Fact 1:

Electronic documents are more powerful and useful due to their ability to link various forms of digital content such as audio, video, and animation, compared to print documents, which are just dead paper.

Electronic documents are much faster to publish. Publishing an electronic document only takes a few seconds, but publishing our advertisements to reach our readers via print magazines can take at least one week.

Electronic documents are much less expensive to publish. Instead of spending thousands of dollars on the cost of print publications, publishing electronic documents costs almost nothing.

Electronic publications have no adverse effects on the environment but print publications require cutting, shipping and processing trees.

Fact 2:

All of the Younger generation (people less than 30 years old) are primarily interested in digital media, electronic documents and internet searches. Even the books that they read are read on tablets and smartphones, meaning that they have little interest or need for print media.

The Middle generation's (people between 30 and 60 years old) focus is split, half on digital media and half on print.

Nearly all of the Older generation depended on print media.

COVID-19 changed many things in a span of few weeks. The COVID-19 virus forced Middle and Older generations to learn how use electronic connections, video conferencing and communicating via computers and smart phones. This is something that we were not able to achieve after many years of promotion.

No more on print media!

JAVAD GNSS will stop advertising in print media and will work towards benefiting from the electronic communication and promotion tools provided by the magazines that we previously used to communicate our message through their print media. They have far reaching e-blast services and electronic messaging.

In addition, we will be working on

- **Audio/Video tutorials**
- **Online publications**
- **Remote Group Video conferences (we have tool for up to 400 participants)**
- **Spreading the news through our sales channels**
- **Local State shows**
- **Words of mouth from happy users**

See us at www.javad.com

TRIUMPH-LS Plus & RTPK

Major good news for surveyors:

PATENTS PENDING

- **TRIUMPH-LS Plus combines RTK and RTPK**
- **RTPK is "Real Time Postprocessed Kinematic" Which can post process the RTK data in parallel and in real time.**
- **RTPK can verify your RTK results in Real Time!**
- **If RTK fails, RTPK comes to rescue in a fraction of a second.**

Price for the current TRIUMPH-LS remains at $12,990 and can be purchased as before.

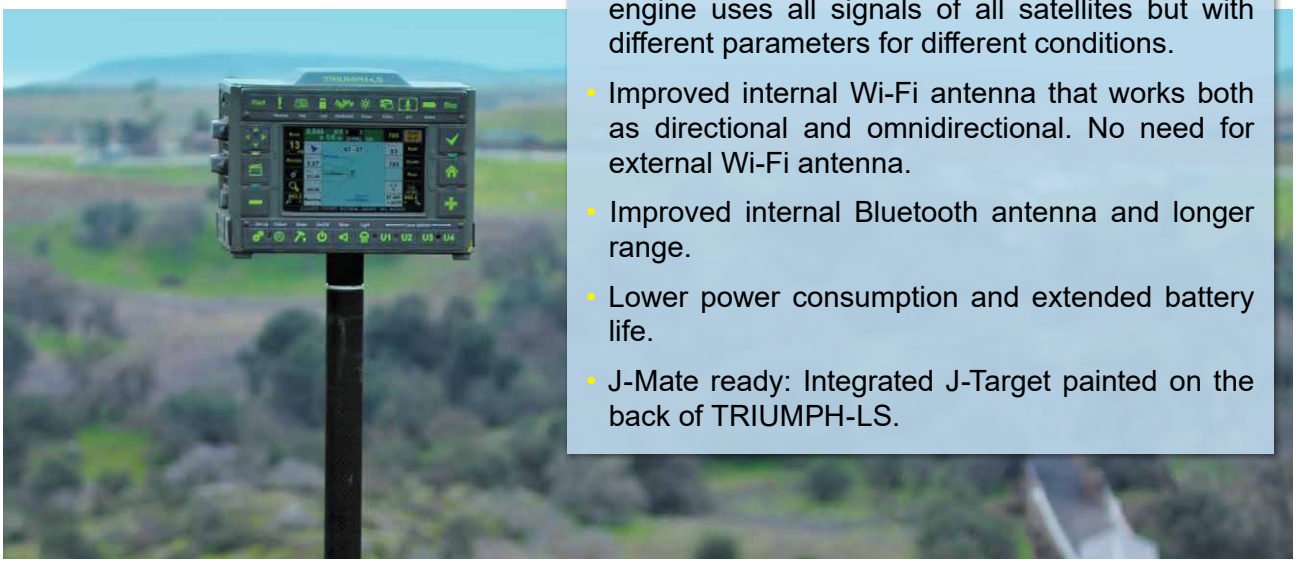
Price of the improved option is $4,990 ($12,990 + $4,990 = $17,980).

