



By Joseph H. Bell, LS

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

## XMap, XMap/GIS Analyst, XMap/GIS Editor and GPS PostPro 2.0

# X

Map is DeLorme's basic mapping package, and it is a remarkable set of programs. XMap/GIS Analyst contains tools for GIS analysis and all of the functionality of XMap.

XMap/GIS Editor contains editing functions and all of the functionality of XMap/GIS Analyst. My first love is data collection and the fact that with GPS PostPro 2.0 you can have sub-meter accuracy with a cheap navigation GPS receiver is very exciting.

I'd like to share with you the story of how this software solved a problem for me, a problem that most of you will have to solve sooner or later. I was fortunate to have a local county parcel map GIS shapefile. The problem: how to keep it up-dated. Nearly everyone has survey-grade GPS receivers, but I doubt whether it is practical to take them off the work schedule to perform a mundane task like up-dating a base map. You may have to start with a TIGER map. The point is that although survey-grade receivers are always desirable, they are not absolutely necessary for map up-dating. My county map, as I have tested it with survey-grade receivers, is no better than plus-or-minus six feet. The TIGER map is frequently no better than hundreds of feet. Anything giving an accuracy in the range of plus-or-minus six feet should be satisfactory for maintaining your basemap.

DeLorme now sells a 12-channel GPS receiver that will record observables (pseudo ranges in RINEX format) for \$99.00. Why is that important? You can do static or kinematic GPS surveying with a single \$99.00 DeLorme Earthmate GPS. How is this possible?

