WinFrog Device Group:	**GPS**
Device Name/Model:	**IMCA TELEMETRY**
Device Manufacturer:	
Device Data String(s) Output to WinFrog:	Operator configured, see Device Description below
WinFrog Data String(s) Output to Device:	Operator configured, see Device Description below
WinFrog Data Item(s) and their RAW record:	POSITION 303 HEADING 409 ATTITUDE 413 COUNT 492 BOTTOMDEPTH 911 ROVDATA 496 PLOWDATA 490 LINETRACK FAIRLEADS IMCA TELEMETRY

DEVICE DESCRIPTION:
The IMCA Inter Vessel Telemetry device driver message specification is designed to allow multiple sets of data to be transmitted using a single configurable message string. All messages use a NMEA like header, are comma delimited and use the NMEA checksum. The exception to this specification is when a specific set of data is required. (e.g., an anchor spread). In this case, a specific message would be used. See the document “description of IMCA Inter Vessel Telemetry specification.doc” for a complete description of the specification.

The current implementation of this interface is designed to transmit and receive telemetry data from any number of vessels.

DEVICE CONFIGURATION INSTRUCTIONS

WINFROG I/O DEVICES > EDIT I/O:
Serial
Configurable Parameters

WINFROG I/O DEVICES > CONFIGURE DEVICE:
This device must be configured at the I/O Device window level. In the I/O Devices window, click the device name to select it, then right-click and select Configure Device. The IMCA TELEMETRY Configuration dialog box appears, as seen below.

The IMCA TELEMETRY device has multiple configurations at the device level:

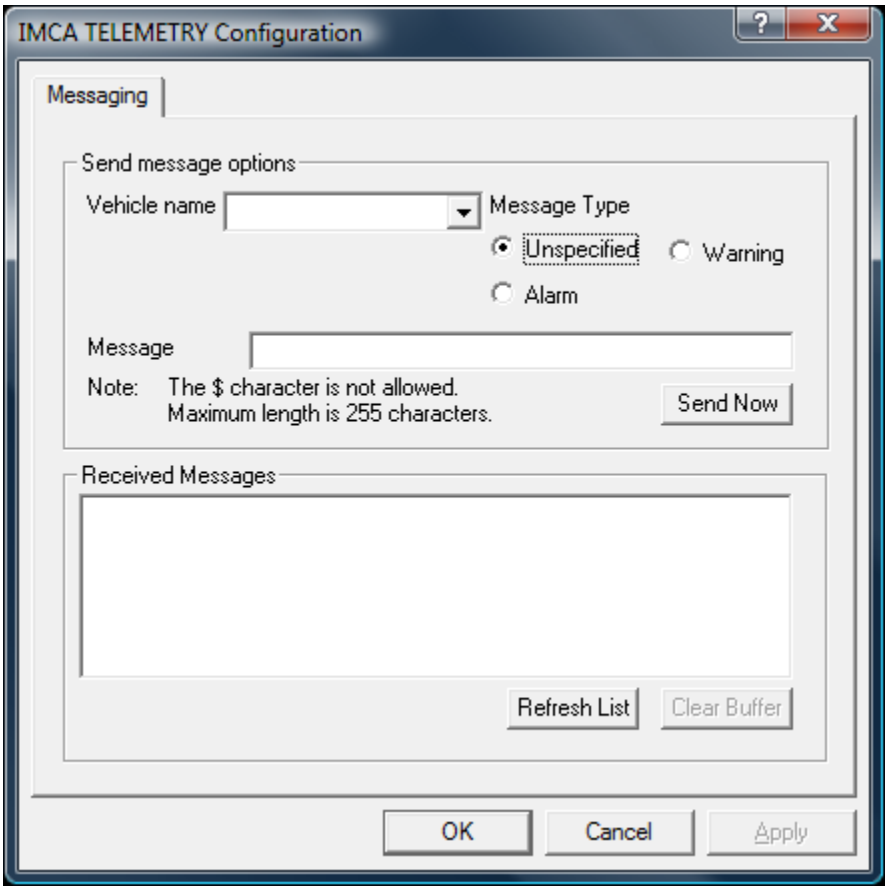
Messaging Tab:
Enter message in the message window and click '***Send Now'***.

Any received messages will pop up in the WinFrog program and will be added to the '***Received Messages***" list box.

Click '***Refresh List***' to refresh the list of messages and click '***Clear Buffer***' to clear the list of messages.

