



# THE JAVAD ROVER POLE

Version 20150427



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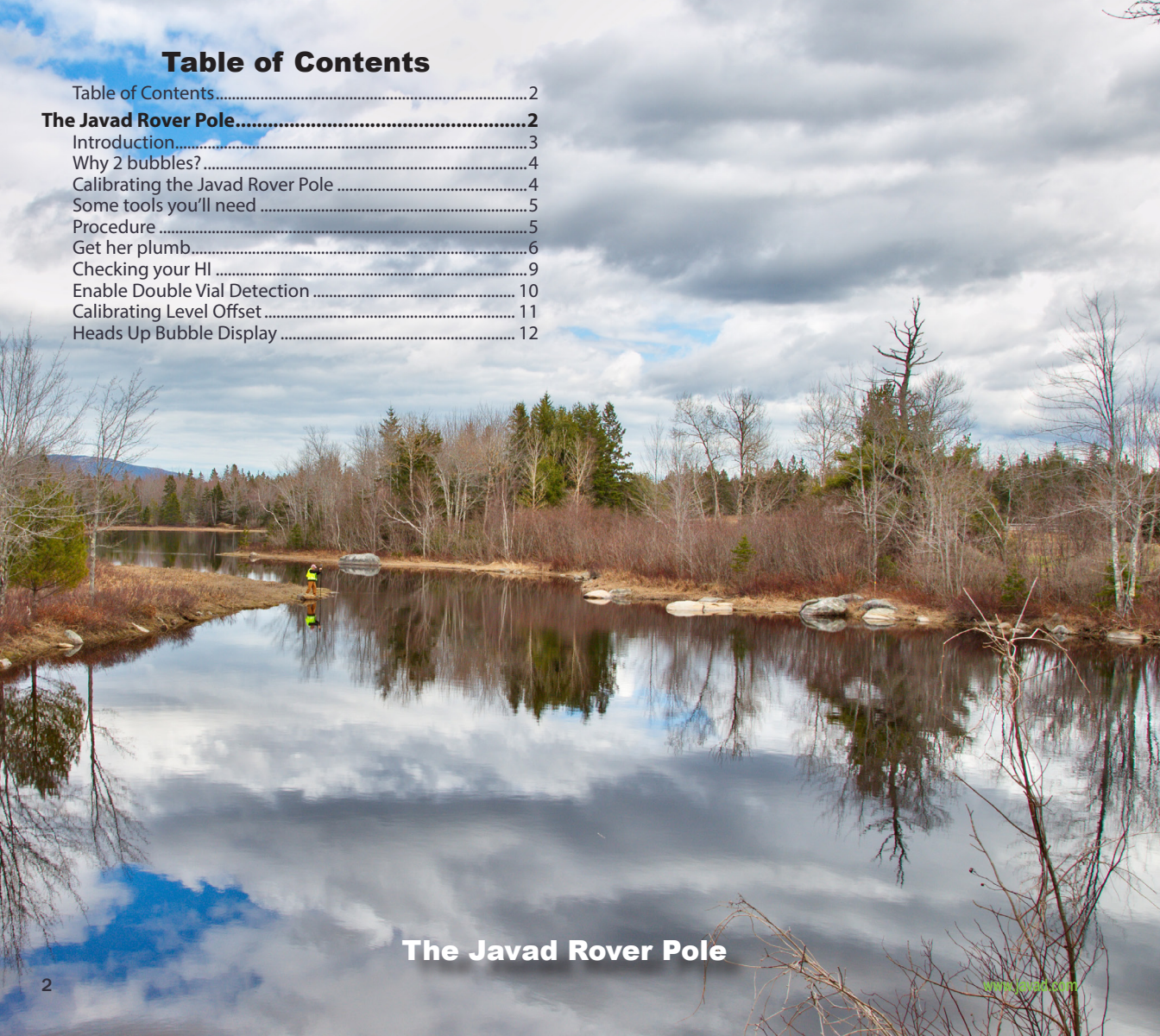
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## Introduction

The Javad GNSS RTK system features a collapsible staff for the RTK Rover that makes for easy transport in the field, the survey vehicle or even through TSA screening when boarding commercial aircraft<sup>1</sup>.

The second generation survey staff by Javad improves on the original design with many new features:

- ◆ **Larger mounting head for improved security**
- ◆ **Foam comfort grip**
- ◆ **Beefier aluminum alloy tubes for strength and rigidity**
- ◆ **Your choice of bubble vials (when ordering) 40', 8' or both**
- ◆ **Easy to read silkscreened graduations**
- ◆ **Quick-flip locks for securing tube sections**
- ◆ **Maximum extended height 1.630 m**
- ◆ **Bigger, hardened steel custom machined tip for improved visibility**

Built from BENRO's series of heavy duty excellent videographer's monopod, Javad has reengineered it into the world's most versatile and rugged RTK Rover Rod with the surveyor's demanding needs keenly in mind.

