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User Manual

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1 Introduction

Terragen has been designed to automate the surface modelling , texture mapping processes and planting processes to create unique environments for game development purposes within the Unity game engine.

The editor window is designed for simple to complex purposes. From updating your current terrain to generating a new one for you. With proper usage of the Terragen there won't be any need for any other third party program and assets about terrain manipulation.

Terragen is rich in procedural generators and randomness. For this reason there are endless possibilities and endless variations of creating unique terrains with Terragen.

2 Technical Information and General Overview

2.1 Surface Extraction Algorithms :

Terragen has the following algorithms:

- Direct Noise
- Noise-Surface Scan

Direct noise algorithm directly manipulates the heightmap values extracted from noises .

Noise –Surface Scan algorithm returns surface values from mesh bounds from unity.

In the near future it is planned to add virtual mesh scan algorithm , it is discontinued for performance reasons , it loops over not only surface values but also all redundant points so it is not currently efficient.

2.2 Automated Concepts:

Terragen has three different generators.

- Procedural Grass map Generator
- Procedural Splat map Generator
- Procedural Noise Generator.

The grassmap generator generates a unique grassmap for each terrain generation. It's surface map is unique in most cases.

The splatmap generator generator generates a unique splatmap for every different texture combination. It's surface map is dependant on terrain textures.

The procedural noise generator creates each time different value for surface extraction.

2.3 Manual Concepts:

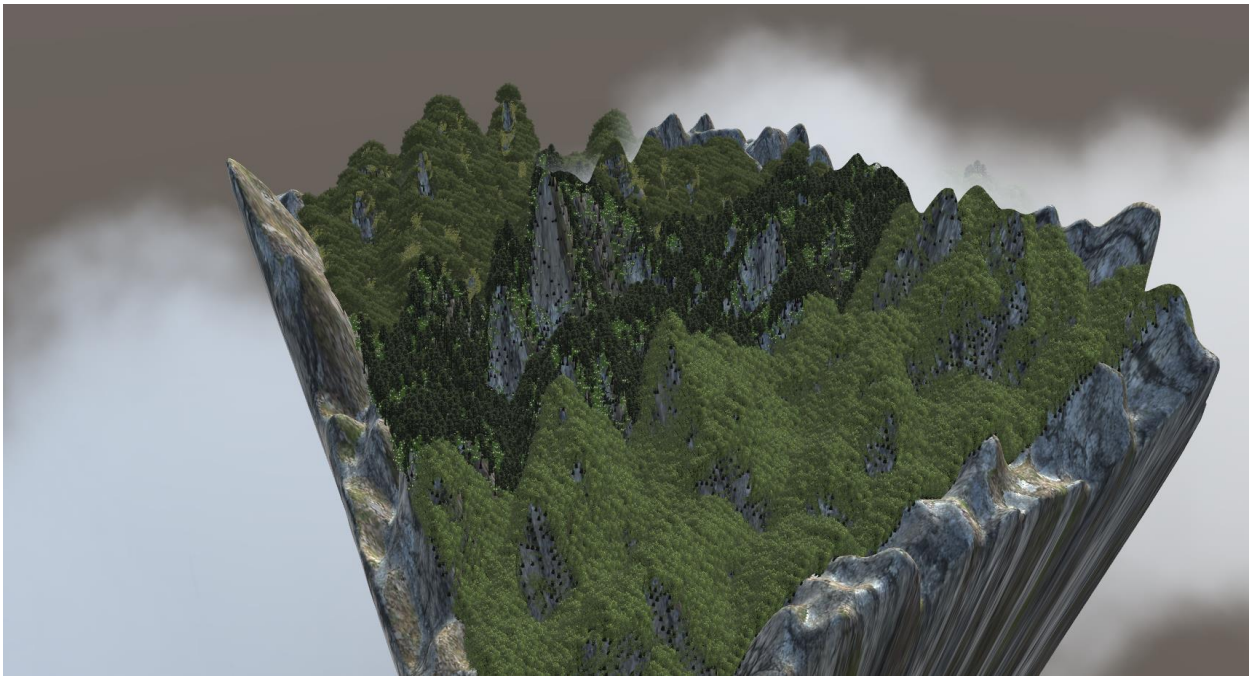
You can assign your own tree map, grass map or road overlay for your terrain. Terragen will handle this images according to their width and height. In the next release there will be chance to place 3d items like mountain .