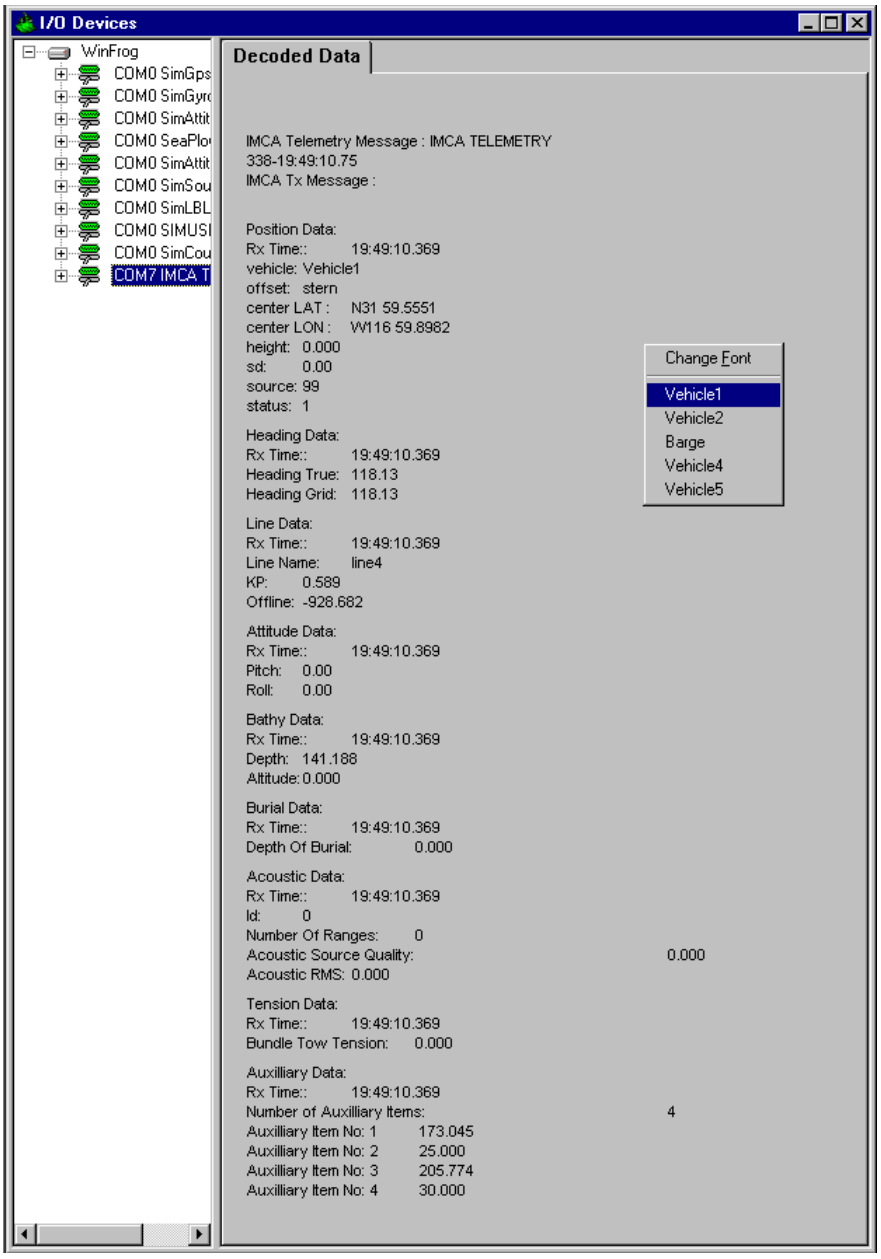
See notes below regarding the use of the data type needed for this portion of the driver to function.

You can also specify the priority of the message to be sent by selecting one of the three options in the Message Type area.



Viewing of decoded data:

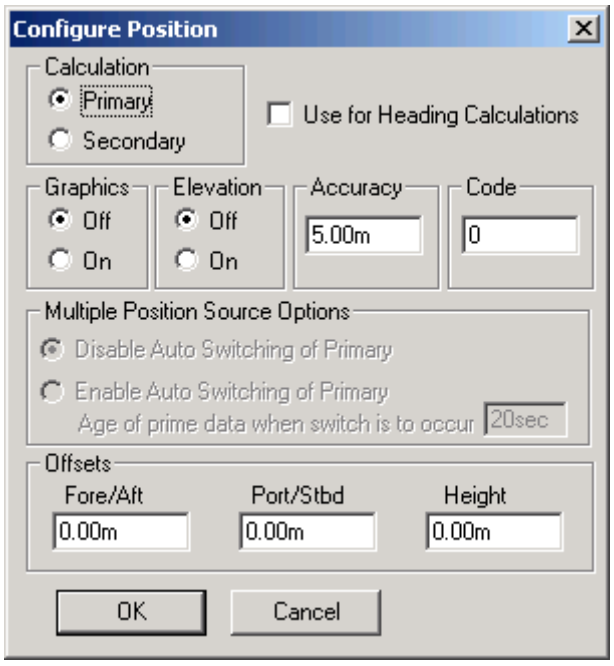
To view the data, highlight the IMCA Telemetry device in the I/O Devices window. The data from the currently selected vessel will appear in the Decoded Data tab. To view data from another vessel, right-click in the Decoded Data Tab portion and select the vessel name to display their decoded data as seen in the I/O Devices window below.



WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:
Adding the IMCA TELEMETRY device creates ten data items: POSITION, HEADING, ATTITUDE, COUNT, BOTTOMDEPTH, ROVDATA, PLOWDATA, LINETRACK, FAIRLEADS and IMCA TELEMETRY. Once the data items have been added to the vehicle, they must be edited to suit the application.

Data item: GPS, IMCA TELEMETRY, POSITION
Since this device supports multiple vehicles you must assign the POSITION data item to the vehicle whose name matches the name in telegram (see decoded data display above). The names are case sensitive. Also displayed in the decoded data window is the offset name (or "no offset") which is the point on the vessel corresponding to the position. You should determine location of this offset and enter the values below otherwise WinFrog will assign the position to the CRP.

The POSITION data item must be edited once it is added to a vehicle's device list. Highlight the data item in the vehicle's device list and click the Edit button. The Configure Position dialog box appears as seen below.



Calculation:
Set the Calculation selection to Primary or Secondary. Devices set to Primary calculation are used to provide a vessel position. Note that more than one Primary positioning device can be added to a vehicle's device list; data from these devices will be combined in a weighted mean solution. (See the paragraph on Accuracy below for more on the weighting of Primary calculation device data).

If the Calculation type is set to Secondary, WinFrog will simply monitor the device's data. WinFrog will not use the data from a secondary device in the final solution of the vehicle's position.

If auto switching is enabled (see below) a secondary may automatically become a primary should all the primaries fail.

Use For Heading Calculations:
Select this checkbox if the device is to be used in conjunction with another GPS device for determination of the heading of the vessel.

