Get on the Grid with VB-RTK. For over a decade American surveyors have been using the National Geodetic Survey's Online Positioning User Service. Surveyors employing RTK have been a significant share of the user segment of OPUS.

A significant share of OPUS users are surveyors using RTK. Often a surveyor will set up his base on a new, unknown position and allow an autonomous (or standalone) position to be used for the base coordinates. While he is performing his RTK work with fixed vectors between his base and rover, he stores data at the base to be submitted at a later time to OPUS. Once he is finished with his work, he downloads this file to his computer, converts the file if necessary, and submits it to OPUS. He then receives an email response back with a precisely determined coordinate for his base station. He then must take this coordinate, relate the coordinate to his project coordinate system, and then translate the work from the autonomous (or standalone) position he used in the field to this new coordinate. This procedure can produce excellent results and anchors the survey to the NSRS. The down side to this is that there are several steps that must be carefully observed and each of these error prone steps costs time.

With J-Field data collection software, Javad has been automating many tasks that surveyors have been doing for years, making the tasks more efficient and reducing sources of potential error. One example, **"Verify RTK with V6 Resets"**, is being recognized by surveyors across the country as the most accurate and efficient way to confidently determine RTK positions. Rather than taking a shot, manually resetting (or dumping) the receiver and taking a second shot for comparison, Verify RTK does this automatically with a user defined number of reset iterations.

Javad has continued this automation philosophy by dramatically simplifying the process of translating a survey from an autonomous base position to precise geodetic coordinates with **VB-RTK (Verify Base – RTK)**. Using the Javad GNSS, Data Processing Online Service (DPOS), which is powered by the proven Javad GNSS Justin processing engine. **This multi-level process is done in J-Filed completely automatically.**

Once an RTK session has been completed, the user returns to his Javad base receiver and presses "Stop Base" on the Triumph-LS. **At this point, the raw data file that has been recording at the base during the session, is wirelessly downloaded from the base to the Triumph-LS. When the download is complete, the user returns to his office and connects the Triumph-LS to the internet.**

When internect connection is made, the file is automaticallyt transmitted to one of the Javad GNSS servers for post processing. Once data and ephemerides are available for the session, **DPOS** processes the file and returns results to the waiting Triumph-LS. This all takes within minutes.
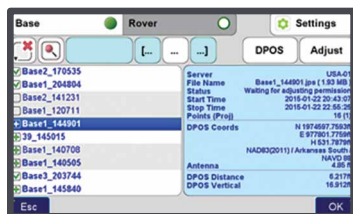
Once results are returned, the new coordinates for the base are shown related to your coordinate system (including localization systems).

The horizontal and vertical differences between the base coordinates used and the DPOS determined coordinates are shown. **This provides for an instant check of the base coordinates and instrument height** if the base were set up on a known position.

All rover points associated with that base session translate automatically in seconds. Only those rover points associated with that base session translate.
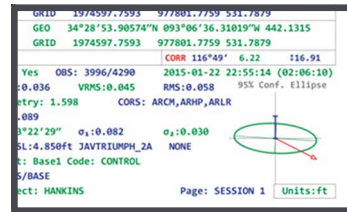

If the user is not satisfied with the results of the DPOS solution and wants to revert back to the original RTK positions, he simply clicks **"Undo"**. This process is immune to base instrument height errors because the internal vectors between base to rover are related to the antenna, not the ground point. So, an accidental entry for the base height of 543' instead of 5.43' can be resolved by VB-RTK.