Please see our website for additional available options for the TRIUMPH-LS.

Owners of current TRIUMPH-LS units (in working condition) can upgrade their units to the improved option at $5,450 and for $5,700 we will also install a brand new set of batteries.

Option available for the TRIUMPH-LS with the following features, using the new ASIC:

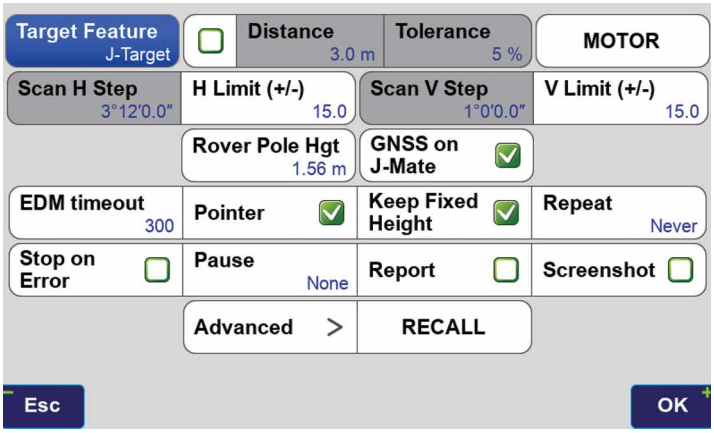
- Improved signal tracking and signal processing (wideband tracking) and adding Galileo and BeiDou L6 bands and Galileo AltBoc and BeiDou AltBoc signals.
- Improved multipath reduction due to wide band tracking.
- Improved spectrum analysis to show and reject spoofers and jammers option.
- Improved RTK with four "Super Engines". Each engine uses all signals of all satellites but with different parameters for different conditions.
- Improved internal Wi-Fi antenna that works both as directional and omnidirectional. No need for external Wi-Fi antenna.
- Improved internal Bluetooth antenna and longer range.
- Lower power consumption and extended battery life.
- J-Mate ready: Integrated J-Target painted on the back of TRIUMPH-LS.



Searching and finding objects by laser and by Optics

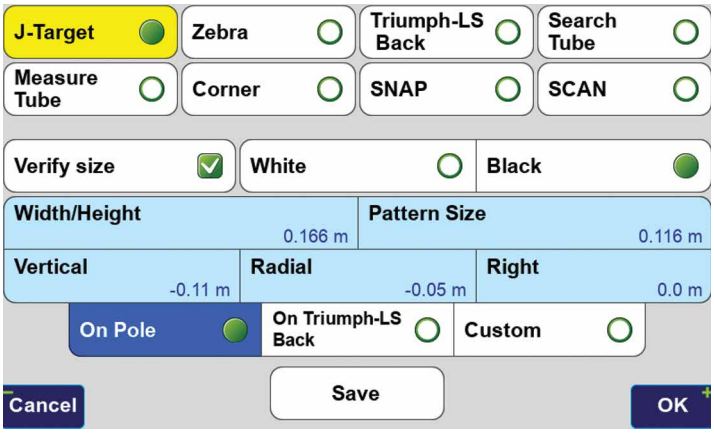
J-Mate has the unique feature of searching for objects by laser and by optics (camera).

