Lattice Model

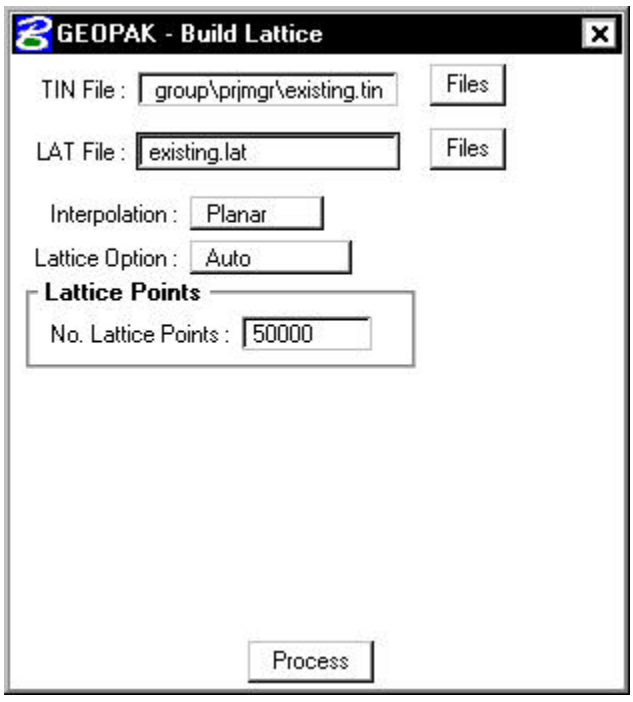
9.1 Overview

Lattice models are grid meshes that are draped over triangulated data. The triangulation model serves as input to the lattice process. The output of the Build Lattice procedure is a binary lattice file.

9.2 Build Lattice Dialog

Feature / Function	Utilizing a TIN model to create a lattice model.
Tool 	
DTM Menu Bar	Build > Lattice

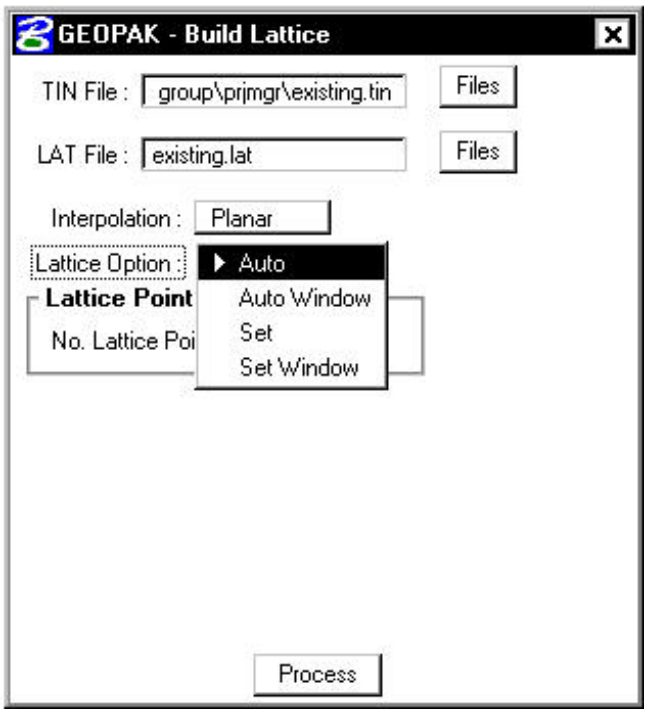
When invoked, the Build Lattice dialog is displayed as depicted below.



At the top of the dialog, the **TIN File** and **LAT File** names must be specified. In lieu of typing, pressing the Files button invokes the files dialog, wherein the desired file may be selected.

Two Interpolation options are supported: **Planar** and **Polynomial**.

