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Carlson SurvCE

The future is here! In my last article (Nov 2005) I reported on Carlson's Explorer II hardware platform. This month I'm reporting on the data collection software that came with it. Carlson's SurvCE software is available for most hardware platforms that use the Windows CE or Windows Mobile operating system. This is no small undertaking for the people that write the code we all benefit from; in essence, two or more versions of the same core program that are hardware and firmware dependent. So, what we see as

one program is actually two or more to be written and supported.

One of the most likeable things about this data collection software is that it is a part of an integrated family of software products that work seamlessly with one another. Data from this software is easily transferable to Carlson's Survey 2006, and SurvCADD that works with AutoCAD.

SurvNET is a real least squares adjustment program that also works with the rest of the family.

When you power up SurvCE, the initial screen has virtually the same familiar look as your desktop: My

computer, Internet Explorer, PC Link, Recycle Bin, Microsoft Word Pad, SurvCE, Inbox, and My Documents. (Figure 1) Word Pad, which is like Note Pad's big brother, is a super text editor – just the ticket for “massaging” data files. With your cell phone and this software you can have a mobile office. If you use wireless Internet, you can pretty much conduct the business side of surveying regardless of your location.

Serial Port Communication

X-Port is a data transfer program that is included with the SurvCE installation CD. It is accessed via Data Transfer under the file menu on the data collector, or from the Carlson X-Port icon on your desktop. (Figure 2) It permits serial port communication from the collector to the PC and it is slick. Since COM Port 1 on my PC is used for a wireless mouse and keyboard, I had to use COM Port 2. Of course I forgot and was disappointed when there was a “no connection” dialog box displayed. As soon as I realized my problem, I reset the communication parameters, cold booted my PC, (thanks Microsoft), and chose “set path”. Once I had the proper paths set up, I clicked on “connect” and then “transfer” and started hassle-free data transfers.

Carlson is coming out with a newer version of the Explorer II that incorporates WiFi, Bluetooth, and a built-in serial to USB converter. The USB port will allow the user to connect USB to USB. If the computer only has a serial port, the user will still need a converter. The unit I reviewed needed a separate serial-to-USB converter and a null modem cable to work properly with my



Figure 1

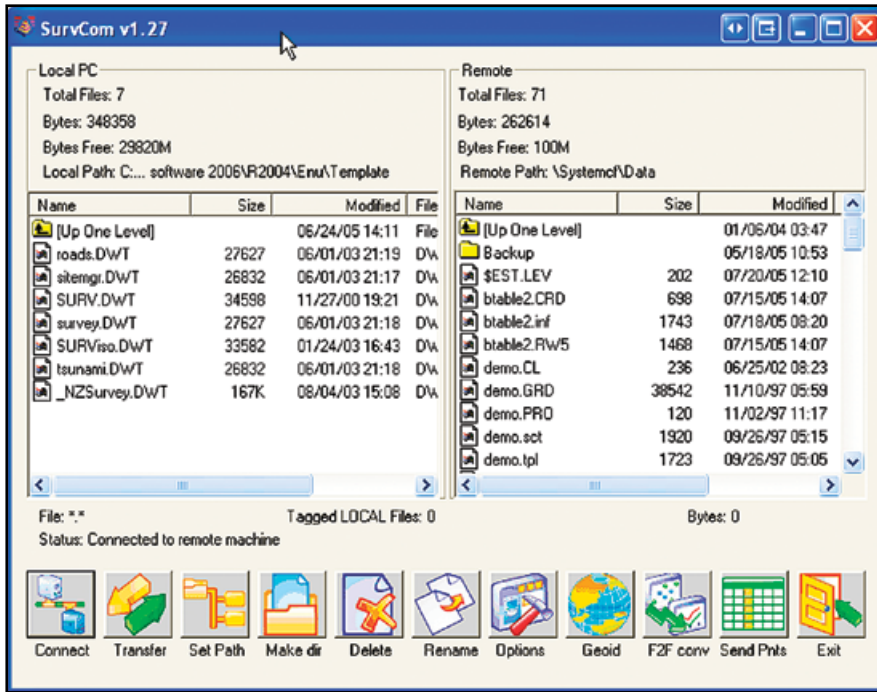


Figure 2 X-Port icons for Connect, Transfer, Set Path, Send Points

computer. Your sales rep should be able to point you in the right direction for these items.