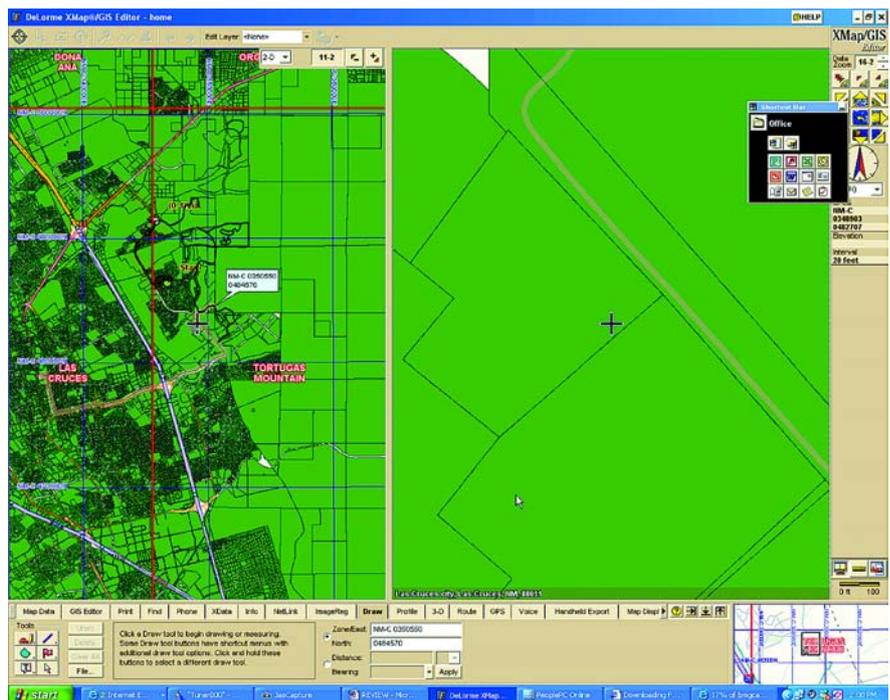


Figure 1 Dual screen with different magnifications

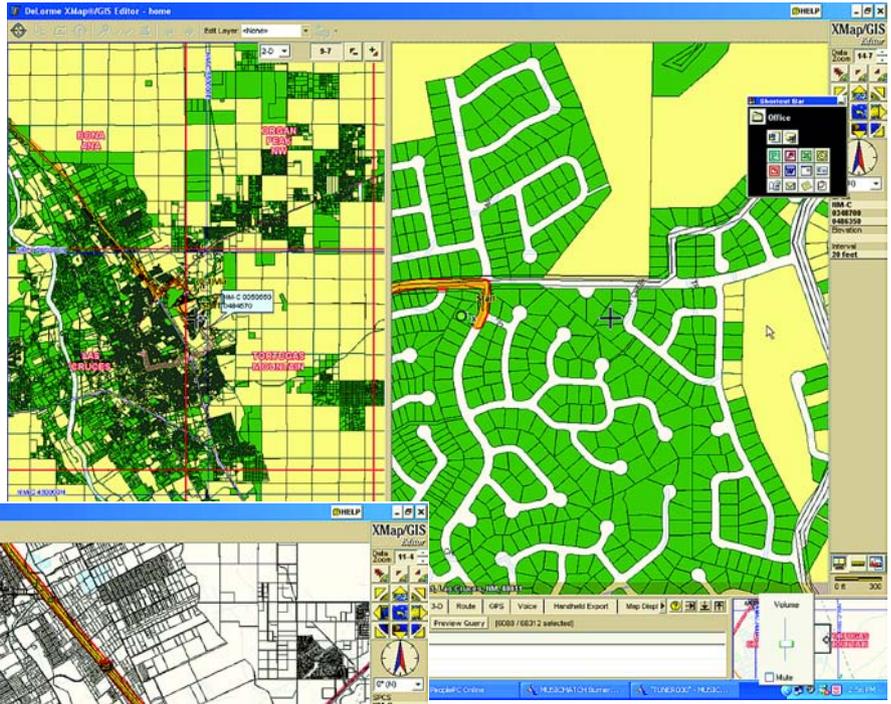
DeLorme's GPS PostPro 2.0 for Earthmate. You can perform static reductions or kinematic reductions. Where is the base station? You can use any available, including your own, but if you have none you can use a Continuously Operating Reference Station (CORS). The software will look up the nearest CORS and download the necessary observations and make the necessary corrections (plus-or-minus 3 feet for static, and 5-15 feet for kinematic). My closest CORS is at White Sands Missile Range. They are usually a day or so late in making the observation files available for download so I had to wait until they were available. The software took care of all of that, including auto-

matically setting up the FTP site for download. I practically did not have to do a thing. GPS PostPro 2.0 searched for the nearest CORS, contacted the FTP site, and downloaded the observations without any interference from me.

First, I set next to a First Order Station called GPS13 for 20 minutes. That was long enough to have a standard deviation (67%) of .081 m North and 0.458 m East. The actual inverse was 1.31 meters. Next, I sat on a bench for 20 minutes and obtained geodetic coordinates on a job site so that I could import the job into the map. Then I put the Earthmate GPS on top of my Jeep and rode around to check the kinematic reductions against my county parcel map. **Figure 1** shows

the dual screen with different magnifications. You can see that the kinematic line is always in the rights-of-way. On the right you can also tell on which side of the road I am driving. The black lines on the left are lines drawn through navigation points without post-processing. Now I have the new streets; what can I do with them?

**Figure 2** shows the geometry of the county parcel map (without the parcel information) and shows the planned route from my house to Albuquerque. Notice the sharp turns in the route. Again we are looking at the TIGER map. One very important and interest-



**Figure 4** Results of query to show parcels valued at more than \$75,000



**Figure 2** Geometry of county parcel map and planned route

ing function is that you can create routable roads. When you select a start point and a finish point, XMap will pick a route between them (shortest, quickest, etc.). In **Figure 3**, I have made the County Parcel Map position of Road Runner Parkway a routable road (I told it to pass a point on that road).

