Carlson UPdate

The Official Newsletter of Carlson Software, Inc. **February 2000**

Carlson on the Web

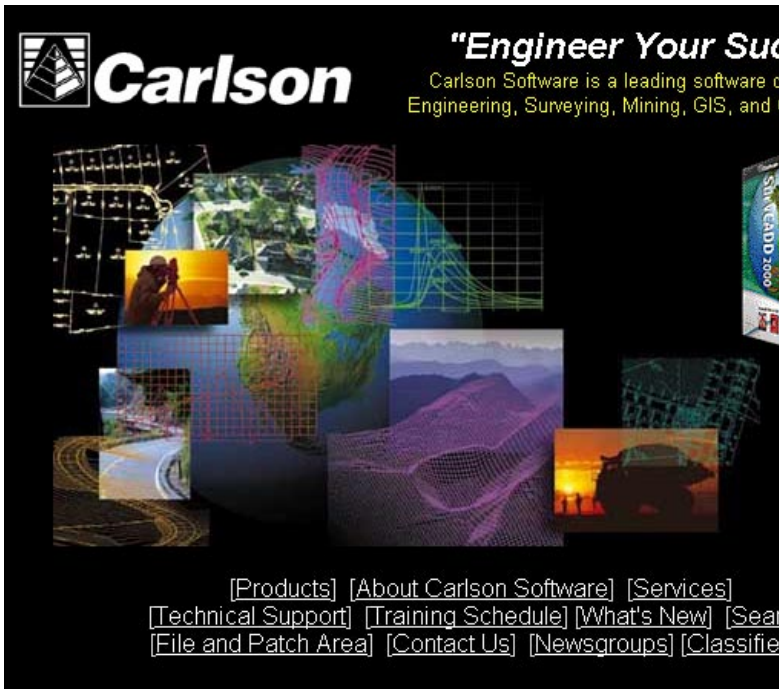
Its no secret that the internet is has become the largest, most effective method of instant communication. People are exchanging messages along with drawings and other files at lightning speed. Decisions are being made in hours that used to take days with conventional information exchange such as the shipping of drawings and documents.

Just as the world has changed to accomodate these improvements, Carlson Software has embraced the technology in an effort to provide you (our valued customer) with better service. We would like to take a moment to elaborate on some present and future services that you should be taking advantage of.

Website: Our website can be visited at ***http://www.carlsonsw.com***. An example of the home page is shown at right. From the home page you can navigate to the various sections. Some of these include:

- ***Products:*** New and even existing users should check out all the products available to enhance their capabilities.
- ***Services:*** Check out other services we provide, such as training and GIS consultation.
- ***Support:*** Existing users should check out the procedures, walk-thru's with graphics and step-by-step instructions.
- ***Whats New:*** Watch this area for information on newly released products, as well as new versions of existing ones.
- ***File/Patch Area:*** We post the latest versions of the products you use in this area, allowing you to 'update yourself' from the website. Be sure you have your serial number handy.
- ***Search:*** This may be the single most important link at our site. It lets you enter a keyword and find all documents containing that word or phrase.

We intend to constantly add to the site, so visit often.



Email Newsletters: The time and effort associated with printed newsletters such as these make them difficult to produce in a timely manner. To allow us to communicate with our user base more efficiently we will be moving to the popular e-news format. This will allow us to release information much more frequently. Our goal is one e-news per month. This also allows multiple users at any site to receive the newsletter directly, not just ending up in the mail stack.

However in order for you to receive the email newsletter we need your email address. Please take a moment to send an email to ***webmaster@carlsonsw.com*** with the email addresses of all those who wish to receive it. Please include the company name and ID number from the back of this newsletter if available so that we can associate you with your company.

Tax Mapping Website: Visit our Mason County Tax Map at ***hq.carlsonsw.com***. This is tax mapping on the web, allowing you to do all your property research from the office. We can help your city or county develop the same capability for the one time cost of $5/parcel.