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<sup>1</sup> The removal and separate storage of the tip is recommended before screening





placed on the left (viewed as facing the engraved Javad logo), is the 40-minute vial. The second vial with its black circle is the 8-minute vial. After I started using the 8-minute vial for fine tuning a setup, I became convinced: ***two bubbles are better than one.***

The Javad 2nd Generation Rover Pole also comes in a Single Bubble version so be sure to specify which style you prefer when placing your order.

Single Bubble Rover Pole (8' vial) [30-590xxx-xx-08]

Single Bubble Rover Pole (40' vial) [30-590xxx-xx-40]

Double Bubble Rover Pole (40' & 8' vials) [30-590xxx-xx]

Note: The original Triumph LS Monopod [30-590210-02] is no longer being manufactured and will no longer be available once its existing stock has been depleted.

## Why 2 bubbles?

That's the first question I asked. But then the comparison of a regular total station quickly comes to mind. Here we have a similar two-bubble scenario: one 40-minute bubble for quickly setting up over the point and a second, 8-minute bubble to fine tune the setup.

That's pretty much what is realized in the 2nd generation rover pole by Javad; one bubble, the one with the red circle



## Calibrating the Javad Rover Pole

Before you start using your Javad Rover Pole, you'll want to calibrate it - just like all of your other surveying equipment. Calibration of the Single Bubble and Double Bubble staff is no different than any other surveying staff except for one important distinction: you must pay attention to the resting place of the receiver when it's attached to the pole. Specifically, the downward facing camera of the **TRIUMPH-LS** isn't going to properly recognize the level bubble(s) if the vials aren't directly in its field of view. Therefore, the vial assembly will likely need to be rotated for optimal placement.

## Some tools you'll need



- ◆ **9/32" socket wrench**
- ◆ **3 mm hex key (Allen wrench)**
- ◆ **2.5 mm hex key (Allen wrench)**
- ◆ **7/64" hex key (Allen wrench)**
- ◆ **Plumb bob**
- ◆ **Plumbing rig**

## Procedure

Begin by hand-tightening the mounting head securely onto the staff.

Next attach the **TRIUMPH-LS**. Because the 1/4" x 20 thread insert is uniquely placed in the **TRIUMPH-LS**, your receiver will always be uniquely oriented to the pole in the same way each time it's attached.

Using a 7/64" hex key, loosen the vial holder clamp, rotate the assembly until the vials are centered on the vertical axis of the downward facing camera, and then tighten securely with the hex key. You can then remove the **TRIUMPH-LS** from

the Rover Pole.



With the location of the vial assembly ascertained and fixed into place, you will want to check how things look when viewed from beneath the assembly. In particular, you'll want to look for conflicts and clearances for the 2.5 mm hex key that will be used to tweak the vials. For example, you may observe conflicts with the uppermost quick-flip lock. In these photos the uppermost clamp has been optimally rotated. While raising the vial assembly higher up on the tube will mitigate such conflicts it will exacerbate clarity of the vial's image due to the fixed focal length of the camera's lens. The easy solution is to just rotate the clamp.





Use the 3 mm hex key to loosen the quick-flip lock assembly, rotate it to provide proper clearance for the vials' adjustments and then tighten.

Check to see where the graduations on the tube fall, and if necessary, readjust and tighten.

Should the quick-flip lock mechanism ever need adjustment, open the flip lock and using the 9/32" socket

wrench, tighten or loosen as necessary.

## Get her plumb



Chances are, you already have some kind of contraption for keeping your surveying staffs tuned up and calibrated. If not, they're pretty easy to make if you're in the Do-It-Yourself frame of mind, or for

about \$50 you can buy something like the rig made by SECO<sup>2</sup> as shown here.