Click button  and select “Target Feature” to see the setup screen for target selection and parameters. If you know the approximate distance to the target, click the check box and enter the distance and accuracy percentage. This will help J-Mate to ignore targets that are outside the range.



Horizontal and Vertical Limits are the limits that J-Mate will search around the starting point to find targets.

“Keep Fixed Height” check box, scans horizontally on fixed target height. You may rarely need to use this feature. It will reduce the scanning speed by a factor of 2.



“Laser time limit”

The time that it takes for a laser measurement depends on the reflective surface of the target and weather conditions (dust and moisture in the air).

On a good white reflective surface and in clean air, it takes about 50 milliseconds to have a laser reading. If there is no reflective surface, or the reflective surface is black, it may take up to 4 seconds to have a laser reading.

If the surface of the object that you want to scan is a good reflective surface, limit the laser time to a fraction of a second. This will cause the laser to skip points that do not reflect enough energy in the time limit that you specified. This will significantly increase the scan speed and will ignore points that are not possibly your target and reduces the chance of identifying a wrong object.

Target Features and its offset from the top of the pole are shown in the “Target Features” screen. You can change the parameters by selecting the “Custom” button.

TRIUMPH-LS Back: You can use this feature to search for the back of TRIUMPH-LS and measure to its center to make sure laser range measurement is not from an unintended object.

GNSS Signals in the improved TRIUMPH-LS with the new chip

1130	1140	1150	1160	1170	1180	1190	1200	1210	1220	1230	1240	1250	1260	1270	1280	1290	1300
GPS		L5		A			P2, L2C		B								
GLN					L3		C		CA2, P2		D						
GAL	E5A		E			E5B		F									
	E5-altBOC							G					E6		H		
Bei	B2A		I			B2B		J				B3		K			
	B2-altBOC							L									

1535	1540	1545	1550	1555	1560	1565	1570	1575	1580	1585	1590	1595	1600	1605	1610	1615	1620
GPS			CA, L1C, P1					M									
GLN								CA1, P1					N				
GAL			E1					O									
BEI			B1C					P									
	B1					Q											

GNSS bands for GPS, GLONASS, Galileo and BeiDou signals are depicted in the above figure.

There are total of 22 signals in 17 frequency bands labeled “a” to “q”. Note that GPS C/A, L1C and P1 are in the same band (m) and GLONASS CA/L2 and P2 also are in the same band (d) of the same satellite. In selecting signals for RTK processing, as an option, we may choose to select only one of such signals in the same band. We label this option as “No Same Frequency” option in signal selection strategy screen, discussed later.

GPS				GLN				GAL				BEI			
C/A M	1.0	8	8.0	C/L1 N	1.0	8	8.0	E1 O	1.0	6	6.0	B1C P	1.1	8	8.8
P1 M	0.8	8	6.4	P1 N	1.2	8	9.6	E5B F	1.2	8	9.6	B1 Q	1.0	9	9.0
L2C B	1.0	8	8.0	C/L D	1.0	8	8.0	E5A E	1.2	7	8.4	B2B J	1.2	9	10.8
P2 B	0.8	7	5.6	P2 D	1.2	7	8.4	Eboc G	1.5	6	9.0	B2A H	1.2	8	9.6
L5 A	1.1	5	5.5	L3 C	1.2	2	2.4	E6 H	1.1	8	8.8	Bboc L	1.5	8	12.0
L1C M	1.1	8	8.8									B3 K	1.1	10	11.0

