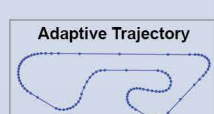
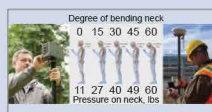
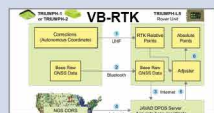
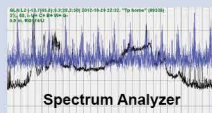
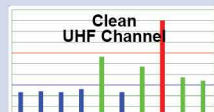




We do more of this...



Matt Sibole, PLS

Surveyors

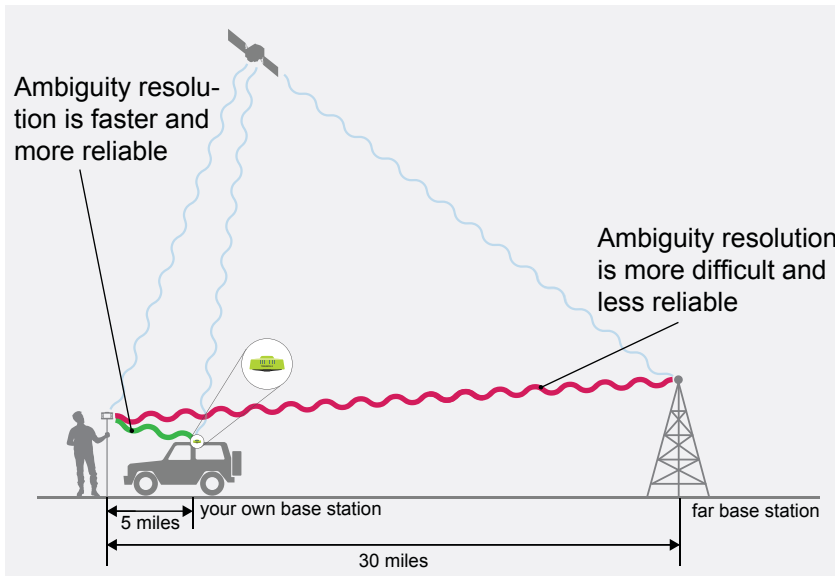
Shawn Billings, PLS

Matt Johnson, PE



... so surveyors do more of this!

Advantages of your own base station and short baselines



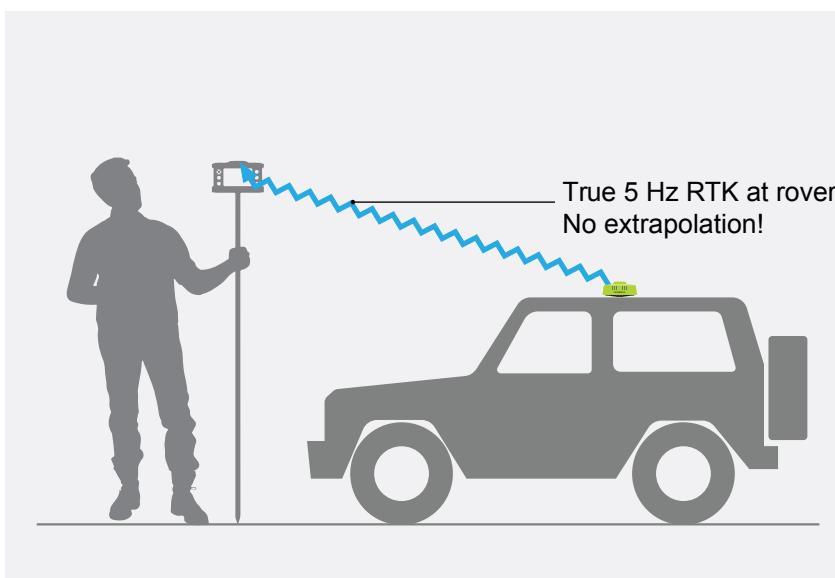
1. Shorter baselines provide significantly better **reliability** because the ambiguities are much easier to resolve and the correct ambiguity solution has an obvious contrast.

