VB-RTK

BREAKING NEWS

RTK productivity improves when the base station is close to the rover. In technical terms, searching for “integer ambiguity” and having a correct “fixed solution” becomes much more reliable, much faster and more accurate, especially in more difficult areas with foliage, multipath, and obstructed satellites.

RTN and VRS systems provide a “virtual” base station near you, but this does not mean that the “virtual” base station is a “real” base station that eliminates the integer ambiguity problem. The difficulties of obtaining a fixed solution is still related to the nearest actual base station to your location.

There are two problems with depending on your own base station near your rover working area. The following are explanations of both and solutions:

First is the financial investment in an additional receiver. In fact, having a separate base station can be less costly, because it eliminates the need to pay for RTN services and communication costs. JAVAD GNSS offers a complete base/rover system (including J-Field, our state of the art controller software) for around $20K. In addition, the system includes “Base/Rover Setup” which can be used to painlessly configure the base and rover in about one minute. Another financial benefit is that productivity increases and more points per hour can be gathered: get a fixed solution and collect a point in seconds rather than minutes, particularly in difficult areas. Also, it eliminates the need to re-observe a point.

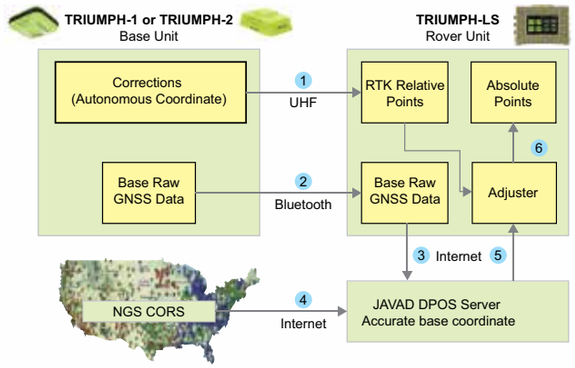
Second, the user may not have a known point to set the base station on, or lack confidence in the coordinates of the point. JAVAD GNSS has solved this problem reliably and automatically by offering “Verified-Base RTK” (VB-RTK). It is automatic, reliable, faster, less expensive, and it is traceable. Of course, the system can be used with RTN networks, too. It works much better than RTN, because usually the nearest actual “real” base station is many miles away, while a user can set up a base station near the RTK work area, usually less than a mile away.

VB-RTK records raw GNSS data at the base station while transmitting corrections to rover. At the end of work, the user returns to the base and again connects to it with the TRIUMPH-LS rover and stops the base. The rover then downloads the raw data from the base. The base station’s raw data is then sent to our own DPOS (Javad Data Processing Online Service) and processed to NGS CORS data. The results are then returned to the TRIUMPH-LS rover. The coordinates from DPOS are compared against the base coordinates used for all RTK points collected from that particular base session and then (upon the user’s confirmation) the RTK rover points are translated. All these steps are done automatically.

VB-RTK is useful even in situations in which the base was setup on a known point as the processed DPOS results can be compared against the known point coordinates to prove the base was setup on the right monument, that the point had not been damaged, that the coordinates were properly entered, that the instrument height was correct, etc.

VB-RTK also corrects base antenna height.

As a separate note: Our Auto-Verify RTK system will never give a wrong fix without a clear warning. We are offering $10,000 to any US PLS who can prove otherwise and show even one bad fix without a clear warning.



You do 1, the rest is automatic

In the issue

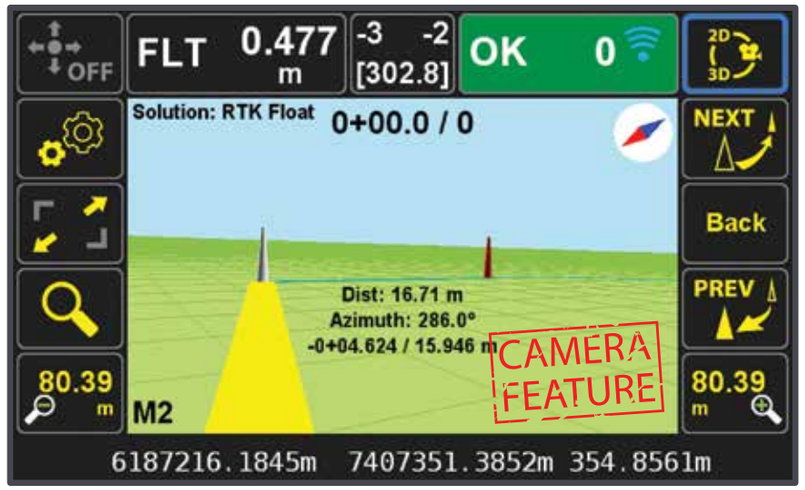
New Photogrammetry
Get about 2 cm accuracy with TRIUMPH-LS

