

# *Terragen™ for Macintosh*

## The 3D Preview

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## The 3D Preview

### Introduction

The 3D Preview is probably one of the biggest advantages Terragen Mac currently has over Terragen Windows. It really makes a huge difference in the way you use Terragen. Although you can certainly gain a reasonable impression from the 2D terrain previews, the 3D Preview puts the terrain right there for you to see. The 3D Preview also gives you an impression of both the clouds and the sky. The 3D Preview can be very valuable for helping spot Terragen's renowned "black hole in the sky" problem, which happens when the sky cover size is not large enough.

It is important to realise however that the 3D Preview is a preview. For example, the textures used are only intended to help you get an idea of the shape of the terrain and to help differentiate between flat and steep areas. As you will no doubt immediately recognise, they bear no relation to the actual surface map. As a matter of fact, the 3D Preview will eventually represent the actual surface map, it can do it now but the texture generation is too slow to be practical. By the same token, the clouds do not appear exactly as they would in a final render. The shape of the clouds is correct, allowing for the lower resolution of the clouds in the 3D Preview, and the colour used is the one specified by you. However, the colour of the clouds can be quite different once all the lighting calculations etc. that happen during rendering have been replied. For example, the default cloud colour is a mid grey, and that is the colour that is used for the clouds in the 3D Preview. The clouds in an actual render will appear much whiter though. The atmosphere/sky colouring is pretty accurate, but the sun is not represented in any particular detail. Nevertheless, the lighting in the sky is generally pretty close. Note that the atmosphere is not applied to the terrain in the 3D Preview, so parts of the terrain which may not be visible in a render due to a dense Simple Haze ( for example ) will still be visible.

Despite all that, the 3D Preview does a good job of letting you know what things look like. It's primary function is really to give you an idea of the terrain shape, and the other capabilities are a bit of an extra, but you should find that the 3D Preview is very useful.

The 3D Preview settings are configurable, so you should be able to make it interactive, if not realtime, even on older computers without 3D cards. My oldest computer is a 604/166 with no 3D card, and the 3D Preview is usable on that with the lowest quality settings. It's a bit unresponsive if I try moving inside the 3D Preview itself, but it's quick enough to update if the camera position is changed from the various places in other windows.

### Known Issues and Bugs

- The entire terrain is not shown in the 3D Preview. Currently the top row and furthest right column are not shown. For example, on a 257 x 257 terrain, only the first 256 rows and columns are shown. This will be addressed in the future.
- Controls in general could be improved, with smoother interaction between the mouse and keys.
- Key bindings are currently hard coded, with no facility for changing them.
- It's possible that parts of the terrain very close to the camera get clipped, which can give you an odd view under the terrain.
- In rare situations, it is possible to get the camera stuck so you can move it neither up or down in the 3D Preview itself. However, you can easily change the height in the Rendering Control window to some point above the terrain, and this will let you move up and down again. Fixing this is a priority.
- If the 3D Preview window is frontmost when you open something like a new world or atmosphere file, you may find that the 3D Preview doesn't completely update to reflect

the changes. This can be solved by bringing another window to the front and then changing back to the 3D Preview. Fixing this is a priority.

- The 3D Preview does not currently display curved terrains correctly.

### How the 3D Preview Handles Changes in Settings

When the 3D Preview is open, changes to settings which effect the camera, such as changing the values in the text fields in the Rendering Control window or changing the Zoom value, always cause the 3D Preview to be updated immediately, as this is generally very quick. However, changes to any other settings which effect the 3D Preview, such as modifying the terrain ( which means the textures and lightmap need updating ) or changing the atmosphere settings ( which means the atmosphere data needs updating ), are much more time consuming. Due to this, the 3D Preview puts off updating these kinds of items until you bring it's window forward again.