2. Shorter baseline has better **accuracy** because most of errors (like atmospheric and tropospheric effects) are common and cancel.

3. Shorter baseline ambiguities are resolved much **faster**. In longer baselines, incorrect ambiguities may pose as being correct in the statistical evaluations and it takes longer to isolate incorrect ambiguities.

4. Shorter baselines make it feasible to work in **difficult** areas (under tree canopy and in urban environments) because ambiguities have better contrast and are easier to resolve.

5. **Beast Mode RTK** is available only via our TRIUMPH-2 and TRIUMPH-1M base station. It makes ambiguity resolution up to 5 times faster because base station transmits base data 5 times per second. 5-Hz Beast Mode RTK is totally different from the up to 100-Hz RTK that is done by extrapolating the same 1-Hz data 100 times per second AFTER the ambiguities are fixed. This extrapolation technique does not improve the ambiguity resolution speed and is mainly used in applications like machine control after the ambiguities are fixed.



6. In addition to savings due to speed and reliability, it saves you RTN and communication charges. A complete system, Base + Rover + Radio + Controller & Controller Software, starts at **\$19,990**. 0% financing available (\$1,537.69 per month for 13 months) to active license US Professional Land Surveyors (PLS). Extended finance terms also available

contact sales@javad.com for details.

1 Equip your car

Mount the TRIUMPH-2 and radio on top of your car or truck. You can use either **UHF or FHSS** (Frequency Hopping Spread Spectrum) radios. You may want to bolt them down in your car for everyday use. FHSS does not need a license but its range is limited to a couple of miles. UHF has a longer range (up to 50 miles with a 35 Watt amplifier) but it needs a license. FHSS is particularly helpful in connection with our Beast Mode RTK which provides corrections from a TRIUMPH-2 near your job site. Use an appropriate long whip UHF/FHSS for longer range transmission.

HPT401BT
1W UHF Radio



TRIUMPH-2
GPS+GLONASS
L1/L2

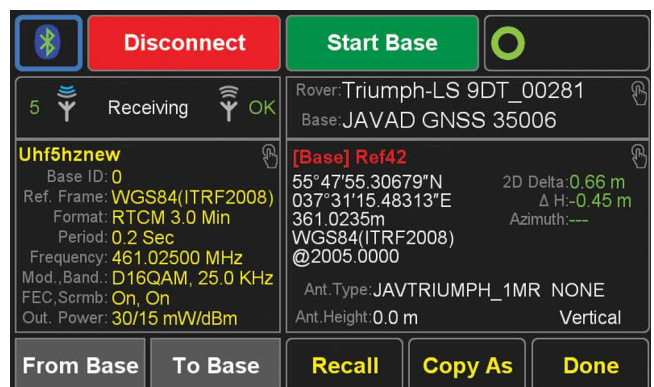
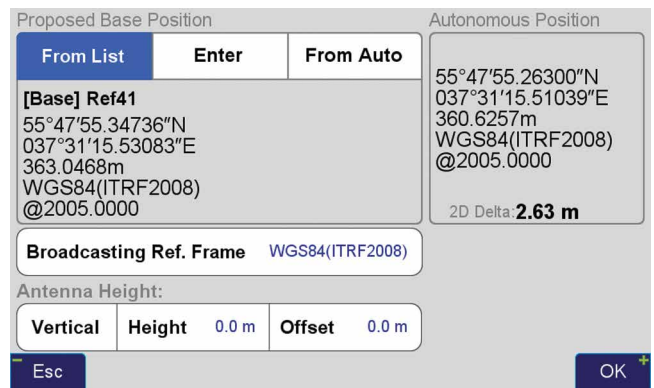


2 Park your car, Start Base

Park your car in an open area near your job site. It may be even in the middle of your site job. Engage all the brakes and ensure the car will not move. The Base/