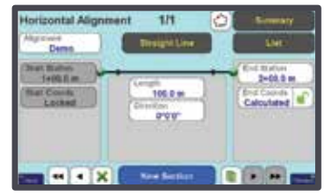
Angle Measurement
Quickly measure angles with TRIUMPH-LS

OEM boards
A variety of high performance GNSS OEM boards

TRE-3
The state-of-the-art in GNSS technology

www.javad.com



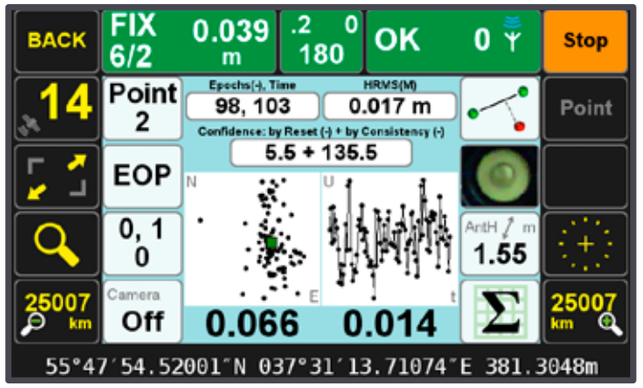


Store and Stake

Introducing GUIDE data collection in the TRIUMPH-LS. Visual Stake-out, navigation, six parallel RTK engines, over 3,000 coordinate conversions, advanced CoGo features, rich attribute tagging on a high resolution, large, bright 800x480 pixel display. Versatile attribute tagging, feature coding and automatic photo and voice documentation.
The TRIUMPH-LS automatically updates all firmware when connected to a Wi-Fi internet connection.

View and Document your level

The downward camera of TRIUMPH-LS scans and finds the liquid bubble level mounted on the pole. Then focuses on the circular bubble automatically and shows its image on one of the eight white buttons of the Action Screen. You can:
• View the liquid bubble level on the screen.
• Document survey details including the leveling by taking automatic screen shots of the Action Screen, as shown here.
• Calibrate the electronic level of TRIUMPH-LS with the liquid bubble level for use in Lift and Tilt and automatic tilt corrections.



All these camera features are possible only in TRIUMPH-LS where camera, and GNSS antenna are co-located and all other modules integrated.

OMEGA

Rugged GNSS Unit

OMEGA + Victor-LS + GrAnt

OMEGA is the most advanced GNSS receiver. It does not include integrated antenna and controller. It is suited for applications like **machine control** and in **marine** and **avionics** applications.

Adding GrAnt and Victor-LS makes a complete RTK system.

It is well suited for **monitoring and network stations**.

TRE-3

The state-of-the-art in GNSS technology...

And this is why:

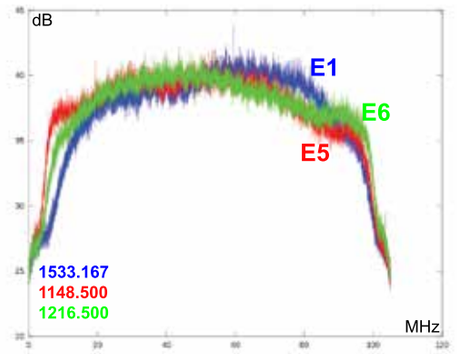
- **Three** ultra wide-band (**100 MHz**) fast sampling and processing, programmable digital filters and superior dynamic range. After **12-bit** digital conversion, **nine** separate digital filters are perfectly shaped for each of the nine GPS L1/Galileo E1, GPS L2, GPS L5/ Galileo E5A, GLONASS L1, GLONASS L2, Galileo E5B/BeiDou B2/GLONASS L3, Galileo altBoc, Galileo E6/BeiDouB3/QZSS **LEX**, and BeiDou B1 bands.

- Each band consists of a combination of a digital Cascaded Integrator-Comb (**CIC**) filter and a digital Finite Impulse Response (**FIR**) filter (up to **60-th** order) where signal selection is performed.

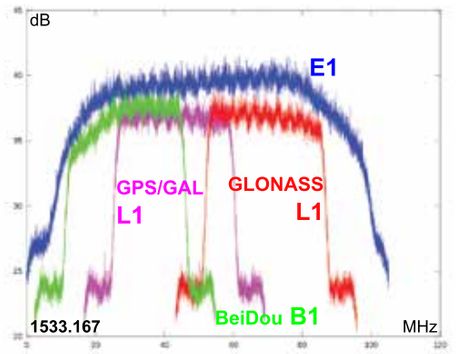
- Two types of digital in-band anti-jamming filters (automatic **80-th** order and “user selectable” **256-th** order).