Discussion Groups: This area of our web is currently underutilized, and we firmly suspect its largely due to the fact that users don't know it exists. Its a chat area of sorts, a place where you can ask questions, post comments and ideas, and exchange views and knowledge with your fellow Carlson users. Of course the Carlson staff is available to answer posted questions, but there is a special interaction that can take place between users. The groups are also broken down into various areas depending on the modules used, to help narrow the focus of the discussion. Choose the 'Newsgroups' link from the Carlson website to navigate to our newsgroups. See you there!

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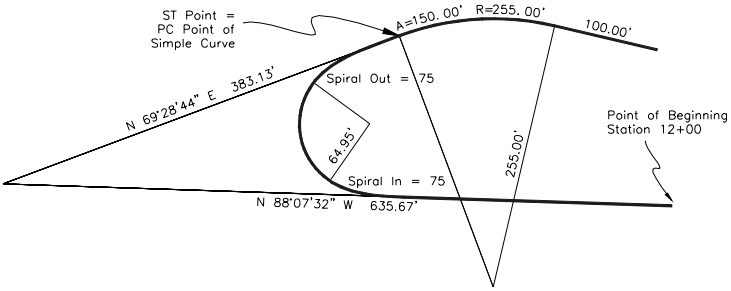
Introducing Input-Edit Centerline

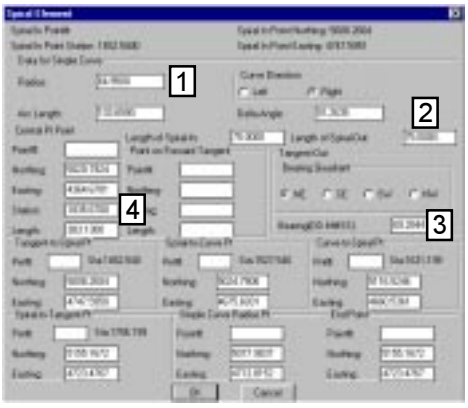
A powerful centerline entry routine has been "quietly" added to SurvCADD, and many users have yet to discover it. In fact, the routine has only been available in its full working form since July, 1999. It is found under the Design pulldown menu in the Section-Profile module of SurvCADD 2000, as well as under the Roads pulldown menu in Carlson Roads 99. It is a dialog-based, non-graphic alternative to Design Centerline, and has the advantage of accepting whatever information you have on your centerlines—coordinates, stationing, length of tangents and arcs, etc. It is ideal for entering centerlines straight from highway design plans. Let's review a typical example:



This centerline, for a highway interchange ramp, involves a starting tangent, then a spiral curve that goes abruptly into a simple curve, then a final tangent. The sequence of entry is (1) Starting Dialog, (2) Line Segment, (3) Spiral Segment, (4) Curve Segment and (5) Final Tangent Segment. Here are all 5 dialogs, with entries highlighted. Note that entry of point numbers (to calculate points) is optional:

Starting Dialog: You start by entering a starting Northing and Easting and starting Station, and the Start Point# is optional. Then the concept is that you click Add to add each subsequent element. The three types of elements are Line (tangent section), Curve and Spiral. Spirals can be "unsymmetrical" as in spiral in only, so all necessary flexibility is in the 3 elements. Our first element is the tangent section.

Line (Tangent) Segment: We want to enter the tangent segment length up to the TS (tangent to spiral). This length is not provided explicitly (see graphic), but can be entered in the form of subtraction as shown. Pressing Enter after the Length entry will compute the actual Length as 233.71. Note also that the End Point# is optional. Each dialog for Line, Curve or Spiral elements always shows the last known station point, in this case 1200. When OK is clicked, the routine will add the Line Element as the first in the list of completed centerline elements. Next up is the Spiral. Click Add.



Spiral Segment: Though the dialog is complex (for total flexibility), enter the four items shown, which can be done in the clockwise order shown:

The key on a typical spiral curve is to enter four things: the radius of the simple curve, the spiral in and spiral out lengths, the tangent bearing out and the PI station. Everything else will calculate when you press Enter for the PI station.

Curve Segment: Add your next element and select curve. The following dialog appears. The key is to enter the Radius Length (255), the Arc Length (150) and the Curve Direction. Everything else will calculate.

Final Line Segment: All you need to enter in the final dialog for the line (tangent) segment is its length. All other items will calculate when you press Enter.