What a sweet little program this is. In addition to the above icons, you can select Make Dir, Rename, Delete, F2Fconv, Geoid, and Exit. File transfers and conversions are all conveniently handled in one place. Most of X-Port's procedures are shown in the Reference Manual.

A thorough, clearly-written reference manual is provided. It is well illustrated, and comes in a seven-ring loose-leaf binder so the pages – all 547 of them

– will lay flat when the manual is open. The troubleshooting section even has a section on how to enter and calculate a traverse by hand. There are pages for most all brands and models of total stations, robotics, and GPS equipment.

Carlson has also provided a Quick Start Guide, or “mini manual” that highlights various groups of instruments with graphics, simple instructions, and helpful information to get you up and running with your GPS equipment or your total station. It contains about two dozen pages of concise directions and a number of step-by-step procedures. In

addition, this information is available in the Carlson Software knowledge base on their website.

Power Up!

Right from the start you can see the influence of the surveyors who helped with this program. Powering up the Explorer II, I double tapped the SurvCE icon and was presented with the File menu upon which was a dialog box asking me if I wanted to continue my last job or start a new/existing job. The job name appears at the top of the menu as well as a total station or GPS icon depending upon which you are using. A battery level icon appears immediately to the right, with word MAP next to it. MAP is a toggle that takes you to the map screen where you can view your points. In the map screen the word “map” is replaced by the word “menu”, which is a toggle back to the menu screen. (Figure 3)

Jobs

The job bar has five choices: File, Equip, Surv, COGO, and Road. The balance of the screen under the File tab lists ten choices: Job, Job settings, List points, Configure Reading, Feature Code List, Data Transfer, Import/Export ASCII, Delete File, Add Job notes, and Exit (Figure 4). The Equip tab has five choices: Instrument, Settings, Tolerances, Comm Setup, and About SurvCE (Figure 5). The Surv tab has ten choices: Sideshot/Traverse, Stakeout Points, Stakeout Line/Arc, Offset Stakeout, Elevation Difference, Bldg Face Survey, Remote Elevation, Resection, Set Collection, and Set