In addition to the advantages of having your RTK base station near your work area, which gives you much more accurate and faster fixes, especially in difficualt areas, and saving you the RTN chargest; perhaps most important of all, your work is now precisely related to one of the most accurate geodetic control networks in history – the NGS CORS. Every rover point is only two vectors removed from the CORS (CORS to base, base to rover). This means that you can return again someday to find your monuments easily and accurately. This makes your records incredibly more valuable to both you and future surveyors. J-Field also has the unique ability to load and view every point you have ever surveyed from all the projects in its system. By combining this feature with a **distance filter** in its advanced set of filters, you can easily view all the points you have previously surveyed within a given distance of a point in your current project. Having an easily accessible record of nearby georeferenced coordinates is very beneficial as you may have previously located monuments in past surveys that are beneficial in your current project. J-Field allows you to easily copy these selected points into your current project, eliminating the need for you to resurvey them. All of this is available automatically on the world's most advanced RTK rover – **the Triumph-LS.**
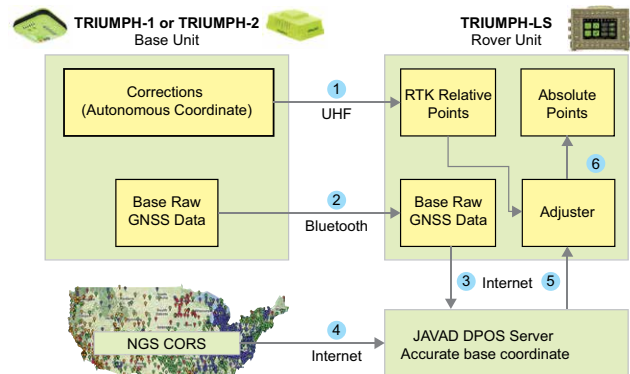

You do ① , the rest is automatic
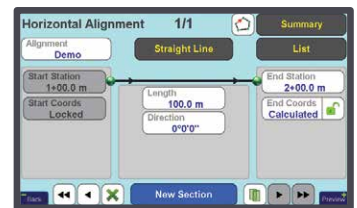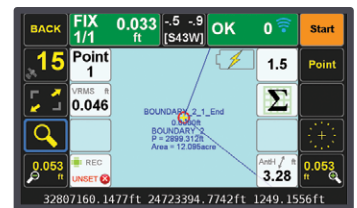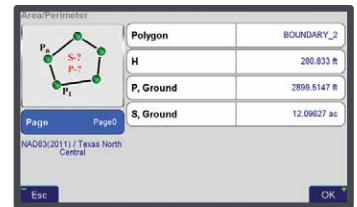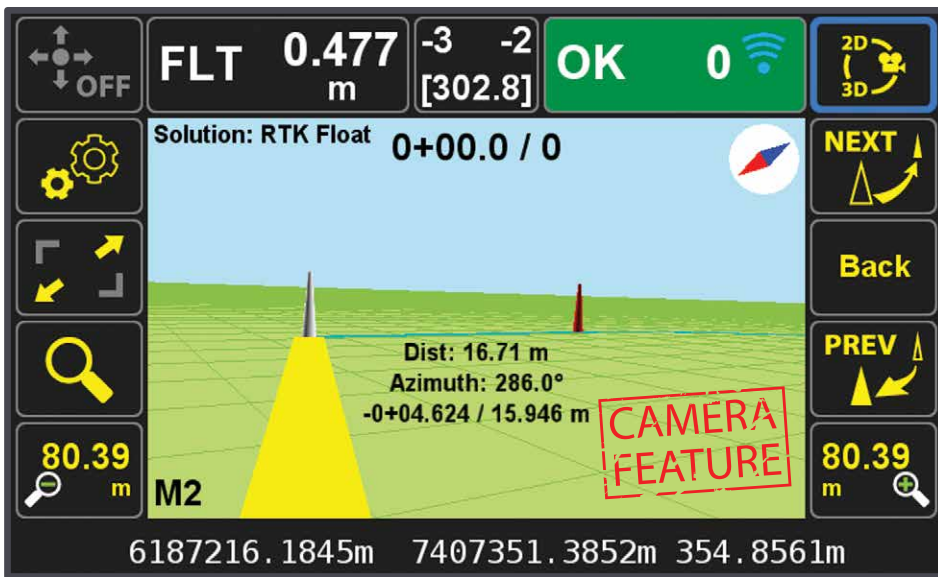
Store and Stake