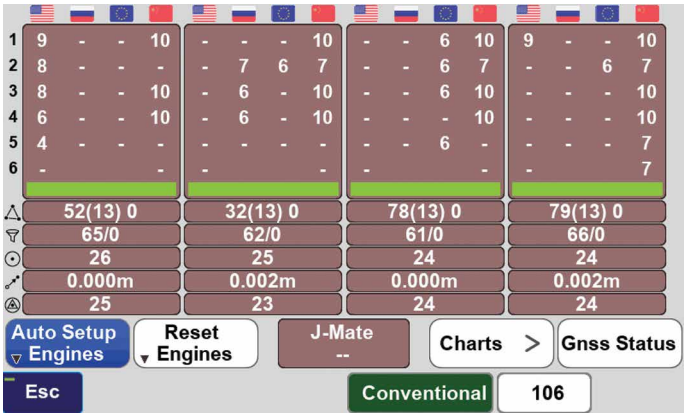
We categorize the GNSS signals as shown in the above figure. The first column is the name of the signal and its designated signal letter (e.g. GPS C/A m). Signals with the same color are those that we discussed earlier as being in the same frequency band of the same system.

The second column is the quality indicator of that signal. Because GPS P1 code, for example, is encrypted and in recovery we lose about 10db of its signal strength we give this signal the quality indicator of 0.8. GLONASS signals also get lower score because of their FDMA signal structure which results in inter-channel biases, even though we reduce such inter-channel biases in our signal processing techniques. Galileo AltBoc and BeiDou AltBoc signals get quality score of 1.5 because of their wide band and signal quality.

The third column is the number of available signals for RTK.

The multiplication of the second and third column is shown in column four, which is an indication of the value of that signal for RTK.

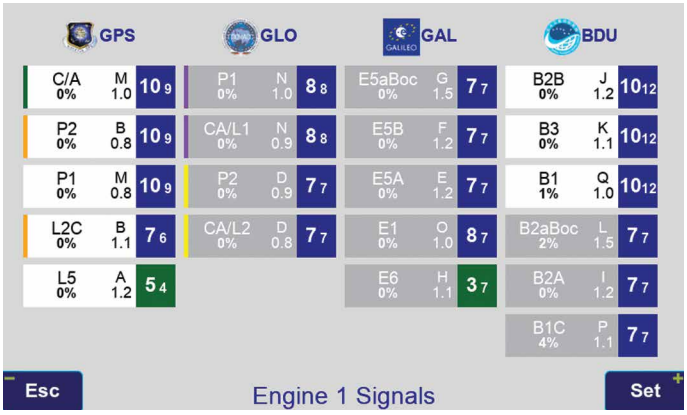
The four super engines



This screenshot shows the four super engine screens. Each engine shows the signals that are used for that engine.

The numbers below each engine are:

- First line is the GDOP of the selected satellites for each engine.
- Second line is the number of signals used / number of signals rejected.
- Third line is epochs since the last reset.
- Fourth line is the solution difference from the first engine.
- Fifth line is the total run time.
- Clicking on each engine, restarts the RTK fix process.
- Long click on each engine to select signals for that engine manually as shown in the figure below.



This screen shows all signals tracked by the TRIUMPH-LS which is real-time indication.

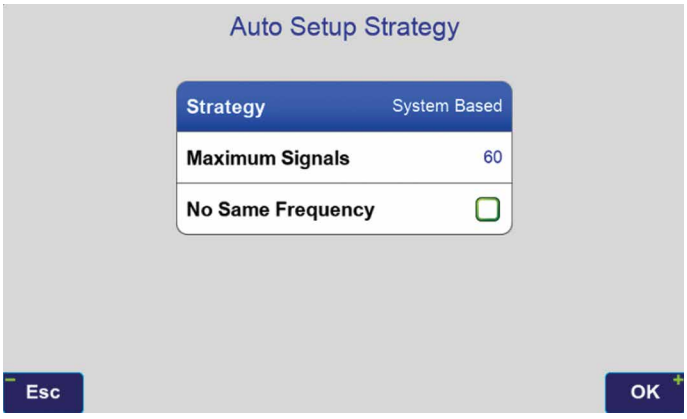
For each system, the name of the signal and its designated signal letter and quality indicator (e.g. GPS C/A M 1.0) are shown. GPS and GLONASS Signals with the same color sideband are those that we discussed earlier as being in the same frequency band of the same system.

