



Report on Grid Settings in 3DTV

By Pat Sanders

3DTV has both Static and Dynamic modeling methods that can be used to generate the underlying surface model. The **Static** method is sub-divided into Accurate and Fast modes. The **Dynamic** method allows you to move a slider to emphasize quality or speed.

The Terrain Settings window is shown to the right. The 'Modeling Methods' are available from the two frames located at the bottom of the window.

Some of these methods are also affected by the Grid Cell Size (length and width) located at the top of the form.

There is a tradeoff between resolution of the surface model and the amount of CPU time used when moving the model and associated nature features (sky, waves, etc.). **The more precise the mode, the more CPU time needed to move through the model.**

If you get close to using 100% of your CPU time, 3DTV will become non-responsive and the frame update rate will not be able to keep up at regular intervals.

As a demonstration, I took the same surface model into 3DTV in order to display the CPU usage and graphics displays using different modeling methods. Those details are shown in the table below.

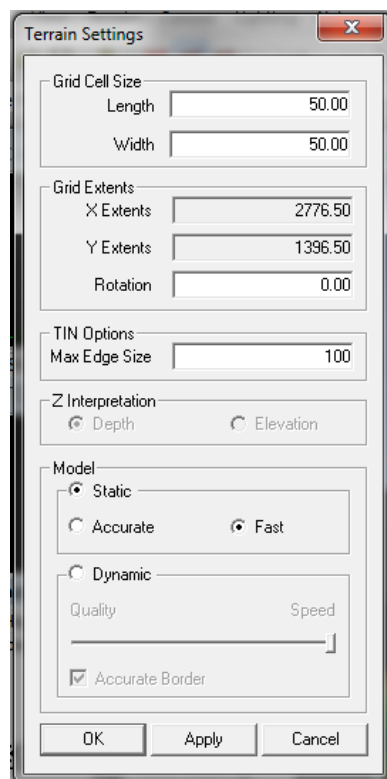
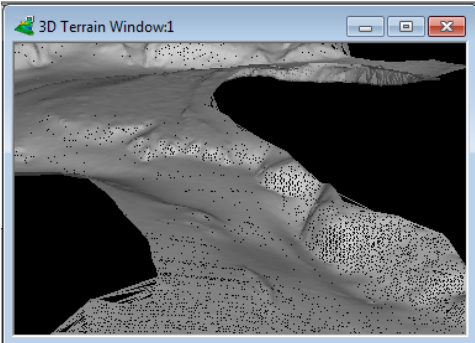
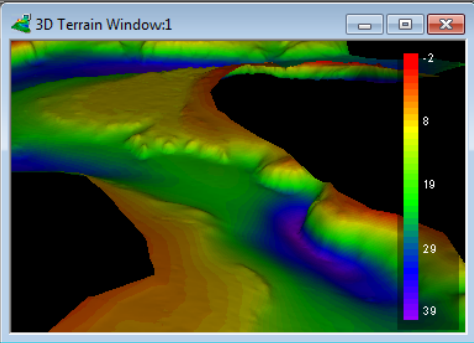
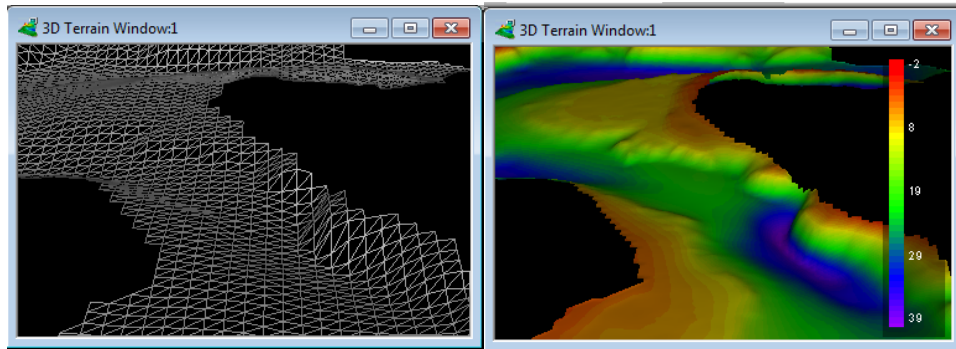


TABLE 1.

