

WinFrog Device Group:	PLOW
Device Name/Model:	Seamole2
Device Manufacturer:	Bolle & Cords Elektrotechnik GmbH Gewerbestr. 16 D-25358 Horst Germany Tel: 04126-38812 Fax: 04126-38813 Email: info@bolle-cords.de
Device Data String(s) Output to WinFrog:	See Telegram Specification section below
WinFrog Data String(s) Output to Device:	
WinFrog Data Item(s) and their RAW record:	PLOWDATA 490 ROV REF VEH NONE COUNT 492

DEVICE DESCRIPTION:

This driver requests plow related data from the Seamole device. It is also used for deriving real-time positions for the Seamole. As can be seen in the Decoded Data tab in the I/O Devices window, this driver reads more data than it's predecessor Seamole1.

DEVICE CONFIGURATION INSTRUCTIONS

WINFROG I/O DEVICES > EDIT I/O:

Serial
Configurable Parameters

WINFROG I/O DEVICES > CONFIGURE DEVICE:

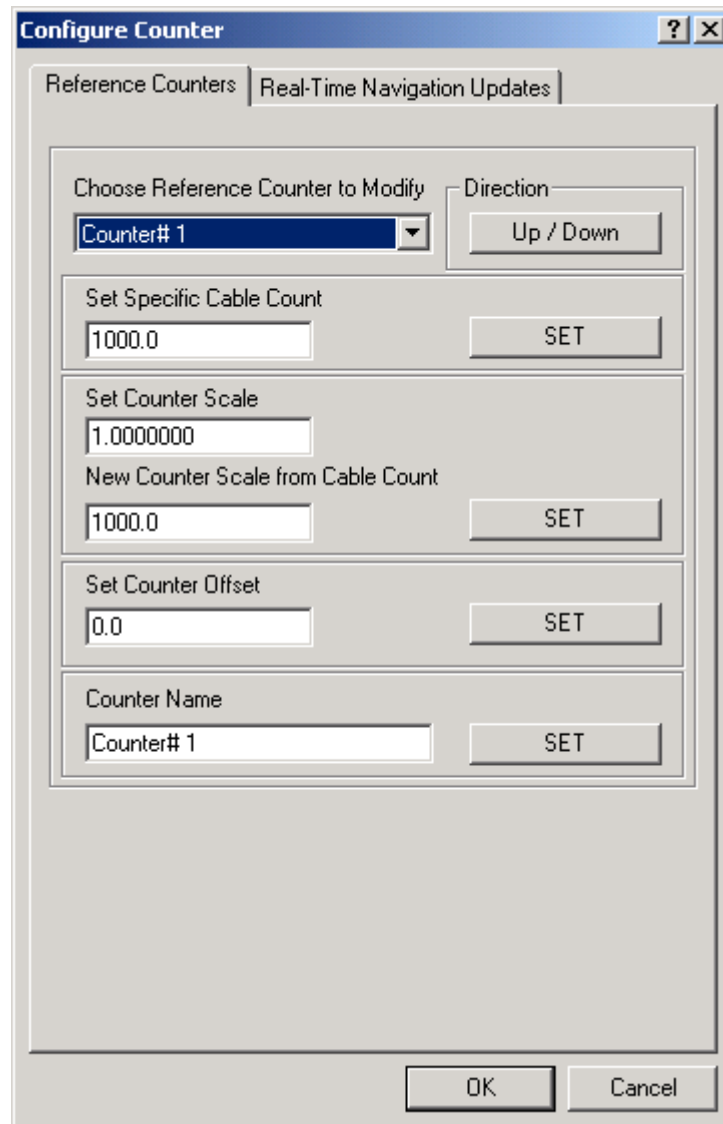
No configuration is required at the I/O Device window level.

WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:

Adding the Seamole2 device creates three data items: COUNT, PLOWDATA and ROV REF VEH. Once the data items have been added to the vehicle, they must be edited to suit the application.

