

THE American Surveyor

A FOOT IN THE PAST... AN EYE TO THE FUTURE

June 2009

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**TRADE-IN
OFFERS**



By Shawn Billings, LS

Shawn Billings is a licensed land surveyor in East Texas and works for Billings Surveying and Mapping Company, which was established in 1983 by his father, J. D. Billings. Together they perform surveys for boundary retracement, sewer and water infrastructure routes, and land development.

Carlson Surveyor

If you're in the market for an extremely durable, fast, comfortable and well-equipped data collector, check out the Carlson Surveyor. Based on drafting specifications by the folks at Carlson Software and using the very reputable people at Juniper Systems to make it a reality, this unique data collector merits attention.

What's Inside

Two models are available: the Surveyor+, which is loaded, and the Surveyor, which is still very capable but with somewhat reduced functionality and speed at a reduced cost. The processor is very fast, running at 624 megahertz with the Surveyor+ and 520 megahertz in the Surveyor, and when mated with the improved SurvCE 2.0, I noticed none of those annoying hourglasses sometimes associated with Windows-based data collectors.

Commands clicked right along. The operating system is Microsoft Windows Mobile 6.1, offering mobile versions of Excel, OneNote, PowerPoint, Outlook and Word. Memory is generous—64 megabytes of RAM for the Surveyor, 128 megabytes for the Surveyor+. Storage is fixed on the Surveyor at 512 megabytes, while the Surveyor+ has a full one gigabyte and is expandable through the MicroSD (Secure Digital) card accessible in the battery compartment.

The elastomer keyboard is pleasantly arranged and spaced well for field use with a nice tactile response. The keys are composed of a full 26-button alpha keyboard, accompanied by 0-9 numerics, four keys dedicated for Alternate,



The Carlson Surveyor is capable of driving most current robot or RTK systems as well as conventional total stations. The built-in tripod hook on the back is especially convenient.



Pictured here are the Itronix Husky (now prehistoric by technology standards), the Carlson Surveyor, and Juniper System's Allegro. Even with its smoking fast processors and graphics, the Surveyor's durability is akin to that of the old Husky.

Shift, Control and Second functions, a rocker style tab forward/tab back key, Escape, Backspace, Space, a dedicated hot key to load Carlson's SurvCE, a dedicated key to disable the touch-screen (TS), Enter, Windows hot key, and power button. In the top center of the keypad is a nine-position navigation

rocker pad with an additional enter button at its center.

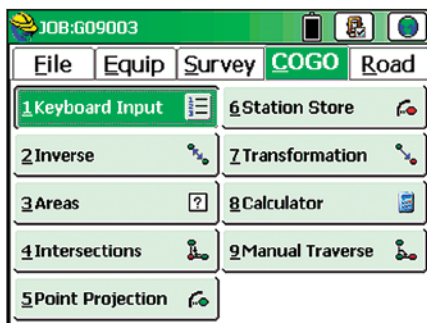
Speakers are located on each side of the keyboard. Centered above the navigation key is a microphone. Holding the microphone a couple of inches from my mouth as I spoke produced a recording with a suitable level of quality and volume

for a field device. While not available from within SurvCE, this feature may be accessed in the Windows environment.

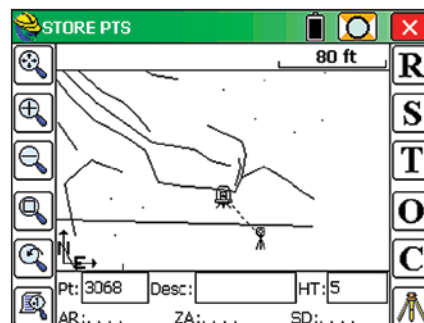
Across the top of the Surveyor+, there are two DB9 ports (COM1 and COM2) as well as the charging port and a USB client mini port (B) and a USB host full size port (A). Perhaps with the host USB capabilities, some day soon there will be a printer driver that will allow users to print maps, point lists, or cut sheets straight from the data collector to a printer while still in the field.

Both versions of the Surveyor are equipped with Bluetooth. Transparent to the user, the Bluetooth in the Surveyor is hardwired to the mother board as opposed to being a modular accessory mounted in the box. The result was a very dependable connection to wireless instruments. The Surveyor+ is also equipped with WiFi 802.11 b/g.