This completes the Centerline, which can be drawn by the command Centerline File to Polyline. The completed Centerline will appear as shown below in a dialog, and each element can be Edited.

A Primer on Edit-Process Raw

What is a Raw File and Why Do I Need It? A raw file contains the angles and distances measured by a total station, as well as references to the set up point number and foresight point number. A raw file also contains special records of information such as instrument height and rod height, backsight references, note fields, and point entry records. A raw file can be created four ways: (1) by downloading data collectors containing raw files, (2) by importing or converting raw files from other sources, (3) by direct entry in the Raw File Editor shown below, and (4) by entering field notes (eg. traverses and sideshots) within the Carlson program, with the "Raw File On/Off" option clicked on. Raw files are needed as a record of field work, as a spreadsheet of information that can be edited and as a basis for computing and re-computing coordinates by different methods of adjustment. All Carlson raw files have the extension ".RW5" and are essentially TDS format. Coordinate values for all foresights and entered points are calculated by the commands found under the "Process" pulldown menu. The most basic form of calculation is "No Adjust". All calculated points are stored in the coordinate file (CRD file) that is currently active. Only one coordinate file can be active at a time, and the active or working file can be selected by the command "Set Coordinate File".

An Independent, Ready-to-Process Raw File: It is important to look at raw files and get a sense of what will process and what won't, what requires a coordinate file and what will process without a single prestored coordinate point. Start with the file shown in the graphic below:

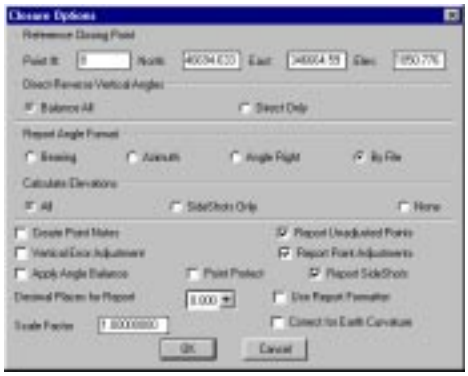
This file is "self-sufficient". The active coordinate file could be newly created and empty of coordinates. If the raw file is processed, for example, by No Adjust, all coordinates would be calculated. Here's why: The occupied point 1 in record 9 is pre-defined in record 7 as having coordinates of 5000,5000,100. Point 3 is given a reference azimuth of 0 and becomes the backsight for point 1 in record 11. Foresights to points 2, 101, 102 and 103 would be from a setup on occupied point 1, backsighting point 3. However, this is not a perfect raw file. A rod height is missing. It would be inconsistent to have an instrument height of 5.03 and no rod height. If there were no instrument height record, one could assume that the rod was set to the height of the instrument, and the differences canceled out. That is a common field procedure. But it is red flag to have one and not the other. The DS records shown above refer only to notes and are not processed in any way. Note also that distinct records (HI, PT, SS) have their own special "header" lines above them. The header line for HI is InstHt and RodHt, for example. If you click the mouse on a particular header line and press the Delete key on your computer, it will not erase the line. However, if you delete the HI record, the header line has no further purpose and it can then be deleted. It will disappear, in any case, if the raw file is saved and re-loaded after deleting the HI line. The program recognizes automatically header lines to delete.

A Raw File that Processes only if Starter Coordinates Exist: Most raw files do not have field-entered or user-entered coordinates. They take off from a setup point and backsight point that must exist in the "active" coordinate file, or no calculation will take place. Consider the raw file in the dialog above.

This is a very simple raw file where no backsight is necessary, because the first traverse record is an azimuth traverse from point 8. With azimuth, there is no need for a backsight. Note that there is no zenith angle column. This is because it has been turned off within the Display options. Look closely at the raw file and you will see that this is a 4-sided traverse, a rectangle of 150x100 (approximately), closing back to point 8. There are also 2 sideshots along the way. The traverse can be "processed" by No Adjust or by Compass, Transit, Crandall or Least Squares. But nothing will happen if there is no coordinate for point 8 to start from. If the coordinate file is empty, this file will not process at all. Point 8 could be added to the file using the CRD pulldown menu.

