HOMEWORLD2

FX Tool

0   Introduction

Welcome to the **FX Tool** documentation! The FX Tool is a small and relatively simple program that can be used to tweak or create dazzling and beautiful special effects for all of your modding needs. Whether your new effect is for a new weapon attack or simply something to make your scenery prettier, the FX Tool is what you will use to bring your effects to life. So, what is this magical tool that we're talking about here? Read on and find out…

1   Getting Started
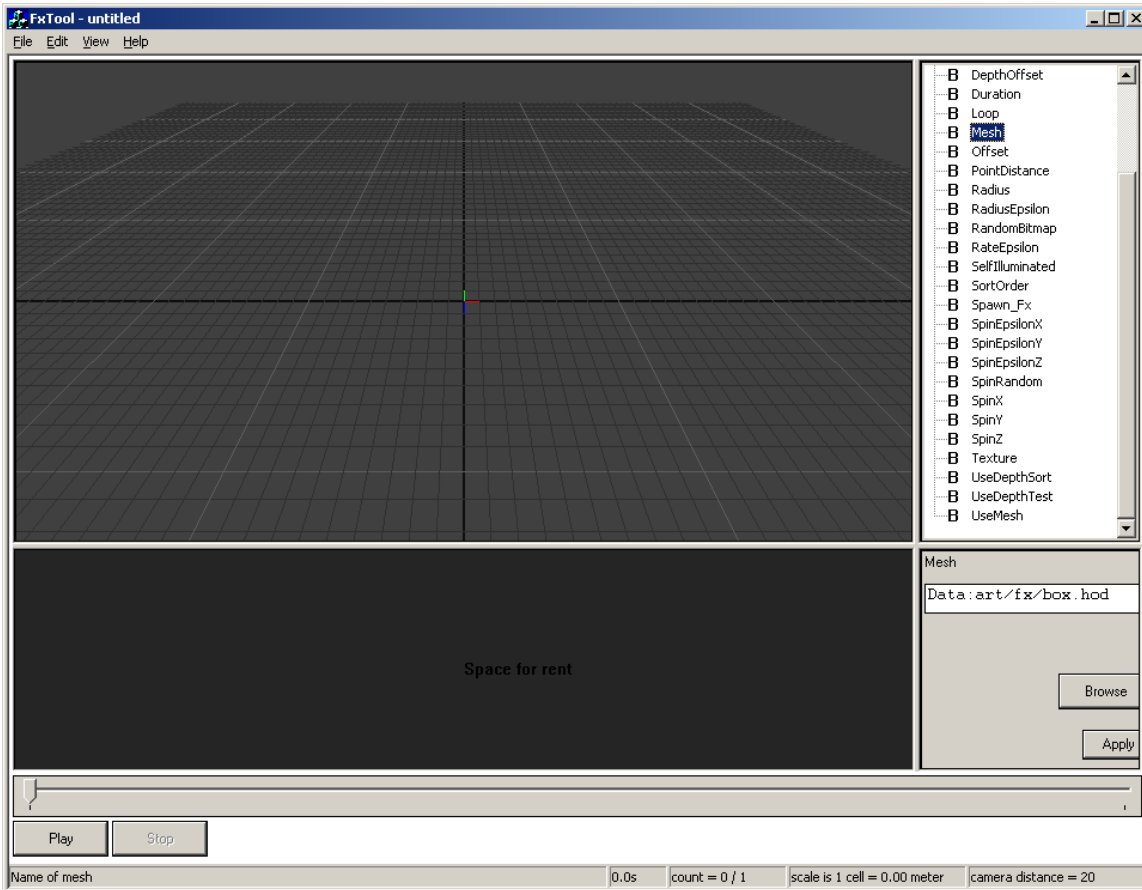
The FX Tool's interface can basically be broken down into three sections:

