

FlowTracker2 Test Plan

Last update: 08/12/2017

The objective of the FlowTracker2 test plan is to describe the field data collection methods for verifying the functionality of the new FlowTracker2 handheld interface, FlowTracker2 desktop software, and compare discharge measurement data from the new FlowTracker2 to the original FlowTracker.

General

Prior to the making the first discharge measurement, the user should become familiar with the FlowTracker2. It is suggested that the tester simulate a measurement in the office to become familiar with the interface. Before completing any field testing always verify that you have the [latest version of the software](#). New versions of desktop software may often also contain new handheld firmware that should be uploaded to the FlowTracker2.

Comparison Site

Any site used for comparison measurements should be at an existing streamflow-gaging station.

Steady flow conditions should exist during the testing period; gage heights and discharges should be stable during the period.

Sites with stable stage-discharge ratings are most desirable.

Both the original FlowTracker and FlowTracker2 measurements should be made in accordance with all USGS methods, procedures, and policies.

Please take photos of the wading cross section, with tagline strung and a photo of bed material, if possible.

Discharge measurements

Both the original FlowTracker and FlowTracker2 will be mounted to a standard top-setting wading rod using the same type of offset-mounting bracket. If making consecutive measurements, it is best to use the same wading rod and offset bracket. Note, the FlowTracker2 probe has a recessed hole for a larger diameter set screw on the new SonTek "J" Bracket. If you are using an original J-Bracket make sure the set screw can be tightened on the probe to hold it securely and the probe level. The new style J-Bracket can be purchased from SonTek.

USGS users should ensure any original FlowTracker being used for the comparison has completed the scheduled quality assurance check at the HIF according to OSW 2010.02 (<http://water.usgs.gov/admin/memo/SW/sw10.02.html>).

The ADV sample volume extends about 10 cm or 4 inches to the side of the transmitting transducer. Care must be taken to note about where the sample volume is located when making a measurement;

for example, make sure the volume will not be striking any solid surface, including the bottom, rocks, leaves, or other debris.

Care should be taken to insure that the probe with the red band is facing downstream, and that probe is oriented correctly with regards to the tagline. An imaginary line drawn through the transmitting transducer, along the transmit beam, should be parallel to the tag line. The rod should be held level to prevent the sample volume from striking a boundary – it is suggested that a bubble level be used as a guide for the original FlowTracker. The FlowTracker2 has a level sensor built into the probe with an on screen display.

Special care should be made to minimizing the effect of any flow disturbance in the sample volume caused by the hydrographer standing in the water. It is important that the hydrographer stand "...in a position that least affects the velocity of the water passing the current meter. That position is usually obtained by facing the bank so that the water flows against the side of the leg. The wading rod is held at the tag line by the hydrographer who stands about 3 in downstream from the tag line and 1.5 ft from the wading rod." (Rantz, 1982, page 146). For these comparison tests as much attempt to verify the stance is similar for both the original FlowTracker and FlowTracker2 at each vertical. If possible, such as in narrow sections, the hydrograph should try to avoid standing in the stream.

SVMobile should be used to record measurement notes.

Remember to get an independent measurement of water-temperature near the FlowTracker probe head and recorded in the measurement notes. This is to confirm the FlowTracker is reading temperature correctly. Follow OSW 2010.07 (<http://water.usgs.gov/admin/memo/SW/sw10.07.html>).

Prior to each discharge measurement, the AutoQC test on the FlowTracker or FlowTracker2 should be completed and stored with the measurement. The QC test should be done in moving water with the sample volume away from any potential boundaries.

Both FlowTracker and FlowTracker2 discharge measurement will be preferably made by the same person – this is to minimize bias errors in reading depths and flow disturbance due to the person standing in the water from different people. However, if flow conditions are changing, it may be necessary to have two persons make the measurement nearly concurrently. Efforts should be made to conduct the tests during periods of steady flow so that this is not necessary.

USGS methods and policies for making wading Streamflow measurements will be followed. This includes vertical methods (0.6 or 0.2 and 0.8), number of stations, etc. For the vertical sampling methods, the six-tenths-depth (0.6) method should be used in depths 1.5 ft or less. For depths greater than 1.5 ft, the two-point (0.2/0.8) method should be used. If the velocity measurement at the 0.8 depth could be corrupted by the sample volume being located on or near a boundary, then, in this case a six-tenths method should be used. If a non-standard velocity profile is found while making a two-point velocity measurement (for example, the 0.8 depth velocity is greater than the 0.2 depth velocity or the 0.8 depth velocity is less than half the 0.2 depth velocity), a three-point method (0.2 depth, 0.6 depth, and 0.8 depth) should be used.

In accordance with OSW 2009.04 (<http://water.usgs.gov/admin/memo/SW/sw09.04.html>), no firmware or software mounting correction will be applied.

The same tag-line stations will be used for both the measurements. This will facilitate comparison of individual station data and error analysis.

If the original FlowTracker measurement departs from the gaging station rating by more than the percentage associated with the quality of the measurement (5 percent for good, 8 percent for fair), then a check measurement should be made according to USGS policy, unless the FlowTracker2 measurement confirms the comparison measurement (the FlowTracker2 measurement would serve as a check measurement in this case).

If the tests are performed at a site where the rating is not reliable (for example a new rating defined by several measurements, conditions are outside the rating range, or the ratings are consistently unstable) the difference between the FlowTracker2 and original FlowTracker measurement should be the criteria for whether or not a check measurement needs to be made.

The measurement file stored by each FlowTracker should be downloaded to the tester's PC and immediately backed up.

Documentation

For each comparison measurement, please create a zip file using the naming convention "FT2_Station_ID-MM-DD-YYYY.zip". Place any files created during the comparison (FlowTracker files, SVMobile file, photos, etc) in this zip file. USGS should submit the comparisons to the [Hydroacoustic Testing and Evaluation SharePoint site](#). Other agencies please contact Mike Rehmel (msrehmel@usgs.gov) to coordinate a method for sharing the file. Submit all documentation as soon as practical.

VERY IMPORTANT – please also supply any feedback about use of the FlowTracker2. Your feedback will be shared with the manufacturer for possible future upgrades or improvements. There is a [google form](#) available for USGS to help track issues and suggestions. Any additional feedback can be emailed to msrehmel@usgs.gov.

If problems occur or questions arise, please contact Mike Rehmel:

Mike Rehmel

5957 Lakeside Blvd

Indianapolis, IN 46278

317-600-2758