

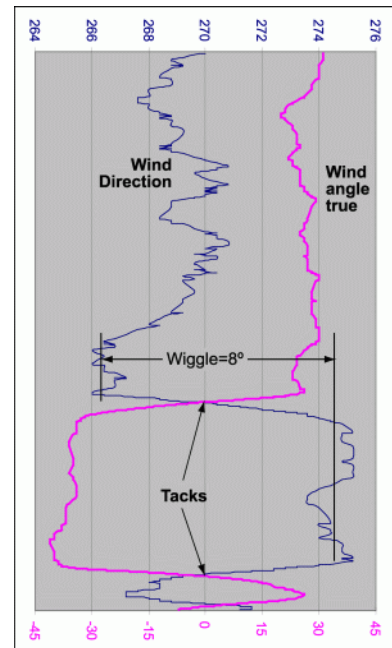
How to set up and use DeWiggler Analyst™

The most important mission of an instrument system is correctly reporting wind direction (see <http://www.ockam.com/functrue.html>). DeWiggler Analyst is an application and process for determining wind direction change due to tacking, and recommending adjustments to the instrument system's calibrations.

If lifts or headers occur every time you tack or gibe, there is a problem with the instrument calibration. DeWiggler records how much wind direction shifts with tacks or gibes. When the log files are processed, recommended changes are downloaded, and set into the instruments calibrations. This Wind Test is the definitive goal of DeWiggler.

To prepare for wind testing, there are two diagnostic tests and the essential Speed & Heading test. These tests ensure the instruments and the basic inputs (speed, heading and apparent wind) are working properly.

In addition to its calibration job, the wind test analyzes and displays the details of tacks – distance lost and various time markers. This analysis can be used to optimize your tacking process.



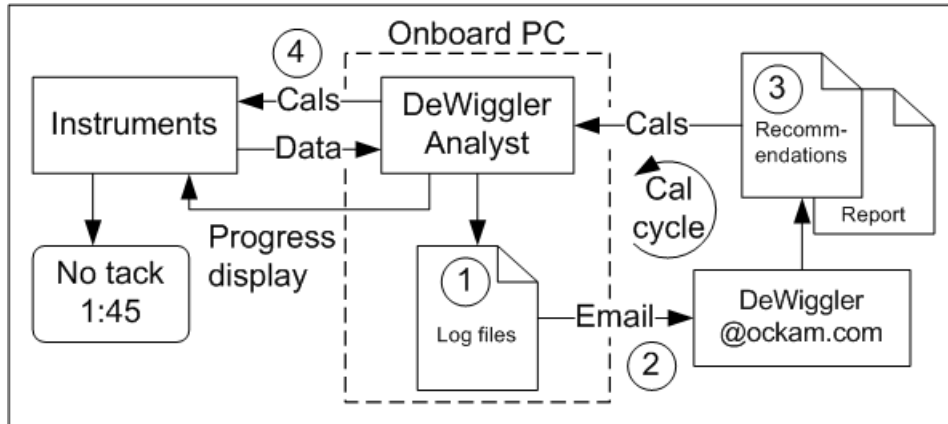
Available Tests

- Startup Checks** checks the instrument system for the required variables, whether calibrations are within range, and errors.
- Record Bus** logs a few minutes of the instrument output for debugging purposes.
- Offsets** adjusts boatspeed and apparent wind angle offsets.
- Speed & Heading** compares boatspeed and compass to GPS COG/SOG. Boatspeed, compass alignment and deviation table are produced.

Wind compares wind direction before and after tacks/jibes in order to recommend upwash and apparent wind speed calibrations.

How it works

The normal DeWiggler calibration cycle occurs via email.