2.4 Biome Formation Algorithms:

Terragen has three different biome algorithms:

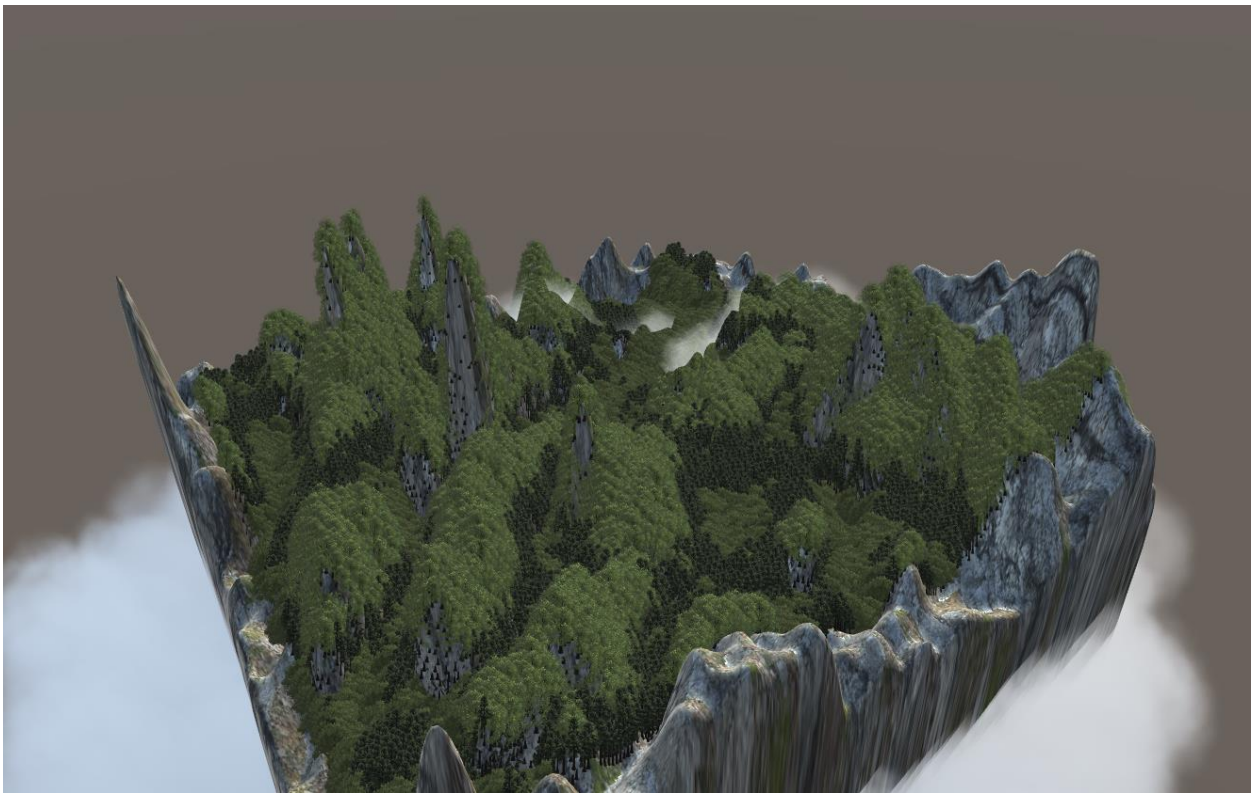
- Horizontal Biome
- Vertical Biome
- Dispersed Biome