2 SECO Part Number 5195-01 - <http://surveying.com/Products/Prism-Pole-Accessories/Prism-Pole-Accessories/5195-01>

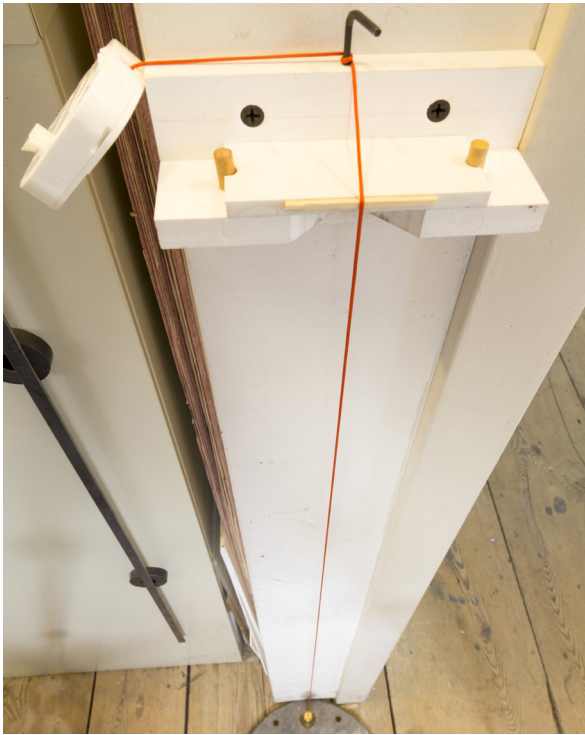


***Gravity - you can depend on it because it will always let you down precisely perpendicular to that equipotential surface.***

The photo above is a home made rig I use for 1 1/4" O.D. standard surveying staffs.

Regardless of what kind of rig you use, before diving into things too far, you'll want to note that because the rover staff is collapsible, the tube diameters vary so pay attention to which section of tubing is held for centering.

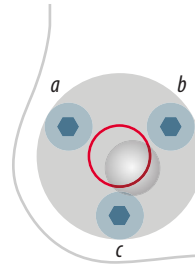
- ◆ ***Uppermost tube 1.425" (36.20 mm) O.D.***
- ◆ ***Next tube 1.273" (32.34 mm) O.D.***



Since I plan to hold the uppermost tube, the difference in radius from the standard 1 1/4" staff is 2.2 mm or just about the thickness of a match stick.

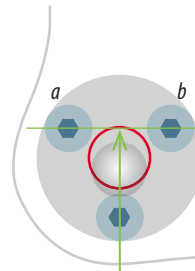
Drop a plumb line from the calculated center of the tube you're holding and mark the point on the floor (or 17-pound steel plate ;). If your shop is built on concrete piers like mine, you've no doubt have had to adapt to the seasonal movements of the walls and floors which noticeably impact such calibration efforts.

Using the 2.5 mm hex key, begin snugging up all three screws on the 40-minute vial with light even tension. Note that no compressible material; i.e., rubber disk is necessary between the bottom of the bore hole and the vial as the raised rounded nipple on the bottom of the vial pivotally accommodates the vial's proper adjustment.



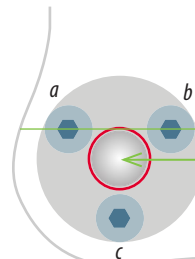
Remember as you begin tightening the screw that you're lowering the side being tightened.

Ideally, you'll end up placing all three screws in roughly the same amount of moderate tension.



*view perpendicular to a-b*

Stand viewing perpendicularly to the **a-b** axis as you tighten/ loosen screws **a** and **b** until the bubble's x axis is centered with the circle



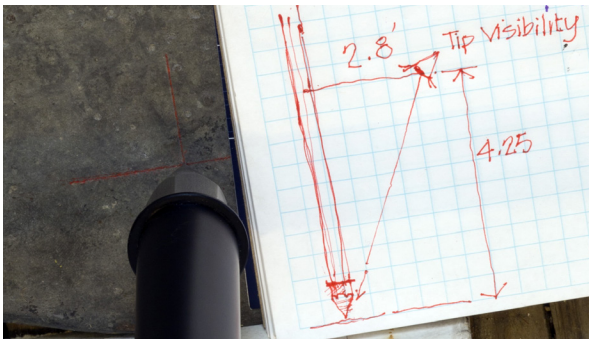
*view parallel with a-b*

Stand viewing parallel with the **a-b** axis as you tighten/ loosen screw **c** until the bubble's y axis is centered in the circle





As you tweak the screws on the vial, keep an eye on the other end of the staff to ensure that the bottom hasn't wandered off of your mark.



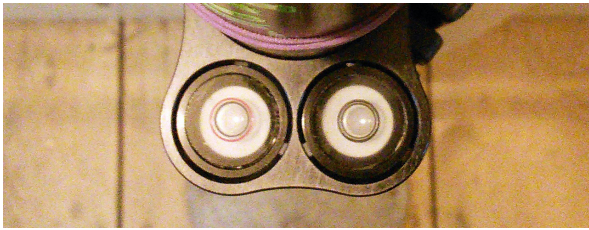
When you've finished calibrating the 40-minute vial, you'll be all warmed up to tackle the 8-minute vial. The procedure is identical; however, a more delicate touch is indispensable as this vial is much more sensitive to the smallest of adjustments.

