

THE American Surveyor

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

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GNSS In Music City

ALTA Standards

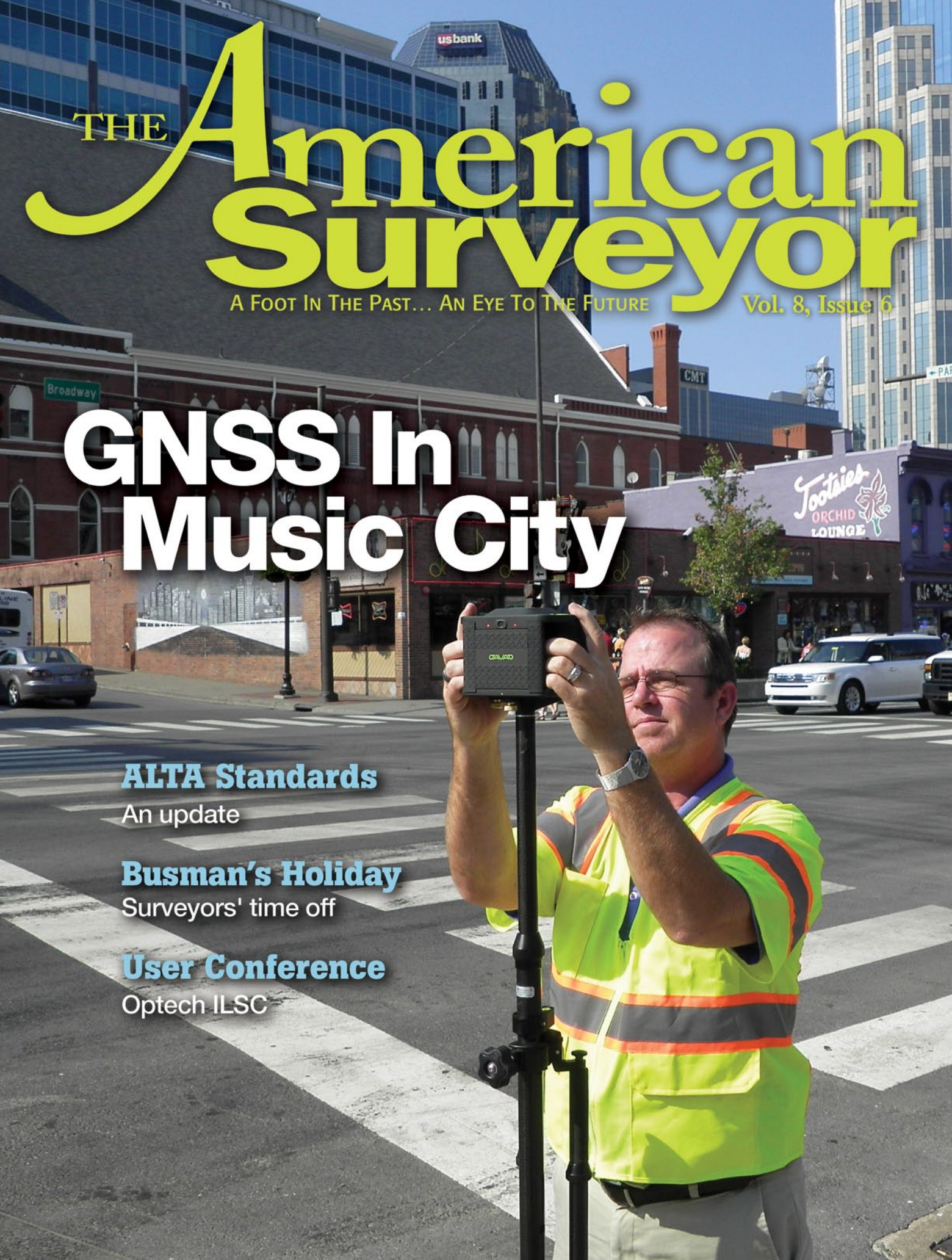
An update

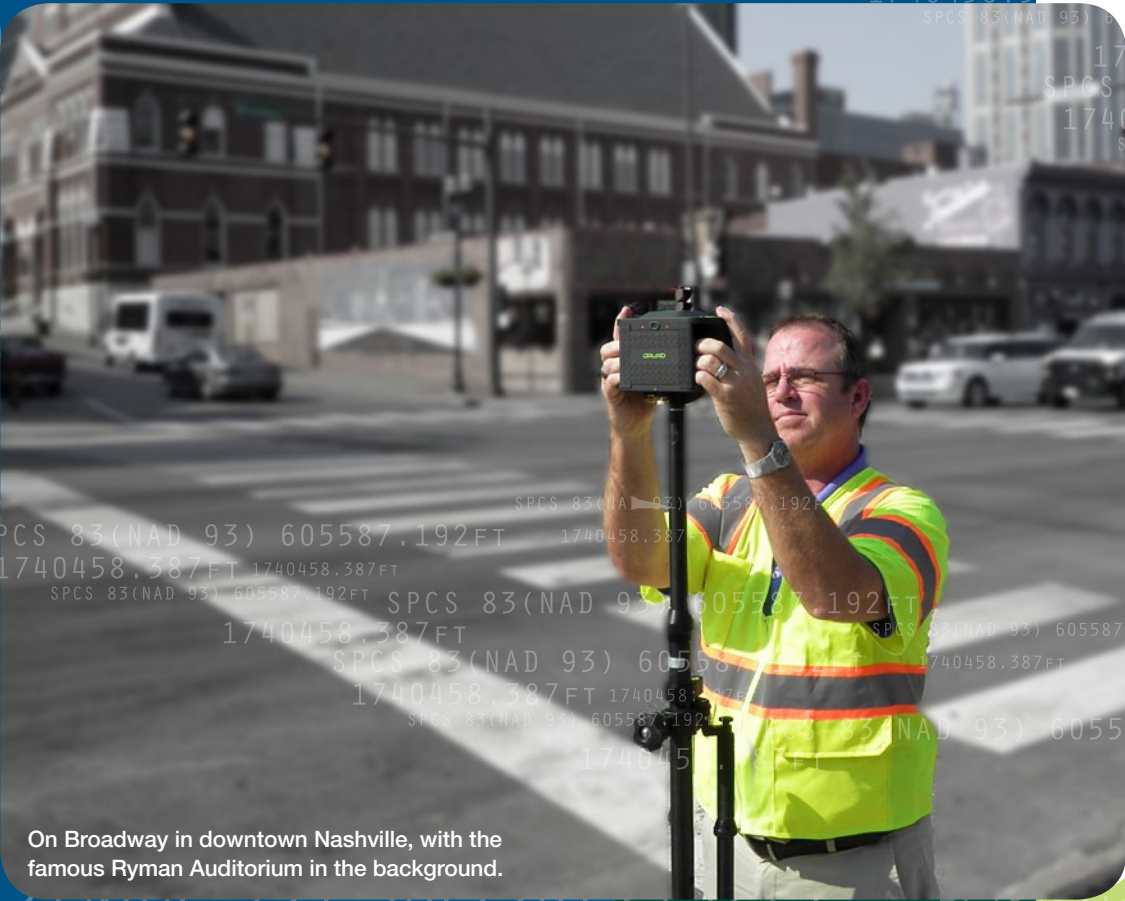
Busman's Holiday

Surveyors' time off

User Conference

Optech ILSC





On Broadway in downtown Nashville, with the famous Ryman Auditorium in the background.

THE Javad GNSS Triumph V.S.

While I've been using GPS equipment professionally since 1997, seeing the Triumph V.S. GNSS system gave me reason to pause. Gone are the days when setting up a receiver in the field was a job better suited for two people rather than one. The work of Javad Ashjaee, founder and president of Javad GNSS, has once again revolutionized the way surveyors work. The Triumph V.S. is not a copy of existing technology—from form factor to software it definitely all new.