Graphics:
If On is selected, a labeled square will show the raw (offset but unfiltered) location of the GPS antenna in the Graphics and Bird's Eye windows. This provides a means of comparing raw device and filtered vehicle positions.

Elevation:
Setting the Elevation option to On will result in the elevation determined by GPS to be used as the elevation of the vessel referencing the GPS (WGS84) Ellipsoid. The sounder data recorded in WinFrog's .RAW data files will not be affected.
This option is meant only for those applications where there is no fixed vertical reference (i.e. mean sea level), such as on a river. For acceptable results, this option requires the use of high accuracy "RTK" GPS data.

Accuracy:
The Accuracy value entered provides WinFrog with the expected accuracy of the position from this device. This value is used in the weighting of this device compared to other positioning devices that may be added to the vehicle's device list. The smaller the value entered, the more accurate it is considered to be, and hence the more weight that will be applied to the device's data.

The Accuracy parameter can be changed from the suggested values. Changes should be made with caution, however, as they will affect the final filtered position of the vehicle.

Code:
This entry window is used when the GPS data is being received by a remote GPS receiver connected via telemetry link. If this is the case, set the Code to coincide with the code parameters associated with the GPS unit being used.
For all other applications, the Code entry must be set to 0.

Multiple Position Source Options:
This group box allows you to enable automatic switching of a secondary to primary should the data from all POSITION and PSEUDORANGE data items set to primary timeout. The **Age** entered is the length of time that the secondary will wait in the

absence of data from all primaries, before taking over as primary. This age is only entered for the secondary.

For example, if the POSITION or PSEUDORANGE data items associated with two GPS receivers were set to primary and the POSITION or PSEUDORANGE data item of a third GPS receiver was set to secondary, both primary GPS receivers must time out before the secondary will become the primary. Upon the recovery of either of the original primary data items, the original primary will be reset to primary and the original secondary will be reset to secondary.

Note for the auto switching feature to work, there must be at least one primary and one secondary enabled. For example, given two data items, one set to primary with the auto switching disabled and the other set to secondary with the auto switching enabled, if the primary fails the secondary is not set to primary and the vehicle positioning stops until the primary data item recovers.

Disable Auto Switching of Primary:
If this data item is not to be involved in the auto switching process, check this box. As stated above, this data item is then not involved in the auto switching process in any way.

Enable Auto Switching of Primary:
If this data item is to be involved in the auto switching process, either as a primary or a secondary, check this box. If set to secondary, enter the Age of data the primary data items must reach before this secondary is switched to act as the primary.

In order for this option to be effective you must have at least one primary and one secondary. If there are multiple secondary data items that are enabled for switching, the first one to receive data will become primary.

Note: This option is not enabled unless WinFrog determines that there is more than one POSITION and/or PSEUDORANGE data item associated with the respective vehicle. The exception to this is the case of a WinFrog with the Remote module operating as a Controlled Remote being configured remotely from the Controller. In this case, the option is always enabled even though it may not be applicable. The operator must be aware of what is available on the Remote and configure the data item accordingly.

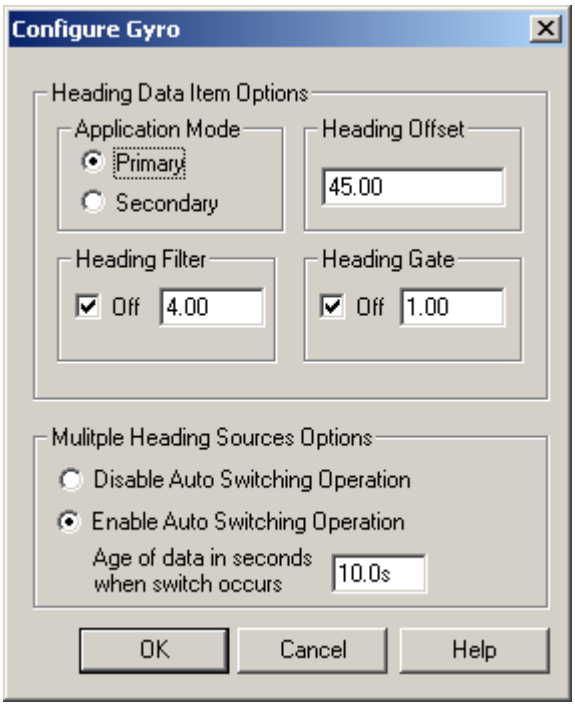
Note: This option is not available in the WinFrog Remote package.

Note: This option is not available for USBL based POSITION data items.

Offsets:
Offsets are required to associate the location of the point which corresponds to the position in the telegram with the vessel's Common Reference Point (CRP). The offsets are applied *from* CRP (of the vehicle) *to* the GPS antenna location.
Forward Offsets are entered as positive values.
Aft Offsets are entered as negative values.
Starboard Offsets are entered as positive values.
Port Offsets are entered as negative values.
Height Offsets are positive upwards. (It is suggested that the vessel's Height origin should be at the water line.

Data item: GPS, IMCA TELEMETRY, HEADING

The Heading data item must also be edited once it is added to a vehicle's device list. Highlight the HEADING data item in the vehicle's device list and click the Edit button. The Configure Gyro dialog box appears as seen below.



Heading Data Item Options:
Application Mode(Primary/Secondary):
Set the type of calculation to Primary or Secondary by selecting the appropriate radio button. Devices set to Primary are used to provide the vehicle heading information. Devices set to Secondary are simply monitored, and are not used in the vehicle's calculations.

Note that WinFrog supports automatic switching from a designated Primary to a Secondary in the event that data from the Primary fails (see Multiple Heading Sources Options).