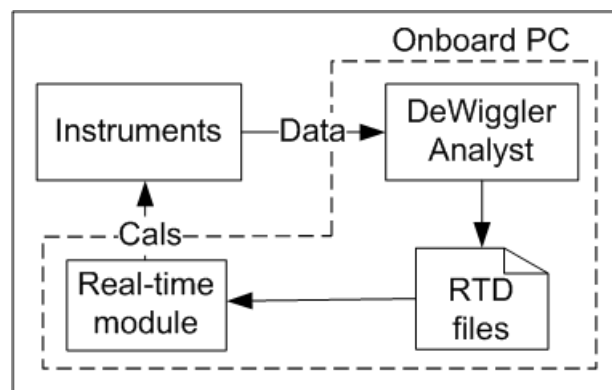


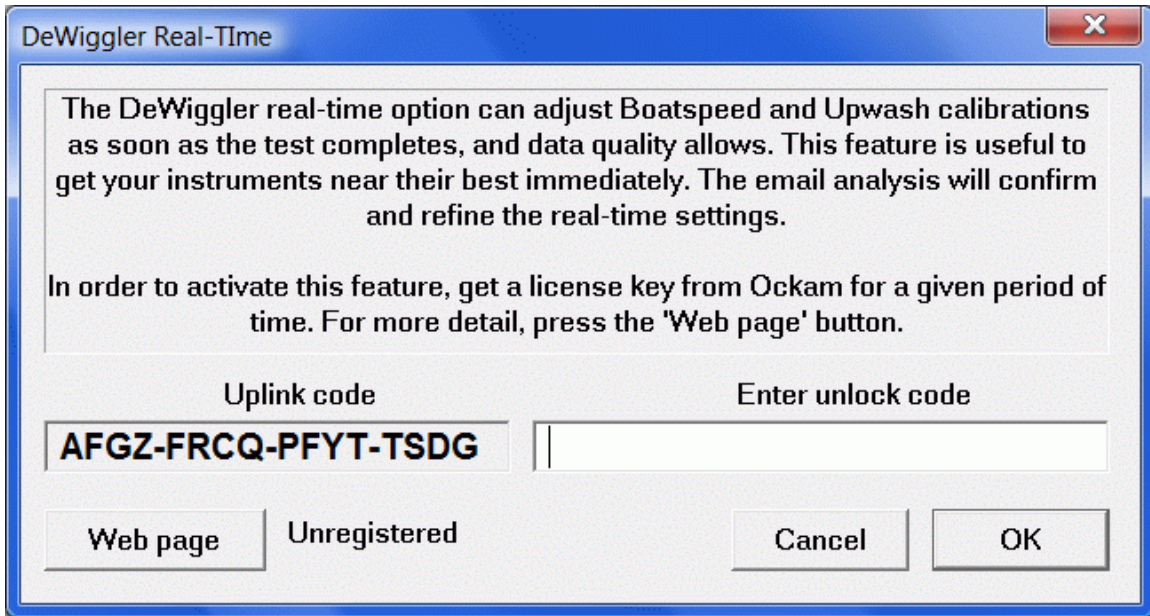
1. Tests are performed and logged.
2. Log files are emailed to Ockam for analysis.
3. A report and recommendations file are prepared and returned.
4. The recommendations file is dragged into DeWiggler, where they are applied to the instruments.

The calibration cycle takes a couple of days. If you need immediate results, you might consider using the real-time option.

Real-time DeWiggler

If you need results immediately, you can use this feature to apply test results as soon as they are completed. RTD adjusts calibrations as you sail (i.e. in real-time). This feature can adjust Boatspeed, Compass offset, windspeed and upwash calibrations as soon as the appropriate tests have been completed. At the end of each test or tack, RTD accumulates a new calibration record. You can review these records, delete outliers and apply the recommended calibrations once you have registered RTD.