1.1   *Main Menubar*

The FX Tool's menubar contains options like **File**, **Edit**, **View**, and **Help**.
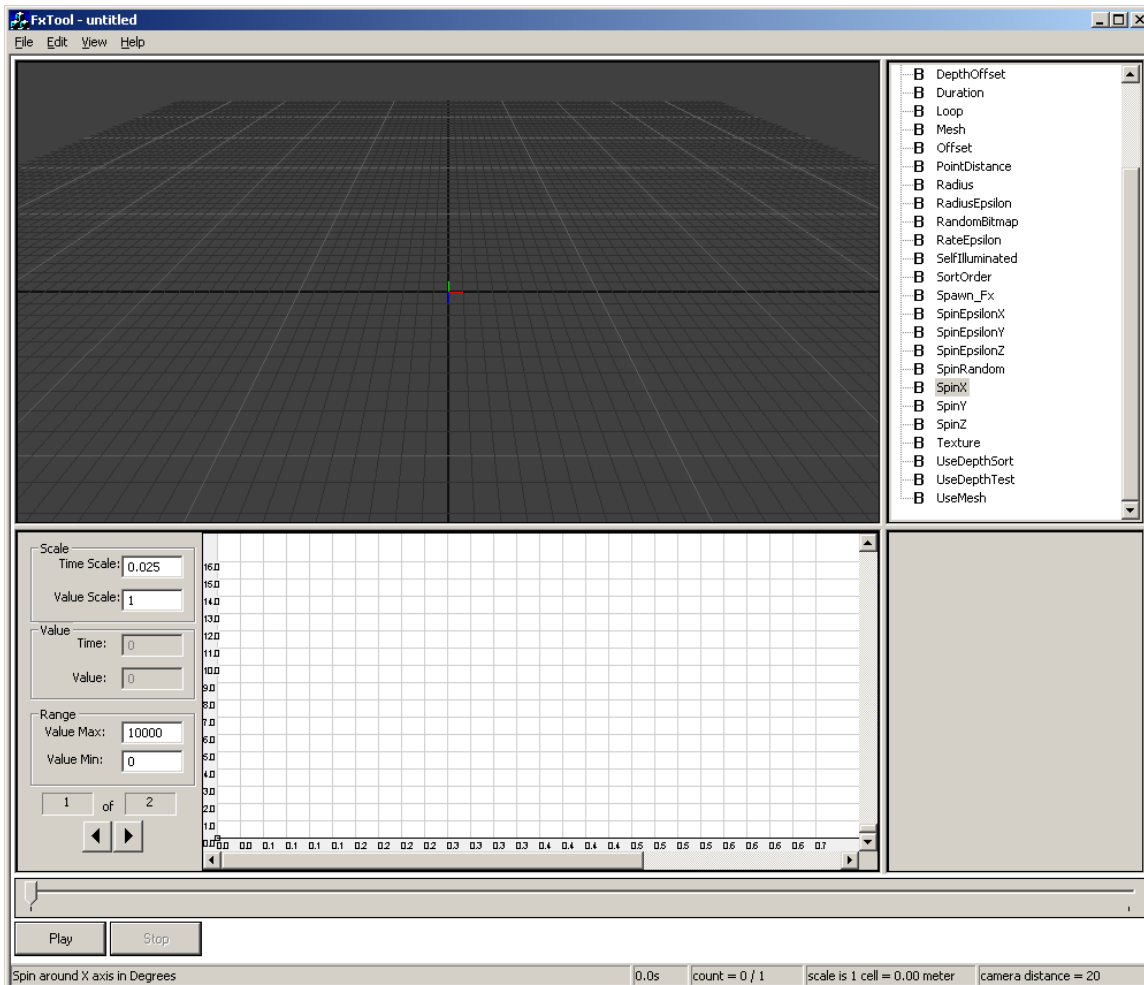
1.2   *Properties Windows*

These windows take up the right side of the FX Tool interface. One lists all the properties that the current effect has, and the other allows for numeric input for the selected properties. Clicking on

any of the "+" symbols next to any of the entry boxes will open the linked effect in a tree view fashion. Any changes made here (except for wind force dynamics) will be stored in its .LUA file.

1.3   _Main Viewer Window and Graphview_

The **Main Viewer Window** is where you will see your effect as it is being played or edited. Below it is an empty grey space used for options that require the graph input, such as radius. When radius is selected in the properties window, a graph will appear below the view window. Clicking anywhere on the graph view will create a key frame at that position. Multiple key frames can be selected at once by band boxing them. Holding down 'Alt' while multiple key frames are selected will allow you to move and scale them. The graph and value ranges are set on the right of the graph view. Below the graph view is the timeline slider. Click the 'Play' button to preview your effect, or drag the slider across the timeline to job through.

1.4   _Keyframe Editing Window_

The **Keyframe Editing Window** is where you can edit keyframe values for time-variant FX properties. It is positioned right below the **Main Viewer Window**. Depending on the property selected, you may edit keyframes via a keyframe graph or a keyframe slider. A keyframe graph is shown the sample screenshot above. The Keyframe Editing Window is blank if the currently selected property is time-invariant.