Heading Offset:
A correction value (as determined from a gyro calibration) can be input in the Heading Offset box. This value is added to the heading value from the NMEA Gyro to provide a corrected heading for the vehicle. Note that positive or negative values can be entered.

Heading Filter/Heading Gate:
The Heading Filter is used to "smooth" heading values used by the vehicle. The value entered in the Heading Filter indicates the number of headings that will be used to predict the next heading value. The larger the value entered, the "heavier" the filter will be – i.e. the slower the vehicle's heading will respond to changes.

The Heading Gate defines a tolerance value to limit the use of anomalies in gyro readings. If the next observed gyro value received falls outside the specified range of predicted values (i.e. plus or minus the entered value), the value will not be used.

Multiple Heading Sources Options:
WinFrog supports automatic switching from a designated Primary source to an alternate Secondary source in the event that the Primary fails. The first Secondary source to receive data after the Primary has failed becomes the alternate Primary providing the heading for the vehicle. When the designated Primary is detected as active again, the alternate Primary source reverts to Secondary and the designated Primary provides the heading data to the vehicle.

If an alternate Secondary fails and there are additional Secondary sources, it in turn is detected by the first of the remaining operational Secondary sources to receive data after the failure, at which time this Secondary becomes the alternate Primary.

Note that this option is only available if more than one HEADING source is associated with the respective vehicle. Changes made to the Auto Switching options for any one of the HEADING data items are automatically assigned to the others upon exiting this dialog with OK. If the Auto Switching option is enabled and the respective HEADING source has been set to Primary, all others are automatically set to Secondary. The exception to this is when configuring a WinFrog Controlled Remote (WinFrog with a Remote module) from a Controller. In this case, changes made to one HEADING source are not automatically made to other HEADING sources. The operator must explicitly make them for each HEADING source.

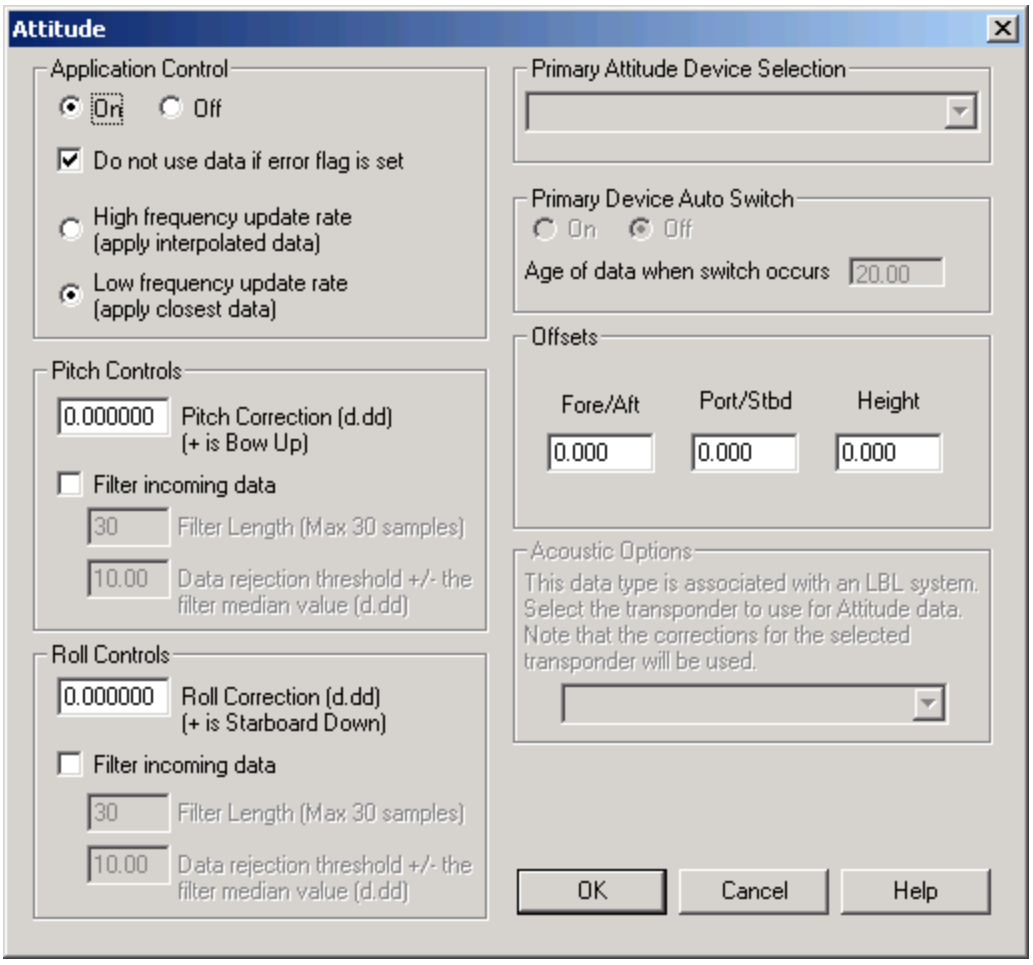
This option is not available in the WinFrog Remote package.

Disable/Enable Auto Switching Operation:
Select the mode you wish to operate WinFrog.

Age of data in seconds when switch occurs:
Enter the age of data that is permitted before the source is considered to have failed.

Data item: GPS, IMCA TELEMETRY, ATTITUDE

The Attitude data item must also be edited once it is added to a vehicle's device list. Highlight the Attitude data item in the vehicle's device list and click the Edit button. The Attitude dialog box appears as seen below.



Attitude
By default, the sensor mode is off, meaning that data from the device will not be used in the vehicle's calculations. To turn the sensor on, and begin using the inclination corrections in the position output, click the 'On' radio button.

