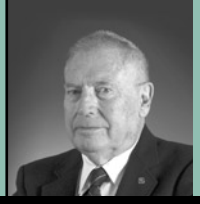
SoftwareReview



By Joseph H. Bell, LS

Joe Bell is licensed in California and New Mexico. He has been reviewing software for surveyors since 1982.

General CADD

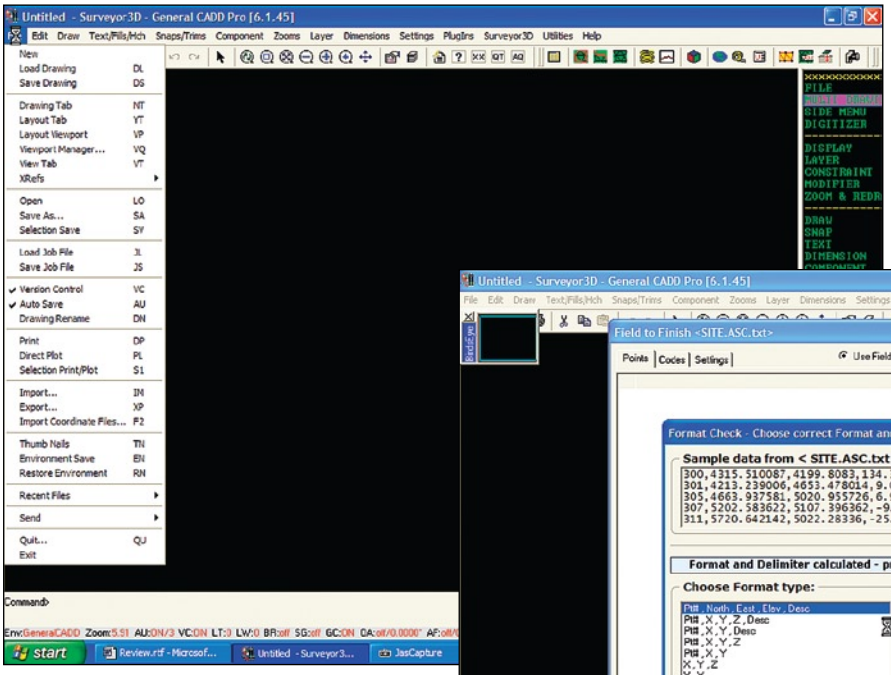


Figure 1

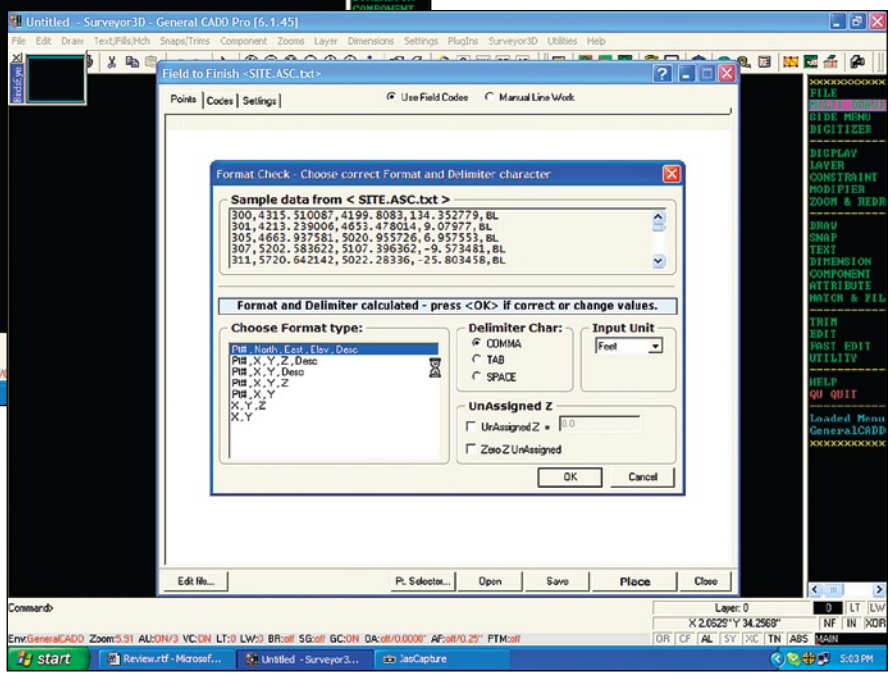


Figure 2

Backward compatibility has always been one of the things that make a good solid product. General CADD started out as an inexpensive CADD program working in DOS. Generic CADD was the name and it made it possible for surveyors who could not afford the very expensive CADD programs or the expensive computers on which to run them to use computer drawing. Generic CADD was relatively simple to learn, and once learned, it was very fast to draw. Although the program has evolved to more advanced operating systems over the years and has added many features of the larger programs, the company has never abandoned the original Generic CADD users. All of the original Generic CADD commands are still active. At the same time you are learning the new commands you can continue to work as fast as you have learned to draw.