Data item: ROV, Seamole2, COUNT

Highlight this data item in the vehicle's device list and click the Edit button to open the Configure Counter dialog box as seen below.



The image shows a 'Configure Counter' dialog box with two tabs: 'Reference Counters' and 'Real-Time Navigation Updates'. The 'Reference Counters' tab is active. It contains several sections for configuring a counter:

- Choose Reference Counter to Modify:** A dropdown menu showing 'Counter# 1'.
- Direction:** A button labeled 'Up / Down'.
- Set Specific Cable Count:** A text input field containing '1000.0' and a 'SET' button.
- Set Counter Scale:** A text input field containing '1.0000000'.
- New Counter Scale from Cable Count:** A text input field containing '1000.0' and a 'SET' button.
- Set Counter Offset:** A text input field containing '0.0' and a 'SET' button.
- Counter Name:** A text input field containing 'Counter# 1' and a 'SET' button.

At the bottom of the dialog are 'OK' and 'Cancel' buttons.

Reference Counters tab

This tab is used in conjunction with the Calculations window to maintain up to five reference counts based on the Channel One (cable) count. These reference counts are not used for any real-time calculations and are not logged to any file; they are intended for reference purposes only.

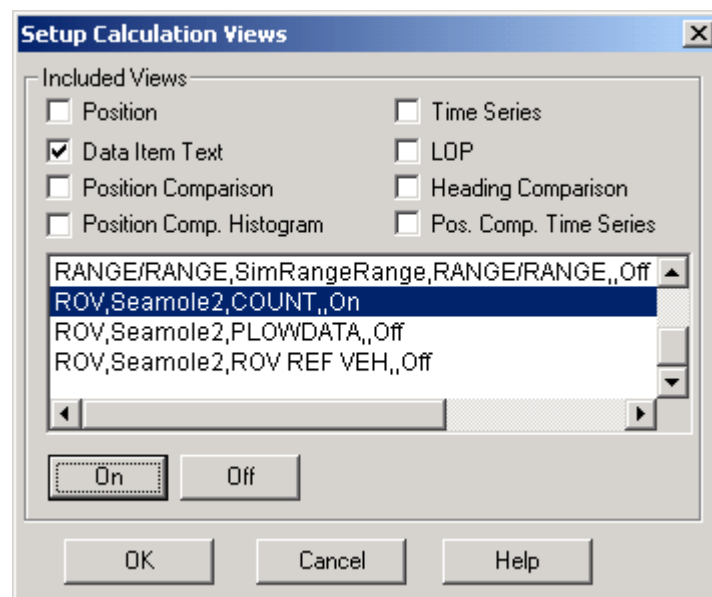
One common use for the Reference Counters tab is to have a 'count down' between cable body deployment. This is accomplished by entering the cable spans between

cable bodies in the 'Set Specific Cable Count' field(s), selecting the 'Direction' as 'Down' and exiting with OK when the first cable body is launched.

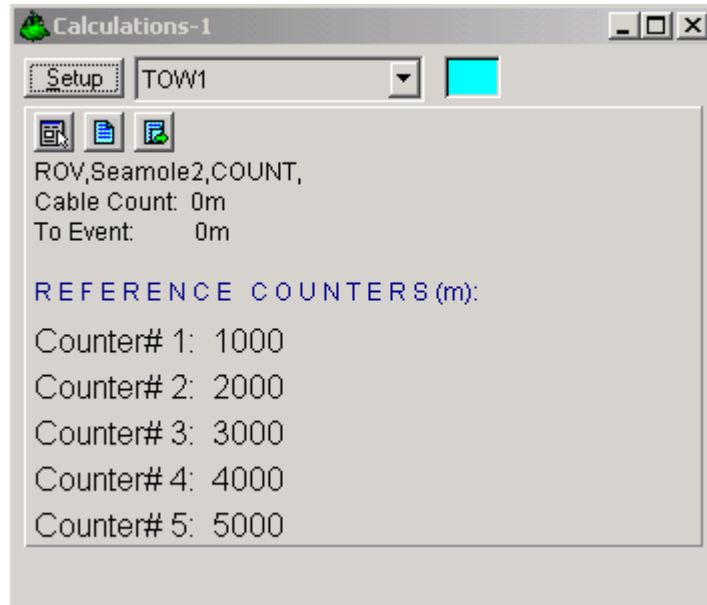
View and configure the Calculations window (shown below) by completing the following steps.