2   Main Menubar

As mentioned earlier, the **Main Menubar** is divided into **File**, **Edit**, **View** and **Help**.

2.1   *File*

New (CTRL+N)

This brings up a dialog box that allows you to select a new type of effect to edit. In the ***Type*** portion of this window, a list of available effects is given to you. To select an effect, click on one of the radio buttons beside the effect type and click on ***Ok***. More information about these effect types is given later in the documentation in the section titled ***4.1 Effects Explained***.

Open (CTRL+O)

Loads up an existing effects file (.LUA format) to edit.

Save (CTRL+S)

Saves an existing effects file (into a .LUA format). If this is your first save, a dialogue box will appear to ask you for a filename to save the file under.

Save As…

Allows you to save the current effect under a different name. A typical ***Save As…*** dialogue box will appear, asking you for a new filename.

> **Note:** The file paths for the last four effects that were loaded for editing are displayed under **File**. Selecting one of these will load up the corresponding effect to edit.

2.2   *Edit*

Emitter position (…)

Allows you to edit the XYZ position of the emitter along with its scale and length. Thus, some of an effect's display properties can be tweaked from here. This option also allows for selecting a marker to use as the position. This setting is only used to preview the effect, and will not be carried when the effect is used elsewhere.

Background Color (…)

A standard Windows palette window will appear which will allow you to choose the background color used in the FX Tool **Main Viewer Window**. A handy thing that you can use this option for (other than for cosmetic reasons) is that you can try changing the background color if you have difficulty seeing the effect, or to preview how the effect would look like on a certain color that's in-game.

Gravity

When selected, this option displays a dialog window that allows you to enter XYZ "gravity" values. The default is a value of "-9.8" for the Y-axis. This option, when used in conjunction with ***particle dynamics*** (**Spray** and **Ring** effects only), previews the way in which certain effects will behave with certain gravity settings (which can be set differently when editing a map). As such, this setting is not carried across when the effect is used elsewhere.

Wind

When selected, this option displays a dialog window that allows you to enter XYZ "wind" values. This option, when used in conjunction with **particle dynamics** (**Spray** and **Ring** effects only) previews the way in which certain effects will behave with certain wind settings (which can be set differently when editing a map). As such, this setting is not carried across when the effect is used elsewhere.

2.3   <u>View</u>

Grid XZ

This option can be toggled on/off. This determines whether or not the XZ grid in the **Main Viewer Window** is displayed.

Grid XY

This option can be toggled on/off. This determines whether or not the XY grid in the **Main Viewer Window** is displayed.

Model (Not Supported in Homeworld 2)

Allows you to toggle your effect's model on/off, if it has one.

Statgraph (Not Supported in Homeworld 2)

Displays timing information on how long it's taking to render emitted effects. *FX Count* displays how many effects are being displayed. *FX max* displays the peak number of effects. *Update* and *display* lists the time (in microseconds) it took to update (move, collide, etc), and display (draw) the effects. These numbers can help indicate performance problems with certain effects.

Wireframe

When activated, it displays the effects in wire-frame mode.

Choose Model (Not Supported in Homeworld 2)

A dialogue window will appear asking you to enter an .SGM file to use. You can browse for these files by pressing the **Browse** button. If you do this, a standard **Open File** dialogue window will appear. This .SGM file will act as your emitter[1].

Fix Random

Toggling this will allow you to scrub back and forth on the time line. This will introduce slower performance from the preview window.

2.4   <u>Help</u>

About FX Tool…

Displays the version information of the FX Tool that you are using.

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[1] SGM files are not used in Homeworld 2.

3   Properties Windows

As mentioned above in the section titled *__File__*, pressing **New** will bring up a dialogue window that has a list of different effects that you can create. There are ten effect types listed. Here we will describe each one and define the properties associated with them.

3.1   Effects Explained

Spray

This creates a **spray effect** that emits a fountain of particles.

- **Emitter_deviation:** Allows you to select how wide the cone of emission is, in degrees. The maximum value that you can enter here is 360 (full sphere, sprays in every direction), and the minimum value is 0 (straight up, or in the direction of the effect). For example, entering a value of 180 will create a spray pattern in a half sphere. Can be animated.

- **Emitter_Direction:** Allows you to set the emitter direction. 0 would be "default" setting and would shoot in the normal direction[2]. A value of 1 will always make it shoot up, no matter what direction the marker is pointing (useful for things like fire), and 2 will always shoot down no matter which direction the marker is pointing.