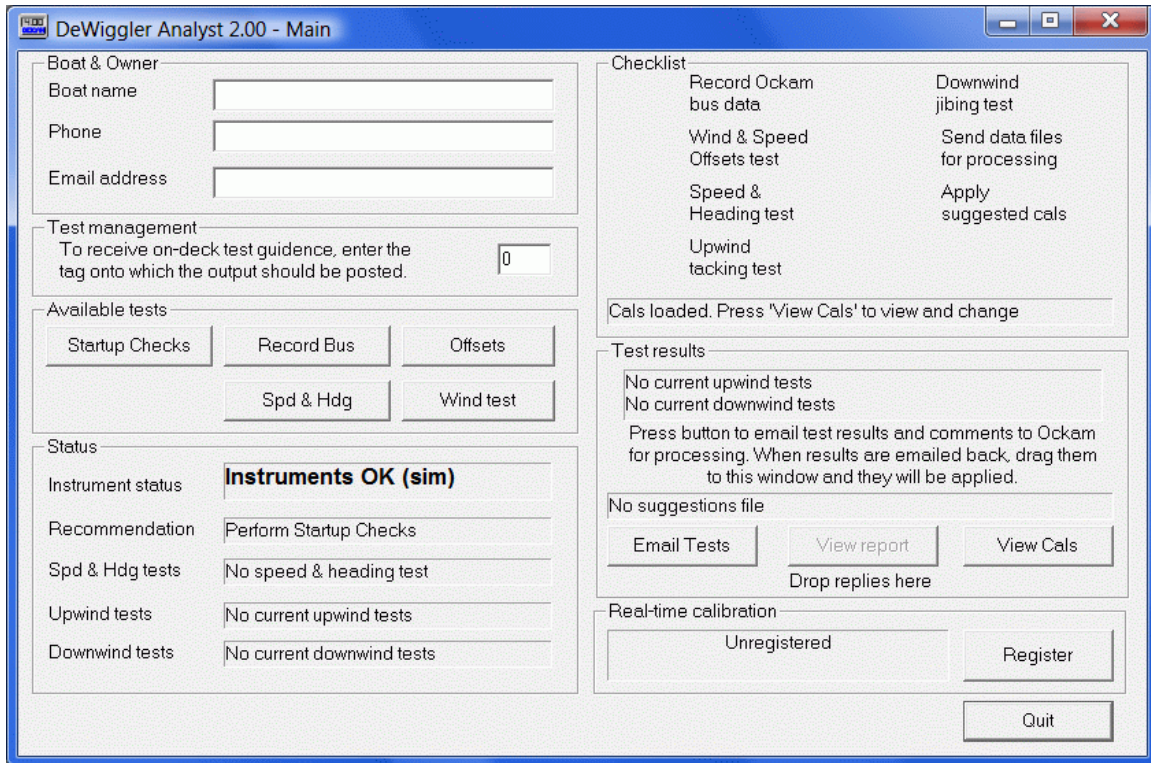
RTD uses an uplink/unlock mechanism to enable real-time calibration on the machine it's installed on for the number of **calibrating days** you specify. Your **calibrating days** decrement on first use of any of the 'Apply' buttons on a given day. You can continue to test and apply calibrations as many times as you wish on that same day. You can gather tests prior to your first calibration application for as long as you want.

In other words, **calibrating days** are how many days on which you can apply real-time calibrations.

RTD does not replace or preclude using DeWiggler Analyst normally (i.e. via email). RTD is an automaton after all. It might do things that a human would reject. For this reason, RTD should be considered a first step on the road to perfect instruments. It will get you within the ballpark in one day. After that, the normal human-filtered, well considered recommendations of normal DeWiggler will refine your calibrations.

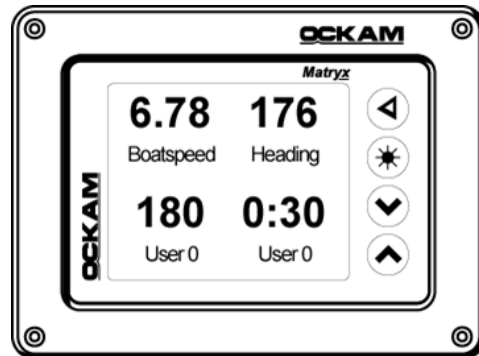
RTD also does not recommend upwash slope, which requires a range of true wind speed in order to be calculated. Therefore, after you have used RTD, you should email your tests in and get a final recommendation.

Setting up

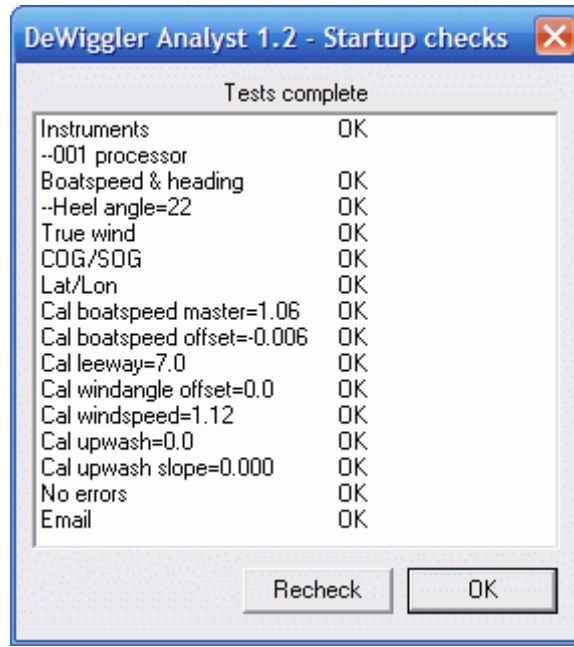


When you start DeWiggler, the setup screen appears.