Note: To view the reference counts, the COUNT data item must be attached to the vehicle.

1. Select View > Calculations from the main menu to open the Calculations window.
2. In the Calculations window, click the Setup button to open the Setup Calculation Views dialog shown below.



3. In the Setup Calculation Views dialog, select the Data Item Text checkbox. Then to turn On the COUNT data item, select the COUNT data item from the list and click the On button.
4. Click OK and a Calculations window, with the reference counter information displays as seen below.



Once the Calculations window has been opened and configured, the five reference counters can be modified using the Reference Counters tab of the Configure Counter dialog. (Note: the Configure Counter dialog can be directly accessed from the Calculations window by clicking the  icon in the Calculations window.)

The Reference Counter tab allows the reference counters to be modified in a number of ways, as described below. Start by selecting the reference counter you want to modify from the dropdown list box at the top of the page.

Direction

When the *Up/Down* button is not depressed, the reference count will increase if the input cable count increases and decrease if the input cable count decreases. When the *Up/Down* button is depressed, the reference count will decrease if the input cable count increases and increase if the input cable count decreases.

Set Specific Cable Count

To set the reference counter to a specific cable count, enter the desired value in the edit field and click the *Set* button. When you click the Configure Counter dialog OK button, the desired reference counter value will be set to the entered value. This value will then continue to increment or decrement based on the input cable count and the current settings for the reference count.

Set Counter Scale

To change the scale at which the reference count will increment or decrement relative to the input cable count, enter the desired scale factor into the scale field. Leave the *New Counter Scale from Cable Count* value at its present value to apply the scale from the current point onward. Enter a count value into the *New Counter Scale from Cable Count* field to apply the scale from a previous count value onward.

Once the desired scale factor and count value is entered, click the *Set* button and then click the *OK* button.

Set Counter Offset

To set an offset from the input cable count to the reference count, enter the desired value into the Set Counter Offset field, click the *Set* button and then click the *OK* button. This value will be added to the input cable count.

Counter Name

To change the reference counter name, enter the desired name into the *Counter Name* field. Click the *Set* button and then the *OK* button to enter the change.

Real-Time Navigation Updates tab

The screenshot shows the 'Configure Counter' dialog box with the 'Real-Time Navigation Updates' tab selected. The dialog has a title bar with a question mark and a close button. Below the title bar are two tabs: 'Reference Counters' and 'Real-Time Navigation Updates'. The 'Real-Time Navigation Updates' tab contains several sections:

- Interval:** A text box containing '1.0 s' and a label 'Enter Raw Data File Logging Interval in Seconds, 0=All Data'.
- Channel 1 (Telephone / Power Cable):** A group box containing three checked checkboxes: 'Cable Count', 'Payout Speed', and 'Tension'.
- Channel 2 (Tow Cable):** A group box containing three checked checkboxes: 'Cable Count', 'Payout Speed', and 'Tension'.
- Channels 3,4,5 Tension:** A group box containing three unchecked checkboxes: 'LCE Tension (Channel 3)', 'CDE 1 Tension (Channel 4)', and 'CDE 2 Tension (Channel 5)'.
- General:** A group box containing two unchecked checkboxes: 'Distance to Event' and 'Cable Angle'.

At the bottom of the dialog are 'OK' and 'Cancel' buttons.