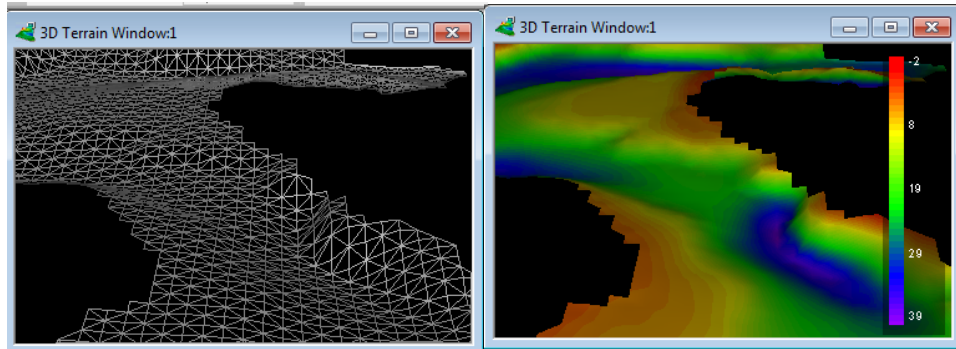
Method	Mesh Grid	Color Model	CPU Usage
Static – Accurate			13%

Static –
Fast



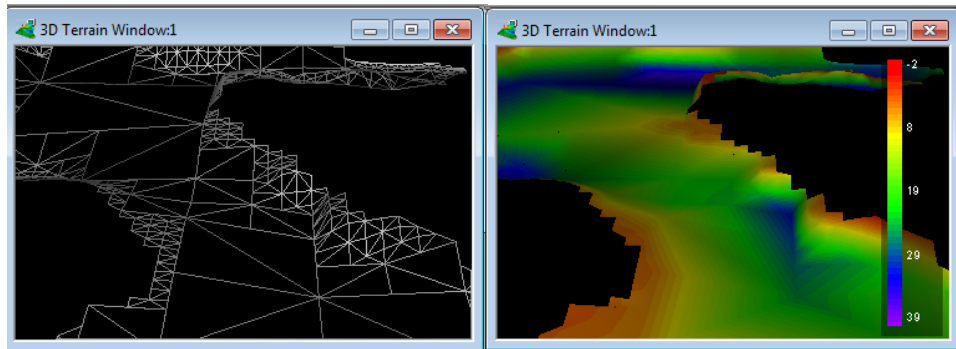
5%

Dynamic
– 100%
Quality



4%

Dynamic
– 100%
Speed



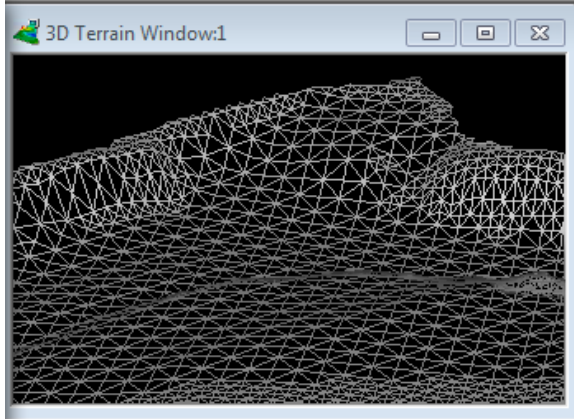
2%

As you go from top to bottom, the resolution of the features in the surface model decreases, while your ability to quickly update the screen increases.