1. Fill in the boat name (required). Phone and email are valuable but not required.
2. If you are not connected to a live instrument system, you can train by enabling the OS4 driver simulator (see below).
3. When you run DeWiggler Analyst, it checks current calibrations against any previous saved calibrations to ensure that new testing time is not wasted re-establishing calibrations. To review your calibrations, press the 'View Cals' button. This dialog gives you the opportunity to set previous calibrations to the screws (strongly recommended), or soft set saved calibrations back into the system.
4. DeWiggler can source a display to allow on deck monitoring. To enable output, set the test monitoring edit box to the desired tag. The default ("0") outputs to User 0.



Startup



When Analyst first starts, it checks the instrument system for the required variables, whether calibrations are within range, and errors. Some missing variables will prevent certain tests and features:

- If true wind is not available, the Wind test will be unavailable.
- If COG/SOG is missing, you will not be able to do the Speed & Heading test. COG/SOG is produced by the T1 GPS input or the 041 interface of the 001 system.
- If Lat/Lon is missing, the Speed & Heading test map will not be drawn, although the test will work. Lat/Lon is produced by the T1 GPS input or the 041 interface of the 001 system.

If you have issues with your instruments, it would be best to correct them before you begin testing.

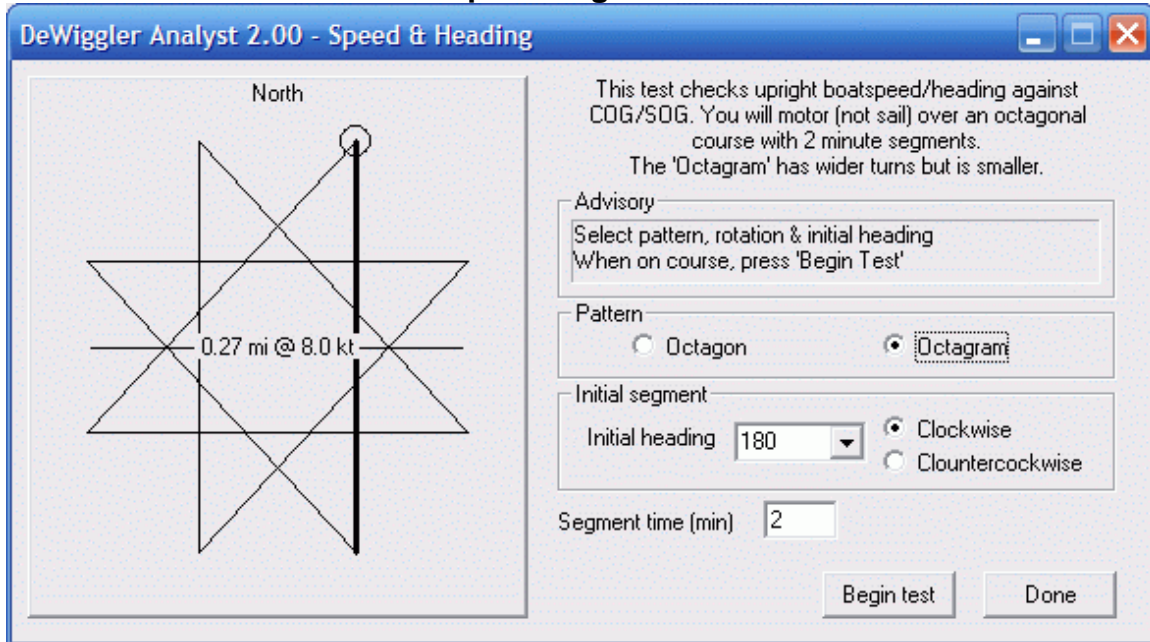
Testing boatspeed and heading

The Speed & Heading test compares upright boatspeed and compass against GPS COG/SOG. This test should be done under power in a location without current if possible. The test consists of 8 segments describing an octagon (or 'Octagram'), each segment lasting 2 minutes.

- Motor to a place where you can do an octagon approximately ¼ miles in diameter.

- Select a pattern, initial heading and rotation. The 'octagon' pattern has 45° turns but is bigger. The 'octagram' (shown) has 135° turns but is smaller.
- Steady up on your initial chosen direction and press Begin Test.