For a long time I had an unreasonable prejudice against program activating keys, mainly because in the early days of DOS they were not well done and there were usually three times as many as necessary. My thinking has gradually changed because time has shown that drafters who use key coding are much faster than drafters using the mouse.

Since Generic CADD started in DOS, it made good use of the key codes.

Through the use of key codes, the successor to Generic CADD continues to support its very first user.

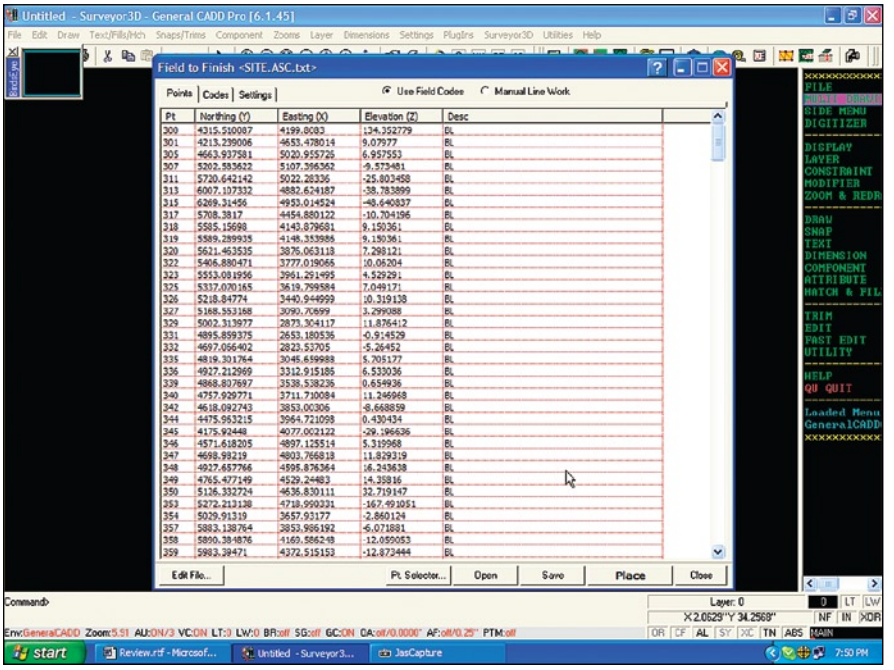


Figure 3

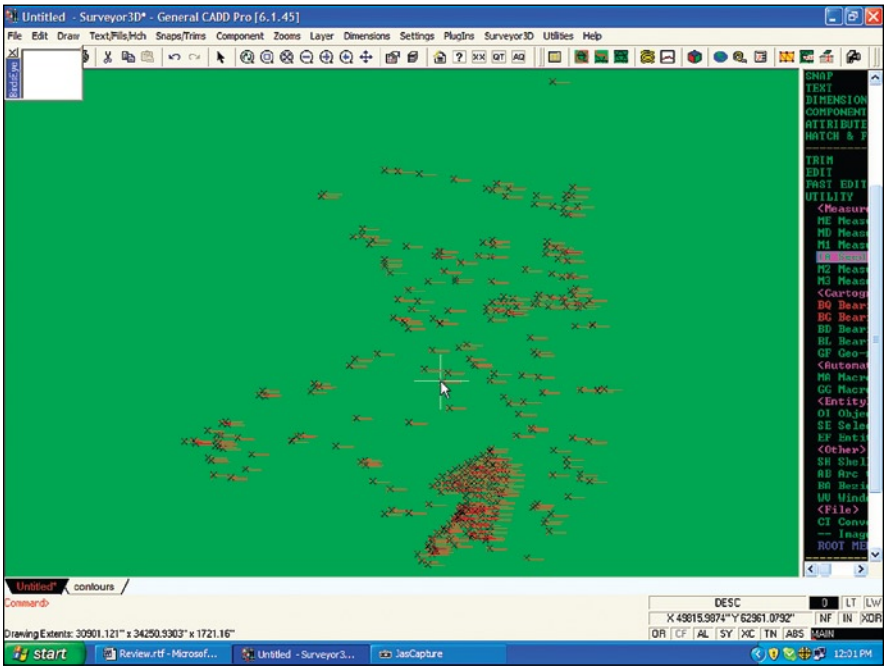


Figure 4

But even more important is that as the program gradually morphed into General CADD, they have continued to support all of the original key codes. In other words, they continue to support their very first customer. If you are still not convinced, you can use the mouse. To make it easier to learn the key codes, they are there beside each icon.