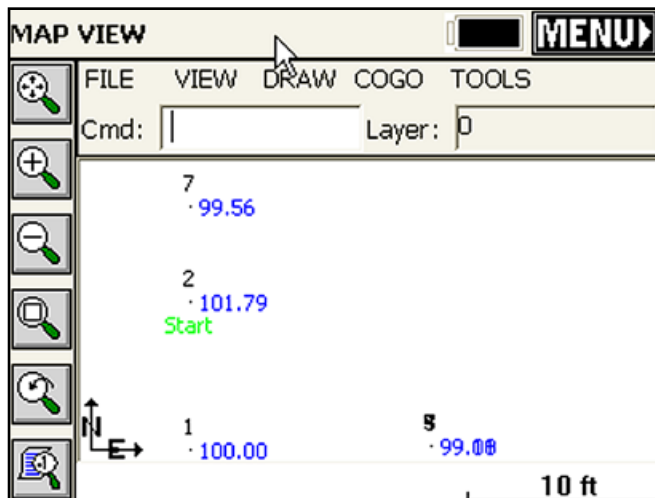


Figure 3 Map View Screen

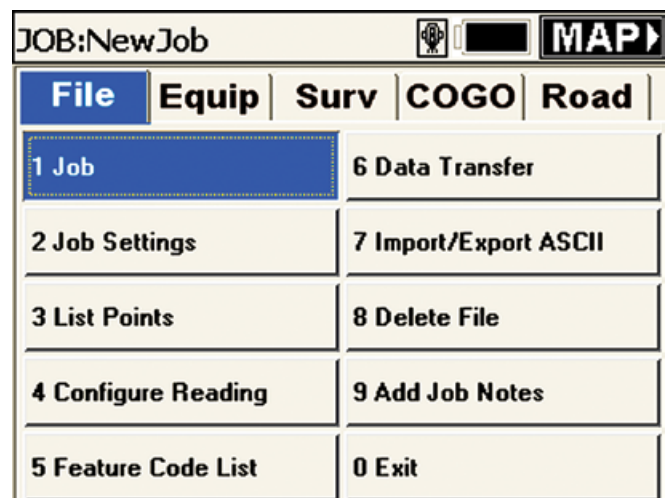


Figure 4 File Tab

Review (Figure 6). The COGO tab has ten choices: Keyboard Input, Inverse, Areas, Intersections, Point Projection, Station store, Transformation, Calculator, Process Raw File, and Point in Direction (Figure 7). Finally, the Road tab also has ten choices: Input/Edit Centerline, Draw Centerline, Input/Edit Profile, Draw Profile, Input/Edit Template, Draw Template, Slope Staking, Cross Section Survey, Road Utilities, and Template Stakeout. (Figure 8) These are the core functions that get you to the operation you want to perform most quickly.

Functionality On-the-Fly

One criticism of menu-driven systems is that you have to go up and down through menus to use certain functions. The software does have the ability to do mathematical functions “on-the-fly”. Let’s say, for example, you are using a two-meter GPS pole, but are working in feet. In the field that indicates rod height you would enter 2.0M, then press down arrow, and the result 6.5617 would be displayed and used as the rod height. It’s that simple!

While on the subject of calculations, SurvCE has “standard”, “scientific”,

“conversion”, and “other” calculators programmed in. Default is “other” which is the triangle and curve calculators. This is one data collection software package that calculates both “arc” or highway and “chord” or railroad correctly. It gives you the “CCL”, (Connected Chord Length) which is the proper method of stationing when using the chord definition of curves. I mentioned that it would be desirable to be able to input the Degree of Curve and the Connected Chord Length as one of the input fields when using the chord definition to one of the programmers during a phone call. He indicated he would bring it up at the next programmers’ meeting. No data collection program that I am aware of has that option to my present

knowledge. I, for one, would like to use it.

The software is very flexible and adaptable to one’s particular

methodology and field procedures. Configure Reading allows you to take from one to nine distance readings for each observation with a warning screen for any of the distances that exceed the tolerance set for the EDM. You can also set Reciprocal Calc to “no”, “prompted”, or “always”. Certain routines have the option to use the average of the Face 1 and Face 2 vertical circle readings, but only the direct horizontal and distance readings for collecting vertical control. There is even a check box for “Angle Only” in the Reverse or Face 2 readings, which uses only the direct distance reading but still calculates the average of both the horizontal and vertical angle readings. Just exactly what the older modular external EDMs need! You can even control the order of the Enter Key to “store” and then “read” (or “read” and then “store”, my preferred method for my field work). Yes, you can also set it to “read” or “store”, too. This is just one example of the versatility and power of this program.

In addition to all the power of this software there are several little touches

“When purchasing surveying equipment, hardware or software, always keep in mind SUPPORT!”