Carlson specs the battery life to be 8-10 hours using a single battery, which I found to be an accurate estimate in my testing. The unit is built to accept a



Using the SurvCE software, most every application can be accessed with a couple of menu selections.



SurvCE allows viewing of points as they are collected. Also, with a field-to-finish code file imported into SurvCE, line work draws out in real time, allowing you to make sure coding is done properly in the field.



The rear cover reveals space for two removable batteries. Beneath the second battery space is the microSD memory card slot protected by a rubber plug. Also seen here are the tripod hook and the elastic hand strap.

second battery in the large battery case behind the unit, making it possible with two batteries to double the time needed between charges.

The touchscreen is full color, 3.5 inches diagonally, and has a resolution of 240x320 pixels. With its durable housing and bold keypad the box screamed to go outside. When I stepped into full sun with it, I was disappointed with the Surveyor's dim screen, which required turning the unit just right to be able to see it (my only complaint, especially when compared to the Explorer, which has a clear advantage in this area).

The blue elastomer bumper at the top of the unit is bored to accept the stylus. At first, the stylus was very snug and difficult to remove, but with use it became much easier to retrieve, and I found it to be very handy. For those of us who still use a conventional total station or need the data collector to collect static GPS data from a tripod-mounted GPS receiver, the tripod hook

at the back was very convenient—just be careful about running inverses on the hood of the truck. The hook likely won't do your paint job any favors.

The unit fit my hand so well, I never found it necessary to use the elastic strap at the back.

What's Outside

The magnesium housing of the Surveyor has a solid feel to it that reassures you that your data and investment are well protected. I was surprised by the thinness of the unit (only 1.5 inches thick) as well as its light weight (just a shade under two pounds) including a single battery. Compared with other full keyboard data collectors, the Surveyor competes very closely in the weight category and is very unimposing in the field.

As for the benefits of the magnesium housing, Carlson has two remarkable "unscientific" videos on their website that depict the incredible strength of this device—check them out! Watch what happens when the unit is thrown onto an

asphalt parking lot from the top of the Juniper building, rolled over with a tire (first slowly, then peeling out on it, then driving over it quickly), dragged behind a truck along a gravel road, thrown out of the back of a moving truck, or submerged in a fish tank. After each insane feat, the Surveyor was shown to power up and function.

Of course, the Surveyor was also rigorously subjected to actual laboratory testing to confirm that it complies with IP67 for water and dust resistance and MIL-STD 810F for shock resistance and humidity resistance.

It is reassuring to know that in the case of an accident the data and the device itself stand a good chance of surviving even the worst case scenario.

SurvCE Completes the System

A neat box without software is just a neat box. SurvCE makes a great device into a real work horse. Just a few short years ago, the capabilities stored in the Surveyor+ would have rivaled the

capabilities of most surveyors' offices. Windows Mobile offers incredible versatility in mundane office chores, WiFi offers Internet access, and SurvCE does almost everything full software packages did in the 1990s.

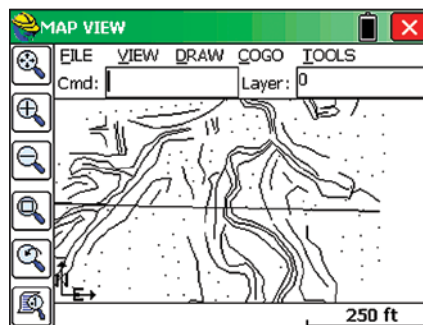
With a very impressive suite of CAD features, a user can draft in the field with many of the tools he or she might use in the office. Calculations of areas, inverses of points or points to lines, intersections, offset intersections, transformations of just about every flavor for translation and rotation as well as scaling are all easily accessed through the COGO tab. The SURVEY tab offers standard routines such as store points (collection both by direct observation and offset methods), staking points, staking lines, resections, sets and more.

If you make a nasty mistake with your coordinate file (a proprietary .crd file), SurvCE allows you to process the raw data file and recreate your coordinate file. You can also make edits to the raw data file, such as changing rod heights. Editing a point description automatically changes the description in the raw data file where the point was created instead of simply making a SP (Store Point) record with the point number, coordinates and new description. This is very handy when it comes time to perform adjustment later back at the office.