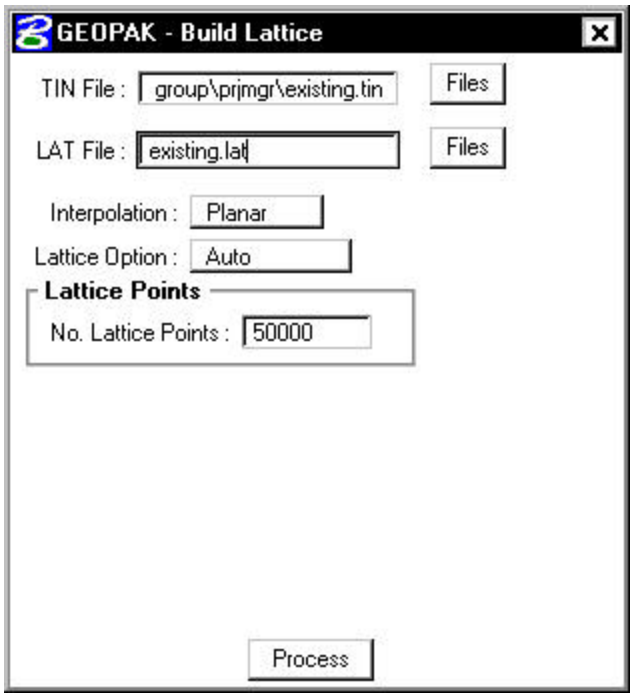
Four lattice options dictate the extent of the lattice model as well as the density of individual lattice points, as displayed in the exploded view below.



Each of the four Lattice Options will be the subject of the subsequent subsections.

9.2.1 Auto Lattice Option

The Auto method generates a lattice over the full extent of the triangulated model. The density of the lattice is dictated by the number of lattice points. For the Auto mode, both the **Lattice Intervals** as well as the **Lattice Window** settings are not applicable. Hence, they do not appear on the dialog box.

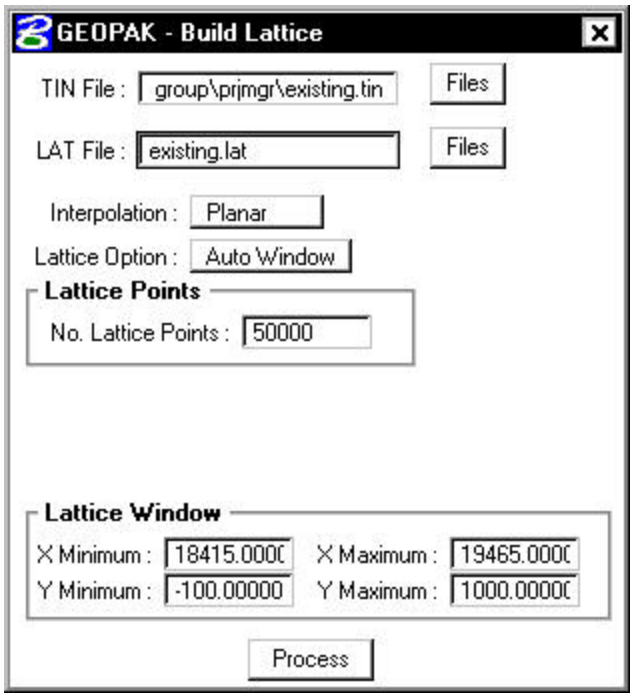


With the **Auto Lattice** option, the distances between individual lattice points will invariably represent non-rounded values. Similarly, lattice grid points will not fall on rounded coordinate locations.