- **Emitter_Drag:** Allows you to set the drag or "air resistance" of particle emitted. 0 is 100% percent drag and 1 is 0% drag. This value cannot be animated.

- **Emitter_Duration:** The duration that the emitter will spawn the effect. Possible values are 0.1 to 30 (in seconds). Anything below 0.05 is not practical since no particles are 'released' from the emitter.

- **Emitter_InheritVelocity:** The amount of vectored velocity inherited from the movement of the emitter- meaning, particles take on a percentage of the parented object's movement and speed.

- **Emitter_Loop:** Check box that determines if the emitter will return to the start of the effect and repeat in a loop. Useful for making never ending effects such as a steam vent.

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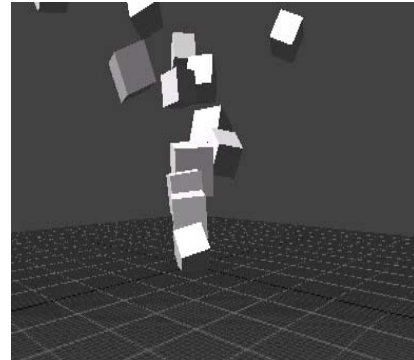
[2] The normal direction is defined differently in Homeworld 2 and Impossible Creatures. In Homeworld 2, the normal direction is along the Z-axis (as defined in Maya). In Impossible Creatures, the normal direction is along the Y-axis (as defined in 3DSMax).

- **Emitter_Offset:** Allows you to animate the XYZ offset for the emitter relative to a marker. If there is no marker, the effect will offset to the model's space coordinate. The following is a screen-shot of the Keyframe Editing Window when the Emitter_Offset property is selected. Left-click in the slider to insert new keyframes. Right-click on keyframe markers to delete them.
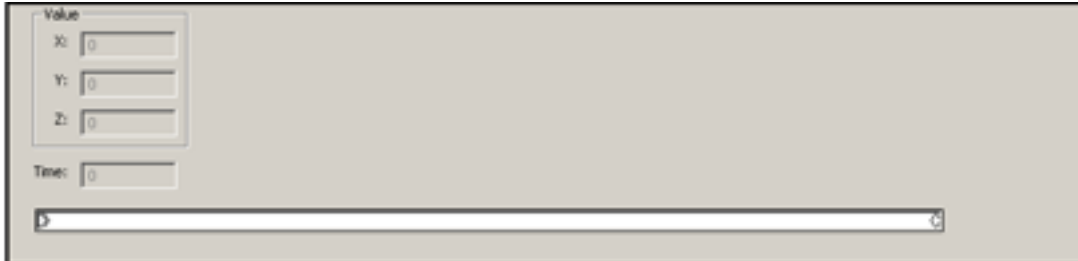
- **Emitter_Rate:** Allows you to adjust the Emitter rate. Possible values are anywhere from 0 to 10000. In essence, this setting determines how many particles are emitted per second. The following is a screen-shot of the Keyframe Editing Window when the Emitter_Rate property is selected. Left-click in the graph to insert new keyframes. Right-click on keyframe handles to remove them.
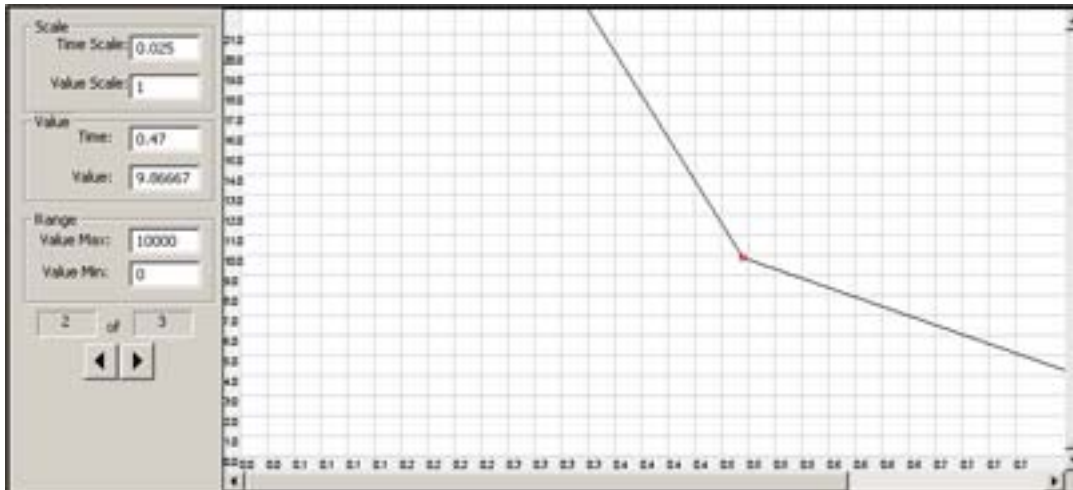
- **Emitter_Rate_LOD%**: This sets the minimum allowable particle count for the effect in its lowest *Level Of Detail*. For example at 20% the lowest LOD would display only 20% of the particles you specified.