Processing (Calculating) a Raw File: Assuming point 8 exists in the above file, selecting Process, No Adjust, defaults to closing back to the starting point, and leads to the report shown below:

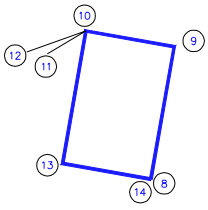
By contrast, selecting one of the closure adjustments (such as Compass rule) requires the user to specify which point is the



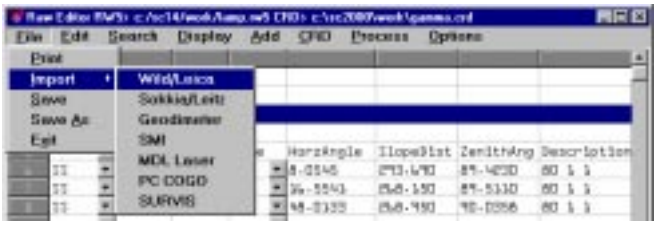
reference closing point. Thus, the routine applies equally well to "open" (point-to-point) as well as "closed" (looped) traverses. In our case, the traverse is closed, so the dialog for the closing point is filled out as shown here:

The "Reference Closing Point" is the point that the last point in the traverse is trying to match. So in this case, the shot to 14 is trying to match the starting point 8. Point 8 becomes the reference closing point.

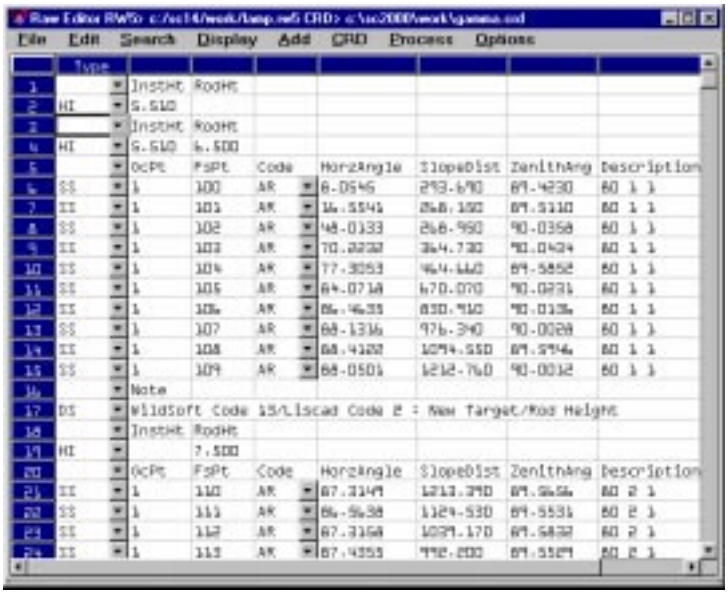
Plotting Out a Raw File: Sometimes it is beneficial to "see" the traverse and sideshots plotted out. This is a good way to detect "busts" and bad shots. The command to plot out a color-coded



traverse is found under Options, Draw Traverse-Sideshot Lines. This command should be issued only after the raw file has been adjusted by some method, and all points calculated. You must exit the Raw Editor to see the plot.

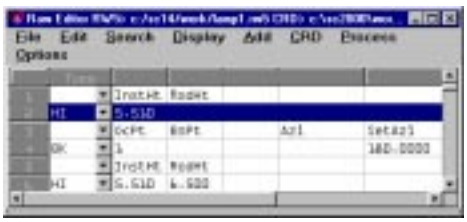


Importing Raw Files: Under the File Pulldown within Edit Process Raw File is the option to import raw files. There are a variety of import options, including reading Leica GSI files in one of three formats: (1) Wildsoft, (2) Liscad and (3) 10-20-30-40. Liscad format is the default.



Immediate plans are to include the LDD FieldBook raw file format among the import options.

Editing Raw Files: Let's pretend we have a problem file so we can study how to edit and add lines. Please review the file below. (Hint: where's the backsight for the first angle right?).



The first thing to do would be to Add a Backsight record. If we assume that we were setup on 1 and backsighting an azimuth of 180 (due south), then we would locate the cursor as shown above, select Backsight under the Add pulldown menu, and fill out the new line.