General CADD works from coordinates. It has no routines for reducing raw field data. However, starting with good coordinates, General CADD can do field-to-finish. That means it can read descriptions and automatically draw lines and figures. You can create your own table of figures, colors, line weights and layers.

Figure 1 shows the opening screen of General CADD with the pull-down menu from FILE. You can pick the command from the list, but you are constantly reminded of the two-key code. If you do a minimal amount of drafting, you will probably stick with the mouse, but if you are a draftsperson you will quickly switch to the key codes and become much faster.

Given a text file of coordinates, you can type F2 or select "import coordinate files". This brings up **Figure 2.** The actual text file is displayed in the upper window. Your choice of format type is in the lower left window. You can select the separator, the units, and you can assign a fixed z coordinate for the whole file. You can see the status of the point on the bottom in red (zoom scale, etc.). You can edit the file, select the point or points you want to import, save the file, place the file in the drawing or simply close the routine.

Before the coordinates are placed, you can see the entire file in the spreadsheet format. The spreadsheet is shown in **Figure 3.** If you are satisfied, you can select "place" and the coordinates are placed in the drawing automatically scaled and centered. As you can see in **Figure 4**, each point is marked by an "x" and a line. The line is actually the mapping *xy* coordinates. From here you could do a subdivision design (automatically creating lots using predetermined areas and parallel lines, etc.). All of the current commands are available like snap to…practically anything. The rest are all the commands of Generic CADD.

The most exciting new addition is SURVEY 3D. At this price you cannot get these features anywhere else. **Figure 5** shows the pull-down menu under SURVEY 3D. The first item is Field

to Finish. This item looks and acts like F2, but there is a difference. Field to Finish brings in the elevations so that you now have a 3D model. You can see that I have already created a TIN with the two-key code, TI. There are basically three major functions, building a Triangular Irregular Network (building a 3D surface), contouring the surface, and editing the surface.

The features are pretty sophisticated. You can create a boundary for the surface. This allows you to exclude points that are outside of the working area. But the most important function of any surface model is the ability to define break lines. To define a break line you must start with a ground shot with an elevation and end on a ground shot with an elevation.

You will notice that every pair of triangles makes a quadrilateral. Sometimes, after contouring the TIN, it does not look quite right. Finding the quadrilateral involved and changing the divider from the corners it connects to the other two corners fixes the peculiar contours.

I have also pulled down the menu for COGO to show you the list of operations you may need in making your map. *PT* is for placing a new point on the map. *Inverse* is a little different. You can actually use it to set a back sight bearing for a traverse.