- **Emitter_RotRate**: Emitter rotation rate. Will rotate the emitter, which will only be visible if you have a local dynamic on. The particles will spin along with the emitter.

- **Emitter_ScaleSpeed:** This toggles the inclusion of the emitter's speed as part of the scaling transformation. Check this box if you want to scale the speed of particles using the "fx_scale" effect-event parameter[3].

- **Emitter_Volume:** This determines the volume of 3D space that the emitter will occupy, in which particles will be spawned. This is determined with XYZ values, and by adjusting

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[3] Effect event parameters are edited via the EffectEvents.xls spreadsheet for Homeworld 2 and via the ObjectEditor for Impossible Creatures.

this property, the shape of the emitter will change. For instance a values of {X=5;Y=0;Z=5;} will cause the particles to be spawned across the area of a flat square. Values of {X=0;Y=0;Z=0;} will cause the particles to be spawned at a single point. Can be animated.

- **Force First:** No matter the rate value at the beginning of the emitter's duration, it will force one particle to be created the moment the effect is triggered. I.e. Used when you want exactly one and only one particle to be produced from a spray. This allows you to create rings with particle dynamics.

- **Gravwell_Strength:** Determines the strength of the gravwell's influence on particles at any given time in the effect's duration. Can be animated.

- **Particle Scale:** Global scaling of particles over time applied to the already set radius of the ring. Can be animated.

- **Particle_Dynamics:** This option determines the particle dynamic of the emitter, and helps determine how the particles act. Possible values are from 0 to 10, with each value's result described in the following table:

Particle Dynamics Values and Descriptions

Value	Description
0	Default, particles travel at a constant velocity and trajectory for the duration of the effect.
1	Particles are affected by gravity but disappear when they collide with the ground.
2	Particles are affected by gravity but will bounce off the ground as well.
3	Particles are affected by gravity but will stick to the ground and stay in place.
4	Particles are affected by wind, according to the specified wind vectors.
5	Particles will align themselves to the surface of the water plane in the game. These will instantly appear on the water. Given a particle speed, will travel outwards from the center of the effect.
6	All particles created with this dynamic stay local to an emitter's orientation and translation.
7	Particles emitted will align themselves to the surface of the ground plane, and if given a particle speed, will follow the contours of the landscape.
8	Particles are affected by gravity but will ignore the ground plane.
9	Particles will align itself to the highest surface.
10	Particles will be attracted back on to the emitter.

- **Particle_Fx:** This can be any .LUA file. The .LUA file used will actually make up the particles of the spray. All types of particles are .LUA files.

- **Particle_Speed:** The speed at which the FX particles will be emitted from the emitter. The possible values range from 0.001 to 100. Can be animated.

Ring

This creates a "ring" effect that scatters a number of particles in a ring pattern.

- **Billboard:** Determines whether or not the ring effect is facing the camera, or the direction it faces when it created.

- **AlternateFOV:** Two field-of-view (FOV) settings may be used for rendering ring effects: the default FOV or the alternate FOV. The FOV settings are game specific. Check this box to use the alternate FOV[4].

- **Birthspawn_fx:** This will spawn as specified effects at the beginning of the rings duration

- **Blending:** Determines the kind of transparency that the particles will render with. Possible values are:

0	No blending
1	Alpha blend
2	Additive blend
3	Multiply blend
4	AdditiveAlpha (used for beam fx(antialiasing)

- **Colour:** Determines the colour of the *ring effect*. This is in RGBA format (alpha channel included). Note that the alpha has to be set manually. Values closer to 0 for alpha will make the effect more 'transparent'. The following is a screen-shot of the Keyframe Editing Window when the Colour property is selected. Two sliders are used for editing the keyframe values: the top one for the RGB components and the bottom one for the alpha component. Left click within the slider to insert new keyframes. Right click on keyframe markers to remove them.