Error flag testing
The error flag check box is applicable to those devices that output a code indicating the data is either good or bad. If checked and the device supports such a code in its telegram, WinFrog will look at the code and if the data is indicated as bad, WinFrog will not use the data.

Sensor Update Frequency Rate
If the associated attitude sensor has a high frequency update rate (e.g. 10Hz and higher) it is appropriate to extract attitude data for application by either interpolating or extrapolating for a given epoch. In this case, the *High frequency update* option should be selected. Some attitude sensors have slow update rates, in particular those installed in acoustic transponders that require interrogation. For these sensors interpolation/extrapolation can produce a bad value as there is insufficient information to determine the correct shape of the curve (aliasing). Thus the most current attitude needs to be used. In this case, select the *Low Frequency update* option. This option applies to the use of the attitude data by the following data items:

- POSITION
- ELEVATION
- ALTITUDE
- XPONDER
- LBL TRANSCEIVER
- PROFILE

Pitch and Roll
There are two control groups, one for each of pitch and roll. Correction values can be added in this section of the window. The correction values (entered in units of degrees-decimal degrees) are added to the raw pitch and roll values received from the device before the data is applied to the vehicle's calculations. Ensure that entered values adhere to the sign convention used by WinFrog. You can verify that the corrections are entered properly by viewing the pitch and roll values in the I/O Device window and the Vehicle Text window.

Filtering
Additionally you may filter the incoming values to remove extraneous noise or spikes – check boxes are provided to switch this feature on or off. A filter length (up to 30 samples) and a threshold value (applied to the median of the samples in the filter to obtain lower and upper bounds) can be entered. Any pitch or roll values outside of the bounds are rejected and not used in the vehicle calculations, but will be recorded in the RAW files. If either one of pitch or roll is rejected, both values are ignored, although you may set up the filtering parameters for them separately. The status of the filters, including the current valid range for each of pitch and roll, and the percentage of values rejected, can be viewed in the calculations window, selecting the appropriate ATTITUDE data item.

Important:

Do not enable filtering unless there is a high enough data rate (say 10hz) to correctly determine the shape of the curve. Essentially, if the low frequency update rate is selected above, do not enable filtering.

Primary Attitude Device Selection
If more than one attitude device is present, you may select one of them to be primary and the others to be secondary and allow WinFrog to automatically switch between them should the primary system stop sending data or has bad data. There must be at least two attitude data items added to the vehicle to use this feature. (Note: The attitude and offset data displayed in this dialog is for the attitude device corresponding to the data item that is being edited. Selecting a Primary Attitude Device from the drop down list does not affect these values for any attitude device in the list. Every attitude device needs to be set up for its own corrections and offsets.)

Primary Device Auto Switch
Select the On radio button to turn on this feature. Then enter the time out time in the edit box. If WinFrog does not receive data from the primary attitude device, or if it receives bad data for this length of time, it will switch to the next secondary that is enabled and has good data.

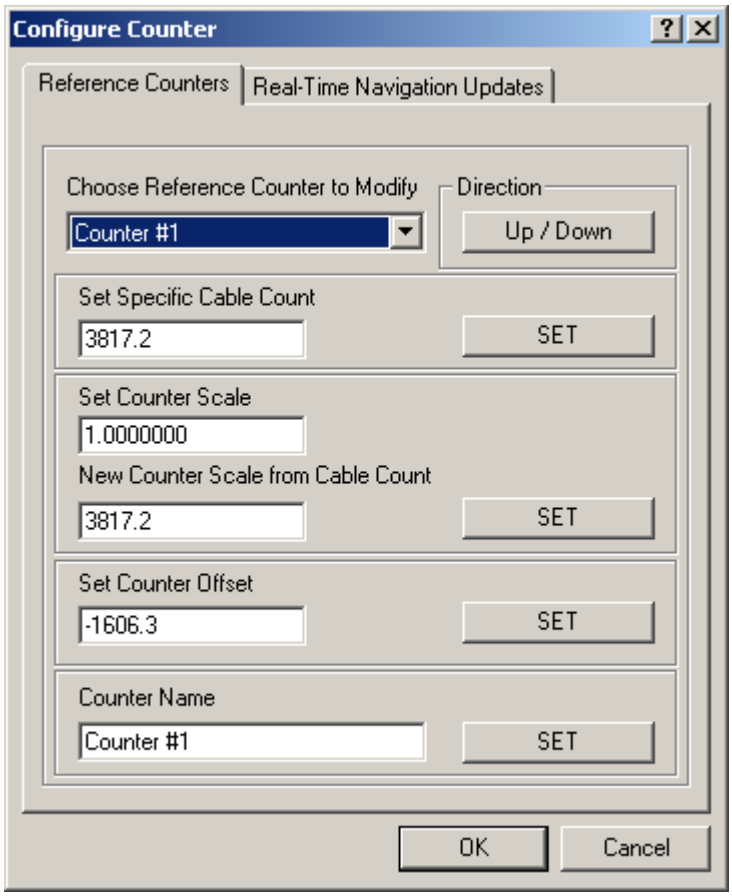
Auto Switch Feature Usage
To use this feature first turn the sensor on as described in the Attitude section above. Next, select the attitude device that you wish to be primary from the drop down list box. Then turn the primary device auto switch on and enter the time out time. Then edit all the other attitude data items and enable them in the Attitude group box. Note that the same selected primary will be displayed for all attitude data items; similarly, the automatic feature will be turned on and the time out time will be the same. However, you must individually enable each attitude device in the Attitude group box.

Offsets
These are not applicable in this case.

Acoustic Options
This applies to long base line acoustic transponders that have inclinometers. See chapter 17 for more information.

Data item: GPS, IMCA TELEMETRY, COUNT

This data item configuration dialog has two tabs, Reference Counters and Real-Time Navigation Updates.