- We assign multiple channels to acquire and track each satellite signal. For example we can assign **20** channels to acquire the GPS L1 signal, each spaced one millisecond apart. We also assign up to **5 channels** to track each signal, each with different filter parameters and tracking strategies. This supports acquiring and tracking **weaker** signals in difficult conditions, especially under trees and canopy. People wonder why we need **864** channels! We put them to good use. Others use one channel per satellite signal. Several patents are pending (Patents and Pendings).

- **80 dB** out-of-band interference rejections: high dynamic range of wide RF bands and highly rectangular digital filters make the receiver much more resistant to out-of-band **jamming**.



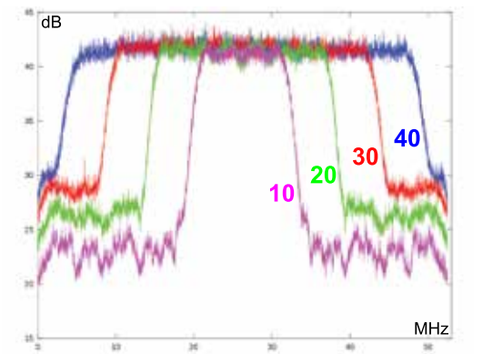
Noise spectrum of three wide RF bands (seen from DSP) with 3 level signal quantization



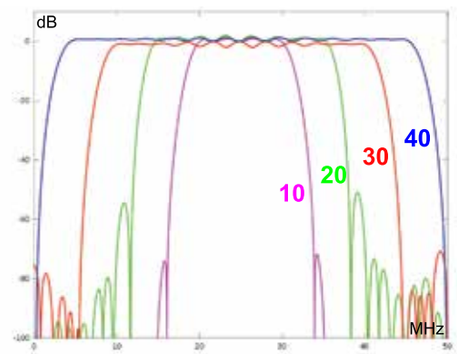
Noise spectrums of GNSS Bands which were cut from E1 wide RF band by corresponding digital filter

- **High-speed** high-dynamic automatic gain control (AGC) to respond to interferences and signal variations.
- Programmable filter **width** (by commands).
- Highly stable digital filters (band characteristics do **not change** with age, input voltages, or temperature).
- Improved **GLONASS** inter-channel bias performance (due to our flat digital filter shape).
- Excellent new **multipath** rejection technique, the best ever.
- 60-MHZ-wide Galileo **altBoc** band unleashes the full benefit of this signal. Its excellent multipath resistance is improved even further with our new multipath reduction technique.
- **864** GNSS channels allow tracking all current and future satellite signals.
- Three wide band RF sections allow monitoring **spectrums** and interferences in three 100-MHz-wide bands.
- TRE-3 is the only receiver in the market that can track AND DECODE the QZSS **LEX signal messages**.
- Excellent features for **time transfer** applications: In time sources where the zero crossing of the input frequency defines the exact moment of the time second, we monitor **zero crossings** and accurately define the moment of the time second. External time interval measurement unit is not required to measure zero crossing and 1-PPS offset.
- Embedded **calibrator** measures phase and code delays of each of these nine bands in timing applications. External calibration is not required.

TRE-3 is form, pin-out, and command compatible with the TRE-G3T.It uses **7-Watts** of power, compared to 4-Watts of the TRE-G3T.



Noise spectrums of GPS L1/Galileo E1 band with different digital filter band width (set by command)



Amplitude response of combination of digital CIC and FIR filters, computed on Matlab. Real out-band attenuation

and more...

Available in all boards:
RAIM; On-Board Power supply; Reduced MinPad; RS232(A) 460 kbaud; USB; Fast acquisition channels; Advanced Multipath Reduction; 1PPS; Event; IRIG A/B; Up to 100 Hz update rate for real time position and raw data

TRH-G2
All-in-view
GPS L1; SBAS L1; Galileo E1; BeiDou B1; QZSS L1;
UART(A) 460 kbaud *

TR-G2
All-in-view
GPS L1; SBAS L1;
Galileo E1; BeiDou B1;
QZSS L1

TR-G3
All-in-view
GPS L1; SBAS L1;
GLONASS L1;
Galileo E1;
BeiDou B1;
QZSS L1

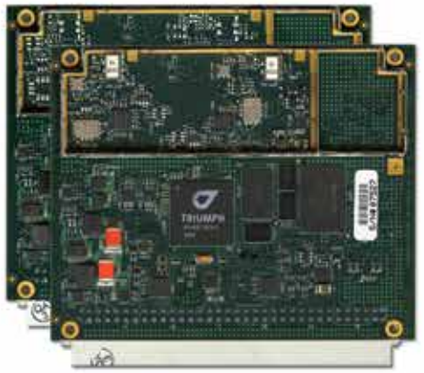
TR-G3T
All-in-view GPS L1/L2/L5;
SBAS L1/L5; GLONASS
L1/L2; Galileo E1/E5A;
BeiDou B1; QZSS L1