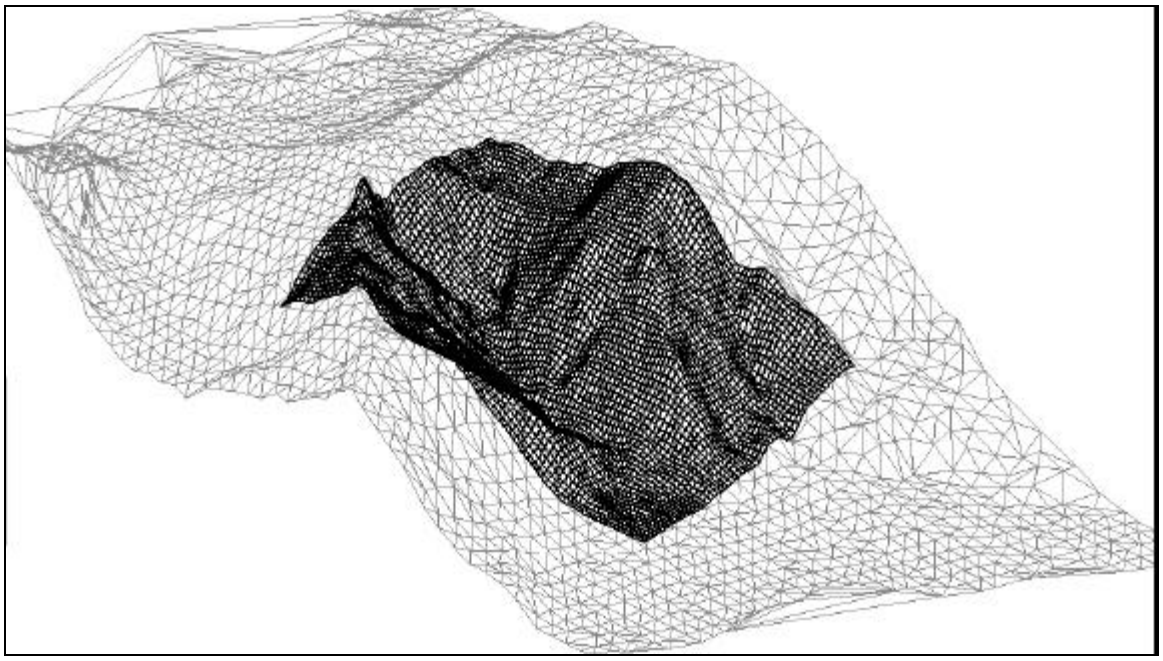
9.2.2 Auto Window Lattice Option

The Auto Window lattice option generates a lattice for a user defined window. This permits a lattice model for a portion of the triangulated model. The lattice density is determined by the number of lattice points. Hence, like the **Auto Lattice** option, the distances between individual lattice points will invariably represent non-rounded values and individual lattice grid points will not fall on rounded coordinate locations.

The image below represents the Build Lattice dialog for the Auto Window mode.



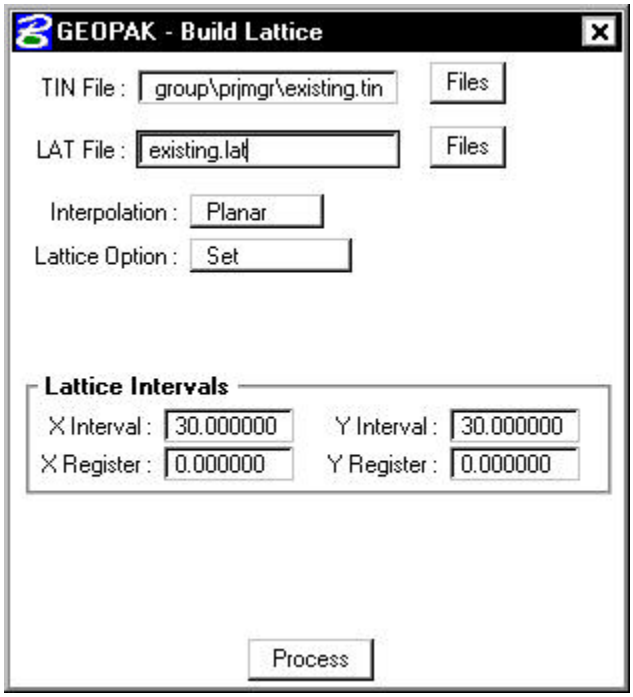
The image below depicts the 50000 point lattice model for the window range specified in the Lattice Window group box. The full triangulation model is also shown for reference.



9.2.3 Set Lattice Option

The third method is **Set**, which generates a lattice over the full extent of the triangulation. The difference between the Set and Auto modes is