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.
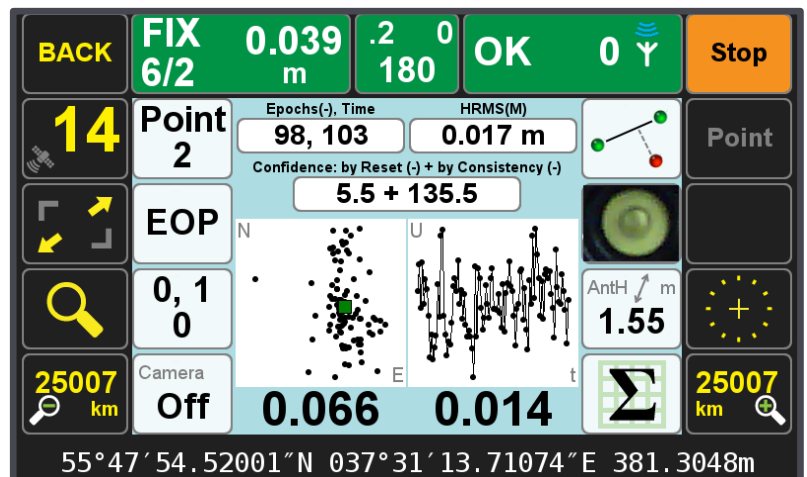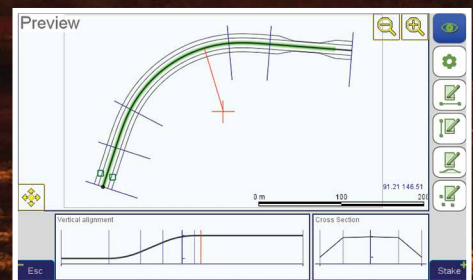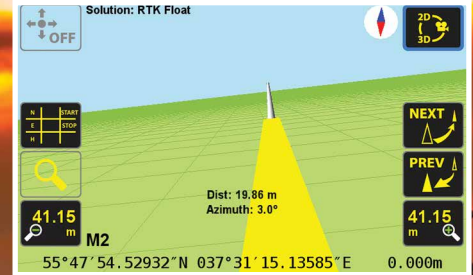

All these camera features are possible only in TRIUMPH-LS where camera, and GNSS antenna are co-located and all other modules integrated.

TRIUMPH-LS

Receiver+Antenna+Radio Modem+Controller+Pole

- **864 Channels for all GNSS signals**

- **24 Hours Battery Life**

- **Interference monitoring of all GNSS and UHF channels**

- **Visual Stake out**

- **Lift & Tilt**

- **6 parallel RTK engines**

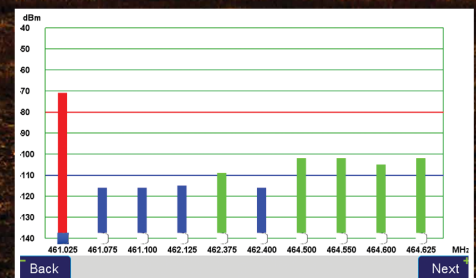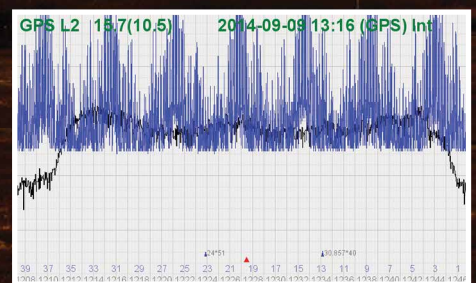# TRIUMPH-NT

Receiver+Radio Modem+Controller+Pole

Similar to TRIUMPH-LS but without integrated GNSS antenna.

TRIUMPH-NT and GrAnt antenna makes a complete RTK system.

TRIUMPH-NT + GrAnt

Victor-LS

The Rugged Field Controller

Victor-LS is a rugged field controller. It runs J-Field and can be used with TRIUMPH-1 and TRIUMPH-2.

TRIUMPH-1M + Victor-LS
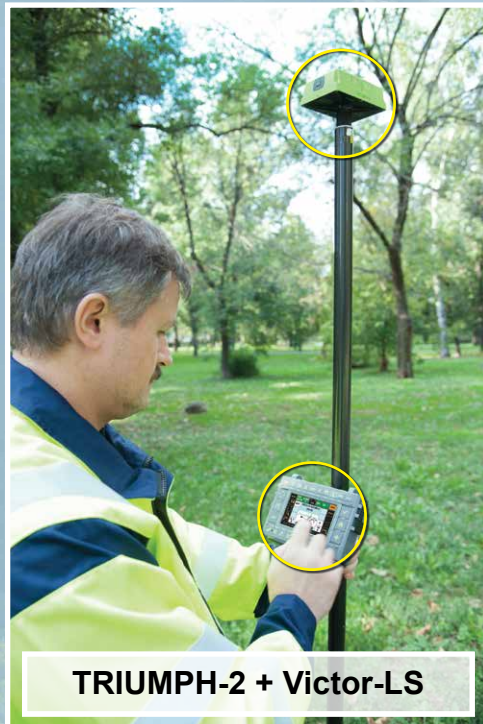
TRIUMPH-2 + Victor-LS

OMEGA
Rugged GNSS Unit

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**.