Align points would better be called "align figure" since it operates on a

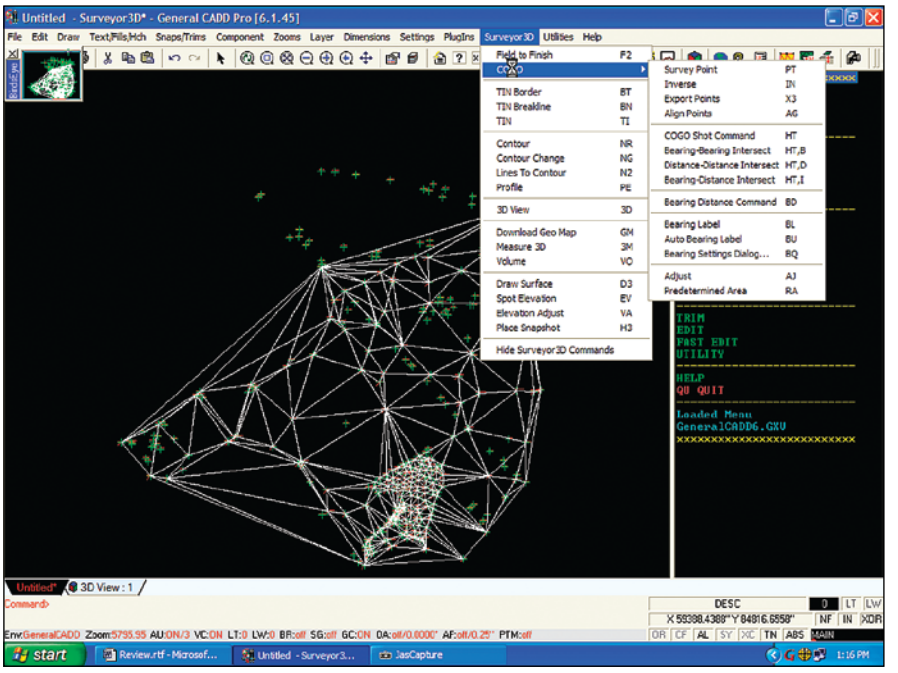


Figure 5

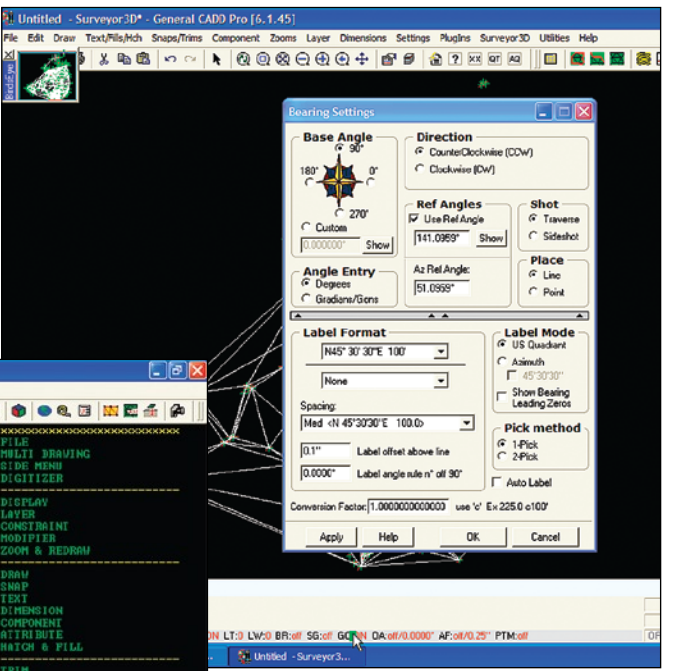


Figure 6

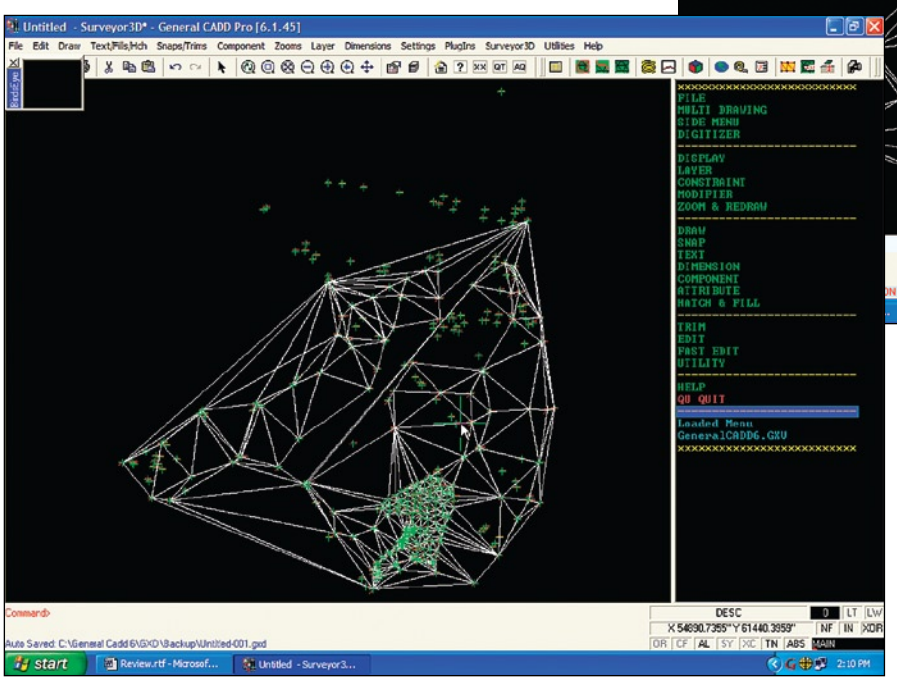


Figure 7

group of points and rotates and moves them. The *intersections* are the same familiar intersection routines for finding the intersection point of various figures. *Bearing distance* shows the bearing and distance, but it also allows you to set out a bearing and a distance. *Bearing settings* dialog is shown in **Figure 6**. Bearing Settings are so nicely laid out that I wanted to show it.