2.4.1 Horizontal Biome:



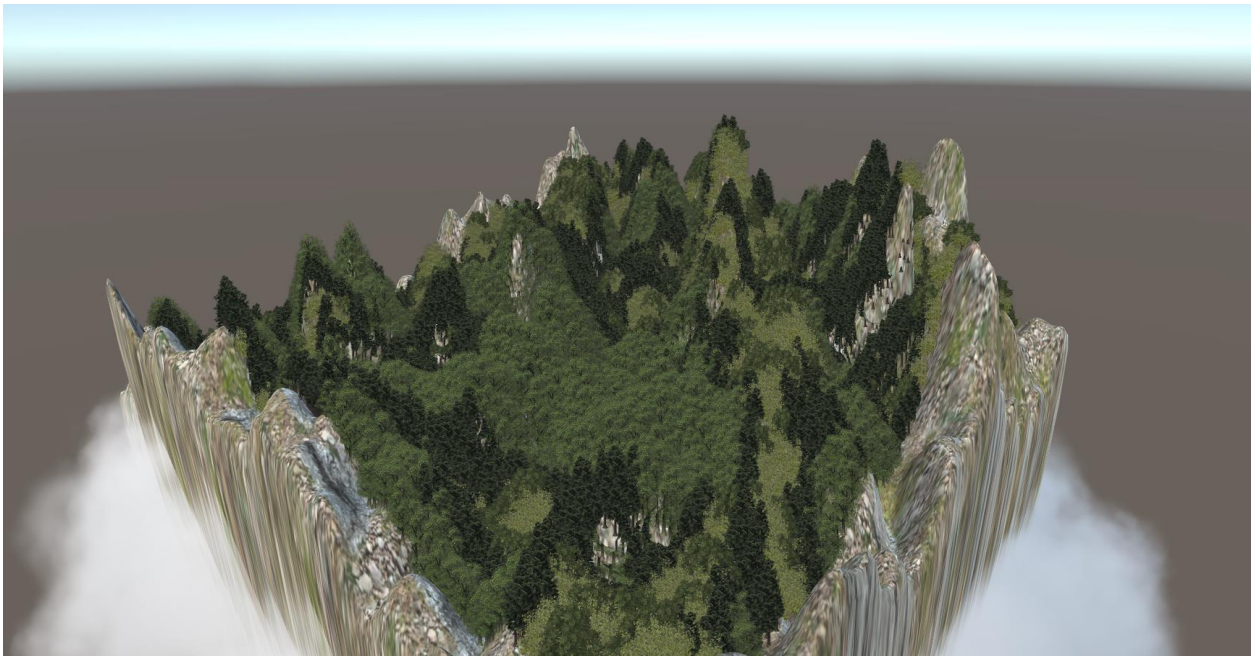
In this algorithm the terrain divided into equal sized horizontal rectangular regions and they are aligned horizontally. For instance in the above representation there are three biomes . You can recognize them from their different colours.

2.4.2 Vertical Biome:



In this algorithm the terrain divided into equal sized vertical rectangular regions and they are aligned vertically. For instance in the above representation there are three biomes . You can recognize them from their different colours. The upper most biome is with light green color, the middle biome is dark color and the deepest biome is dark colored.

2.4.3 Dispersed Biome:



In this algorithm the terrain has random distributed vegetation. As you can understand from above image the top trees are completely random and there is no order in vegetation.

3 FAQ

- I always get spiky results with the surface of the terrain. Why do I get these kind of results?

In this case , height map resolution and terrain size should be considered. If you are not using advanced resolution settings you should consider downgrading resolution parameter in Geography section.

- I have created a big terrain but the trees are placed in a small square which is smaller than the terrain ?

This is definetly about height map resolution. . If you are not using advanced resolution settings you should consider upgrading resolution parameter in Geography section.

- Are there any differences between geography algorithms?

Yes, they are completely different. Direct Noise creates noise directly manipulating it , Noise- Surface Scan extracts the surface values from the interpolated vertices , so from mesh object. Please note that slope factor works differently in the algorithms , you have to find out your best value.

- Can I update the terrain with different algorithms?

Yes , this is possible but you have to update the terrain with Direct-Noise algorithm. Because updating current terrain with Noise-Surface Scan is not allowed it does not have updating feature. But after creating the with Noise - Surface Scan you can update it with Direct Noise Algorithms.

- How can I get better looking results?

This is very relative question depending on these parameters:

Size of the terrain.
Scale of the terrain.
Resolution parameters of the terrain.
Smoothness of the terrain surface.
Slope factor of the terrain surface.

- The parameters are too complicated I could not find the smooth terrain yet.

In this case which I do not recommend this approach but I have to advice just upgrading the values of the smoothness coefficient. This will lead to less detailed but smooth looking results.

- Can I manipulate the surface off the terrain after it is generated?

No but in the near future it is expected to add mountains or hills and primitive shapes of the terrain.

- Is there any hole cave system?