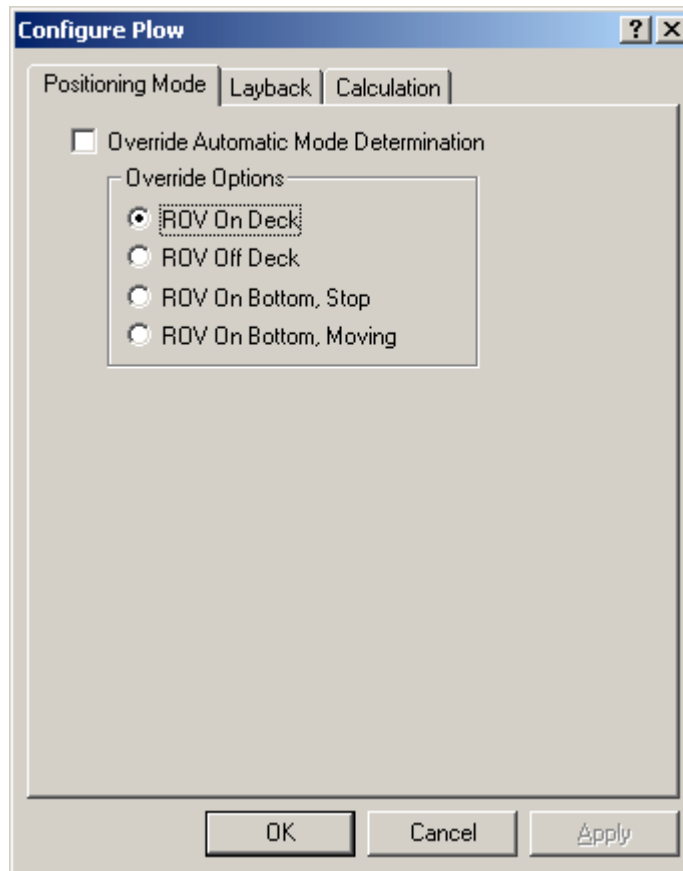
This tab enables/disables certain data from this device to be passed to the vehicle. Unlike the Reference Counters tab, data from the Real-Time Navigation Updates tab can be logged to the raw files if this data item is associated with a vehicle. This allows the vehicle to have more than one COUNT data item without one conflicting with the other. One COUNTER device may provide the telephone cable count while the other provides the tow count. If a checkbox is selected, the data value will be passed to the vehicle. For example, if the *Cable Count* checkbox is selected in the *Channel 1* section, then the cable count from the input device will be passed to the vehicles channel 1 count.

The *Interval* section sets the data logging interval used when the “With Events” Logging Control option is selected (refer to chapter 10 of the WinFrog User’s Guide for more information).

Data item: ROV, Seamole2, PLOWDATA

This data item is used to read plow related data as well as to provide a reference point on the plow for positioning the plow relative to the ship. It is typically added to the plow vehicle in WinFrog.

Highlight this data item in the vehicle’s device list and click the Edit button to open the Configure Plow dialog box as seen below.



Positioning Mode tab

Override Automatic Mode Determination:

This checkbox determines whether WinFrog automatically determines the towed vehicle location and mode or whether the operator determines it.

When in automatic mode, WinFrog uses the following criteria to determine the mode of the towed vehicle:

ROV On Bottom, Moving is assumed if the speed is greater than .2 knots or the Use ROV Speed setting is off and the layback is calculated at more than 1 meter.

ROV Off deck is assumed if the speed is greater than .2 and the layback is calculated at less than 1 meter and the altitude is greater than 4 meters.

ROV On deck is assumed if the speed is 0 and the layback calculated is less than the sum of the depth offset entered on the Calculations tab and the Tow point above water entered on the ROV REF VEH dialog.

ROV On Bottom, Stopped is assumed if none of the others are true.

Override Options:

ROV On deck places the towed vehicle on the tow vessel 5 meters forward of the offset point entered in the ROV REF VEH dialog.

ROV Off deck places the towed vehicle on the tow vessel at the tow point, which is the offset point entered in the ROV REF VEH dialog.