The next commands have to do with labeling the lines. *AJ* is for adjust. That seems unusual in a program that accepts only coordinates. It works in this way: the turning points and the closing point are identified in the description field. General CADD recreates the traverse by inversing between the turning points. A compass rule adjustment is made. You can then adjust to side shots to the new turning point positions. They have had requests for a least squares adjustment of a traverse. It sounds like it should be much better than a compass rule adjustment, but contrary to popular belief, that thought can be misguided. The strength of the least squares adjustment is directly proportional to the number of redundant measurements. The traverse has only one redundancy. It can be completely drawn from the points. The redundancy is the shot back to the beginning. The traverse is the weakest least squares adjustment configuration possible having only one redundancy. It offers no advantage over the compass rule adjustment. The compass rule adjustment is easier to understand and to analyze your field work. The final

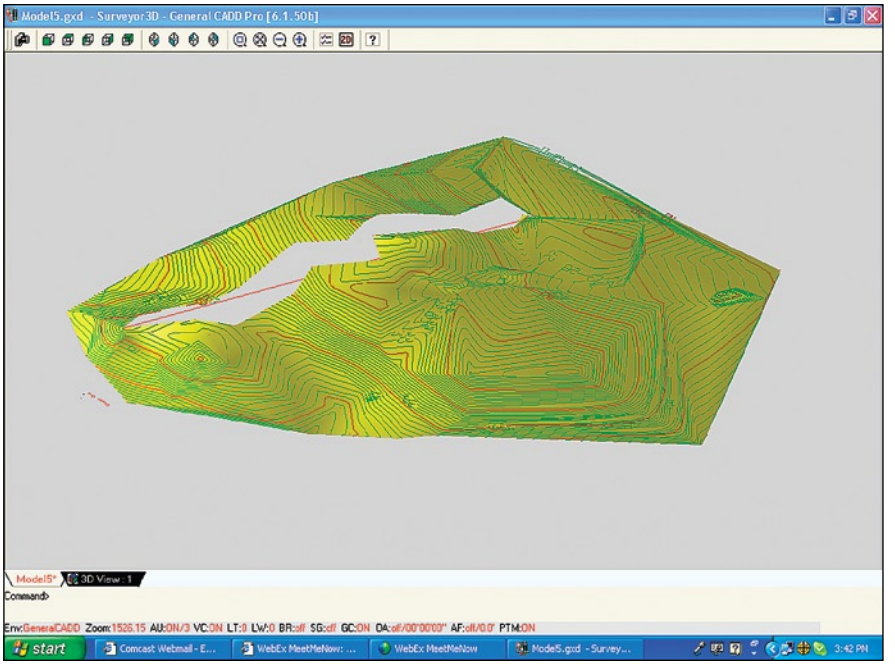


Figure 8

COGO command is the *predetermined area.* This is the one you use to divide property and more commonly set out lots in a subdivision.

Back to the Survey 3D, command *F2* brings in 3D points so that you can now think in terms of surfaces and volumes. The boundary points can be

imported by putting *BT* in the description. I tried to "break" the routine by putting a break line almost the full length of the proposed TIN to look for any triangle that crossed the break line. I used the *TI* command (build a TIN) to check it out. There was not one failure. I used the *contour* command and it made contouring and labeling automatic.

Figure 7 shows the TIN with the single break line that runs nearly the whole length of the TIN. You can see that no triangle crosses the break line. You will notice that there are many points that are not involved in the TIN. In this case it is because they are mapping coordinates without elevation data. The TIN program automatically ignores them and they do not cause the TIN program to stop and give an error message.

General CADD has one more feature of special interest. You can create a 3D image with shading to give a realistic picture of the surface. **Figure 8** shows such an image. You can rotate the image in any direction to get a good look at the complete surface. I have used two programs to make changes in the terrain more obvious. The first is the contour program, which is really easy to set up. The text is too small to read, but the contours are labeled and placed in a broken space in the contour line.

The second is shading, which gives you a real sense of the surface shape. As you can see, the monster break line virtually cut the surface in half, giving it the appearance of a lake. The surface model can be rotated by moving the mouse around. It can be rotated in any direction so that you can carefully examine every part of the model and satisfy yourself that it is truly representative of what you saw on the ground.

Dollar for dollar, this program is hard to beat. Try out a personalized demo on line at www.generalcadd.com.