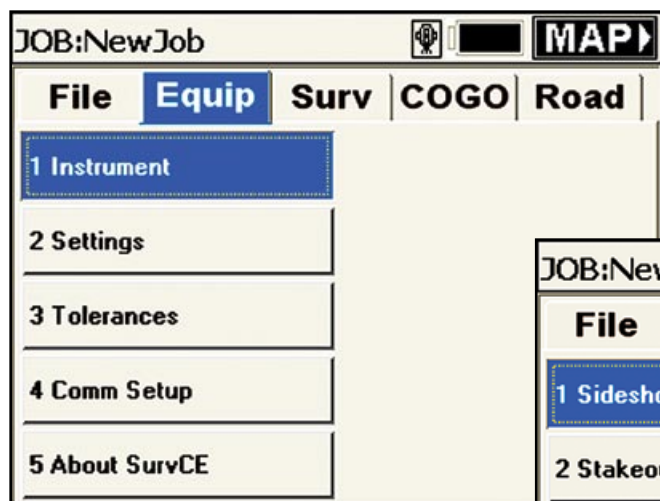


Figure 5 Equip Tab

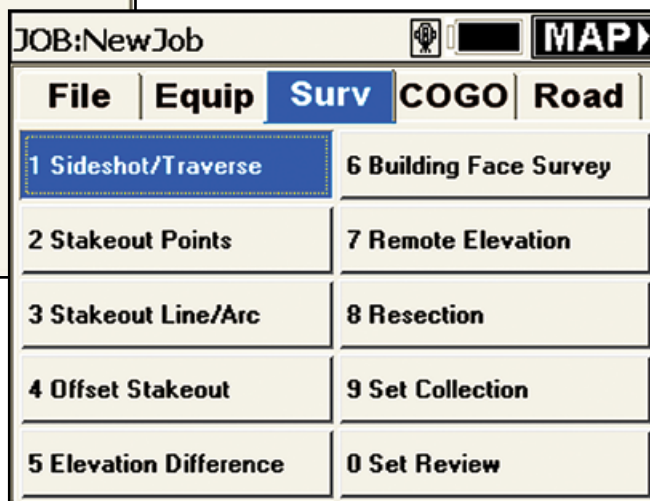


Figure 6 Surv Tab

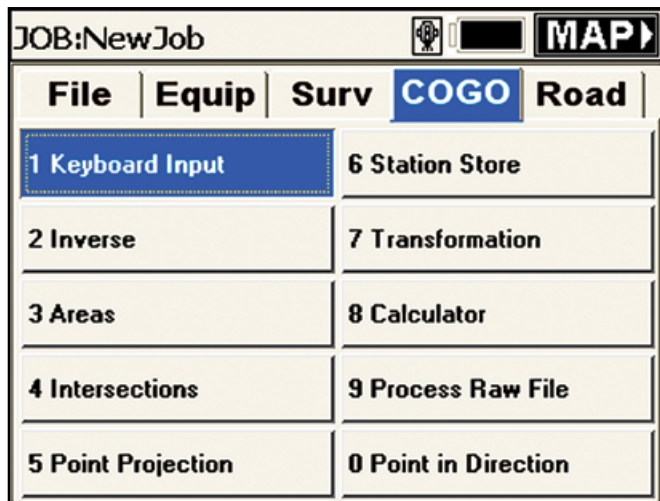


Figure 7 COGO Tab

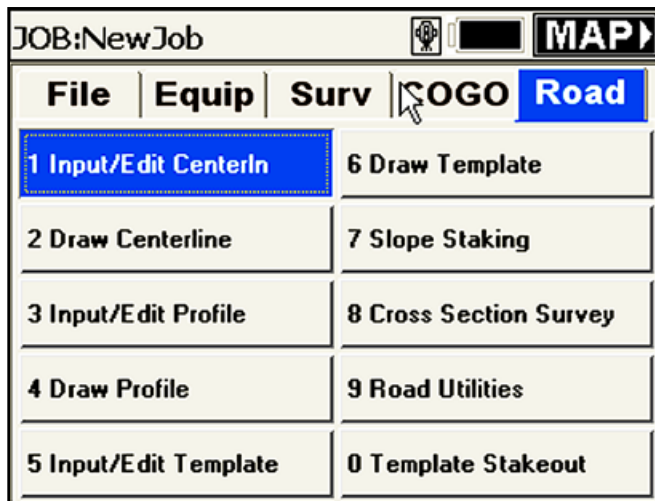


Figure 8 Road Tab

that also demonstrate the input from the surveyors on staff. How many times have you looked at a point list, but there was not enough display screen real estate to show all the point information? So, you scroll to the other side but have difficulty in remembering which point number you were on when looking at the elevation and point descriptor. Now you scroll back to double check. Well, scroll to the other side of the SurvCE point list screen and there it is, a duplicate point ID column – a feature as handy as a pocket on a shirt! In this same screen you can edit point information, find a point by number or description, add a point manually, or delete any selected point or points (Figure 9).

Once you get all your job information set to your preferences, you pick the next tab “Equip”. First up is “Instrument” where you select your make and model. There is a large list to choose from, starting with an old instrument like mine, right up to the latest in total stations. For GPS it even has a generic NMEA GPS Receiver. There is a manual total station mode as well as a GPS simulation mode enabling you to enter data by hand for practice with the software, or even from hand notes. You can use it with Topcon, Leica, Thales/Ashtech, Sokkia or Novatel, to name a few of the GPS selections.