ROV On Bottom, Stop leaves the vehicle where it was when this option was selected and makes no further calculations as to its position.

ROV On Bottom, Moving calculates the towed vehicle's position using the data available and updates all displays with this data.

The screenshot shows the 'Configure Plow' dialog box with the 'Layback' tab selected. The 'Positioning Mode' tab is also visible. The 'Layback Calculation Method' section has two radio buttons: 'Pythagorean' (selected) and 'Catenary'. To the right of these is a text box for 'Tow Cable Constant' with the value '73.29051' and the unit 'N/m'. Below this are three sections: 'Use ROV Depth' with 'Yes' and 'No' radio buttons ('No' is selected), 'Use ROV Speed' with 'Yes' and 'No' radio buttons ('No' is selected), and 'Use ROV Tow Angle' with 'Yes' and 'No' radio buttons ('No' is selected). To the right of these is a 'Trench Depth' section with a text box for 'Offset' containing '0.0cm'. At the bottom are 'OK', 'Cancel', and 'Apply' buttons.

Layback tab

Layback Calculation Method

Pythagorean uses the depth and cable count to form a right triangle. The layback is then calculated and applied to the tow vehicle's offset position along with an azimuth based upon the previous towed vehicle's raw position. WinFrog will use this position to calculate an azimuth but use the calculated layback for the distance between the towed vehicle and the tow vehicle.

The right triangle is formed thus: the hypotenuse is the cable count and the vertical value is the sum of the depth, Tow Point Above Water and the z offset found on the Calculations tab.

Catenary requires the weight of the cable in newtons/meter, (1lbs/ft = 14.63nt/m). This calculation uses the cable count, depth of the towed vehicle and the tow tension to calculate the layback using a static catenary model. The azimuth used is the same as described above.

Use ROV Depth

Yes causes two actions:

- 1) The depth obtained from this device will be added to the depth offset and assigned to this vehicle. The depth offset is entered in the Calculation tab. The depth obtained from this device is either the manually entered value (if applicable) or the depth from one of the data items from the selected device.
- 2) The depth obtained from this device is used to determine the layback. No offset is applied except which may be applied at the source device.

No causes the depth for the layback calculation to be obtained from the vehicle. Essentially, this means the depth must be assigned by another device. This overrides the selection of a device or manual entry of depth.

Use ROV Speed

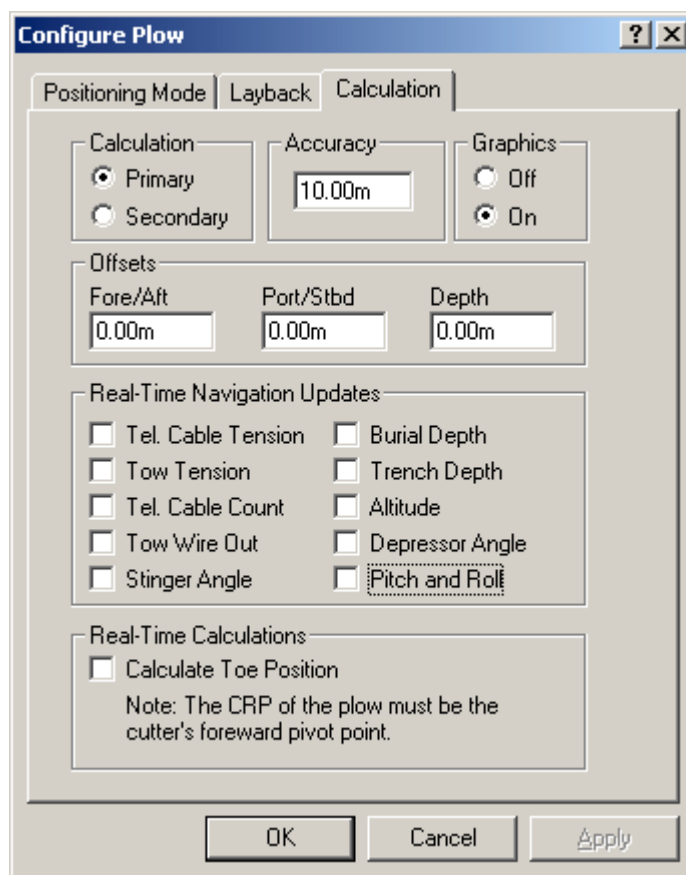
Yes causes the speed of the device to be obtained from this device. This requires that the towed vehicle in use must have the ability to output a speed in its data string. If it does not, then select No. **No** causes the speed to be calculated from the positional information and time. It will be assigned to the vehicle.