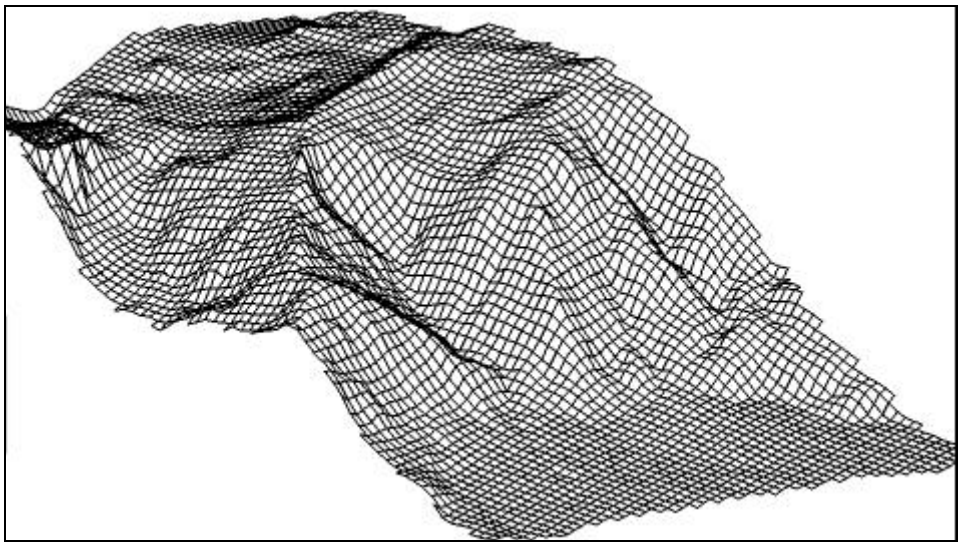
that you specify a specific number of lattice points for the Auto mode. For the Set mode, however, the density of the lattice is specified by the **X** and **Y Lattice Intervals**. Hence, the dialog for the Set mode appears as shown below.



On the dialog above, the **X** and **Y Lattice Intervals** are set to **30.0**. Therefore, the distance between individual lattice points will be 30 master units. Furthermore, the coordinate value of lattice points will be a number evenly divisible by 30.0.

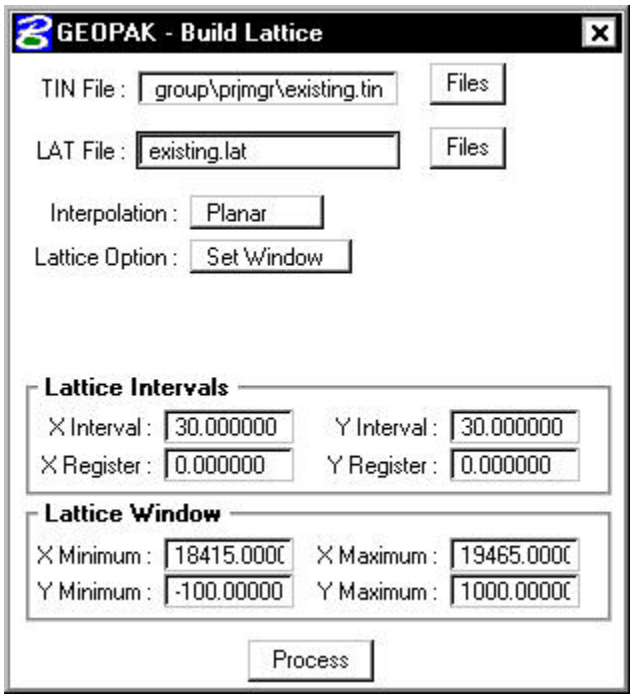
The **X Register** and **Y Register** entries on the Build Lattice dialog in conjunction with the **X** and **Y Intervals** dictate the coordinate values assigned to individual lattice points. The coordinate values of a lattice point are always a multiple of the **X** and **Y Intervals** plus the **X** and **Y Register** values. For example, a 30 meter **X** and **Y Interval** and a 0.0 **X** and **Y Register** would result in coordinates at 30, 60 and 90. Conversely, if the **X** and **Y Registers** were changed to 5.0, then the resulting coordinates would be at 35, 65, and 95.

The resulting lattice model is shown below. With a 5000 point model, the approximate spacing between lattice points was approximately 10 meters. Therefore, the density of the lattice points for the image depicted below is approximately 70% less.