### XMap/GIS Editor

Not only can you import all of the various mapping products from DeLorme, you can also import text files; more importantly, ESRI shapefiles. The vast amount of material available in the ESRI shapefile format is the *defacto* standard for GIS maps. My county road and parcel map file is in the ESRI

**Figure 3** Routable road

shapefile format. XMap/GIS Editor Draw Function imported the geometry of the shapefile quickly and perfectly. I

did have to indicate that it was New Mexico Central State Plane

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Coordinates, in feet, so that it could automatically convert it to whichever map format was current. Now, if you want to import a shapefile with all of the database information, you have to import it through the GIS Editor Tab. This literally imports all of the information related to the shapefile. Now you can do something very special and very easy: find the information in graphic form. For example, suppose I want to find all of the parcels valued at \$75,000.00 or more. **Figure 4** shows the results of the query. In addition, the supported file formats include Microsoft Access, Microsoft Excel, Microsoft Visual FoxPro, dBase files and text files. You use the XData tab to import and export these formats.

Look back at Figure 1. It shows black lines inserted in the Draw layer from my old Garmin GPS II Plus. Several things need to be identified. The heavy yellow line outlined in red is the route created by XMap as the quickest way to Albuquerque from my home (the Green spot identified as Start). It is based on the TIGER map. The correct location of Road Runner Parkway is the curved road. The black lines are derived from the moving positions supplied by the Garmin GPS II Plus. They all fall within the rights-of-way shown on the Dona Ana County Parcel Map. That gives us the reasonable expectation that the lines on the new roads also fall within the rights-of-way of those new roads. In drawing the new roads I was pleased to note that the "draw line" command snaps to the nearest flag insertion. There are a complete set of drawing functions, but if you're already using a CAD package that can generate DXF files, you may be more comfortable using the CAD package and importing the DXF files. I am happy to say that XMap/GIS Editor reads DXF 2004 files.

The Draw layer can be edited, but I did not find a universal editor that would batch edit all symbols of the same kind all at once, I could turn off "feature" or "symbol" but I could not turn them all off to see what was underneath. There are literally hundreds of functions you can perform, far more than I could hope to cover in this short article, but I will mention a few.

The program runs in 2D or 3D. In 3D you can do profiles and a complete set of 3D views. XMap/GIS Editor is

perfectly integrated with GPS, Earthmate, and any others that support generic NMEA. You can download your map into a pocket PC or a Palm Pilot. You can also plan photogrammetric flights. It also supports voice commands for hands-free operation.

One of the strengths of these GIS programs is that they can make use of all the DeLorme mapping products: USA Street Atlas, SAT 10 (10-meter resolution satellite images), 3-D Topo Quads and aerial photographs. The other great strength is the ability to read other formats. AAA Map'n'Go, GPS log files, text files, shapefiles, and address books can be read using the "draw" tab. As I mentioned earlier, the county parcel map (a shapefile) is in NAD83 State Plane Coordinates New Mexico Central, but in feet. I had to tell the XMap GIS Editor Draw function what coordinate system the shapefile was using, and XMap GIS Editor automatically converted it to the present project's coordinates.

### In Conclusion

For as powerful a program as XMap/GIS Editor is, it is easy to use. I particularly like the way in which it imports complete themes, the ease with which you can then perform queries, and the simple way the results are displayed. You can also publish your GIS on the Internet, both maps and queries. To try it out, DeLorme will give you a website for publishing, free for 15 days (great for people with multiple offices or even multiple computers in one office).

Two things would enhance the usefulness: an index and a tutorial. XMap/GIS Editor does not have all of the functionality of the major GIS programs, but I expect they'll add them. There is enough now to manage a GIS, it is a lot less expensive, and the learning curve is shorter. As a side benefit, XMap/GIS Editor comes with a complete list of phone numbers of hotels, car rental agencies, airline information, and travel condition information by state (with websites).

If you need more data, XMap/GIS Editor links directly to the DeLorme website where you can purchase and download what you need. Visit [www.delorme.com](http://www.delorme.com). A \$99.00 GPS receiver that you can use post-processing using the nearest CORS—now that is exciting. *A*