Next to the signal name, the top number in each cell is the number of signals tracked by the Rover and the number below that is the number of signals tracked by Base. The smaller number of the two represent the number of common signals between base and rover.

You can long click on the signal name to change the quality indicator of that signal.

Each system is sorted by the number of common signals multiplied by the signal quality indicator.

The number below the signal name is the percentage of noise in that band. Numbers above 30% hint possible spoofing in that band. In case of jamming the original signal and adding a spoofed signal, this percentage may raise to even 200%.



"Auto Setup Engine" button selects signals for each engine automatically according to the strategy option selected by user.

For selection strategy, hold the "Auto Setup Engine" which leads you to the following screen.

"Maximum Signal" box allows you to limit the number of signals used for each engine. Numbers above 60 limits RTK solutions to one per second. Numbers below 30 allows 5 Hz RTK.

The "No Same Frequency" check box selects only one of the GPS and GLONASS signals in the same band as explained earlier.

Click "Strategy" button to select the strategy for automatic signal selections for each engine.

You can long click on each engine and select signals for that engine manually.

In "System based" strategy, for the first engine all GPS signals are used (subject to the check box and Maximum Signal parameters) and then complemented with the best other signals up to the "Maximum Signal" limit. The other three engines are similarly selected by giving preference to GLONASS, Galileo and BeiDou, respectively

In "All the Best" strategy, the best signals among all systems are selected and identical signals are given to the four engines (subject to the Maximum Signal number and the No Same Frequency Check box).

No signal type will be selected unless at least four satellites transmit that signal.

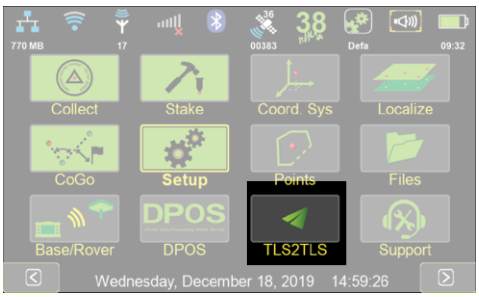
Each engine can accept maximum of 8 signal type. And each signal type can have maximum of 10 signals.

Clicking the "Reset Engines" button, resets all engines.

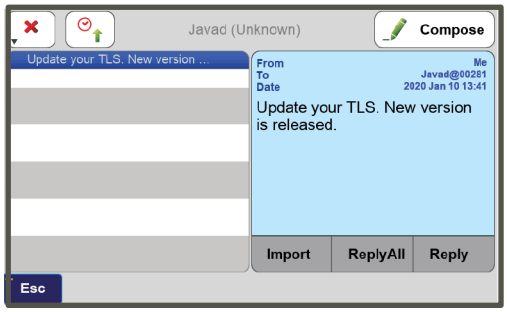
You can switch between "Convention Tracking" and Independent Tracking by clicking on this button. Conventional tracking users information from the L1 band to help other bands.

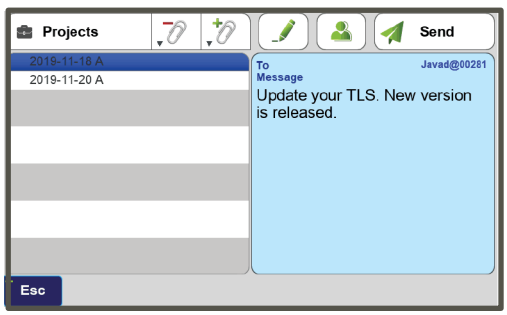
The number of the bottom right of the Figure 3 is the number of lost data from the base since the last reset. Long click to reset it to zero.