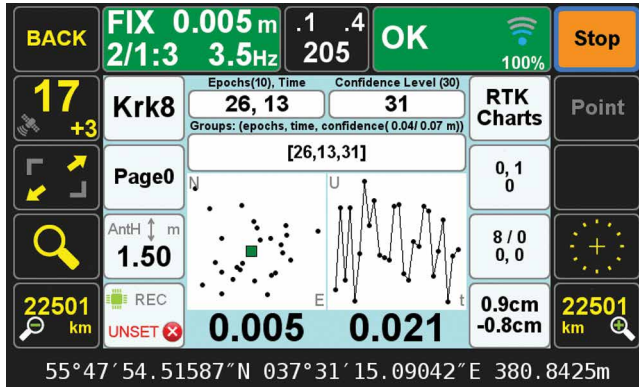
Rover Setup screen makes it easy to configure the base and rover with the same parameters.

Use **“Auto”** for the base coordinate. “Auto” will use an autonomous solution as the base coordinates which may be off by several meters (this will be corrected later). Then click **Start Base**.

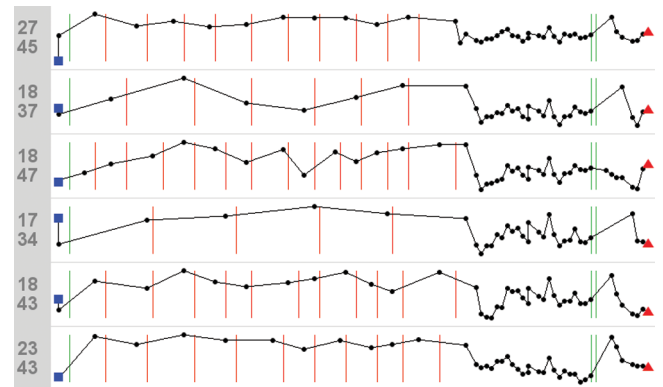
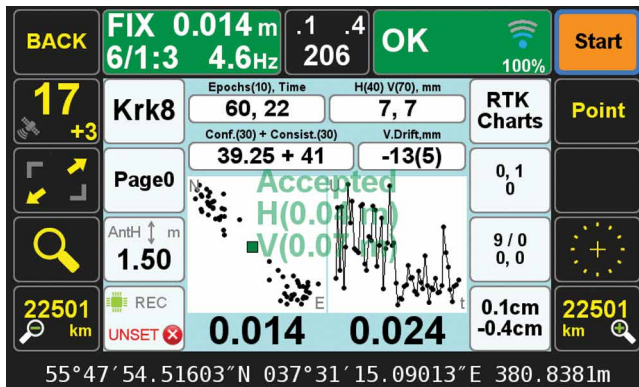