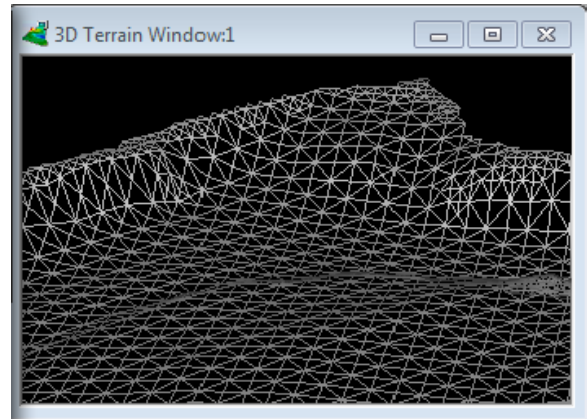
By moving the slider between the 'Quality' and 'Speed' ends of the Dynamic method, you can affect the total number of triangles created and the speed in which they can be drawn to the screen. These mesh examples show the resulting surface models with the slider set at 0% (Full Quality), 25%, 50%, 75% and 100% (Full Speed).

TABLE 2. *Quality vs Speed and the Effects on Model Resolution.*

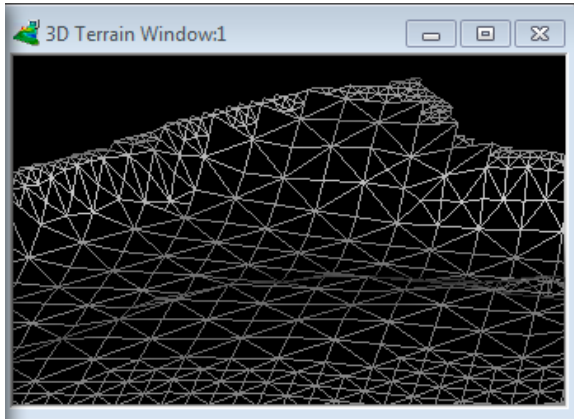
Full Quality (100% Quality, 0% Speed)



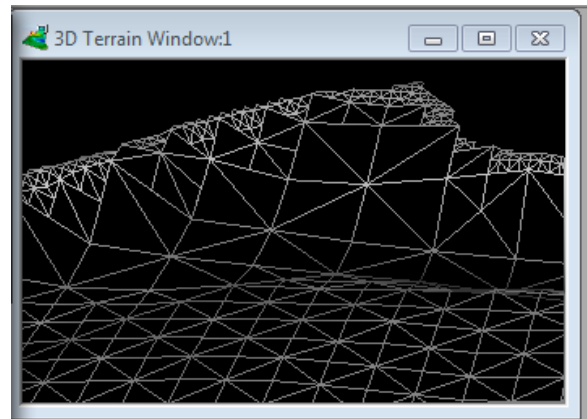
75% Quality 25% Speed



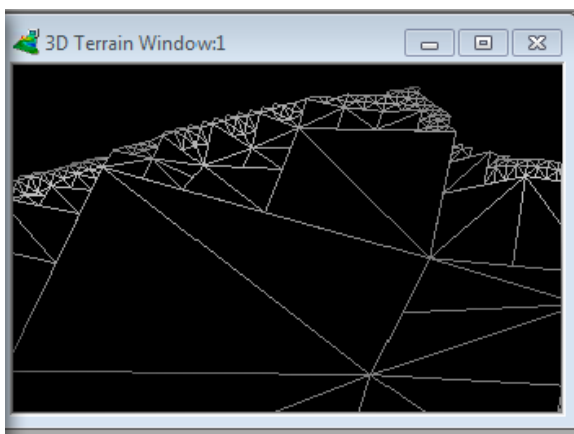
50% Quality 50% Speed



25% Quality 75% Speed



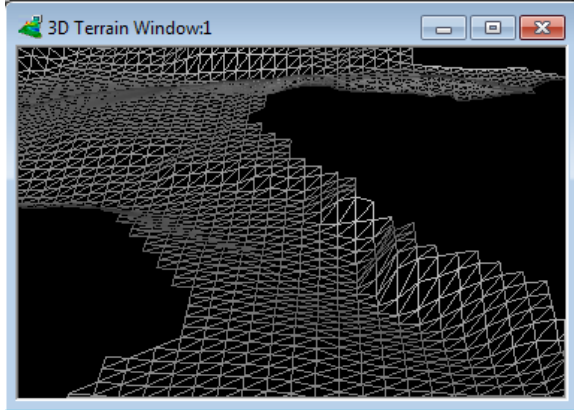
Full Speed (0% Quality 100% Speed)