No, but in the next release there will be hole a generator which handles cavingprocess. But in the Dig & Flatten Map section will help you to play with iso-surface of the terrain.

- Are there any example values of already generated terrains?

Yes, please investigate samples section.

- The textures of the terrain looks horrible what I can do for it?

You need to play with TileSize parameter of the texturing section. You need to change you resolution settings , if that does not work play around Advanced resolution. Try to decrease these parameters:
Detail Resolution
BaseMap Resolution
Patch Resolution

- Can I apply overlay map?

Yes this is completely possible just set strength parameter in the Dig & Flatten Map section to 0. In that case there won't be iso-change in the surface. Then you are going to just apply overlay map in that case.

- Why there are rectangular patterns emerged with grass surface ?

You should be played with patch resolution try changing it.
Or try :
Patch Resolution:16
Detail Resoultion:1024
You will observe that there is no problem with shaping of clusters with above stated settings.

4 PROPERTIES OF THE EDITOR WINDOW

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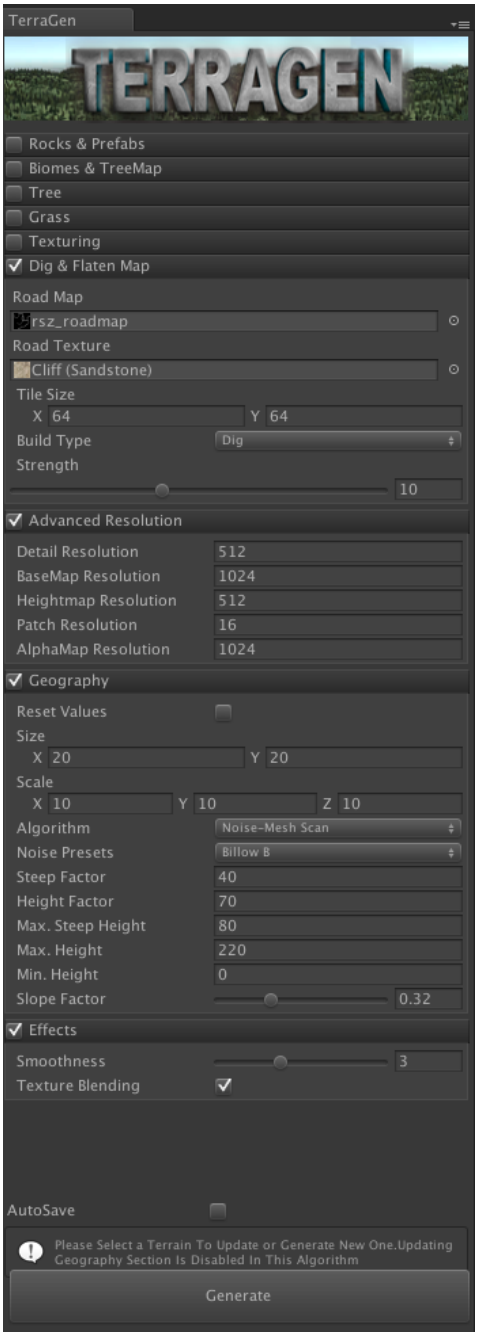
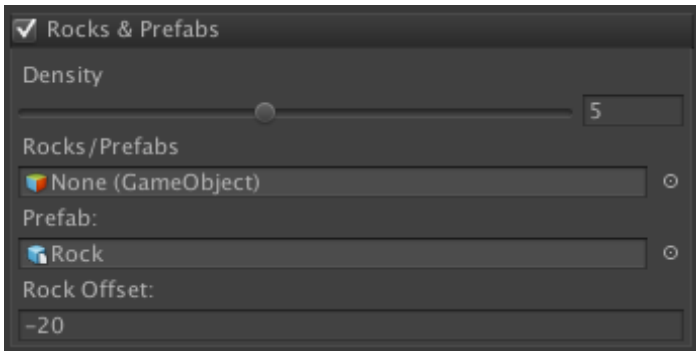