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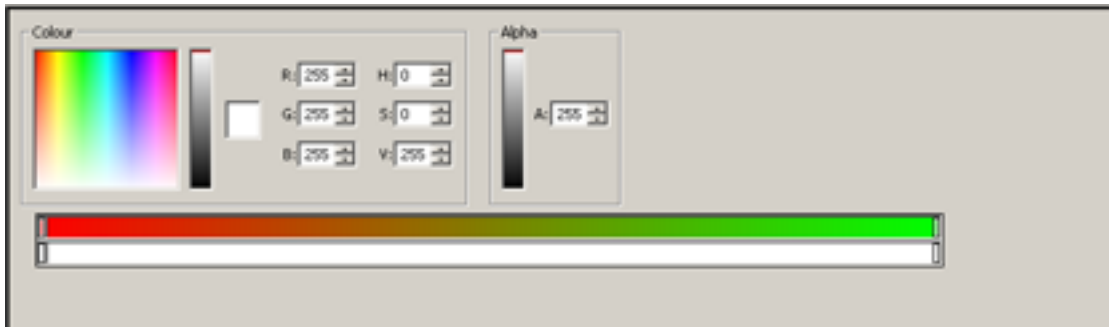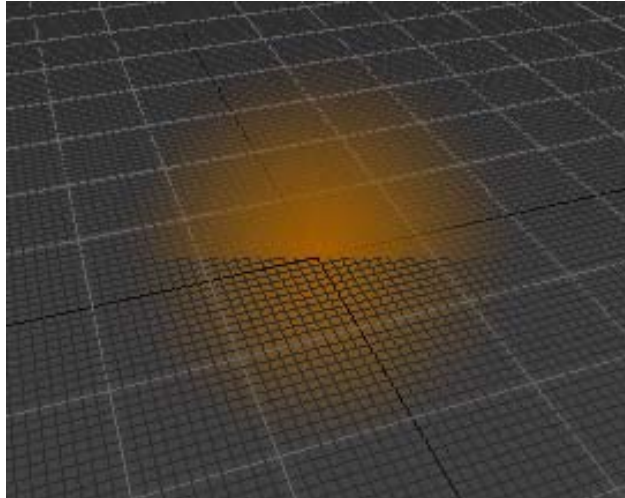
[4] In Homeworld 2, use the AlternateFOV for effects that are spawned as part of the background.

- **DepthOffset:** Moves the particle forward in the depth of the scene. This allows you to avoid clipping with the mesh.

- **Duration:** The duration that the effect lasts for. Possible values are 0.1 to 30 seconds.

- **Loop:** This determines if this effect will be looped or not.

- **Mesh:** Defines what mesh you would like to use as a particle. For example, you could use an animated cheetah as a ring to be later sprayed from an emitter.

- **Offset:** XYZ offset that determines where the effect will start with relation to the emitter. Can be animated.

- **PointDistance:** When the camera is this distance or greater from the ring, the ring is replaced with a vector point drawn in the set color. Setting the value to –1 will disable this feature.

- **Radius:** Determines the radius of the ring. Possible values: 0.001 to 100. Can be animated.

- **RadiusEpsilon:** Determines the amount of randomness of the ring's radius. Possible values are 0.001 to 1.

- **RandomBitmap:** Toggle random bitmap choices from a specified .anim file.

- **RateEpsilon:** Possible values are 0.001 to 1 (0-100%). Determines the amount of randomness of the duration of the ring

- **SelfIlluminated:** This is a check box. Determines if the effect is self-illuminated or not. A self-illuminated effect is rendered at 100% luminance. This is useful for mesh effects, when you want to control if the world lighting affects it.

- **SortOrder:** Determines depth sorting between particles. Effects with higher values will be drawn last, thus showing up in front of effects with lower values. Set the value to 0 to disable.

- **SpinX:** Determines which way and how fast the ring effect will spin around the X-axis. Possible values are: -360 to 360. Can be animated.

- **SpinY:** Determines which way and how fast the ring effect will spin around the Y-axis. Possible values are: -360 to 360. Can be animated.

- **SpinZ:** Determines which way and how fast the ring effect will spin around the Z-axis. Possible values are: -360 to 360. Can be animated.

- **SpinEpsilonX:** Possible values are 0.001 to 1. Determines the randomness of the ring's spin.

- **SpinEpsilonY:** Possible values are 0.001 to 1. Determines the randomness of the ring's spin.

- **SpinEpsilonZ:** Possible values are 0.001 to 1. Determines the randomness of the ring's spin.

- **SpinRandom:** If this checkbox is checked, the spin on the ring effect will be random.