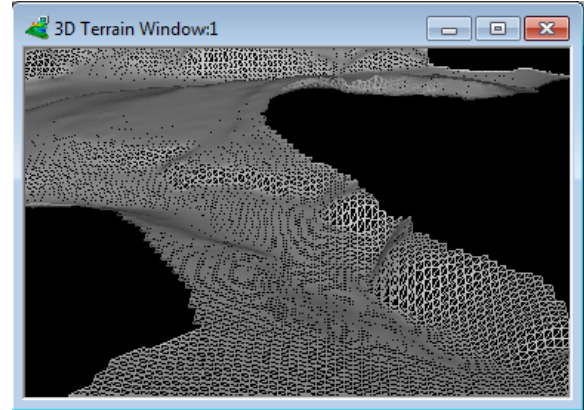
You can also affect the quality and update speed of the model by changing the Grid Cell Size (Length and/or Width) at the top of the Terrain Settings window. This works for all methods, with the exception of the Accurate – Static model. That method creates a TIN of the entire data set and is not altered by the Grid Cell Size.

TABLE 3. Grid Cell Size affects Quality and Speed - Wire Frame Models

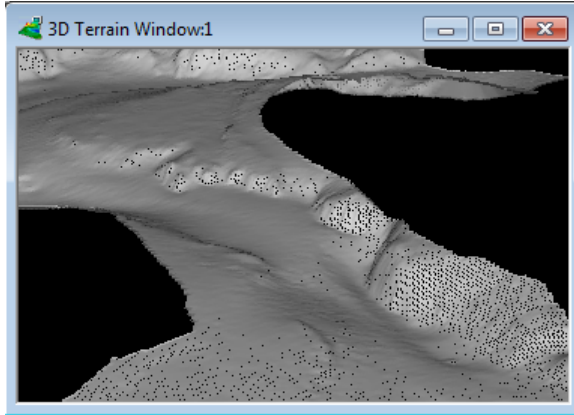
Static Fast Mode; 25m x 25m Cell Size



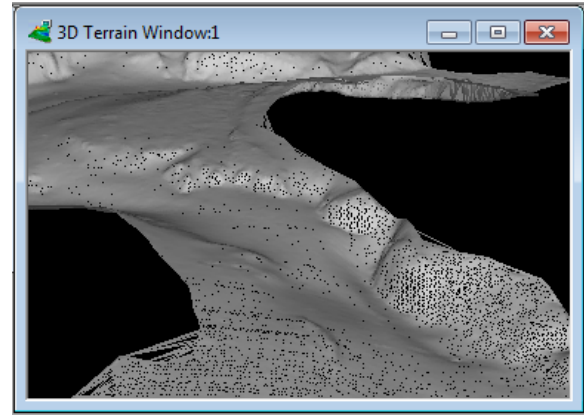
Static Fast Mode; 10m x 10m Cell Size



Static Fast Mode; 5m x 5m Cell Size



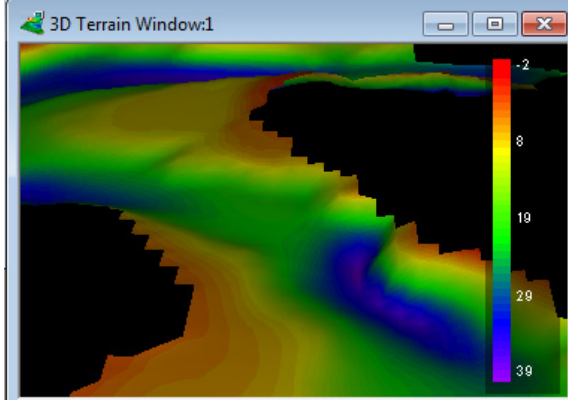
Static Accurate Mode



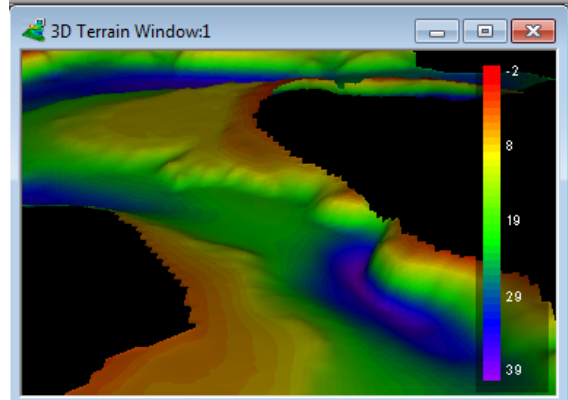
The resulting color filled models are shown in the following table:

TABLE 4. Grid Cell Size affects Quality and Speed - Solid Models

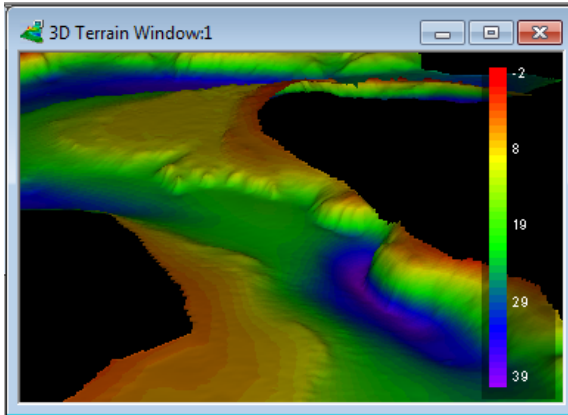
Static Fast Mode; 25m x 25m Cell Size



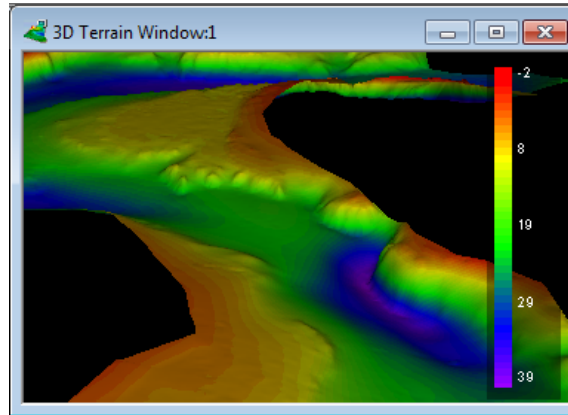
Static Fast Mode; 10m x 10m Cell Size



Static Fast Mode; 5m x 5m Cell Size



Static Accurate Mode



With a little bit of experimenting, you should be able to find a good balance between the level of detail and the speed at which the model can be moved. Note, the Terrain – Settings window is only available if the camera is not moving and certain dynamic nature features, such as waves, have been disabled.

3DTV also has the ability to display ‘Nature’ features, such as Sky, Clouds, Waves and Fog. You can also drape GeoTIF files or insert the surface model into a GeoTIF. Each feature that you add requires a little bit more of the CPU time in order to update the display. The table shows the average percentage of CPU time used with different elements included.

TABLE 5. Average Percentage of CPU Time Used with Different Elements

Method	Grid Only	Grid & GeoTIF	Grid, GeoTif & Sky	Grid, GeoTif, Sky & Waves
Static Accurate	13%	18%	49%	52%
Static Fast	5%	11%	25%	38%
Dynamic				
(100% Quality)	4%	16%	20%	31%
Dynamic				
(100% Speed)	2%	6%	19%	29%

Pat Sanders

29 Dec 2010