TLS2TLS



You can send and receive text messages and files from and to other TRIUMPH-LS units. In the Main screen click TLS2TLS and then in the "Compose" screen, click and enter names and serial numbers of the TRIUMPH-LS units that you want to communicate with. You can attach Projects, Screenshots, Images, Audio, GNSS RAW files to your text messages and send to the selected TRIUMPH-LS units.



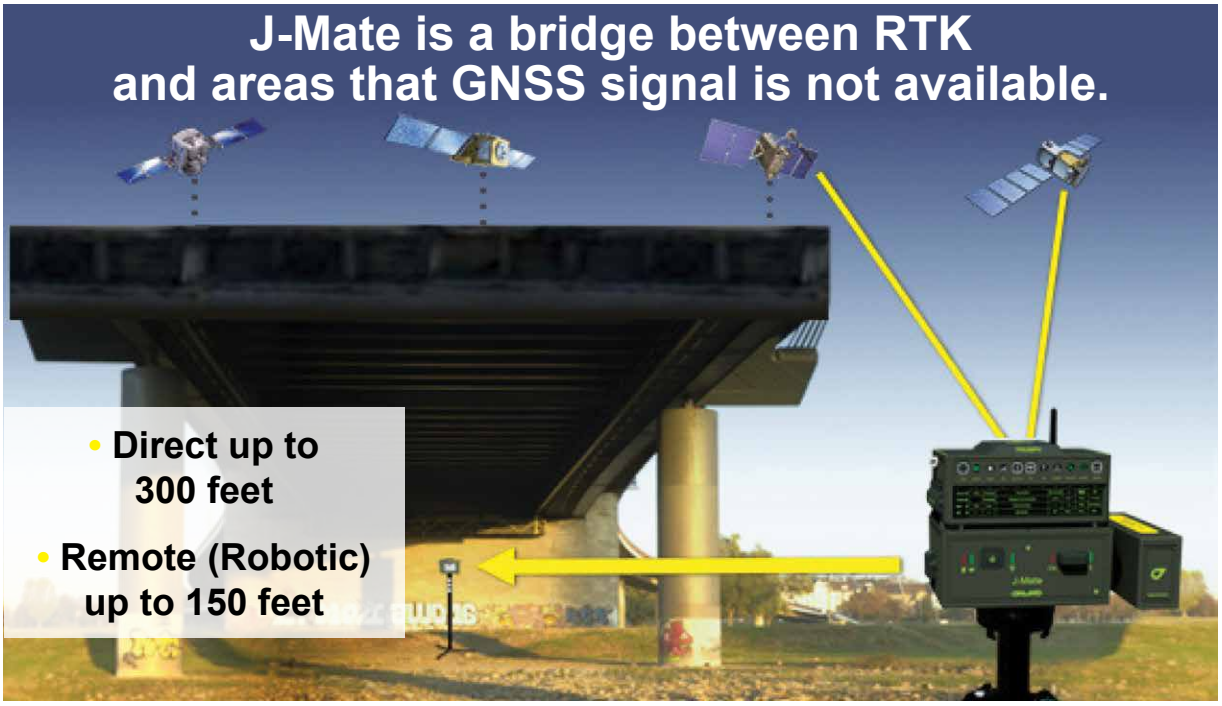


The received messages are shown in the first screen. You can "Import" the attached files, if any, to your local unit. Click "Reply" to reply to a message.