3 RTK Survey

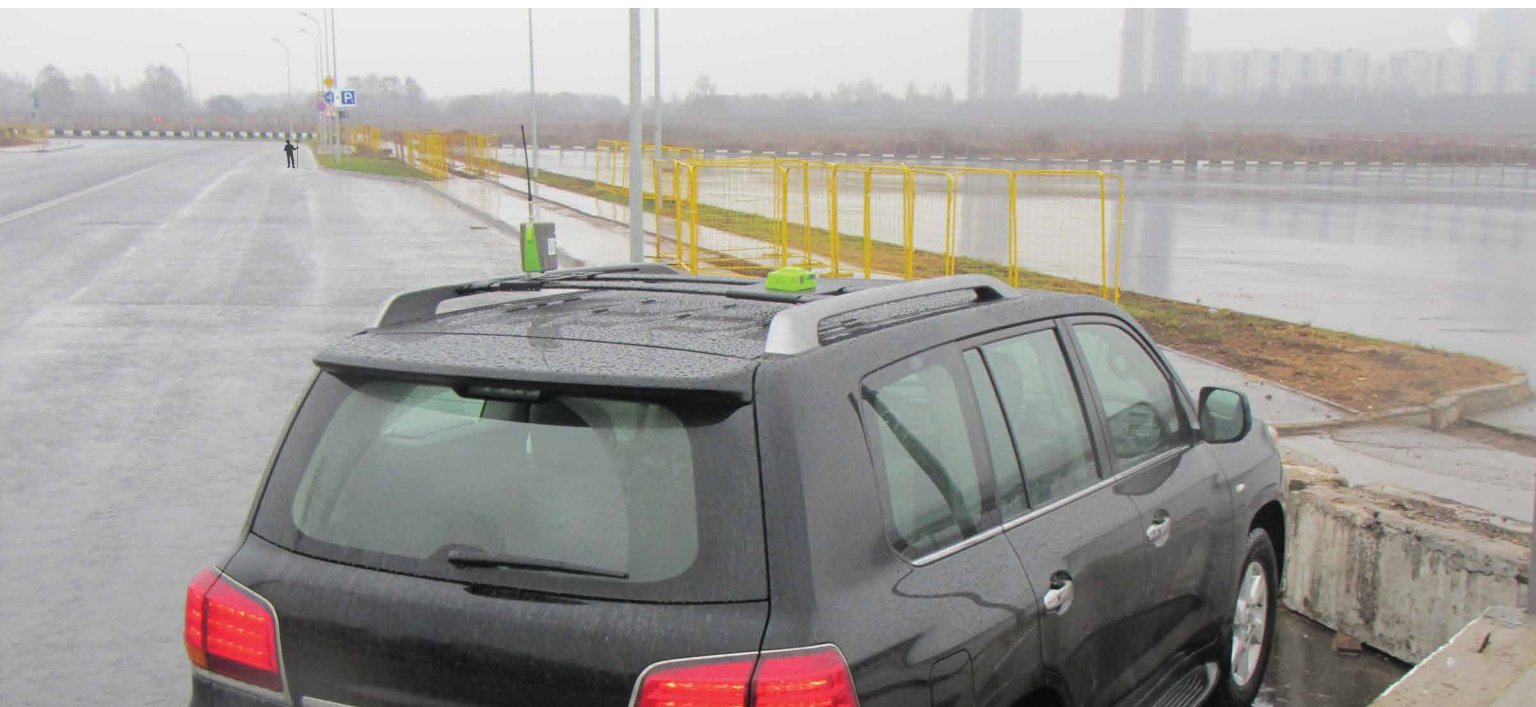
Use your rover to perform your tasks. We have combined UHF and Spread Spectrum Frequency Hopping (FHSS) in the same module in TRIUMPH-LS as an option. The automatic “Verify” feature (Phase-1 and Phase-2) ensures that you will never get a wrong solution.



Since your RTK baselines are short, you benefit from all advantages that we discussed earlier BUT all your rover shots are shifted by the offset error of the autonomous base coordinates (up to several meters). “DPOS-It” or “Reverse-Shift-It” to correct for the error from the autonomous position.



4 DPOS-it, Reverse-Shift-it, CORS Process it, AUTOMATICALLY with Hybrid RTK.



Hybrid RTK

Triple-Check your RTK results and ...

It triple checks the accuracy of RTK solutions by post-processing and CORS processing. In addition, if RTK can't get a fix (because of bad environment or bad communication with Base) Hybrid RTK comes to your rescue... automatically.

Nine Automatic Steps of Hybrid RTK

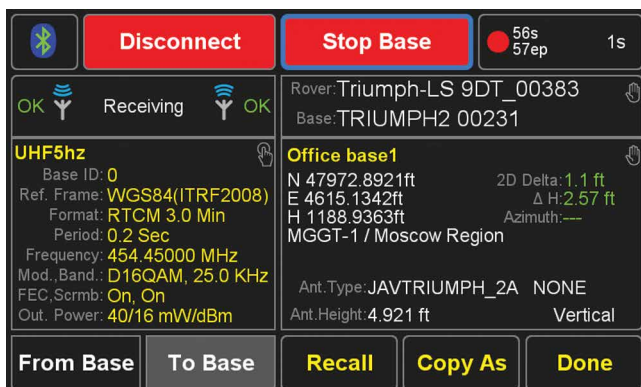
Confidence and Speed... Unlimited!