Once you've gotten both vials adjusted, it is suggested that you check yourself using a small camera such as is available on your phone or tablet. The reason for this is because of parallax and it's difficult to get your eye directly over the bubble. Your smartphone or tablet's camera will often be close to its edge which will permit a superior vantage point and at the same time documenting your progress toward the finishing touches of your adjustment.



Camera centered over the 8' bubble for final tweaking.





View from above using the tablet's camera as the fine tuned adjustments are made during calibration of the 8' vial.

## Checking your HI



While you still have the staff plumb and secured to the wall, now is a good opportunity to do a quick check of the height with the survey tip in its present condition.

Using whatever measuring tool you have on hand, confirm that the graduation markings shown on the staff are being correctly read. There are times after extensive use, the survey tip will begin to wear down resulting in a value less than that represented by the graduations. This height check should be done periodically and whenever you change tips.



In this example, I was concerned with the results of reading the graduation markings after having rotated the up-

permost quick-flip lock. Note that in the photo on page 6 shows the lowest point on the lock as splitting the painted line at 1.620 m.

The Bosch laser is perfect for this exercise, but really a six-foot folding rule will adequately do the job. The cool thing with the laser is that the measurement can be done hands-free as well as recording the measurement to the tablet using Bluetooth communications.

Name	Value	Unit	Time	Date	Type	Manually created
Unnamed	1.6185	m	3:24 PM	4/1/2015	Length	No
Unnamed	1.6180	m	3:15 PM	4/1/2015	Length	No
Unnamed	1.6183	m	3:13 PM	4/1/2015	Length	No
Unnamed	1.6179	m	3:13 PM	4/1/2015	Length	No
Unnamed	1.6180	m	3:09 PM	4/1/2015	Length	No
Unnamed	1.6182	m	3:08 PM	4/1/2015	Length	No
Unnamed	1.6182	m	3:08 PM	4/1/2015	Length	No
Unnamed	1.6181	m	3:07 PM	4/1/2015	Length	No
Unnamed	1.6178	m	3:07 PM	4/1/2015	Length	No
Unnamed	1.6183	m	3:06 PM	4/1/2015	Length	No
Unnamed	1.6185	m	3:06 PM	4/1/2015	Length	No
Unnamed	1.6180	m	3:05 PM	4/1/2015	Length	No
Unnamed	1.6183	m	3:05 PM	4/1/2015	Length	No
Unnamed	1.6180	m	3:05 PM	4/1/2015	Length	No
Average	1.6182	m				

In this example, when reading the mark I split the graduation, the measured distance is short by about 0.0018m. This difference is good to know for future reference, but from a practical standpoint will be regarded as nil.

Whenever a *significant* difference between the measured height and the height shown by the marked graduations is observed, *J-Field* can help by accommodating for the difference using *Vertical Height Offset*.

Antenna

Internal >	Definitions >
Measured Height 5.315 ft	Slant <input type="radio"/> Vertical <input checked="" type="radio"/>
External (if connected) Unknown Antenna	Calibrate >
Vertical Height Offset 0.0 ft	
Antenna Input:	
Auto <input checked="" type="radio"/>	Int <input type="radio"/> Ext <input type="radio"/>
<span>Esc</span> <span>OK</span>	

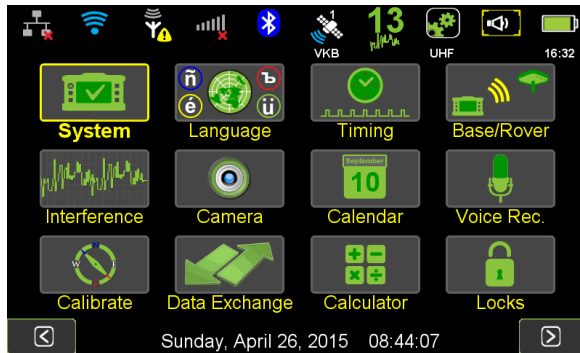
In *J-Field* (v1.10.3.22045), from Home screen1, Setup, Advanced, Antenna, **Vertical Height Offset**. Enter the offset value with attention to the algebraic sign.

Such customizations are saved to the current setup. This then makes it possible to use multiple rover poles with different Vertical Height Offsets, but you'll want to be sure and name or otherwise annotate those special setups which use Vertical Height Offsets to avoid mistakes and confusion.