Tolerances for horizontal angles, vertical angles, EDMs, and stakeout are set from the appropriate button selection under the “Equip” screen. When necessary, you can custom set your communication parameters from the “Comm Setup”. In my case, choosing my make and model under the “Instrument” screen automatically set the proper communication parameters for it. It saves you from having to set the communication parameters every time you change instruments.

Have you ever had the need to use a separate laser device? Keep your familiar data collector and choose “Laser”, and then one of the five brands of supported laser. Depth sounders for hydrographic surveys are also a part of the many options supported with this

software. There appears to be a way to handle any surveying project you may encounter over the span of your career.

The “Surv” tab is your entry to the usual tasks most of us perform routinely. Picking 1-Sideshot/ Traverse brings up the “Instrument Setup” screen which give you your occupy point and backsight point entry fields.

There are three methods available: point list, map, or hand entering your setup and backsight information. If you enter a backsight point, the backsight field for bearing entry is faded out. Without a known backsight point entry, the bearing field of the backsight is available for entry of the bearing you choose. At any time you can choose “Confirm NEZ” which shows you your point data for the “station” or the “backsight”. Tapping

“Configure” brings up your screen to configure reading for a quick check and change if necessary. When you tap “OK” in this screen, you are immediately back at the “Instrument Setup” screen. No need to go up and down through a menu structure. To borrow a phrase from the last article, “the best of both worlds,” you have the ease of menu operation combined with the power of “command line” operation. When you have checked to see that all of your data is correct, you

Pts: 8					Details	Settings	Close
Northing	Easting	Elevation	Description	Pt ID			
000.00	5000.00	100.000	Start	1			
000.44	5024.20	99.079	EP	3			
000.44	5024.20	99.099	EP	4			
000.44	5024.20	99.109	EP	5			
000.44	5024.20	99.132	EP	6			
024.40	5000.01	99.555	EP	7			
100.00	5000.00	100.000	EP	8			
100.00	5000.00	100.000	EP	9			

Figure 9 List Points (scrolled to the right)

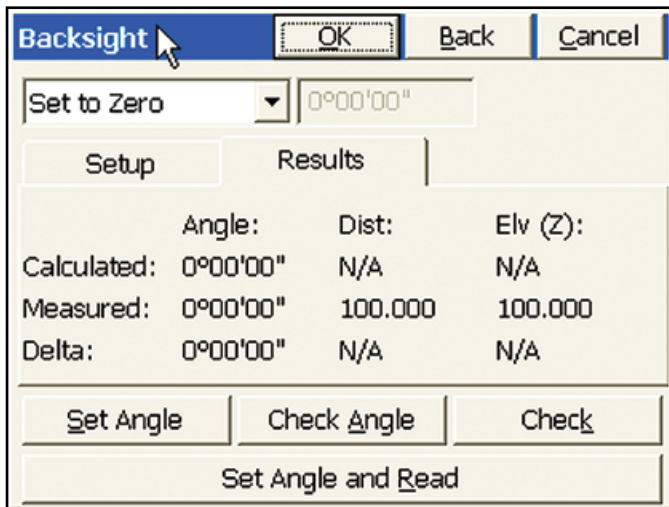


Figure 10 Bacsight screen with results

tap the backsight button. Again your setup information is displayed along with the options to set the backsight angle or check it. Or you can simply tap the “Set Angle and Read” button to do it in one step. Tapping the “Results” button brings up a screen that shows you your angle, distance, and elevation data as calculated, as measured, and their deltas (Figure 10).

Another thing I should mention is how well this software is “error trapped”. Say you enter an improper data string into a data field. Without “error trapping” the program locks up or freezes or dumps you out of the program altogether. With “error trapping” a warning sound is emitted, or a warning dialog screen appears and it gives you the opportunity to make a correction and continue on from

supported. I can keep on using the same method I once used when collecting data with hand notes. Until this package came along, I hand entered all of my traverses into my desktop software. With this method and unequal BS and FS distances I only have to focus once on the BS and once on the FS. Both sights are taken in nearly identical climatic conditions. With the classical BD-FD/FR-BR you focus on the BS, then on the FS, and again when you turn back to the BS. Even with my old eyes I seem to turn tighter angles with my preferred method (Figure 11).