4.1 Rocks/Prefabs Section:

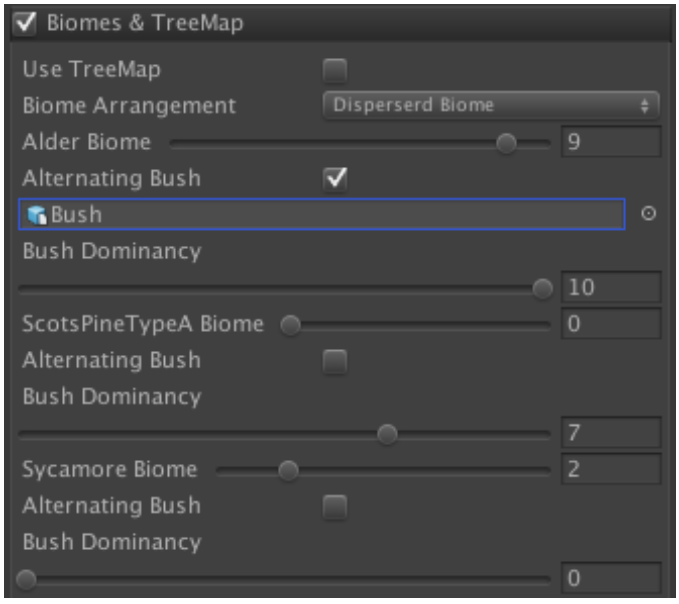
Rocks/Prefabs sections is responsible for placing custom gameobjects on the terrain.



Density indicates frequency of the prefab on the terrain. Offset is the vertical offset of the prefab. If you're your object floats in the air just assign negative values.

4.2 Biomes & TreeMap Section:

This section is helper of the Tree section . If you want to activate this section you have to activate the Tree section first.



"Use Treemap" checkbox indicates whether you want to use your own treemap image for planting trees.

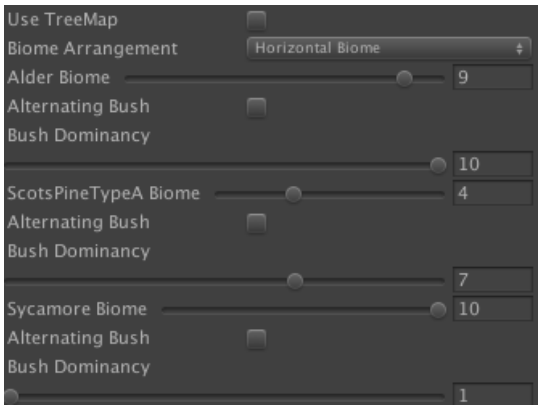
Biome Arrangement has three options and they are:
Vertical Biome
Horizontal Biome