OMEGA + Victor-LS + GrAnt

Offset Survey with built in camera

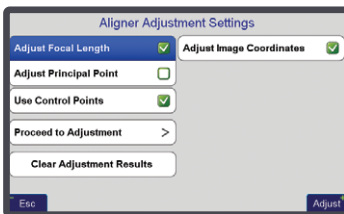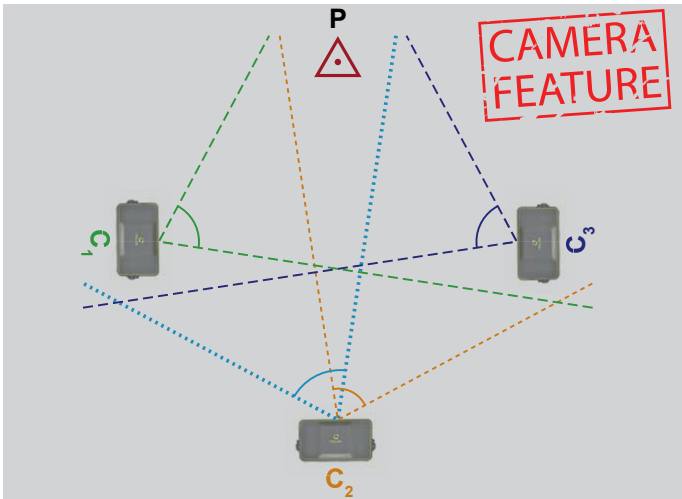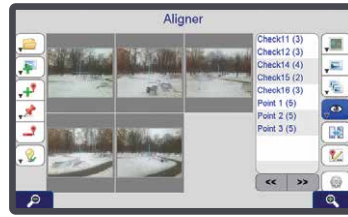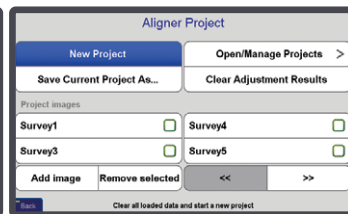You can survey points with internal TRIUMPH-LS camera with accuracy of about 2 cm. Take pictures from at least three points. Leave a flag on points that you take pictures from, otherwise accuracy will be about 10 cm.

Aligner Adjustment Settings

Adjust Focal Length	☑	Adjust Image Coordinates ☑
Adjust Principal Point	☐	
Use Control Points	☑	
Proceed to Adjustment	>	
Clear Adjustment Results		

Esc — Adjust

Aligner Manage Points

Point	#	Δ,m	σ,m	RE,px	Used	Ctrl	Chk		
Check14	4	0.044	0.052	0.214	☑	☐	☑	AB[	✕
Check15	2	0.041	0.055	0.722	☑	☐	☑	AB[	✕
Check16	3	0.230	0.154	0.170	☑	☐	☑	AB[	✕
Mark1	5		0.085	0.500	☑	☐	☐	AB[	✕
Mark2	5		0.093	0.336	☑	☐	☐	AB[	✕
Mark3	5		0.067	0.207	☑	☐	☐	AB[	✕

Add Control — Add Check — << — >>

Back

Aligner Project

New Project	Open/Manage Projects >
Save Current Project As...	Clear Adjustment Results

Project images

Survey1	☐	Survey4	☐
Survey3	☐	Survey5	☐

Add image — Remove selected — << — >>

Back — Clear all loaded data and start a new project


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.
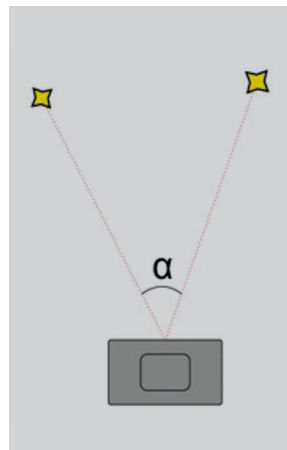
From:
V. Kelly Bellis, PLS
Horizon Surveying Co., Inc.
Ellsworth, Maine 04605
kellybellis@gwi.net

Without question, the Triumph-LS is the most mind-blowing piece of technology that I have ever held in my hands and being able to work with it is the highlight of my 40-year career in land surveying. Intertwined and commensurate with that highlight has also been the incredible honor and privilege in working with Javad Ashjaee, his amazing Moscow-based team of scientists and engineers, as well as some of the brightest surveyors in the United States, all in the shaping of the Triumph-LS and its graphical user interface, J-Field.