Spd & Hdg button

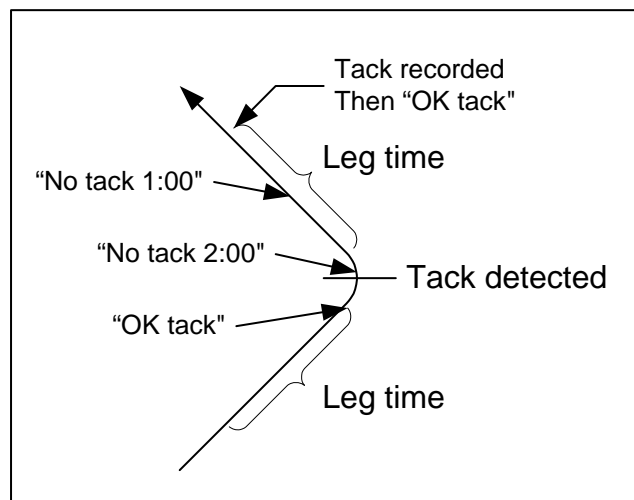


The dialog draws a schematic of the test with the chosen initial conditions highlighted, and an estimation of the diameter of the pattern based on your current boatspeed.

Testing for Wiggle

Wiggle is our term for wind direction change on tacking and jibing, and indicates incorrect instrument calibration. Wiggle is discussed in detail at <http://www.ockam.com/truwind.html>. Upwind wiggle is corrected by upwash calibration, while downwind wiggle is corrected by apparent windspeed calibration.

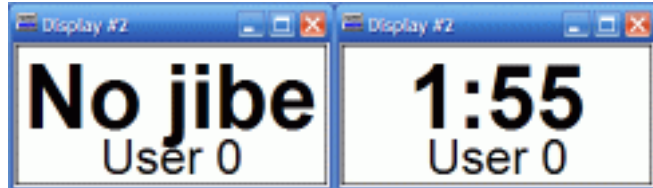
The wind test monitors your true wind angle. After you have been on a steady course (up or downwind) for LegTime, it recommends "OK tack" (or jibe). When the tack is detected, it records the previous leg, and recommends "No tack 2:00", counting down until LegTime after the tack has elapsed. At that time, the tack statistics are



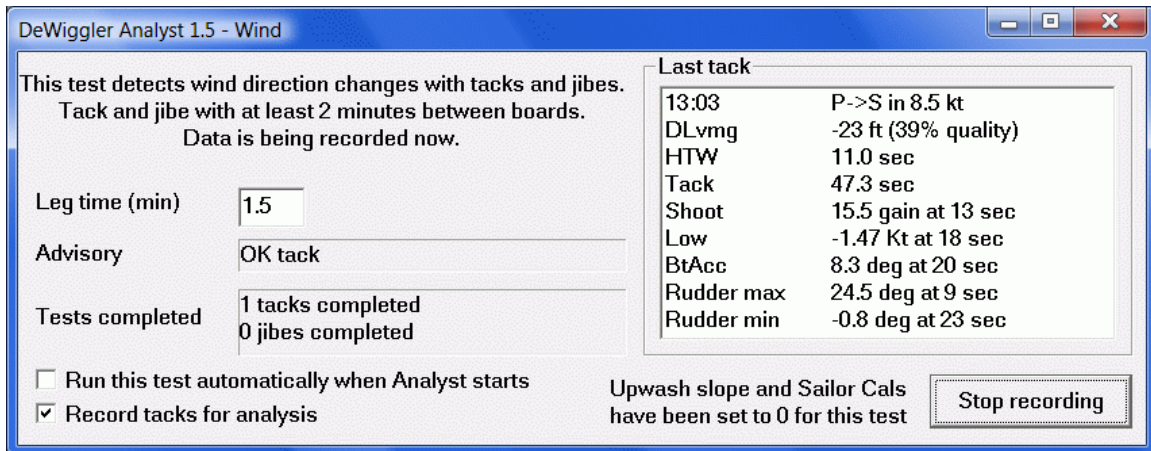
recorded, and it returns to “OK tack”.

“No tack” does not mean you can’t tack, jibe, round a mark or any other maneuver. If you do any of these things, the recording is merely aborted, and it waits for another steady state to develop.

You can keep tabs on what the wind test is doing by putting up the output tag (User 0 by default) on a graphic display.