## Enable Double Vial Detection

By default, *J-Field's* bubble detection software will be set to the single vial setting. When viewing the level bubble in the Action screen using the White Box **Level Vial Camera**, no indication will be given as to it being the left or right vial until you've enable **Double Vial Detection**.

In *J-Field* (v1.10.3.22045), from Home screen2, System, Customize, Double Vial Detection, **check the box**.



System

Receiver Details >	Versions >
Restore >	Connection Setup >
Customize >	

Esc

Customize

Long Click Time

Short <input type="radio"/>	Medium <input checked="" type="radio"/>	Long <input type="radio"/>
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Double Vial Detector ☒

Allow Browsing Files in Internal Memory ☐

Esc
OK

## Calibrating Level Offset

Once calibrated, your Javad Rover Pole can immediately be put to good use in Calibrating the **TRIUMPH-LS**'s Level Offset. If you haven't already done this on your **TRIUMPH-LS** and are unfamiliar with the process, think of it as taring a scale.

With the **TRIUMPH-LS** attached to the rover pole and plumbed up, initiate the calibration in *J-Field* (v1.10.3.22045), from Home screen1, Collect screen1, Quick Setup, Level Offset.

Tap **Click to center bottom camera on vial if any** to switch between the left and right vials. Confirm the staff is plumb and when ready, tap on **Calibrate**. That's it! You're ready for action.



Prj.2015-04-23 16.21.42	Control	NAD83(2011) / Maine CS200...
1. Project	2. Page	Coordinate System
DefTag	DefCode	---
3. Tag	Code	4. Code Attributes
Point13		5.315 ft
5. Point Name	6. Point Description	7. Antenna Height
Review	View	UHF RTK ...
		19:52
		Next

### Quick Setup (UHF RTK ROVER)

Start with Start Button	Stop After 20 epochs [A]
Only RTK Fixed	Verify [2] w/o V6 reset
Correct for Tilts	Revert Code to Tag default
Level Offset	What To Record
Advanced Settings	

Esc OK

### Calibrating Level Offset

Set receiver on a flat surface or plumb as shown on the picture and click "Calibrate" when ready to start calibration.

Click to center bottom camera on vial if any

Calibrate

Roll, Deg	0.53	-0.06
Pitch, Deg	0.07	-0.00

Esc

## Heads Up Bubble Display

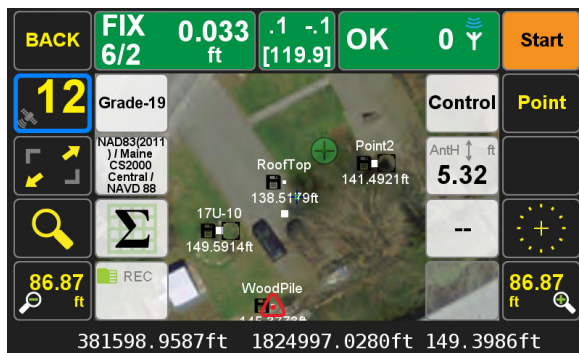
Many aspects of every shot taken with the **TRIUMPH-LS** are automatically documented and include a screen shot of the accepted point, including a photo of the level bubble.

To turn on the level vial display, from the Action screen, find an empty White Box. Alternatively, you can reassign any of the occupied spaces as you like. On the White Box intended for the level bubble display, press and hold for a moment (duration as determined by your **Long Click Time** setting) to bring up the **Show Statistics** menu of choices.

Note that values that are currently in use will be greyed out and the selected item will be highlighted in blue.

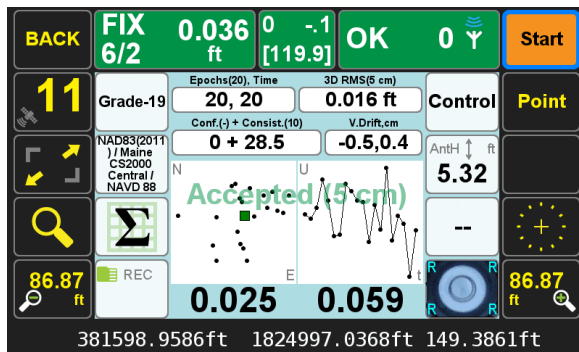
Tap on **Level Vial Camera**

Questions or comments? Please post them on the **Javad Support Forum** at: <https://support.javad.com/index.php>



Accept / Reject Statistics	Antenna Height	Attributes	Audio Record	Base/Rover Statistic
Bottom Camera	Code	Coordinate System	GNSS Epoch Recorded	Inclination
Level Vial Camera	None	Offsets	PDOP	Page
Photo Record	Point Description	Point Name	Recording Statistic	Review
Tag	Undo	VHor	VRMS	Verify Statistic

Esc









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