Hitting Add will lead to an insert. You do not need to, and shouldn't, use the Insert key on your keyboard. To be even more thorough, we could delete the first HI record, because it is duplicated and overwritten by the HI record on line 6. If we position the cursor on line 2, we can hit the Delete key. Then we can position the cursor on line 1 and delete the now useless header line. To change any entry in a raw file, simply position the cursor over the item and re-enter the values. For traverses and sideshots, pressing Enter will move forward naturally from horizontal angle to slope distance to zenith angle, etc. The Tab key also moves forward, and Shift Tab moves backward. When an entry "lights up blue", it can be simply re-entered by typing a new entry. If it is not lit up, you can revise it by adding individual characters to the entry, or by backspacing out individual characters. An entire set of field notes can be entered from scratch using the raw editor and making the proper selections under the Add pulldown. Once a traverse or sideshot is entered, the program will remain in the traverse or sideshot "mode" until altered. Traverses and sideshots, once begun, do not need backsights, since they assume that the previously occupied point is the backsight, by definition. If this is not the case, you must insert a special backsight record.

Advanced Raw Editor Usage: This article was designed to familiarize the novice with the Carlson Raw Editor, found in both SurvCADD and Carlson Survey. None of the above files, for example, were designed to illustrate angle balance. That and other Raw Editor issues will be reserved for the next newsletter!

Tips & Tricks

Carlson OEM products (Survey, Roads) Customization: Many customers have asked about the customization possibilities with the Carlson OEM products (Carlson Survey & Carlson Roads). Currently, we do not support customizing the menu or toolbars. If you attempt to customize the toolbars it will result in a corrupt menu, and the only way to correct this is to re-install.

Unhandled Exception - Fatal Error: Experienced AutoCAD users may be familiar with this message, but sometimes Carlson Survey and Roads users are faced with this also. Most of the time, this message means that the current drawing has become corrupt. This will be followed by a dialog asking you if you want to save all changes up to the last command - to be safe, answer NO to this prompt. You will lose any changes made after the last save, but you will not introduce any corrupt data into the current saved drawing.

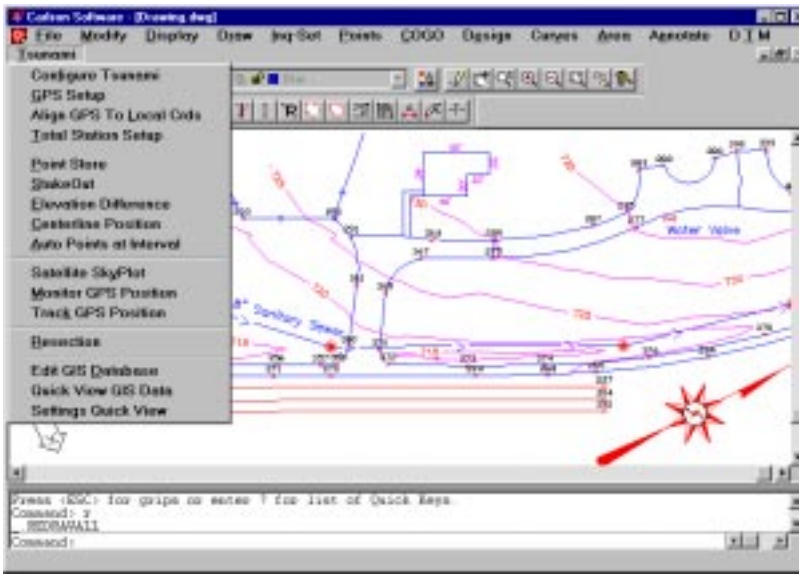
Corrupt Drawings: If you have a corrupt drawing (one that will not open, or one that causes Carlson Survey/Roads to crash), sometimes this is very simple to fix. Open Carlson Survey/Roads and choose New from the File menu. Select the "start from scratch" button on the "Create new Drawing" dialog box. Next, from the Draw menu, choose Insert. Select the File button and then choose the drawing that you are having problems with. Next, UNselect the "Select Parameters on screen" toggle, and make sure the insertion point is set to X=0 Y= 0 and Z=0 and Scale = 1 and Rotation = 0. Click OK and then choose Extents from the Display menu.