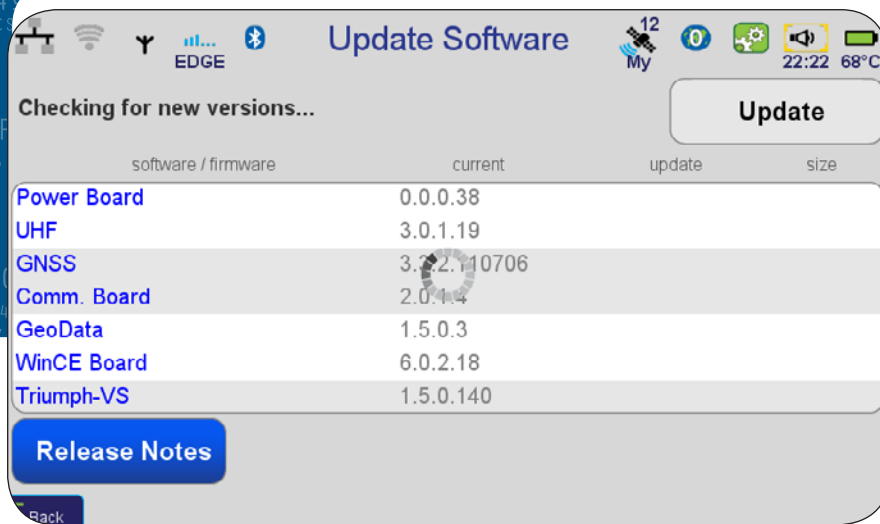
The Javad GNSS Triumph V.S. is marketed as “Three Products in One,” but in actuality comprises four products:

the GNSS Receiver, the GNSS Geodetic Antenna, a Windows-based data collector, and the software to run it all. The “products” work together without cables, in itself a major beauty of integrated technology.

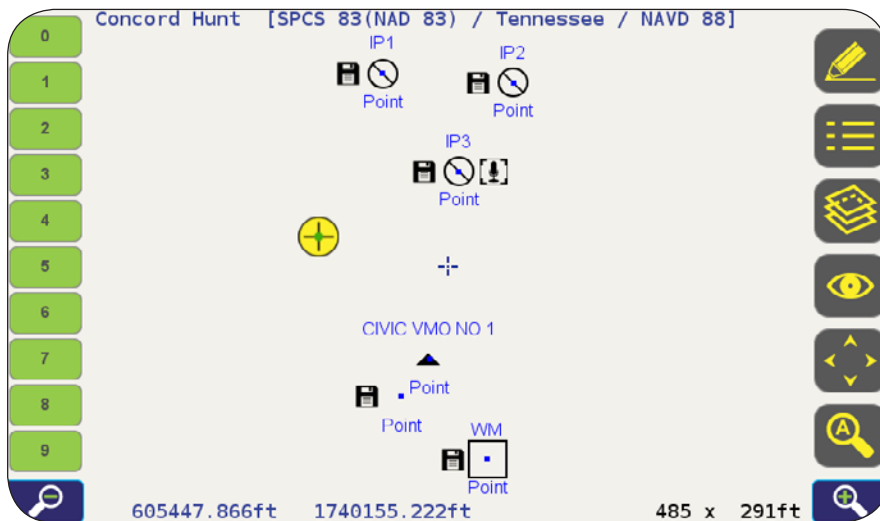
V.S. GNSS Receiver/Add-Ons

The V.S. boasts a 216-channel triple-frequency GNSS board capable of tracking any and all current GNSS signals including GPS, GLONASS and Galileo, as well as any foreseeable ones. Packed in with the core GNSS board is a wide variety of communication options: GSM/GPRS (think AT&T/T-mobile, etc.), UHF (transmit and receive), Bluetooth, Ethernet, even WiFi. Firmware updates for receivers are fairly common and

>> Clifton Ogden, EI, LSIT



A V.S. software upgrade is just a few screen taps away.