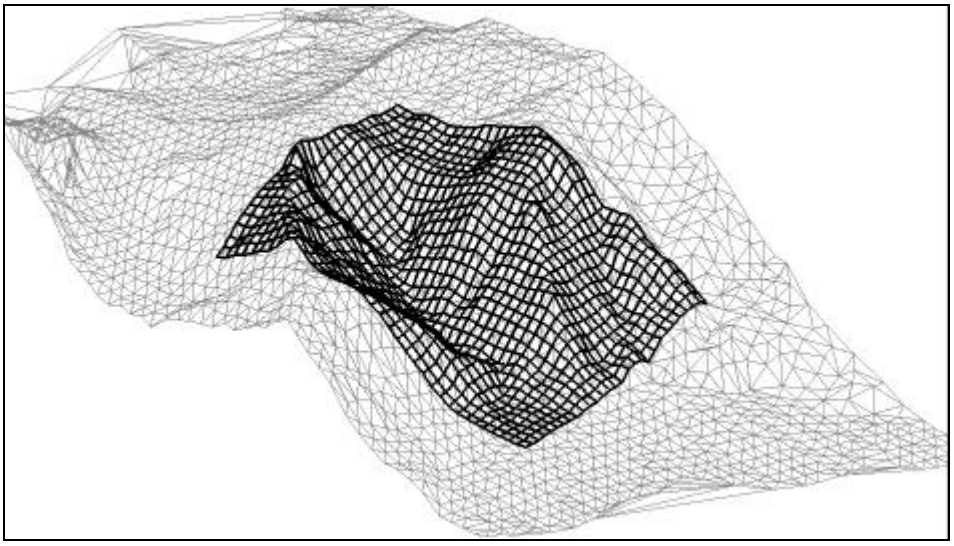
9.2.4 Set Window Lattice Option

The final lattice generation option is the **Set Window** mode, which generates a lattice for a user nominated window. The density of the lattice is determined by the **X** and **Y Intervals**. The lattice dialog for the Set Window mode is shown below.



Like the Set mode, the **X** and **Y Lattice Intervals** for the Set Window mode equal **30.0**. Therefore, the distance between individual lattice points will be 30 master units. Furthermore, the coordinate value of lattice points will be a number evenly divisible by 30.0.

Although not utilized in this example, X and Y Registers are supported and function identically to the Set Mode usage. The resulting lattice is shown below. Again, the triangulation model is also shown for reference purposes.



9.3 Producing the Lattice Model

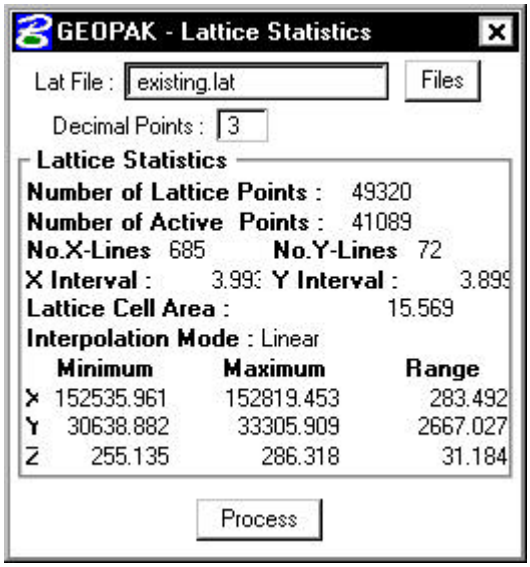
Once all entries on the Build Lattice dialog have been established, press the **Process** push button. The process is very quick. A lattice model in the 50000 point range will consume less than five seconds to produce on a Pentium PC. Even a 1,000,000 point lattice consumes less that 20 seconds of processing time.

9.4 Lattice Statistics

Feature / Function	Generate lattice statistics
Tool 	
DTM Menu Bar	Reports > Lattice Statistics

The Lattice Statistics tool displays the coordinate ranges of data points in a lattice model, the total number of points comprising the model as well as other statistics such as the distance between lattice points.

The dialog is depicted below. Simply type the name of the lattice file (if not supplied, a "LAT" extension is assumed) and press the **Process** push button. Lattice statistics are then displayed. The Lattice Statistics dialog below corresponds to the lattice that was built for the Auto mode with a **No. Lattice Points** setting equal to **50000** points. Take note of the non-rounded **X** and **Y Intervals**.



By contrast, the Lattice Statistics dialog below corresponds to the lattice that was built for the Set mode with an **X** and **Y Intervals** of **5.0**. For this model, the number of lattice points is reduced. However, the **X** and **Y Intervals** are rounded to **5**. The Interpolation Mode during the Build Lattice procedure was set to **Polynomial**, which is displayed in the statistics report.