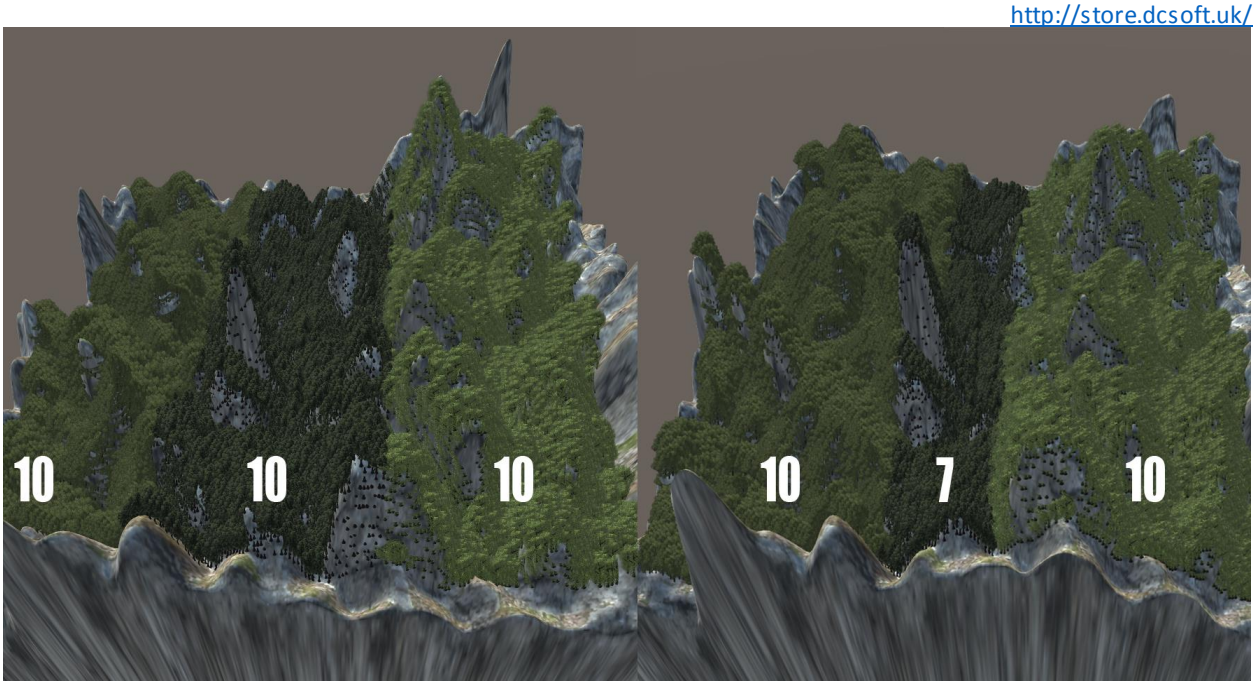
Dispersed Biome

They are all informed in 2.4 Biome Formation Algorithms.
Biomes
“Alternating Bush” indicates whether there will be additional tree or bush in that biome.
“Bush Dominancy” indicates the dominancy of the alternative tree object in the biome . If it is set to 10 . There will more alternating bush prefabs.

You will notice there are sliders near “your prefab” Biome. This setting is Biome’s space.

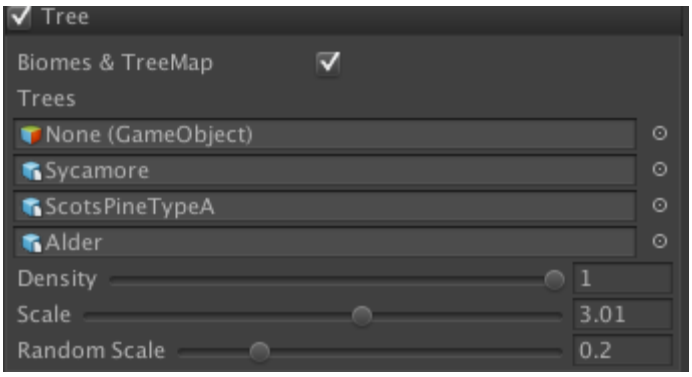
In this setup the biome with ScotsPineTypeA has strength 7 . But the other biomes has strengths 10.You will notice that the biome with strength 7 has less space then others.Please have look at the image below.





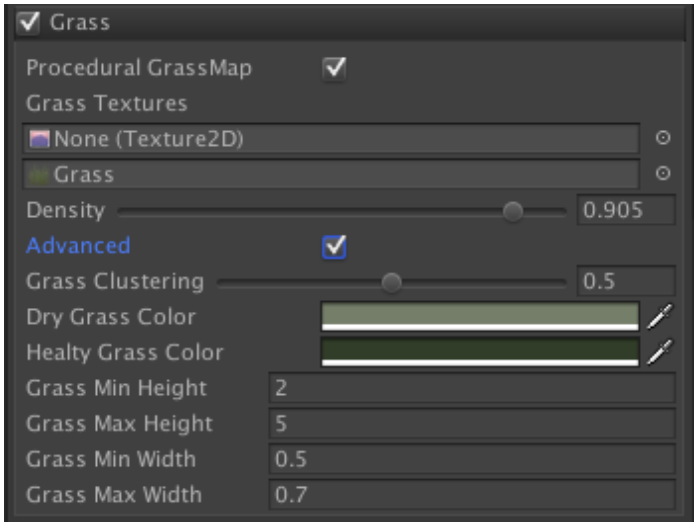
4.3 Tree Section:

As mentioned before you can activate Biomes & TreeMap section from this section.
The sliders in the Tree section are
Density which indicates Tree Density.
Scale which is Tree Size scale parameter.
Random Scale parameter indicates random tree size probability.



4.4 Grass Section:

The Procedural GrassMap checkbox provides chance to choose between Procedural GrassMap Generation and custom Grassmap image. If you disable it you have to assign GrassMap image. Density property indicates grass density on Terrain.