Use ROV Tow Angle

This option only applies to the SeaplowVIII Device.

Trench Depth

Offset – If the Trench depth checkbox is selected on the Calculation tab (see below) then this value, 0.0 or otherwise, will be assigned as this vehicle's trench depth.



Calculation tab

Calculation

Primary – when selected, the layback described above will be used to calculate this vehicle's position, which will be assigned to it.

Secondary – when selected, this device will not determine this vehicle's position.

Accuracy

The Kalman filter uses this value as a weight factor. It should be set to a reasonable value.

Graphics

Select the On radio button to display a square in the Graphics and Bird's Eye windows at the offset position below.

Offsets

The **Fore/Aft** and **Port/Stbd** offset point is the reference point for the layback distance. Essentially the lay back distance is the distance between this point and the offset point of the tow vehicle described in the **ROV, Seamole2, ROV REF VEH** section. This can also be viewed as the beginning or 0 point of the tow cable. This offset point is from the towed vehicle's CRP to the tow point.

Depth is an offset from the CRP. It is applied in several different ways:

- 1) If **Use ROV Depth** is set to **Yes** (on the Layback tab) this value is added to the depth from this towed vehicle device and assigned to the vehicle's depth. See Use ROV Depth on the Layback tab above.
- 2) If the Pythagorean solution is selected, this value is added to the vehicle depth and the Tow Point Above Water value to get the vertical portion of the right triangle when computing the layback.
- 3) If the catenary solution is selected, this value is not used in the model.

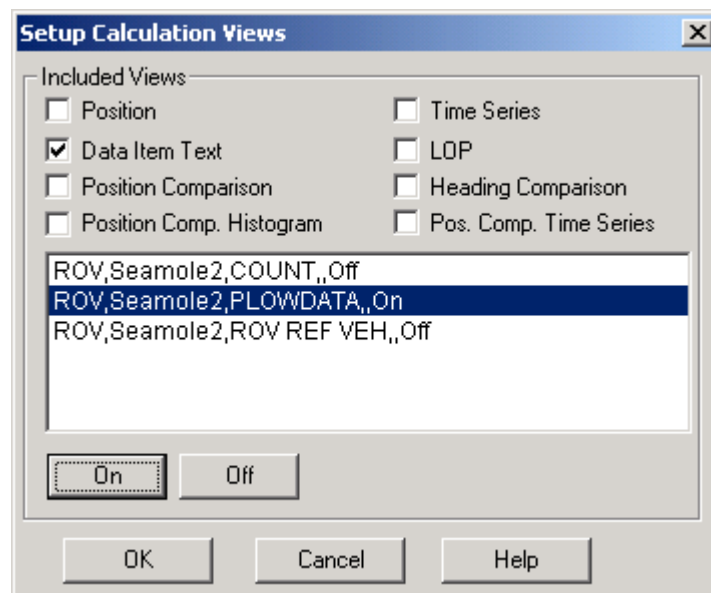
Real-Time Navigation Updates

Most Plow devices have the ability to provide real-time data updates via an umbilical. The Decoded data tab in the I/O Devices window will indicate what data is updated in real-time for each device. You should only select the boxes for data output by the device, as leaving these boxes checked causes data to be assigned to the vehicle. If the device does not output a particular type of data, 0 will be assigned for each item left selected and this will cause values from other devices to be overwritten.

