Dimension	Suggested: 256x256 pixels Required: Power of 2 and Ratio < 16:1 (i.e. L <= 16* W and vice versa)
DPI or PPI	Suggested: 72
Pixel Depth/Colors	Suggested: 24/16 Million
Alpha Layer	Suggested: None. (Part and parcel with 24-bit Pixel Depth)

On the right side of the screen you should see a window that looks similar to this. Currently, there are two of six allowed textures enabled. The purpose of this window is to act as a sort of painter's palette for textures. Simply by dabbing your cursor on (clicking on) a loaded texture, you can use that texture to paint the terrain with the now familiar brush. As with the Terrain Editor, you can change the shape, size, and hardness of the brush. In this case, the hardness will affect blending. A softer brush provides a softer stroke, therefore less of the new texture is applied per stroke, with more of the underlying texture showing through. Give it a try. Click on the 'WeirdTerrain' texture and paint some lines, swirls, whatever. Cool eh?