### Controlling the Camera in the 3D Preview

There are several ways you can control the camera in the 3D Preview. In the 3D Preview itself you can move around using certain keys, described below, and the mouse. The 3D Preview also updates when you change the camera position with the ordinary camera controls, such as the camera and target settings in the Rendering Control window, or by clicking and dragging in the 2D terrain previews in the Rendering Control or Landscape windows. This can be very useful. To get a quick overview of the terrain, open the 3D Preview and position it somewhere you can see it. Now go to one of the 2D terrain previews and drag the the camera or target around. You can move the camera quickly over large distances like this.

The current control mechanism is somewhat like walking around the terrain. In the future I hope to add a flying mode to the 3D preview, as well as support for other peripherals such as gamepads and joysticks.

If you find that the camera stops moving and you get warning beeps, you have come to the edge of the terrain. You cannot move the camera off the edge of the terrain in the 3D Preview. It may not always be immediately obvious that this is what happened, particularly if you are using the orbit controls, but looking at one of the 2D terrain previews will show you that the camera position is against the edge of the terrain.

### Key Controls

Here's a list of the keys that can be used to control the camera in the 3D Preview. These keys are not configurable yet, but will be in the future. These keys should hopefully suit both right and left handed people.

Up arrow or W key	Move forward
option - Up arrow or option - W key	Move forward a small amount
Down arrow or S key	Move backward
option - Down arrow or option - S key	Move backward a small amount
Left Arrow or A key	Turn left
Right Arrow or D key	Turn right
option - Left arrow or option - A key	Move left sideways
option - Right arrow or option - D key	Move right sideways
+ key	Raise camera position
- key	Lower camera position

P key  
option - P key  
B key  
option - B key  
O key  
option - O key

Pitch up  
Pitch down  
Bank right  
Bank left  
Orbit right around target  
Orbit left around target

Holding down shift while pressing any of the above will make you move twice as fast, almost like the Run key in many games.

Pressing the F key toggles frame rate display on and off.

Pressing the M key toggles a mini map, which helps to show where you are on the terrain. You can't click on this to position the camera or target yet, but this may be possible in the future.

There is no key to control the Zoom yet, but the 3D Preview updates if you change the Zoom using the sliders in the main windows.

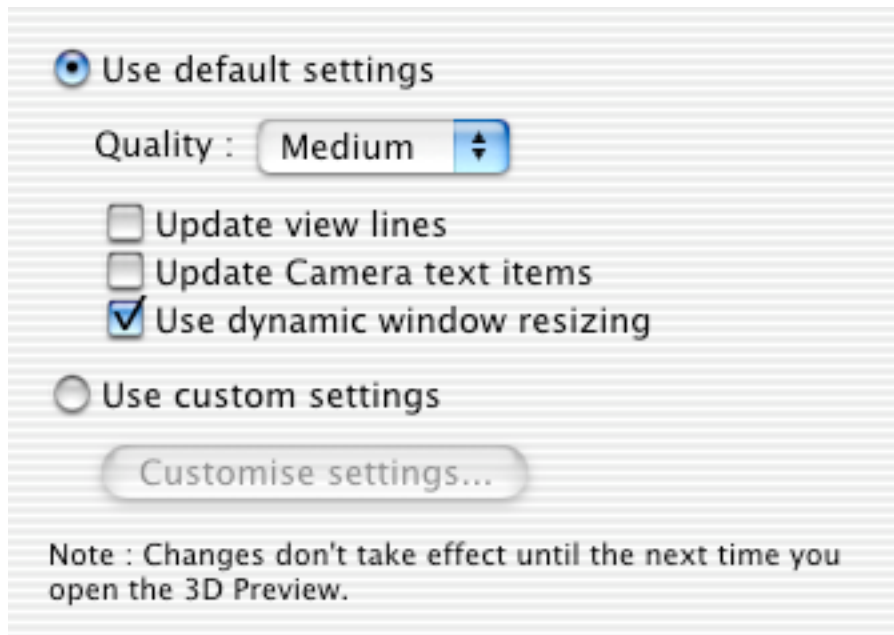
### Mouse Control

You can also use the mouse to control the rotation and pitch of the camera, in other words to let you turn around and look up and down, by clicking and dragging in the direction you want to look. You can use this in conjunction with the keys so you can look around while moving.