- **Texture:** What texture is the effect to use. Texture used must be in a 32-bit .tga file.

- **UseDepthTest:** Whether you want the rendering system to sort the meshes properly to get accurate z-buffer rendering.

- **UseMesh:** This is a checkbox that determines if the effect uses the mesh specified in *Mesh*. If checked, the texture slot will be disabled because a mesh will already have a texture associated with it.

Beam

This effect is a textured polygon with seperate length and widths values. Used for creating laser beams and Ion beams.

- **Arc:** Arcing is based on world orientation and allows you to arc a beam effect between two points. Can be animated.

- **Blending:** Determines the kind of transparency that the *Beam* effect will render with. Possible values are:

0	No blending
1	Alpha blend
2	Additive blend
3	Multiply blend
4	AdditiveAlpha(AA)

- **Colour:** Determines the colour of the *Beam* effect. This is in RGBA format (alpha channel included). Note that the alpha has to be set manually. Values closer to 0 for alpha will make the effect more 'transparent'. Can be animated.

- **Duration:** Determines the duration of the effect. Possible values 0.001 to 30.

- **Length:** Length of the beam effect. Beam length must be set to 1 if you intend to transform the beam between two entities in the game. Possible values are 0.001 to 10. Can be animated.

- **LengthEpsilon:** Possible values are 0.001 to 1. Determines the randomness of the beams length.

- **LineDistance:** Determines the distance at which the beam is replaced with a vectored line. Used to keep beams from sparkling from at far viewing distance.

- **Loop:** Determines if the beam effect will loop.

- **Offset:** The Offset in X Y Z space from (0,0,0).

- **Noise:**   Amount of noise added to the beam. Possible values are from 0 to 1. This setting will disperse the beam, causing it to jiggle. Can be animated.

- **Segments:** Amount of segments in the beam effect. Possible values are from 1 to 10. The amount of segments determines how much detail your arcing and noise settings will reproduce.

- **SelfIlluminated:** Makes the beam self lit (100% luminance), thus receiving no lighting from the game.

- **Texture:** Determines the texture to use for the beam effect.

- **Texture_U_Offset:** The offset of the texture. Possible values are 0 to 10. Determines where the texture will be offset to on the beam. Can be animated.

- **Texture_U_Repeat:** The number of times the texture is repeated on the beam. Possible values are 0 to 100. Can be animated.

- **Width:** Width of the beam effect. Possible values are 0 to 10. Can be animated.

- **WidthEpsilon:** Possible values are 0.001 to 1. Determines the randomness of the beams width.
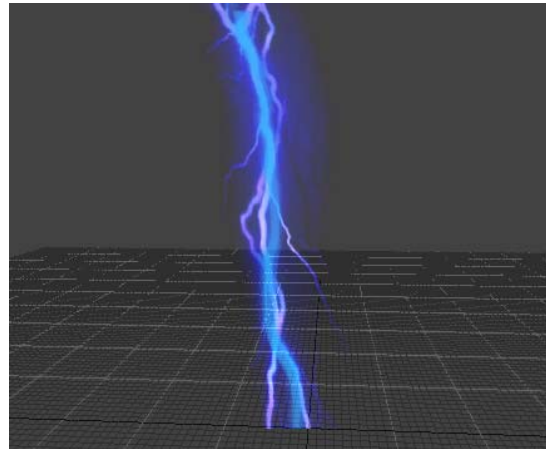
Trail

Has to be attached to something that has a velocity in order to be visible. It basically draws a trail behind the path of the entity in motion.

- **Billboard:** This determines whether or not the trail effect is facing the camera, or the direction it faces when it created.

- **Blending:** Determines the kind of transparency that the trail will render with. Possible values are:

0	No blending
1	Alpha blend
2	Additive blend
3	Multiply blend
4	AdditiveAlpha(AA)

- **ColourHead:** Determines the RBGA value for the color of the head of the trail.

- **ColourTail:** Determines the RBGA colour for the tail of the trail.

- **DeathRate:** Determines the length of time it takes for the trail to "catch up" to the object. The number entered is the number of seconds that it takes for the end of the tail to begin following it's creator after it's creator begins moving.

- **Duration:** The amount of time the trail exists before disappearing.

- **FadeOutTime:**   The percentage of the trail's duration where it will begin to fade out. Possible values are 0 to 1.   i.e. A trail with a duration of 10 seconds, and a FadeOutTime of .5, will begin to fade away after 5 seconds, and have completed fading away 5 seconds later (10 seconds from it's creation).