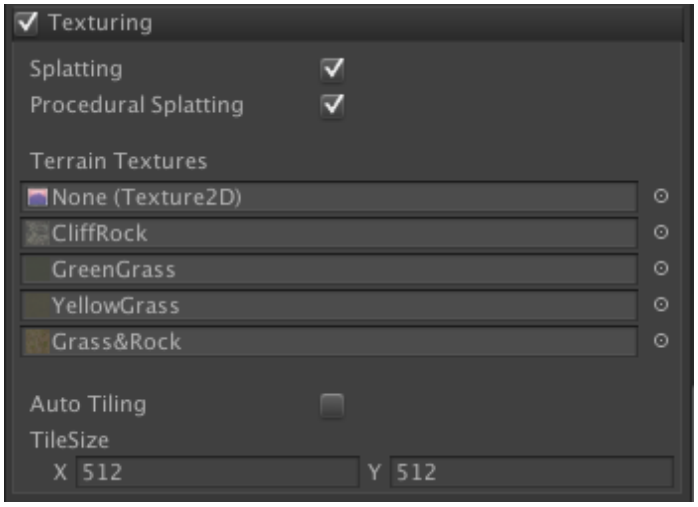


Advanced options have these additional properties :
Grass Clustering
Dry Grass Color
Healthy Grass Color
Grass Min Height
Grass Max Height
Grass Min Width
Grass Max Width

The Grass clustering parameter helps to increase probability of grasses heaping together.

4.5 Texturing Section:

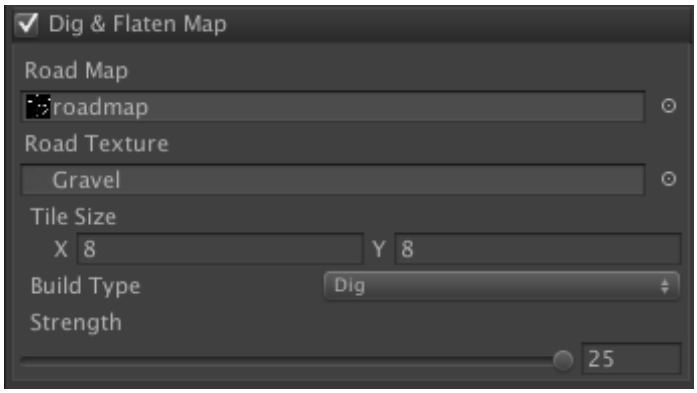
Splatting Parameter indicates whether there will be splatting or not.
Procedural splatting procedurally creates a splatmap for you. If you disable the option you have assign you own splatmap.
If splatting option is disabled the assigned textures will be applied to terrain.



If Auto Tiling is enabled you can define texture tile size with X Y parameters.

4.6 Dig & Flatten Map:

If You can create rivers , roads and walls with this section

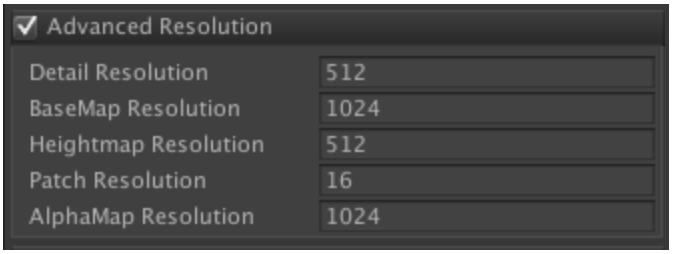


You need to assign the “Road Map” texture to be overlayed on the terrain . You can also use this feature to create your overlaying.There is an advise in the FAQ section please read it.

Road Texture is the texture that you are going to apply.
Tile Size will set your RoadMap image tile width, heights parameters.
Build Type has two features you can dig and flatten the terrain with your road map.
Strength indicates the strength of the build action.