I did not use the COGO section much in the field other than to inverse between some points. (Figure 12) It is quite nice to choose between 2D and 3D inversing and be able to check some distances by slope chaining. It also comes in handy

where you were without having to start out from the beginning. It takes quite a bit of programming to accomplish this.

One of my favorite features when using this software is the variety of ways to collect the points of “sets” of angles. My personal preference is BD-BR/FD-FR and it is

when you are setting up cross section stations on non-level roadways.

I did use the curve section of the “other” calculator tab in the office when checking curve data presented on highway and railroad alignments. I find it much more convenient to move a handheld around on a plan than to move huge plan sheets around a desk in the office.

From the little I did with the “ROAD” section I can tell you it is very similar to the “ROAD” routines in Carlson Survey 2006. Inputting alignments and stationing them is a breeze and quite fast, too. Setting right-of-way and right-of-way offsets is just as easy.

It would take a few more columns to do justice to Carlson SurvCE than what I have written in this article. When purchasing surveying equipment, hardware or software, always keep in mind SUPPORT! While my own experience with Carlson has been very positive; I am happy to pass along and paraphrase comments by other surveyors as well:


“Best customer support in the business!”

“I have always gotten through to tech support on the first try.”

“Give SurvCE a try before you commit to any other data collection purchase.”

“If a technician was not available when I called, I always got a call back within an hour or so.”

“Every time I called tech support I got a knowledgeable land surveyor on the other end.”

And I could add many more. Why not check out SurvCE for yourself and see what all the buzz is about? 

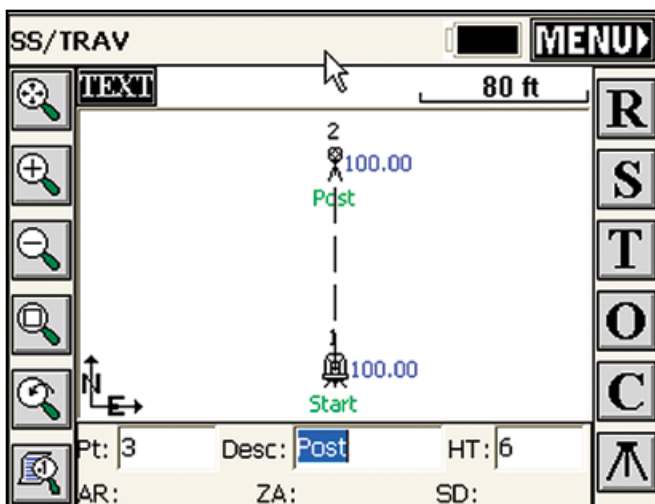


Figure 11 Graph screen showing TS, Bacsight and Foresight

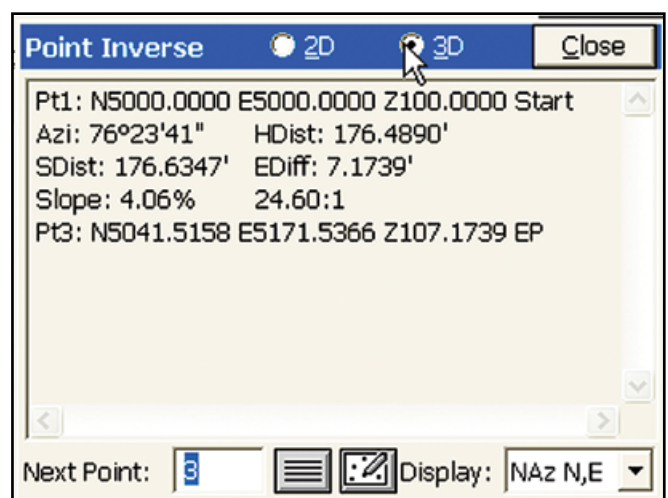


Figure 12 Inverse with two inverses