Wind Test button



Here you see a wiggle test in progress.

The status line shows that we’re recording a tack where there is 1:30 left to go before you can tack.

Things to be aware of

- The wind test looks for a relationship between tacking and wind direction. When racing, it is an advantage to tack into a lift. When testing, this behavior would appear to be instrument miscalibration. The best test methodology is to tack regularly by the clock. Chances are the wind gods aren’t using the same clock.
- The setting for LegTime depends on the boat’s response time. If tacks are too close together, the wind direction disturbance due to tacking becomes most of the signal. If tacks are too long, the tacking ‘signal strength’ is reduced, and there is a greater chance that a big wind shift will come along and mess up the test.
- You should record as many tacks/gibes as possible, balanced between port and starboard. You should also test in a range of wind speeds to allow Upwash Slope to be recommended.

- If there is a lot of wind shear, it may adversely affect the test. If shear is more than 15 degrees, postpone the test until mixing makes things more normal.

Getting an analysis

By Email

When you have completed several tests, press the 'Email Tests' button to email the log files to Ockam for analysis. After analysis, a 'Recommendations.txt' file and a report file will be returned. Drag the recommendations file to DeWiggler, and its contents will be applied.

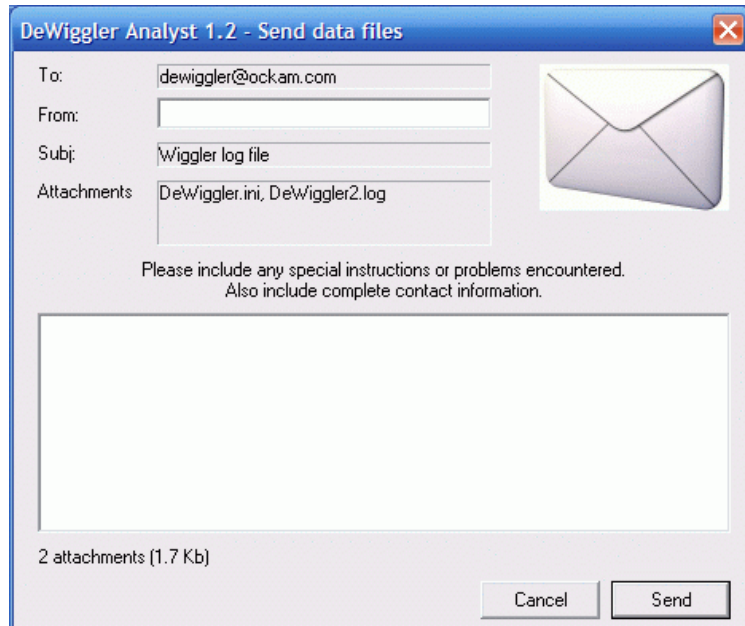
Then, when on the boat and attached to the instrument system, press the 'View Cals' button to review and set your calibrations.

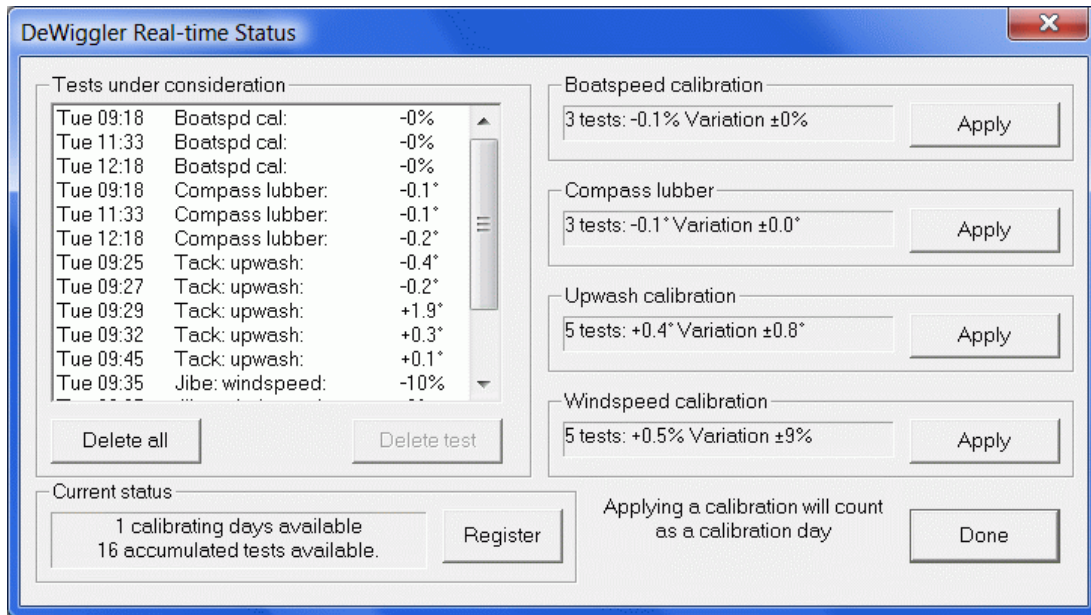
After this, it is usually a good idea to run another set of tests to confirmation the new calibrations.