You do this ▾

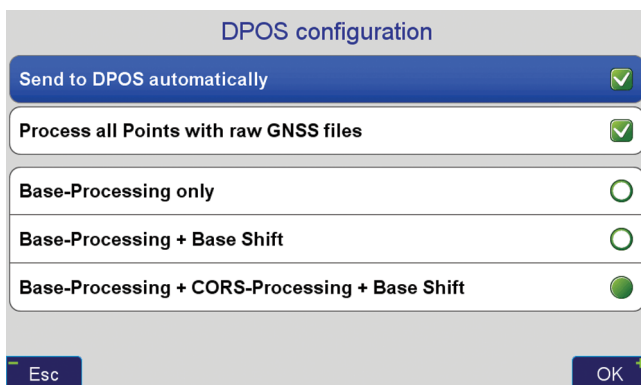
1

Downloading base data.

When your RTK job is finished, go to your base and in Base/Rover screen click "Stop Base". Base data will be downloaded to TRIUMPH-LS via fast Bluetooth automatically. All of the following steps will be performed automatically too when WiFi/Internet connection is established.



DPOS options



Automated steps ▾

2

Base data downloaded.

3

Awaiting DPOS server connection.

4

Rover points and base data sent to DPOS. Awaiting DPOS to process base-rover.

5

Rover points processed with base (relative).

6

Base data sent to DPOS to be processed with CORS data. Awaiting CORS data.

7

Base processed with CORS and corrections applied. (Absolute)

8

Base and rover points sent for CORS processing.

9

Rover points individually processed with CORS data.

Post-process and CORS process missed points... Automatically!

Base Rover Settings

Undo

BaseN_210003

Point File	BP	CP
BaseN_210003.jps 19.28 MB	Yes	Yes
L_210218.jps 1.11 MB	Yes	Yes
L1_210735.jps 1.08 MB	Yes	Yes
L2_211252.jps 1.05 MB	Yes	Yes
L3_211809.jps 1.04 MB	Yes	Yes
L4_212326.jps 1.00 MB	Yes	Yes
L5_212843.jps 979.19 KB	Yes	Yes
L6_213359.jps 987.56 KB	Yes	Yes
L7_213916.jps 1.00 MB	Yes	Yes
L8_214433.jps 1020.50 KB	Yes	Yes
L9_214950.jps 1.02 MB	Yes	Yes
L10_215507.jps 1.01 MB	Yes	Yes

V. Shift -0.855ft

Status of DPOS and Hybrid RTK processing for this session.

Survey Design Polyline Trajectory DPOS

BaseN 2 FX CP DP

L 5 FX RT DP

L1 5 FX RT DP

L2 5 FX RT DP

L3 5 FX RT DP

L4 5 FX RT DP

L5 5 FX RT DP

L6 5 FX RT DP

L7 5 FX RT DP

DPOS Status 9. PP points CORS processed and applied.

Name BaseN

Date (Local) 2016-03-14 21:00:00

Page Page0

CS MGGT-1 / Moscow Region

North 48054.5308ft

East 4640.8788ft

Height 1142.1602ft

Epoch 2016.0000

Coords SRV: yes DSN: no BS: yes

Solution Type Fixed

Status of each point and indication that base was DPOSED and corrections were applied.

L2, FLN

REL RTK Fixed Base Fixed

N, ft	48058.194	48058.187
E, ft	4639.414	4639.408
H, ft	1141.877	1141.873
HRMS, ft	0.006	0.014
VRMS, ft	0.007	0.012
Epochs	1546 / 312s	311 / 0s
Dist, ft	3.940, -0.855	3.936, -0.851
Stat	36 / 2293 / 10	

Horizontal and vertical graph of Relative solutions.

Access notes, audio, photos and screen shots that are attached to this point.