The map view screen provides icons for positional data as well as if a voice memo or photograph was taken.



The "Action" Screen provides extensive status and positioning information in one view.

for most of us it means getting all the receivers together and hitching them up to a PC one at a time for updating. With the V.S. there is a better way. Firmware and software updates are performed via the Internet (over GSM, WiFi or Ethernet) on the unit itself with a couple of clicks. No PC required!

But Javad didn't stop there. He added two (yes, two) 3-megapixel cameras—one downward facing and one forward facing—a digital compass, a multi-axis inclinometer (to sense and measure the unit's angle from level) and expandable MicroSD slot (4GB card included with the unit, supports up to 32GB) to hold all the GNSS data, images, sound recordings you will need to store.

V.S. GNSS Antenna

The Triumph V.S. Antenna is a stacked microstrip multipatch model that supports GPS, GLONASS and Galileo. The antenna is very similar to the Javad GrAnt. Unless you plan on using the V.S. as a CORS station, you simply won't need another antenna. And if you are like me, and use OPUS to process data from time to time, rest assured that the V.S. antenna has been calibrated by NGS (see www.ngs.noaa.gov/ANTCAL). The only downside I could find in regards to the antenna is that I couldn't pick up my favorite XM station, Willie's Roadhouse.

The pole mounting options for the V.S. are many. You can use a conventional 5/8" rover rod, tripod (with 5/8" coarse thread), or a 1/4"-20 threaded monopod (included with the V.S. as a standard accessory). Mounting can be performed either eccentrically or in any of the three offset attachment points. If you use an offset attachment point, you simply set the options in the V.S. so that it will adjust the position to eccentric using the compass and clinometers. You also have the option of using the bottom camera to center the V.S. over a point visually (and of course snap an image at the same time as you collect the point). This use of a graduated monopod is a new idea from Javad. Because you don't need a level bubble (the V.S. clinometers take care of that), monopod use is a convenient and simple option. Monopod is also in context to those passers-by that ask, "Are you taking my picture?" With the V.S. you can reply, "Yes, as a matter of fact, I am!"



Even in a high multipath environment, the V.S. quickly fixes and provides a very good precision solution.

V.S. Controller

More than likely, the first thing you notice about the V.S. is the LCD screen. While most controllers utilize a 320x240 pixel or 640x480 pixel screen, the V.S. boasts a “wide” 800x480 pixel touchscreen that is easily readable in direct sunlight. Not only is the screen a higher resolution than any other survey controller that I have seen, it is also physically larger than the average controller screen. With its colorful icons and single-screen main menu the V.S. user interface looks much like an iPhone or Android home screen, however the operating system running behind the Javad software is Microsoft Windows CE.

V.S. Software

The V.S. software is a complete GNSS data collection package that runs on the V.S. controller. I was able to quickly get up and running on our local VRS network with the unit. Quick setup is due in part to the single-screen menu layout as well as the workflow-based instructional videos posted on Javad’s website (www.javad.com/jgnss/support/JavadVideoLessons.html) narrated by Javad himself. The V.S. also has a

built-in manual. Simply click on the “User Manual” icon on the home screen and you are presented with a choice of Tutorials and How Tos that cover everything from connecting the unit to the Internet to transferring data to a computer. Online support from Javad Technicians is also accessible directly from the unit—it’s like “texting” tech support!

The software contains all the tools one would expect in data collector software including COGO and linework editing. The basic software functions operate similarly to other software I have used such as TDS, Carlson, SMI, Topcon and others, but getting to a specific function seems to take fewer “clicks” due to the shallow V.S. menu structure.