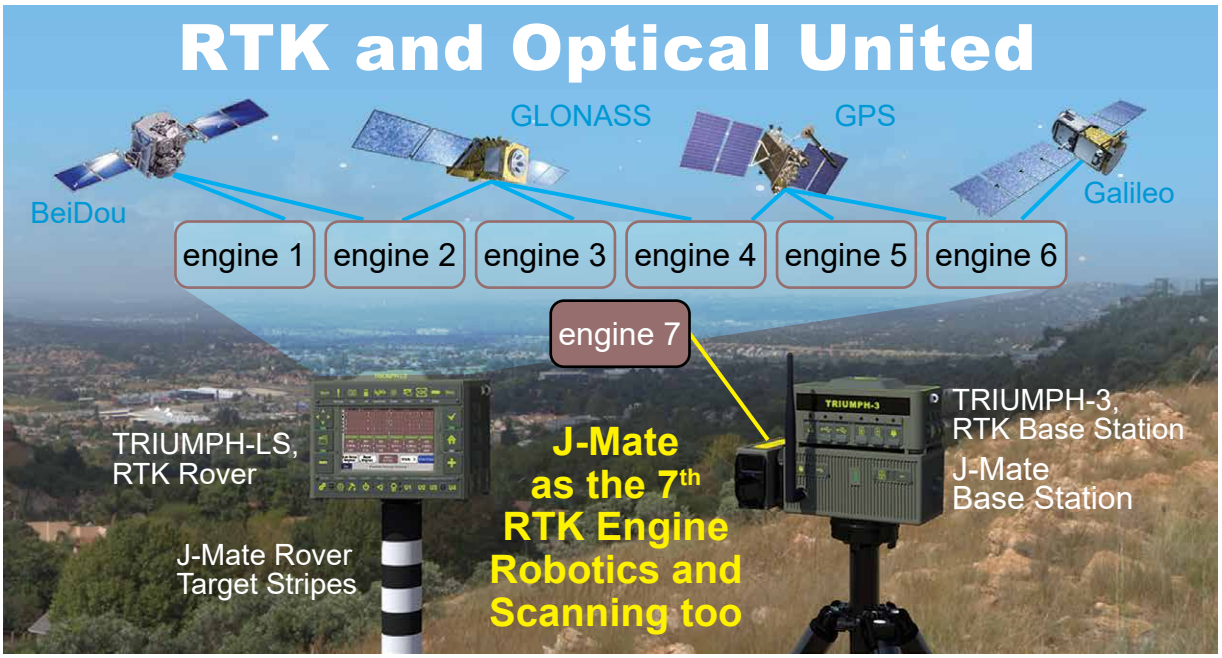
You can reply to received messages by clicking the "Reply" (only to sender) or "ReplyAll" (to all recipients) buttons.

You may receive "Public" messages from JAVAD GNSS team. You do not to reply to them.

J-Mate



J-Mate is not a total-station. J-Mate and TRIUMPH-LS together make the “Total Solution” which is a combination of GNSS, RTK, camera, angle encoders and laser range measurements that together do, conveniently and cost-effectively, a lot more than a total station. For long distances, you use GNSS and for short distances (maximum of 300 feet in Direct mode and 100 feet in Remote/Robotic mode), you use the J-Mate along with the TRIUMPH-LS. Together they provide RTK level accuracy (few centimeters) in ranges from zero to infinity.



TRIUMPH-3

The new TRIUMPH-3 receiver inherits the best features of our famous TRIUMPH-1M.

Based on our new third generation TRIUMPH chip enclosed in a rugged magnesium alloy housing.

The TRIUMPH-3 receiver can operate as a portable base station for Real-time Kinematic (RTK) applications or as a receiver for post-processing, and as a scientific station collecting information for individual studies, such as ionosphere monitoring and the like.

It includes options for all of the software and hardware features required to perform a wide variety of tasks.

- UHF or Spread Spectrum Radio
- 4G/LTE module
- Wi-Fi 5 GHz and 2.4 GHz (802.11 a, b, g, n, d, e, i)
- Dual-mode Bluetooth and Bluetooth LE
- Full-duplex 10BASE-T/100Base-TX Ethernet port
- High Speed USB 2.0 Host (480 Mbps)
- High Speed USB 2.0 Device (480 Mbps)
- High Capacity microSD Card (microSDHC) up to 128GB Class 10;
- “Lift & Tilt”
- J-Mobile interface

Ideal as a base station