By Real-time DeWiggler

In order to use Real-time DeWiggler (RTD), you must obtain an unlock key (see above). Once RTD is registered, each test is displayed on the RTD Status dialog. Boatspeed, Compass offset, Windspeed and Upwash calibrations are shown as soon as the appropriate tests have been completed. You can review these records, delete outriders and apply the recommended calibrations.

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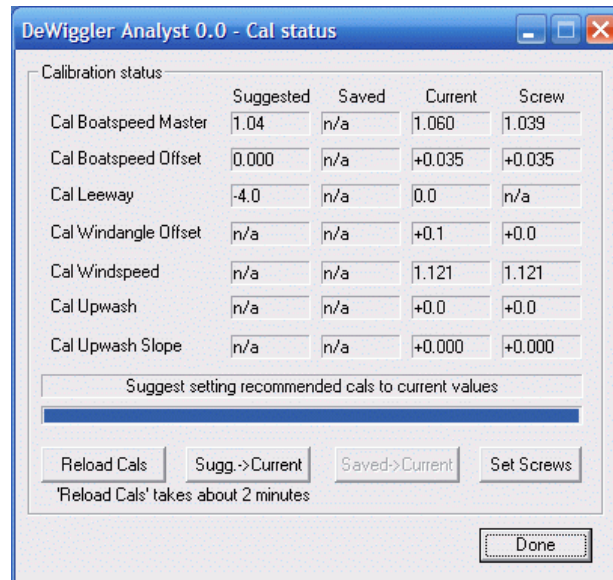




Viewing and setting Calibrations

Calibration recommendations, whether by email or RTD are displayed in the 'View Cals' dialog.

The Ockam system has 7 primary calibrations. For each one, there are 4 states:



Suggested These numbers come from the recommendations file. If no changes are recommended, the value is n/a. Suggested cals can be transferred to the Current state (soft cal).

Saved These are the numbers which were in effect during the last DeWiggler session. Saved cals can also be transferred to the Current state.

Current These are the current calibrations in effect. They can come from the screw cals, but are usually modified by software or a display (soft cal). Current cals can be transferred to the Screw cals by the Set Screws dialog.

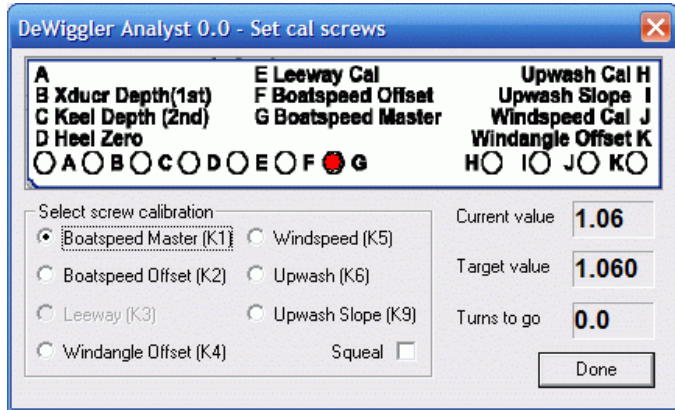
Screw The screw cals are set by hardware adjustments on the interface(s). Although they are a pain to set, they are very important to set to the correct value so that a system reset can instantly restore your carefully won calibrations.

DeWiggler suggests changes to the calibrations in effect when the tests are performed. These suggestions can be applied to the instrument system by the Set Screws dialog. These are set into the 'soft' calibrations, and possibly stored in the instrument's screw calibrations.

When DeWiggler starts, it checks saved calibrations against the current calibrations. After that, it is a good idea to review your calibrations in case they have changed. This prevents wasted time re-establishing calibrations already set in previous testing sessions.