Carlson Survey

Carlson Survey has proven to be one of the most popular products of Carlson Software. Priced at only $1295, it includes the AutoCAD R14 OEM engine and covers the full range of survey features from data collection to Cogo to drafting and annotation. It is the ideal upgrade product for users of the DOS based Surveyor 1 program. It also offers a way for large engineering firms to cost-effectively add work stations for survey work and field note downloading. Carlson Survey works in the native AutoCAD DWG format. Users can upgrade from Carlson Survey 98 to the current release for $245.

Tsunami! A Tidal Wave of Data Collection Power

It is no accident that Tsunami (pronounced "Soo-nom-ee") has arrived at the same time as the new millennium. It represents the future. Tsunami is the first data collection product that operates within AutoCAD itself. It is unique and revolutionary. Tsunami eliminates the need for "field-to-finish", "downloading" and "data conversion", and even minimizes the amount of office preparation needed to prepare for stakeout. Tsunami works on all major brands of GPS and total station instruments. Tsunami offers maximum visualization and field power, all based on the universally standard AutoCAD platform.



The Surveyor's Arsenal: The technology tools available to the surveyor have proliferated since just 1980. They include, in approximate order, electronic total stations, DOS-based COGO software, DOS-based data collectors, computer-aided-drafting (CAD) and CAD-based survey/civil engineering software, on-board data collectors, computerized "field-to-finish", post-processed GPS, robotic "one-man" total stations, sub-centimeter "real-time" GPS, Windows CE data collection and now CAD-based data collection. Were you a skeptic at any time or did you keep up? We invite you now to catch the wave with Tsunami.

Technical Advantages with Tsunami: As field data collection has developed, surveyors have demanded more and more graphics. At a minimum, they have demanded point plots, then plots of centerlines, profiles and templates, and that's as far as the market has progressed to date. Now with Tsunami, the entire drawing appears on the screen. In addition to use of touchpads or touchscreens, arrow keys can be used to pan, and Page Down and Page Up will zoom in and out. Function keys or pressing Enter will take shots. Text and linework can be added while in the field. The field crew can forget having to recall complex coding for "field-to-finish". It's not necessary. Just turn on linework as you collect and it draws in the field. Contours can be drawn in seconds to check the quality of the fieldwork. If the contours aren't adequate, get more field shots, add breaklines, then re-contour. Since points plot in real-time, there is no chance that areas will be overlooked or duplicated during topo work or as-built surveys. Stakeout can be conducted by snapping to points on the screen or by station and offset, requiring little or no office preparation and pre-calculation of stakeout points. With robotic total stations or real-time GPS, the rodman's position is seen with respect to the target point and the local graphics (linework, text and points) at all times. Tsunami eliminates the trips back to the office to upload more stakeout data. The key is, your drawing is with you in the field. And for that reason, downloading and file conversions are eliminated. Just copy your field files to the office computer! For that matter, your field computer may double as your office computer.

Field Computers—Pros and Cons: Tsunami is gaining steam as more lightweight field computers with good outdoor viewability come online in the marketplace. The Sony PictureBook (~$2750) is super lightweight (3.2 lbs), bright, and has the ability to take pictures of points, which can store with the GIS data (see below).

The Panasonic Toughbook (~$3500) is 3.9 lbs, brighter than the Sony, ruggedized and is a touchscreen. The Fujitsu computer (b/w or color and $2500 to $6500 depending on configuration) is a keyboardless touchscreen. These computers can be configured with 64mb RAM and up to 4 gb hard drives.

GIS Applications: Tsunami has three ways to gather GIS data: by entering "random" notes, by entering "prompted" notes with default responses, and by entering "prompted" notes in a table that outputs directly to an MDB file and links data to the drawing in classic GIS fashion. Entering FH (or just F), for example, could trigger the fire hydrant prompts assuming the prompts are saved in a file called FH.mdb. Entering WV (or just W) would trigger the water valve prompts based on a WV.mdb prompting file. Tsunami offers high-tech, high-visual GIS compatible with AutoCad MAP, but also includes output to shapefiles for import to ESRI. Tsunami is an excellent "software companion" for the affordable sub-meter accuracy GPS systems available from Leica, Sokkia, Ashtech and Javad.