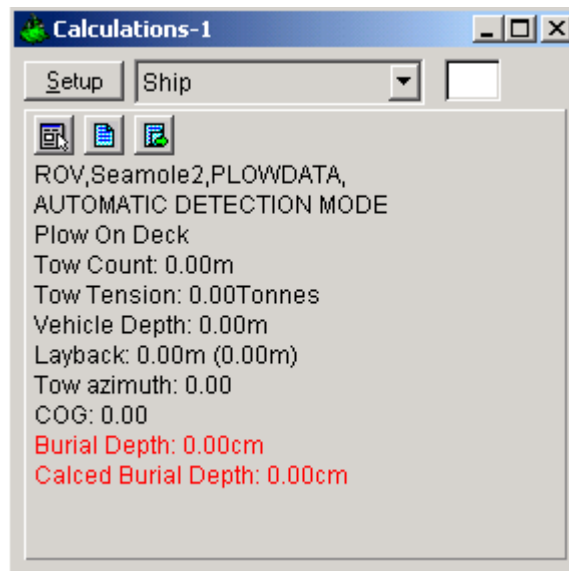
Real-Time Calculations

Calculate Toe Position – this option only applies to the Smart Cutter plow device.

The results of the above configurations are typically viewed in a Calculations window. To display the Calculations window, select View > Calculations from the main menu. Select the appropriate vehicle from the dropdown list and click the Setup button. Select **Data Item Text** and turn the data item **ROV, Seamole2, PLOWDATA** on by highlighting it and clicking the **ON** button as seen below.



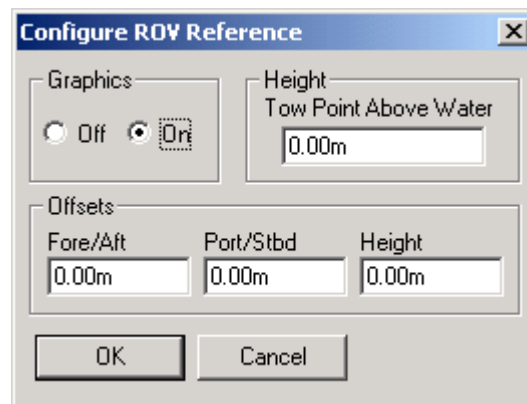
Exiting with OK will display the Calculations window as seen below.



From this window, you can monitor some of the input data as well as the layback calculation. This Calculation window also provides a shortcut to the Configure Plow dialog box by clicking the  button.

Data item: ROV, Seamole2, ROV REF VEH

This data item is attached to the vehicle in WinFrog that has a real-time positioning source (DGPS, etc.), typically the ship. This vehicle with its known position serves as the reference point for determining the Plow's position. Highlight this data item and click the Edit button to open the Configure ROV Reference dialog box seen below.



Graphics:

Select the On radio button to display the device name and a square at the location of the ROV, within the Graphics and Bird's Eye windows.

Tow Point Height:

The height of the tow point above water is added for layback calculations only if a towed vehicle model is used.

Offsets:

The X,Y,Z Offsets are applied from the CRP to the tow point (usually the winch) on the ship. These values are set similar to values that would be applied to any device offset within WinFrog. Note that the Height Offset is not used for operations involving plough vehicles.

Note: It is advised to use the waterline as the vertical CRP reference when sub-sea positioning devices are employed.

TELGRAM SPECIFICATION:

The data telegram from the Seamole consists of;

Field Data

- 1 \$SEAMOLE
- 2 portPull
- 3 stbdPull
- 4 asLaidTension
- 5 depHeight
- 6 pitch
- 7 roll
- 8 subDepth
- 9 heading
- 10 altitude
- 11 shipTowOut
- 12 shipTowTen
- 13 telTension
- 14 telCount
- 15 telSpeed
- 16 burialDepth