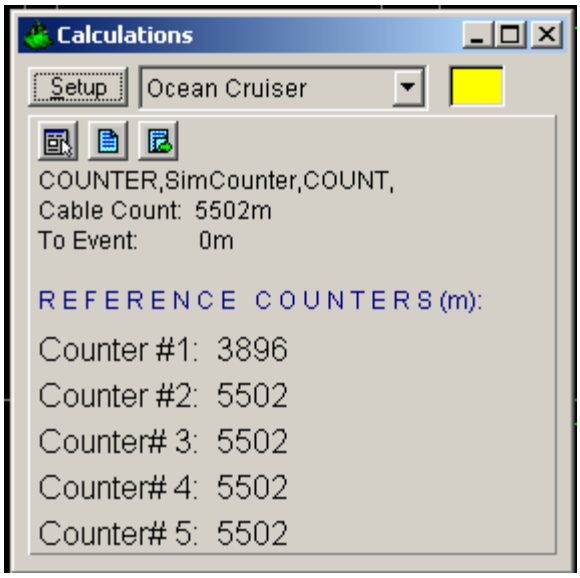


Reference Counters Tab

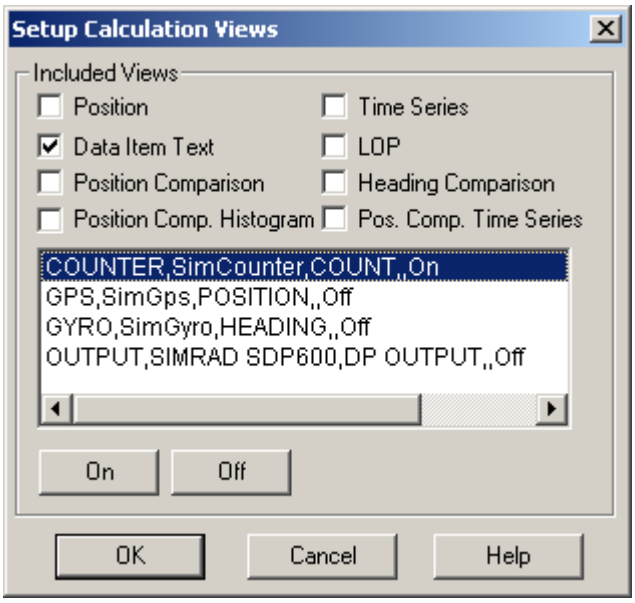
This tab is used in conjunction with the Calculations window to maintain up to five reference counts based on the Channel One (cable) count. These reference counts are not used for any real-time calculations and are not logged to any file; they are intended for reference purposes only.

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, select the appropriate vehicle from the dropdown list. Then click the Setup button to open the Setup Calculations dialog shown below.



3. In the Setup Calculations dialog, select the Data Item Text checkbox. Then turn On the COUNT data item by selecting the COUNT data item from the list and click the On button.
4. Click OK.

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.

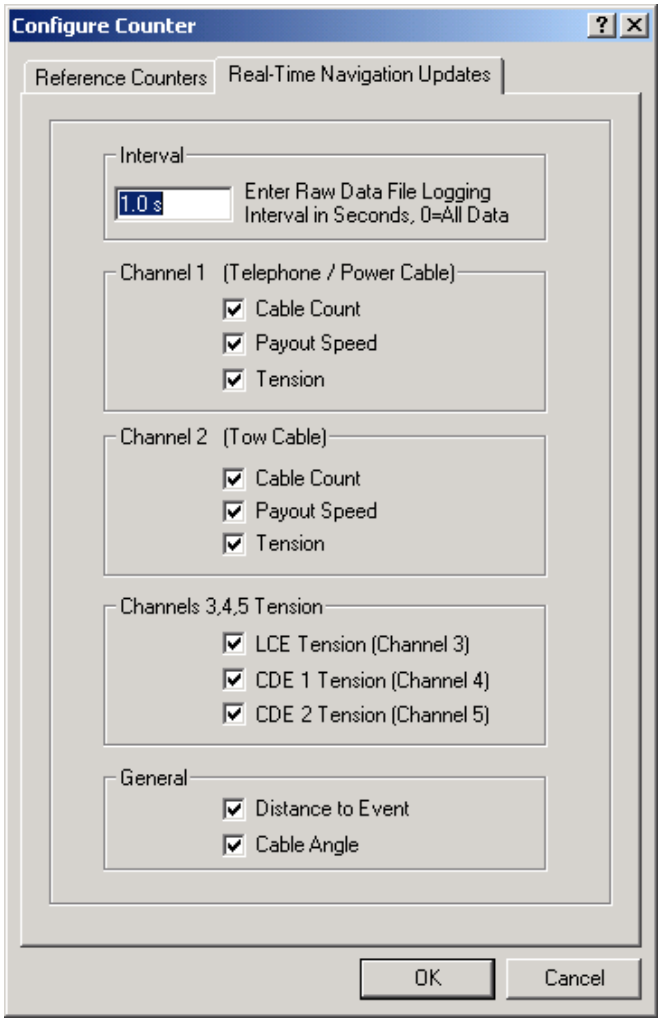
Set Specific Cable Count
To set the reference counter to a specific cable count, enter the desired value in the edit field and click the *Set* button. The desired reference counter value will be set to the entered value when the OK button is clicked to exit the Configure Counter dialog. This value will 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* and then the *OK* button to enter the change.