Specifications: Tsunami requires Windows 95, 98 or NT. It works as an add-on menu within AutoCad 14, AutoCad 2000, LDD, MAP R2, MAP R3 and MAP2000 and standalone based on the Carlson Survey engine. Tsunami costs $1295 or $2500 when purchased with Carlson Survey.

Mounting brackets are available for $250 for both GPS and total station applications.

New Employees

Julia Lipman, B.S. in Mathematics/Computer Science from M.I.T. Julia joins our Boston office as a software engineer. To date, Julia has been involved in our new TruckPRO product (Euclid truck download and data management) and is developing an expanded Least Squares analysis for raw traverse closure.

James Brooks, B.S. in Civil Engineering from M.I.T. has also joined our Boston office as a software engineer. James has concentrated on Dozer 2000 and HydroStar.

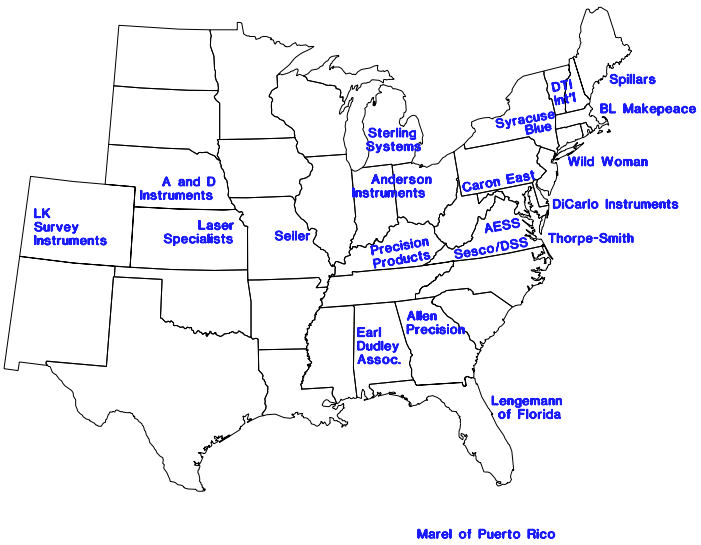
Randy McSwain, from an engineering firm in Houston, Texas, brings a strong CAD background and lisp programming experience. Randy is involved in tech support, quality control and sales. Randy is located in our Maysville, KY office.

Rob Rasnic, a sales engineer, formerly of Seiler Instruments, will head up our St. Louis sales office. Rob has a strong background in Autodesk products and will help in our efforts to develop LDD add-ons.

Boyd Jensen, formerly of Western Water Consultants in Sheridan, Wyoming, heads up the Carlson Training Program and does direct sales and on-site support. Boyd also is based in Maysville.

Carlson Software Dealers

Carlson Software sells and delivers products directly and through a dealer network. We appreciate our dealers, and want to encourage our existing and potential customers to contact dealers for price quotations and product demos. Dealer inquiries are welcome. Below is a list of dealers who have been active in selling Carlson products in recent years:



We would also like to recognize our "award winning" dealers for 1999, based on these products:

Carlson Survey: Marel of Puerto Rico and Allen Precision

SurvStar: Thorpe-Smith, Laser Specialists, Precision Products

Tsunami Sales: Thorpe-Smith and Allen Precision

SurvCADD Sales: Anderson Instruments

Training Calendar

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17	18 AdvMining General	19 AdvMining Geology	20 AdvMining Underground	21
24 SurvCADD Fundamentals	25 SurvCADD Cogo/Design	26 SurvCADD DTM/Contour	27 SurvCADD Sect/Profile	28

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Monday	Tuesday	Wednesday	Thursday	Friday
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8	9 AutoCAD Map	10 AutoCAD Map	11 GIS MapPlus	12
15 AdvMining Geology	16 AdvMining Underground	17 AdvMine Surface	18 AdvMine Dragline/ Dozer	19
22 SurvCADD Fundamentals	23 SurvCADD Cogo/Design	24 SurvCADD DTM/Contour	25 SurvCADD Sect/Profile	26
29	30 AutoLISP Level1	31 AutoLISP Level1		

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