- **Length:** The length of the trail. Possible values are .01 to 5. Can be animated.

- **LengthEpsilon:** Possible values are 0.001 to 1. Determines the randomness of the trail's length.

- **Texture:** Determines the texture to be used for the trail effect.

- **Width:**   The width of the trail effect. The possible values are .01 to 100. Can be animated.

- **WidthEpsilon:** Possible values are 0.001 to 1. Determines the randomness of the trail's width.

Combo

This combines several different effects into one. Fx1 through Fx8 are effects that will be combined into one effect by being played simultaneously in the same spot. Note that you can combine combos with other combos for more elaborate effects. Be aware you can click on the plus icon beside the Effect name to edit it will still in the combo view.

Conditional (Not Supported in Homeworld 2)

> **Warning:** This is a special case, as it functions a bit differently than other effects. The *conditional effect* is a special "placeholder" for the "land-and-water" effect.

This allows us to get around some restrictions in the code architecture. The **land-and-water effects** are like **combo effects** in that they take more than one effect as input.   Unlike combo effects, conditional effects do not play all the input effects at the same time. Instead, only one of the input effects are displayed at a time and this is determined by some condition. For the land-and-water effects, the determining factor is whether the effect is played over land or water in the terrain. The effects system in *Impossible Creatures* was architected in such a way that it has no knowledge of the terrain. As a result, we could not make the land-and-water effect available as an effect type in the FX tool. Thus, the conditional effect was born to provide a generic interface for the user to specify the different input effects.

To set up the land-and-water effect, the user must:

1. Choose the conditional effect type, and
2. Name the effect "land_and_water"

Once this is done, the code will then provide the proper behavior.

Light

This is an attenuated dynamic light source created by the effects system.

- **Colour:** Determines the color of the light emitted. Can be animated.

- **Duration:** The duration of the effect.

- **Loop:** Determines whether the effect loops.

- **Offset:** The Offset in X Y Z space from (0,0,0). Can be animated.

- **Priority:** Determines the importance of the light for the LOD system. 0 is high priority, and 1 is low priority.

- **Radius:** Determines the attenuation of the light. I.e. How far the light travels from its origin. Can be animated.

Hyperspace[5]

The Hyperspace FX is a specialized FX type with custom properties for controlling the opening and closing of hyperspace gates. The hyperspace gate is rendered as a bordered rectangle. The colour of the rectangle, its texture, its dimensions and the border colour and texture are all keyframe-able properties.

- **Blending:** Determines the kind of transparency that the trail will render with. Possible values are:

0	No blending
1	Alpha blend
2	Additive blend
3	Multiply blend
4	AdditiveAlpha(AA)

- **Colour:** Determines the color of the effect emitted. Can be animated.

- **Duration:** The duration of the effect.

- **EdgeColor:** Colour of the windows outline. Can be animated.

- **EdgeTexture:** The texture applied to the window's border.

- **EdgeTexture_U_Offset:** Determines the offset of the texture. Can be animated.

- **EdgeTexture_U_Repeat:** Determines the amount of the texture repeats across the window's border. Can be animated.

- **EdgeTexture2:** The second texture applied to the window's border.

- **EdgeTexture_U_Offset:** Determines the offset of the second texture. Can be animated.

- **EdgeTexture_U_Repeat:** Determines the amount of the second texture repeats across the window's border. Can be animated.

- **Height:** The height of the hyperspace window. Can be animated.

- **LineWidth:** The thickness of the border around the hyperspace window.

- **Offset:** The Offset in X Y Z space from (0,0,0).

- **Texture:** Determines the texture to be used over the hyperspace window.

- **Width:** The width of the hyperspace window. Can be animated.

Sound (Not Supported in Homeworld 2)

Plays a sound file.

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[5] Hyperspace FX is only supported by Homeworld 2.

LensFlare[6]

LensFlare FX is a specialized FX type for animating lens flare objects. Lens flares are visual effects that are managed by a separate system. Currently, lens flare FX's may not be previewed using the FXTool and can only be visualized in game.

- **Colour:** Determines the colour of the lens flare.

- **Duration:** Life-time of this lens flare effect.

- **Infinite:** Check this box if this lens flare is to appear on the background.

- **LensFlare:** Name of the lens flare file.

- **Radius:** Radius multiplier for the lens flare.

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[6] LensFlare FX is only supported by Homeworld 2. Lens flare objects are stored in %HW2_ROOT%\Data\Effects\LensFlare. Their properties are defined in Lua files with extensions ".flare".