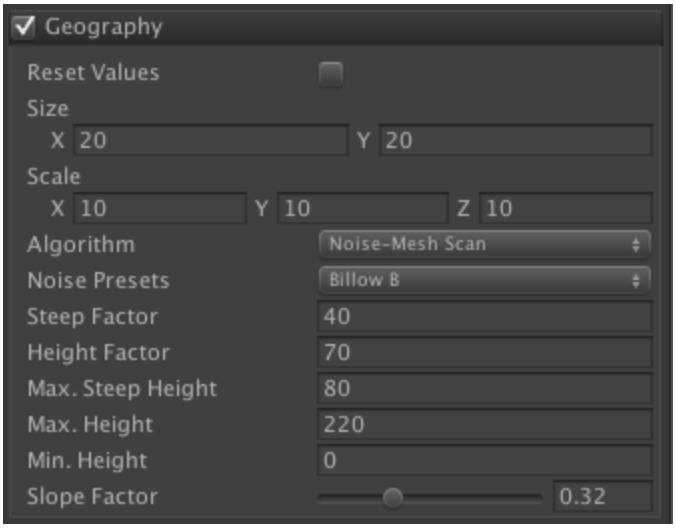
4.7 Advanced Resolution:

You can set terrain objects following parameters with the Advanced Resolution section:
Detail Resolution
BaseMap Resolution
HeightMap Resolution
Patch Resolution



4.8 Geography:

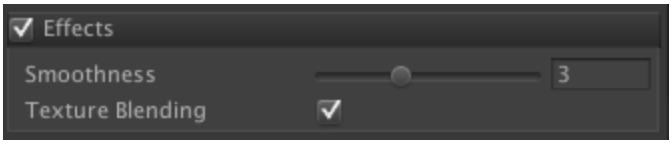
This is the core of the surface manipulation section.



Reset Values checkbox indicates to reset values.
Resolution dropdown list will let you easily choose the resolution of the terrain with this
You can just set height map resolution of the terrain. It will be automatically disabled and will be overrode when Advanced Resolution feature enabled.
Size option indicates terrains size.
Scale option indicates scaling of the terrain.
Algorithm drop down list is the way of choosing surface extraction algorithm

Noise Presets is the option to choose surface type of the terrain.
Alternate Noise option is only enabled in Direct Noise algorithm. It calculates heightmap values in different way.
Steep Factor defines steepness of the terrain.
Height Factor defines the overall height of the terrain.
Max Steep defines maximum height of the steeps.
Max Height defines the Maximum height of the terrain.
Min Height defines the Minimum height of the terrain.
Slope Factor defines the over slope of the terrain.

4.9 Effects:

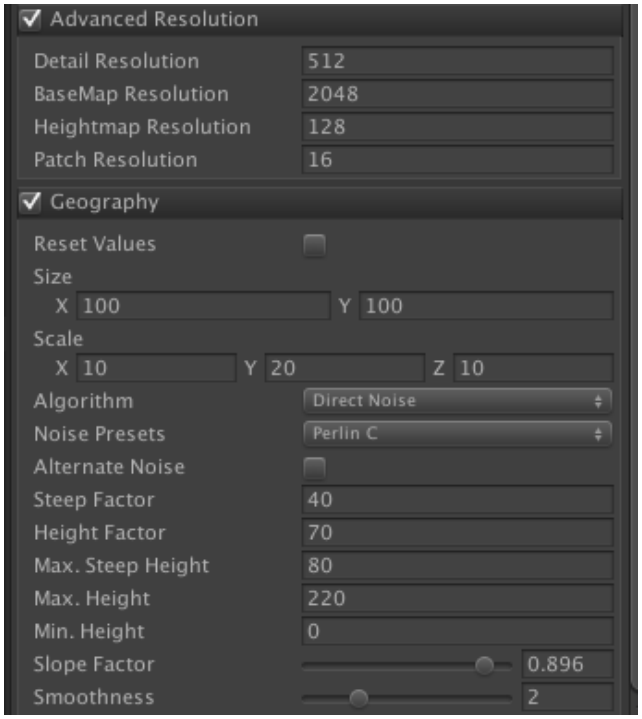


Smoothness is the smoothing factor when generating the terrain.
Texture Blending is the option to blend the current terrain textures with terrains heightmap. With this approach you don't need to generate normal for your textures.

5 TIPS & TRICKS

5.1 You Never Get Good Results With Direct Noise:

Just start from this settings.Do not play with settings except size parameters . You will be shocked with the speed . Just observe the logic. You will see how smooth how endless it is.



You will get a result like this it is fairly simple and smooth. Just try to increase the amount of the resolution parameters and try to change slope factor or Y parameter. Now observe the size of the terrain you will see it is 16000 ! Generating a terrain with this size is efficient. But there is no planting and vegetation or prefab placement if you want to increase the tree density just increase tree density first and then increase the heightmap resolution