RTK solution (relative to autonomous position of the base).

Post-processed solution (relative to the autonomous position of the base).

Three types of Absolute rover solutions after autonomous position of the base is corrected with CORS data.

L2, FLN

ABS RTK Fixed Base Fixed CORS Fixed

N, ft	48054.537	48054.530	48054.526
E, ft	4640.882	4640.875	4640.877
H, ft	1141.022	1141.018	1141.018
HRMS, ft	0.006	0.014	0.037
VRMS, ft	0.007	0.012	0.024
Epochs	1546 / 312s	311 / 0s	311 / 0s
Dist, ft		0.009, 0.004	0.012, 0.004
Stat	36 / 2293 / 10	3	1+3

Horizontal and vertical graph of Absolute solutions.

Number of CORS stations used.

Corrected RTK solution.

Corrected post-processed solution.

Solution post-processed directly with base and with CORS data.

Statistical details.

Your thick trees and Our six RTK engines...

"This thing is bad ass!"

"I used "Beast Mode" on a small project yesterday and all I can say is WOW!!!! Did Javad and Red Bull team up to enhance RTK or did my system drink hypercaffeinated coffee when I wasn't looking? Amazing accomplishment/development Javad. I can't imagine using any other GPS equipment."

"the data collection will make your whole body stiff, and quiver from head to toe. It is flat awesome."

"We are considering a third system (these things are awesome)"

"got some shots that he could not get with our gr5's"

"Btw, pardon my French, but holy shit. I got some ridiculous 'fixes' today in some horrible situations. Reset receiver, moved around, etc. Tried to get a bad fix but had a hard time doing it."

"The LS has increased our productivity 2:1."

"On a side bar, the highway contractor had a guy using a Trimble for his as-built shots. My Javad ate his lunch on fixes and the verify routines. He had never seen anything like it. His was stop, drop, and go."

"I've been using BEAST MODE RTK and it works very fine even in heavy canopy. Tremendous application."

"The only bitching now is for the crew that has to take out the Hyper V."

"I often get 2 days of work done, in a day."

"This thing is bad ass!"



...making friends!

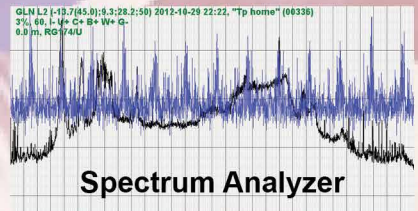
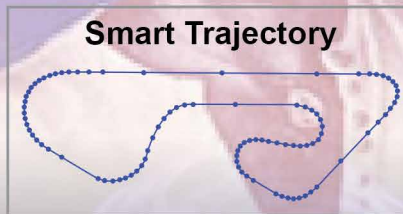
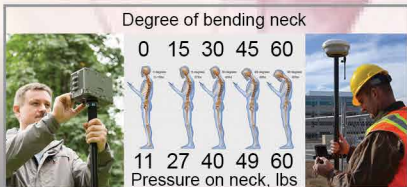
HOW DEEP IS YOUR LOVE

for science?
for technology?
for survey?
for money?

and for

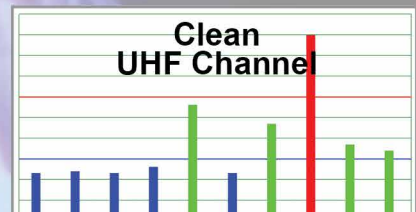
Hybrid RTK Automatic

and much more...

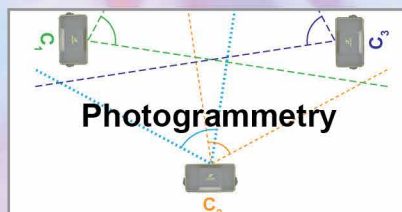


BEAST MO **RTK**
Real 5-Hz Base Station Transmission

RAMS
Remote Assistance & Monitoring Services



**REVERSE
SHIFT** <<it



>>>
Wolfman Jack