Setting cals into the screws

Soft calibrations are vulnerable to modification and memory loss. The Ockam system has a hardware backup for most calibrations in the form of 'screw cals'. These are mechanical adjustors which are invulnerable to the whims of nature and man. If the time is taken to set your calibrations

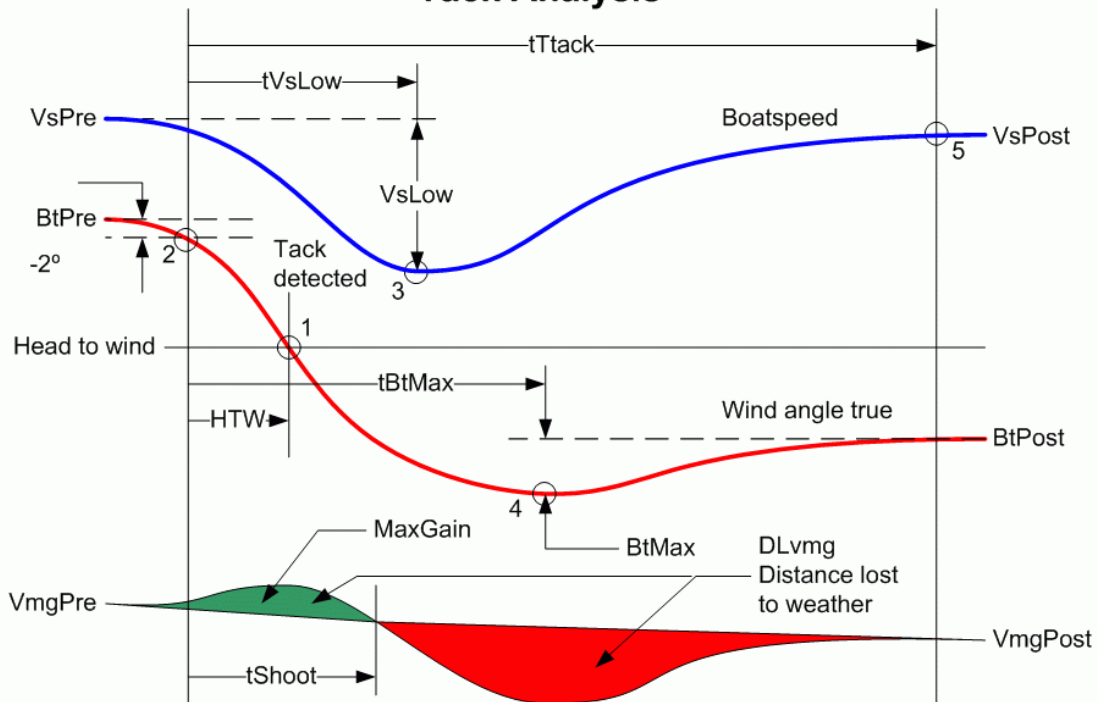


into the screws, your system can always be returned to correct settings from wherever they have wandered off to, with a master reset.

When you press the 'Set screws' button, the 'Set Cal Screws' screen appears to help you quickly adjust the relevant screw cal to the current soft value.

To help with single-handed adjustment, you can enable a tone ('Squeal') that rises in pitch the further away from the target you are. The tone is a long beep for "turn clockwise", a short one for "turn counterclockwise" and a steady tone for "yer there".

Tack Analysis



Analyst also calibrates boatspeed and compass by comparing them against COG/SOG. For this speed & heading test, you motor over an octagonal course about ¼ mile in diameter.

Using the OS4 simulator

You can use OckamSoft 4 to train in using DeWiggler.

- OS4 (<http://www.ockam.com/os4>) should have already been installed.
- Run the driver, and bring up the driver dialog (click on the gray icon in the "tray").
- Check that you have a polar file installed (OS4 Polar tab). If not, press Select and find the polar that comes with OS4.
- Go to the Simulator tab and check Enable.
- In the Course group, select WindLwd and press Reset. This gives you 100% DeWiggler fodder. Leave the simulator dialog up so you can Tack the simulator when you want to.
- Start DeWiggler. Wait for the "Reading Cals" to finish, then press "Wind Test".
- After a couple of minutes on the initial tack, press the Tack button on the simulator tab. The boat will tack. Repeat as desired.