### Configuring the 3D Preview

The 3D Preview is configurable from low to high quality. There are default settings or you can fully customise all the available settings. Configuration of the 3D Preview takes place in the 3D Preview panel of the Preferences dialog. Most of the settings you change there do not take effect until the next time you open the 3D Preview.

One important thing to note is that if you have customised your 3D Preview settings using the 3D Preview Settings dialog ( described below ), if you change from "Use custom settings" to "Use default settings", all your customisations are overwritten and if you go back to "Use custom settings" you will need to set up your settings again, if you aren't happy with the defaults.



The 3D Preview Preferences panel

## Default Settings

Here's a rundown of the settings you can change if you choose to use default settings :

### Quality

The Quality popup menu lets you choose from Low, Medium or High settings. Low quality has no textures and uses a lower overall terrain detail. Low quality still uses a lightmap, as the shading helps define the terrain. Low quality is suitable for older computers with less capable 3D cards, or for computers with no 3D card at all.

Medium quality uses textures, and the terrain has a higher overall detail level. The quality of the textures and the lightmap resolution drops off quite quickly as terrains get larger. This is a good setting for those with G3 and newer computers with Rage 128 and newer graphics cards.

High quality is much the same as Medium quality, except that texture quality and lightmap resolution remains higher as terrains get larger. This setting would be good for newer G4s and up, with GeForce 3/Radeon class graphics cards.

### Update view lines

If this setting is checked, the view lines in the 2D terrain previews in the Landscape and Rendering Control windows will be updated as you move around the terrain. This can help to give you a better idea of where you are on the terrain as you move around it. Having this turned on can slow down the 3D Preview though.

### Update Camera text items

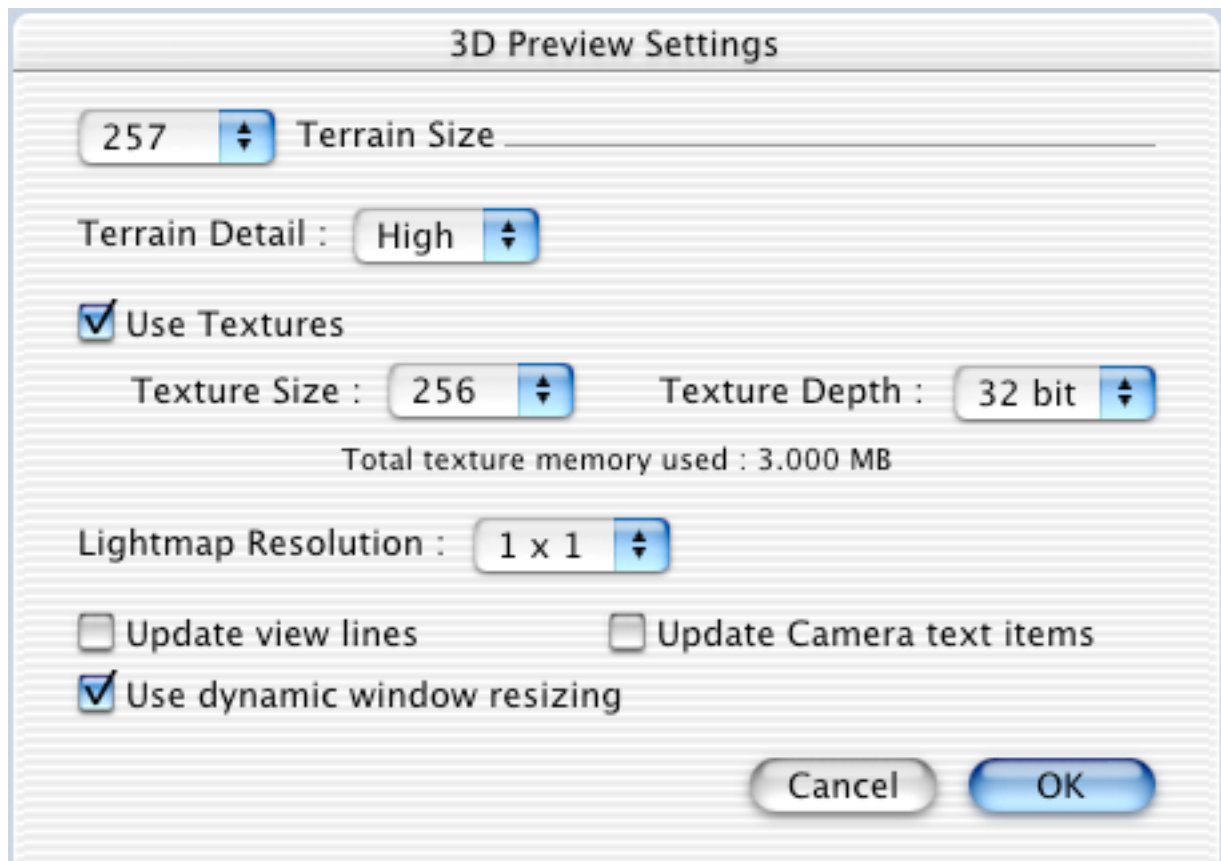
If this setting is checked, the camera position text items in the Rendering Control window will be updated as you move around the terrain. Although it can be handy, this does slow the 3D Preview down, and on OS X in particular it makes it run about half as fast as when this setting is unchecked.