Real-Time Navigation Updates Tab

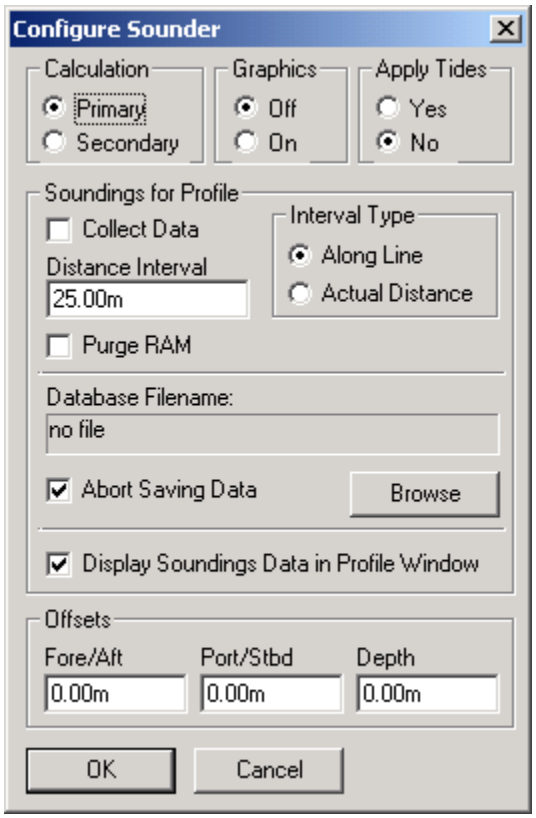


This tab enables/disables data from this device to be passed to the vehicle. Unlike the Reference Counters tab, data from the Real-Time Navigation Updates tab can be logged to the raw files if this data item is associated with a vehicle. This allows the vehicle to have more than one COUNT data item added to it which is required if it is necessary to log data from more than one counter (raw device data is only logged if the data item is associated with a vehicle). If a checkbox is selected (checked) 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 on configuring Data Events).

Data item: GPS, IMCA TELEMETRY, BOTTOMDEPTH

The BottomDepth data item must also be edited once it is added to a vehicle's device list. Highlight the BottomDepth data item in the vehicle's device list and click the Edit button. The Configure Sounder dialog box appears as seen below.



Calculation:
Set the type of calculation to Primary or Secondary using the appropriate radio button. WinFrog will only utilize (i.e. display and record) data from a Primary sounder device. If there is more than one Primary sounder attached to a vehicle's device list, WinFrog will not mean the data (as is done with positional devices), but rather alternate between the devices. Data from a Secondary status sounder will simply be monitored.

Graphics:
Select the On radio button to display a labeled square representing the location of the sounder in the Graphics and/or Bird's Eye windows.

Apply Tides:
If the Yes radio button is selected, WinFrog will apply tidal corrections to the observed water depths. Depths displayed in the Vehicle Text window and recorded in automatic event (i.e. .DAT, .SRC, and .RCV) and type 351 raw files will refer to

the datum corrected depths. Note that type 411 raw data records will remain truly raw and will not reflect the tide correction.

The tide information can be supplied by a real time telemetry system or by predicted tide files. Either way, the tide "device" must also be attached to the same vehicle's device list. For more information, refer to documentation on Tide devices.

Soundings for Profile:
This section of the Configure Sounder dialog permits the collection of sounding data to an .mdb database file for display in WinFrog's Profile window. This collection is completely separate from automatic event or raw data collection.

Collect Data
Select this checkbox to enable the collection of data to an .mdb database file.

Interval Type
Select to utilize either Along Line or Actual Distance (i.e. between successive position updates) calculations for data collection intervals. Selecting Along Line requires that you also enable survey line tracking.

Distance Interval
Specify the distance interval at which the data will be collected.

Purge RAM
Sounding data is stored in the RAM memory of the computer. Any data collected which will not be required at a later time can be deleted by selecting the Purge RAM checkbox, then clicking the **OK** button to exit the dialog box.

Database filename
Click the Browse button to define where and to what filename the .mdb file will be written. The file name and location is displayed in this dialog.

Abort Saving Data
Select this checkbox to abort saving data to the .mdb file. In other words, to save data to the .mdb file ensure that this box is NOT checked.

Display Soundings Data in Profile Window
Select this checkbox to enable the display of this data in WinFrog's Profile window.

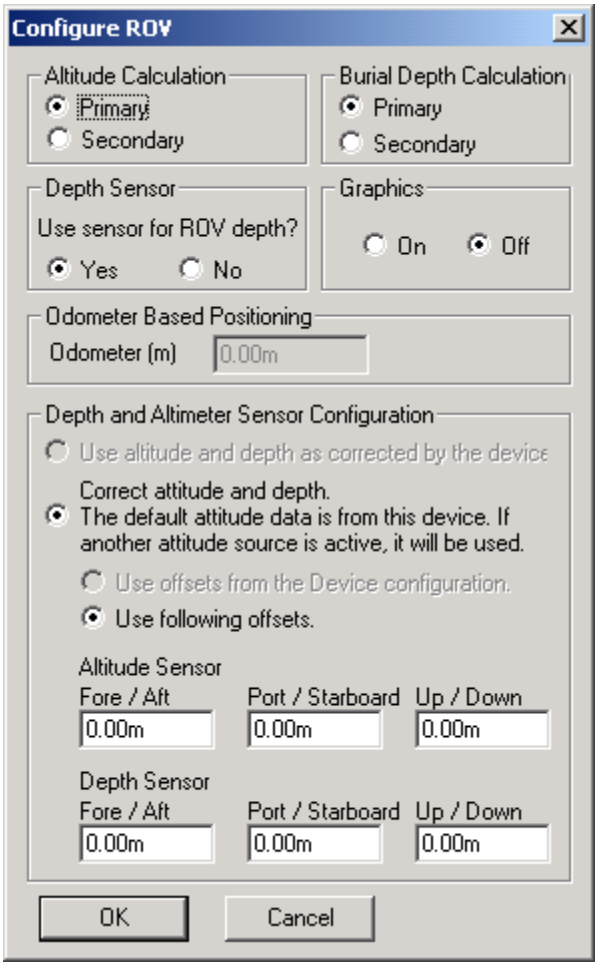
Offsets
This section of the dialog allows for entry of Offset values as measured from the vessel's common reference point (CRP). Note that the Fore/Aft and Port/Stbd offsets are used for "cosmetic" visual purposes only: An echo sounder is not a positioning device, and hence its horizontal offsets have no application. If the echo sounder's position is to be recorded correctly, you must create and enable a vehicle Tracking Offset for that specific location. The offsets entered here can simply be used as a

means of graphically confirming that the Tracking Offset values have been entered correctly.