There are so many features of the Triumph-LS worth highlighting, it's difficult to know where to start; from the built-in frequency scanners for both UHF interference and GNSS interference, the automated shifting of project coordinates after the base file has

been submitted to DPOS (Javad's own version of OPUS for .jps files) and its adjustment received – all being done by J-Field, or to start by mentioning Visual Stakeout using J-Field's unique and way cool Guide feature. The ability to locate objects using photogrammetric methods is another exciting tool included in J-Field's extensive tool-set.

Being a person that has always gravitated to understanding things visually, J-Field's approach and graphical displays has aided my transition from strictly being an L1 guy for more than a dozen years; (6) ProMark2 Ashtech[1] receivers, to finally get with today's surveying using RTK. Of course, the Triumph-LS's very competitive price point also made this transition possible.
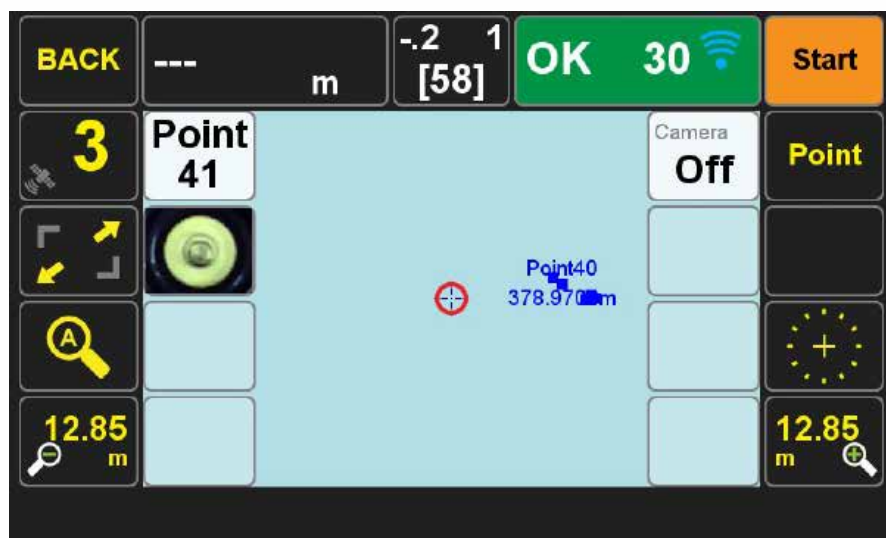
Shown here is just one example of the visual presentation of information given the surveyor. It includes being able to see at a glance the image of the rod bubble beneath the instrument's second camera and the textual display of Triumph-LS's internal pitch and roll values.

If I was limited to saying only one thing about the Triumph-LS that has impressed me the most, I'd have to say that it doesn't have anything to do with technology whatsoever. It has to do with a GNSS manufacturer that has so openly embraced the surveying profession during the development of a specific product, and most notably, professional land surveyors in the United States. As a matter of policy, Javad GNSS users are encouraged to suggest improvements and new features to all Javad GNSS products. And nowhere is that policy reflected more clearly than in J-Field.

The Javad PLS Support Network is an other reflection of Javad GNSS's commitment to supporting the U.S. Professional Land Surveyor and

their use of Javad equipment. Composed of a core group of licensed professional land surveyors scattered across the United States, the so-called 5PLS members stand ready to assist by phone or email. The best method of support is actually using the website's support forum (https://support.javad.com/index.php) which serves not only as a portal to quickly getting answers to questions from all of the licensed land surveyors, Javad GNSS geodesists, scientists, engineers and even Javad Ashjaee himself, but also ever increasingly the support forum serves as a reference source and suggestion box.

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1 Ashtech was the first GNSS company that was founded by Javad Ashjaee.