### Use dynamic window resizing

If this setting is checked, then the 3D Preview window will resize itself as you change the image size in the Rendering Control window. The 3D Preview window will never get

larger than 640 x 480, however it will preserve the aspect ratio of the dimensions you specify if you enter a larger size than 640 x 480. Having this setting checked is handy because it gives you a better idea of the composition of your final image, whereas the preview render has a fixed aspect ratio.

Although the default settings provide reasonable values and easier configuration, you can completely customise all the settings that the 3D Preview uses to get the best performance on your machine. If you click the “Use custom settings...” radio button, the “Customise settings...” button becomes active. Clicking the button opens the 3D Preview Settings dialog, as shown in the screenshot below.



The 3D Preview Settings dialog

Here's a rundown on the settings in the 3D Preview Settings dialog.

#### Terrain Size

This popup menu lets you choose the terrain size you want to customise the settings for. It defaults to the size of the terrain you are currently using.

#### Terrain Detail

This popup menu allows you to choose between Low and High detail levels for the terrain. High detail means the number of polygons generated for the terrain is higher.

#### Use Textures

If this is checked, then textures will be used for this terrain size. It also activates the texture related settings below.

#### Texture Size

This setting lets you choose from 64 x 64, 128 x 128 or 256 x 256 textures. The terrain

is divided up into a number of 64 x 64 patches, and this setting controls the size of the textures applied to each patch. Larger textures take up more memory ( both main memory and texture memory ) and take longer to generate.

#### Texture Depth

This popup menu allows you to choose to use 16 or 32 bit textures. 16 bit textures use less main and texture memory, but can be a little slower than 32 bit textures.

#### Total texture memory used

This text item displays the amount of memory used to store textures. It updates as you change the texture settings described above. For best performance, if you know the amount of texture memory ( VRAM ) on your graphics card, you should try and keep the texture memory used within that, though this may not be possible for larger terrains.

#### Lightmap Resolution

The 3D Preview uses a lightmap to indicate shadows and the like on the terrain. This lightmap is generated by the same method as is used during rendering, so it's pretty accurate for a given resolution. This popup lets you choose from 1 x 1, 2 x 2 and 4 x 4 resolutions for the lightmap, each setting decreasing in accuracy respectively. 1 x 1 is the most accurate setting, but it takes longer to generate and the lightmap takes up more memory. The time taken to generate the lightmap and the amount of memory needed to store it decreases with less accurate resolution settings. You may find that lower lightmap resolutions are acceptable on larger terrains.

The final three settings ( Update view lines, Update Camera text items and Use dynamic window resizing ) are exactly the same as described in the Default Settings section above, so I won't describe them again here. The only difference is that whereas with the default settings these settings apply to every terrain size, in this case the settings apply to the particular terrain size you've specified.