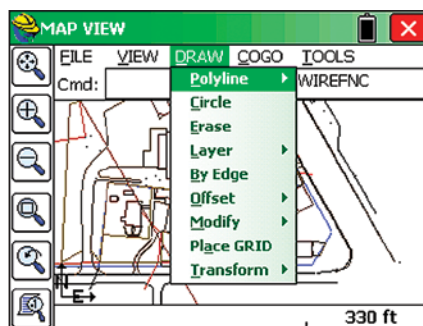
Carlson also offers excellent instrument control for just about every instrument and receiver currently on the market. Whether by cable or by Bluetooth, instrument response and control are excellent. My one complaint with the Bluetooth is the way SurvCE attempts to automatically reconnect to a device if the Surveyor is powered down. Immediately when the data collector is turned on, it attempts to reestablish the lost connection, however, if I'm back at the office and want to download the day's work, I don't really want to reconnect to the total station or GPS rover. But because the unit automatically attempts the reconnect, I have to wait for the search to timeout. It would be nice if this were done in the background or with a pop-up asking if the user would like to reconnect.

By far, my favorite aspect of Carlson's SurvCE is its field-to-finish. In my opinion, of all the other software offerings, SurvCE has the best I've yet seen. Field-to-finish allows you to enter codes for the descriptions that

act as commands for linework. This linework can be generated in the field so that you can see that your coding is progressing as expected. This is a powerful tool. Furthermore, if you are using Carlson Software on the desktop, you can export your field codes directly to the Surveyor for seamless results in the field or on the PC back at the office. Carlson also allows you to set up codes the way you want giving you a world of flexibility and easing the learning curve by allowing you to use codes that are intuitive to you.



Seeing linework in real-time is especially beneficial when working with elaborate topographic surveys with multiple breaklines obtained from numerous setups.



The Map display is very CAD-like and has many of the tools you use everyday on your desktop.

We generally locate a great deal of topo shots when we survey, even for most boundary surveys. In the course of a typical small survey, we will generally collect a minimum of a hundred points. Jobs specifically focused on topography may include several thousand shots. With field-to-finish, I can usually come in, download the coordinates and have the plat linework 80-90% complete immediately. I then have to complete the remaining 10-20% and do all of the necessary labeling manually, but at least half of my work

or more is done before I even sit down to the computer to finish the plat. And, because the coding was done in the field and the linework was being generated in real time on the Surveyor's screen, I can feel confident that the linework is accurately drawn.

Collection of breaklines is made better using the field-to-finish techniques in SurvCE, too. During testing of the Surveyor+, we surveyed a proposed roadway through a timber tract. At the end of the route was a deep ravine with a stream six to ten feet wide flowing through it. There were numerous drains, banks, toes and other various breaklines to collect to accurately depict the contour of the ground there. With field-to-finish on the Surveyor, I could see each breakline being drawn shot by shot. And when we had to move setups to continue locating a breakline, I could pick a point from the screen and see what code it had to keep my coding consistent. Developing a quality field-to-finish coding system will take time, but the benefits are tremendous.

Maybe you are happy with your existing CAD/COGO software. You may be thinking a lot of these features don't apply to you. You might be surprised. If you can import and export a .dxf file from your computer, you could export an existing drawing right to the Surveyor and be working on top of a real drawing in the field. Maybe you don't have a field-to-finish routine on your desktop. Since SurvCE is able to perform field-to-finish in the field, you can export the resulting linework as a .dxf file and import it into your desktop software, still benefiting from the great features Carlson brings.

The Carlson Surveyor is a brutally tough, functional and reliable device. Throughout my weeks of testing, I had only one instance requiring a hard reset of the data collector. As I waited for the reboot, I tensely waited to see if I had lost any data. I was extremely pleased to see that all of my points for the day were still there and I was ready to get back to work in a matter of a couple of minutes. Only time will tell if the Surveyor will be as dependable on the inside as it is on the outside. Carlson seems confident it will with a 24-month standard warranty on the electronics. From the time I've spent with it so far I would love the opportunity to personally see it operate reliably for the next eight or nine years. *A*