TR-G2T
All-in-view
GPS L1/L2/L5;
SBAS L1/L5;
Galileo E1/E5A;
BeiDou B1;
QZSS L1

TRE-G3T
All-in-view**
GPS L1/L2/L5; SBAS L1/L5;
GLONASS L1/L2/L3, Galileo E1/
E5A/E5B/AltBoc; BeiDou B1/B2;
QZSS L1/L2/L5; Ethernet;
Frequency Input/Output

TRE-G3TAJT
All-in-view**
GPS L1/L2/L5; SBAS L1/L5;
GLONASS L1/L2/L3; Galileo E1/
E5A/E5B/AltBoc; BeiDou B1/B2;
QZSS L1/L2/L5; Ethernet
(also support for IEEE 1588);
Frequency Input/Output;
Anti-jamming

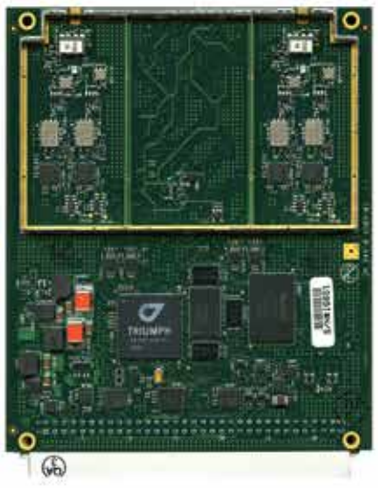
TRE-G2T
All-in-view GPS L1/L2/L5; SBAS L1/L5; Galileo E1/E5A; BeiDou B1; QZSS L1/L2/L5; Ethernet



Duo-G2
All-in-view
2 groups of GPS L1; SBAS L1;
Galileo E1; Ethernet;
Up to 50 Hz Heading rate

Duo-G2D
All-in-view
2 groups of GPS L1/L2;
SBAS L1; Galileo E1; Ethernet;
Up to 50 HzHeading rate

Duo-G3D
All-in-view 2 groups of GPS L1/L2; SBAS L1; GLONASS L1/L2, Galileo E1; Ethernet;
Up to 50 Hz Heading rate

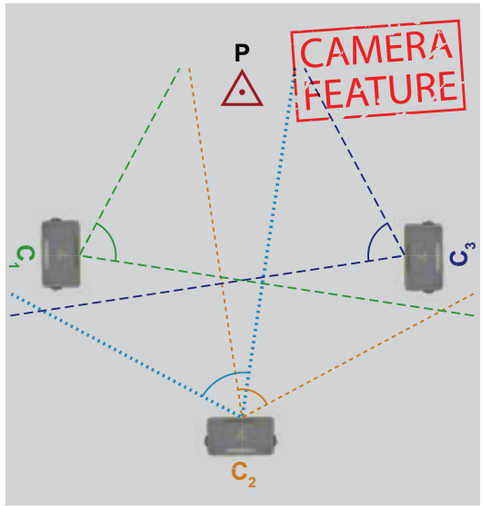


Quattro-G3D
4 groups (up to 12 satellites per group) of GPS L1/L2; SBAS L1; GLONASS L1/L2;
Galileo E1; Ethernet;
Frequency Input/Output;
Up to 20 Hz Attitude rate

** Not available in this board: Reduced MinPad; RS232(A) 460 kbaud; USB; 1PPS; Event; IRIG A/B*
*** May be not applicable for simultanious tracking of Galileo and BeiDou*

Offset Survey with built in camera

You can survey points with internal TRIUMPH-LS camera with accuracy of about 2 cm. Take pictures from at least three points. Leave a flag on points that you take pictures from, otherwise accuracy will be about 10 cm.

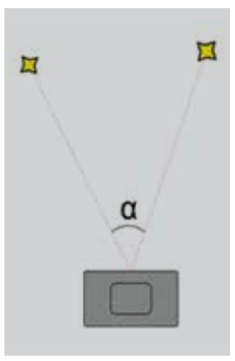


Visual Angle Measurement with Triumph LS

The new Visual Angle Measurement function of the TRIUMPH-LS allows measuring angles between points by using photos taken by the TRIUMPH-LS camera and use in CoGo tasks with the Accuracy of about 10 angular minutes.

To measure an angle:

- just take an image containing both objects of interest and open it in the Measure Angle screen
- select first and second point (using zoom to focus on necessary features)
- The angle between points is immediately displayed on the screen.



High performance Antennas

A variety of Radio Modems. Bluetooth and USB in all JAVAD radios
See details at **www.javad.com**

JLink 3G

JLink 3G BAT

HPT435BT/HPT135BT/ HPT225BT