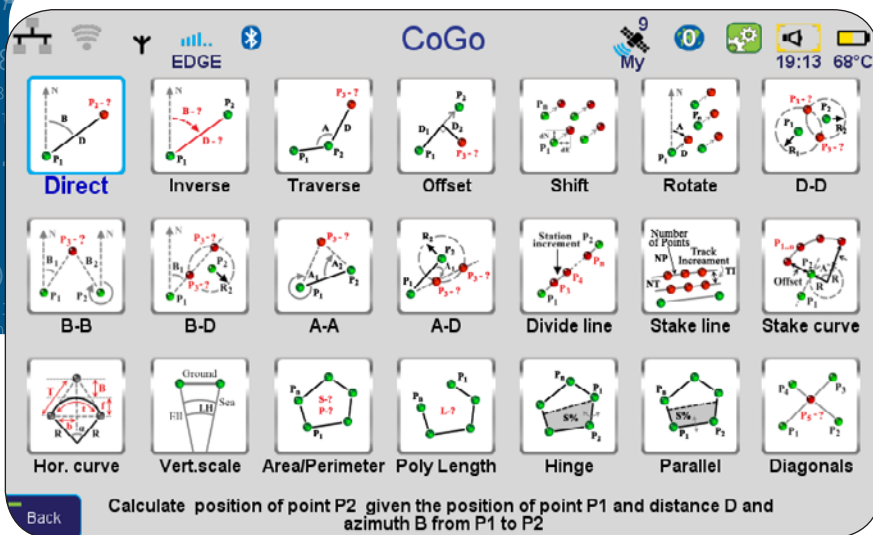
In addition to the touch screen, the device has several hardware buttons to access common functions (such as home screen and action/collect data screen) with one push of a button. In addition to the common buttons, the V.S. has five hardware (F) keys that assist with quick navigation. Rumor has it that these keys may eventually be user configurable, but at the time

of this review, with version 1.5 of the software, the buttons are hardcoded.

The storage for all data collected with the V.S. is handled within a database organized by Maps. Think of V.S. Maps as being synonymous with job files. On the V.S., Maps contain all the points, raw GNSS data, images, sound files associated with a specific job. This allows for cohesive organization of all the project data which simplifies data download and storage both on and off the unit. Data management on the desktop is handled with a free application called JustinLink which allows export to several common data formats including ESRI, KML (Google Earth), DXF and ASCII text.

Along with common elements, the V.S. has some unique features in the software that are made possible because of the specific hardware contained in the V.S.:

“Lift and Tilt” Mode In this mode, the V.S. waits to become near level and then begins collecting data. I say near level, because the V.S. can correct for not being level using the internal inclinometers and compass. This mode is very useful if you are surveying several similar features (such as a break line) as you can set the



Because of its large screen, V.S. menus are presented more like a buffet.



The “Six Pack” Status Screen shows the precision of each solution and the weighted percentage given to each solution.

V.S. with the descriptor and move from point to point and never have to touch a button to start and stop the point data collection. By default the V.S. will begin collection when the unit is within 5 degrees of level and stop when greater than 15 degrees from level. (This is great, just make sure your survey crew knows what level is.)

Spectrum Analysis With all the concern of LightSquared and other terrestrial interference that affects the GPS signal, wouldn't it be cool to have a spectrum analyzer to check out what is broadcasting in-band with GPS? If you are as geeked-out as I am and agree, the V.S. has your desire covered. With spectrum

analysis function built in, you can view interference analysis directly on the V.S. screen.

Time for a six-pack? Maybe not exactly what you had in mind, but Javad has come up with a very versatile engine for handling RTK solutions. If you have used RTK for any time at all, you know there is potential for a bad initialization and therefore a bad fix to occur. The Javad Six Pack RTK V6 Engine mitigates bad initialization by simultaneously generating six separate solutions and weighting them accordingly. Not only does this help mitigate bad fixes, it provides a more accurate RTK

solution. Simply put, male or female, you want a six-pack.

Data Calendar Do you want to go back to a specific day and see what data was collected with the V.S.? Go to the calendar and you will be presented with a view of a calendar with icons showing data collected on the given day.

Audio Guidance Tired of looking at a display for stakeouts? The V.S. has an audio guidance feature that gives you a nice “left, right, forward, backward” voice feedback system. Read a magazine, stakeout; text a friend, stakeout.

V.S. Function in the Field

In all seriousness, all the bells and whistles don't mean jack scratch if the gear doesn't perform in the field. While I may be able to use the unit effectively, I try to spend my day playing golf and trying to solve the Federal budget crisis, so the real test was to put the unit in the hands of one of our die-hard survey crews. To validate the unit I replaced one of our crews' existing GNSS receivers with the V.S. While they did seem to notice the change immediately, we spent the next hour going through the basic initialization and point survey functions of the unit. The unit was a moderate change from the data collectors running another software package they are used to, but they quickly got the relation of the V.S. menus to that on their existing software and into the field they went.

Final Thoughts

We utilized the three V.S. units we were provided by Javad GNSS in both a base-rover configuration and on a VRS network. We used the V.S. to set survey control, stakeout, GIS data collection—performance, productivity and usability was stellar. I was greatly impressed by the RTK performance in heavy multipath environments, specifically in downtown Nashville. Being able to snap a picture and record a linked audio comment about a shot was a nice feature that we enjoyed using. I utilized the ability in the V.S. to create a data dictionary with pick lists, which worked well for GIS data collection, however when using very long predefined code lists, I would like to see an auto-complete function instead of having to page through a code list. It would also be beneficial to have an ASCII export function within the V.S. to allow simple point data to be transmitted via Bluetooth to another data collector in the field without using JustinLink

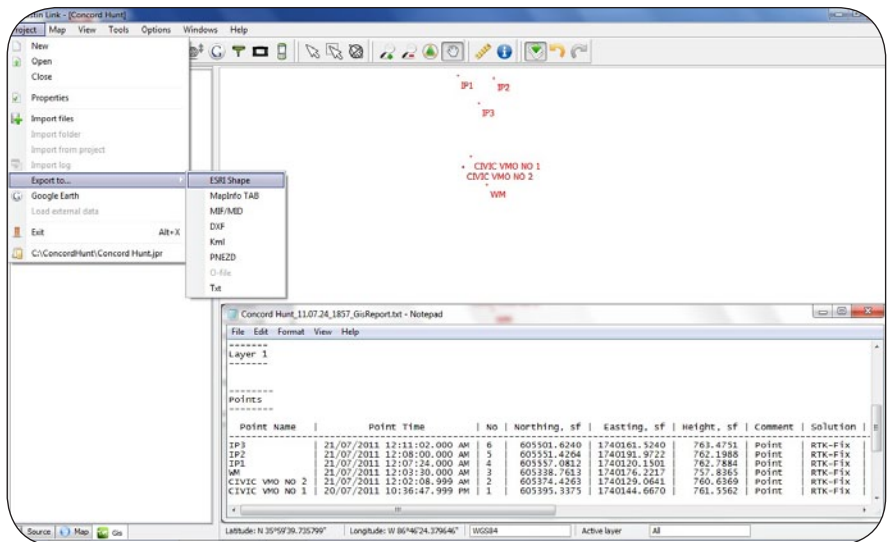


Even in full sunlight, the V.S. screen is highly readable.

(or even e-mail directly from the device in the field). Considering the speed at which the V.S. software is being updated (monthly), these features may even be implemented by the time this review is published.

The V.S. is truly unique and performs very well on paper and in the field. It was a pleasure using the units in a production environment—so much so that perhaps the manufacturer won't ask for the test units back! *AS*

Clifton Ogden, EI, is a Vice President with Nashville-based Civic Engineering & Information Technologies, Inc., and is a graduate of Auburn University (Engineering) and the University of Wyoming (Surveying). He gained his LSIT in the Fall of 2010 and plans to sit for his LS in 2012. Mr. Ogden has been working in the surveying industry since 1989.



JustinLink, the office software included free with the V.S., is used to import/export and translate data, photos and audio recordings