The Depth Offset is applied; the entered value will be added to the received sounder data.
Depths displayed in the Vehicle Text window and recorded in automatic event (i.e. .DAT, .SRC, and .RCV) and type 351 raw files will refer to the corrected depths. Note that type 411 raw data records will remain truly raw and will not reflect the depth offset correction.

Data item: GPS, IMCA TELEMETRY, ROVDATA

This data item is attached to an ROV, Fish or other such vehicle that provides data such as pitch, roll, heading, depth, altitude, burial depth etc.



Altitude Calculation:
Primary will result in this vehicle's altitude being determined from the observed altitude value found in the data string from this device minus the altitude offset also found on this dialog. This value can be displayed in the vehicle text window as ROV Alt.

Secondary will result in no calculation or assignment of the vehicle's altitude from this device. The raw data is still always recorded.

Burial Depth Calculation:
Primary will result in the burial depth (if applicable) being determined from the observed burial depth value found in the string from this device minus the Depth Offset also found on this dialog. This value will be assigned to the vehicle.

Secondary will result in no calculation or assignment of the burial depth from this device. The raw data is still always recorded.

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

Use sensor for ROV depth.
Yes will cause the depth of this vehicle's CRP to be determined from the observed depth value found in the string from this device plus the depth offset below. This vehicle's elevation will be the negative of the value above. This value will be used to calculate the bottom depth.

The bottom depth will be determined as:
Observed depth +Depth Offset + observed altimeter - altitude Offset
The offsets (see below) are not corrected for pitch and roll when determining the water depth.

No will result with this device obtaining the depth of the CRP from the vehicle itself, as opposed to assigning it to the vehicle as above. You must assign another device to determine the depth of the vehicle (e.g. USBL and assigning it as the source for depth).

Note: The observed altimeter value is always used for depth determination regardless of the primary/secondary altimeter setting.

Odometer Based Positioning:
This is only used by the ROV device Sonsub Innovator3.

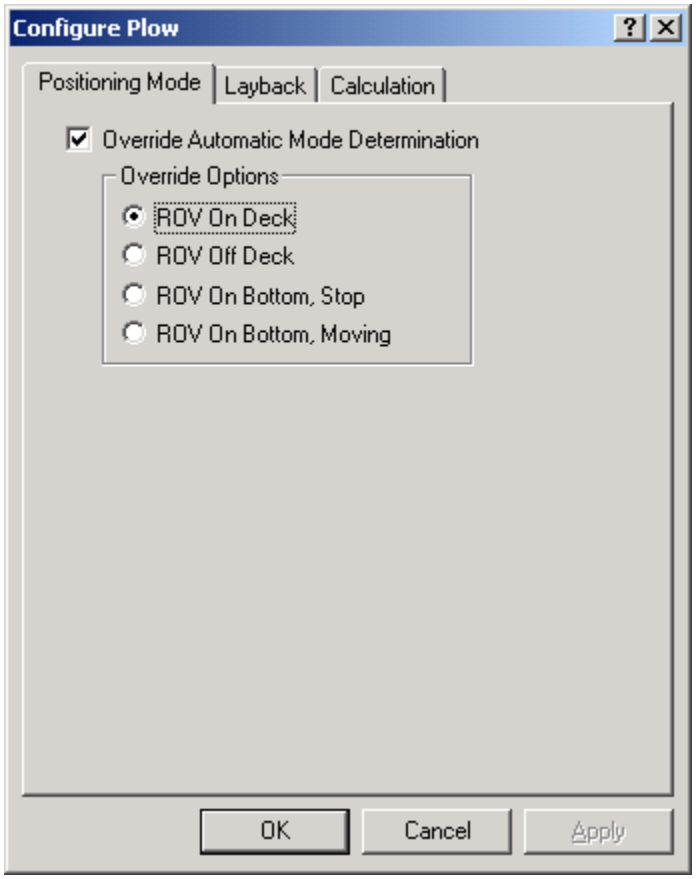
Depth and Altimeter Sensor Configuration:
For all ROV devices except Deep Blue ROV, the radio button settings cannot be changed. See the Deep Blue ROV documentation for information on setting these radio buttons.

Vertical offsets of the altitude and depth sensors, relative to the CRP, can be entered here. The Altitude Offset is the vertical distance (positive up) from the ROV's CRP to the acoustic beacon tracking the seafloor. The Depth Offset is the vertical distance (positive up) from the ROV's CRP to the sensor that provides depth information of the ROV.

The offset position will be corrected for pitch and roll then the vertical offsets will be applied to determine the depth of the ROV and height of the ROV above the bottom.

Data item: GPS, IMCA TELEMETRY, PLOWDATA

The PLOWDATA data item must also be edited once it is added to a vehicle's device list. Highlight the PLOWDATA data item in the vehicle's device list and click the Edit button. The Configure Plow dialog box appears as seen below.



Positioning Mode Tab

Override Automatic Mode Determination:

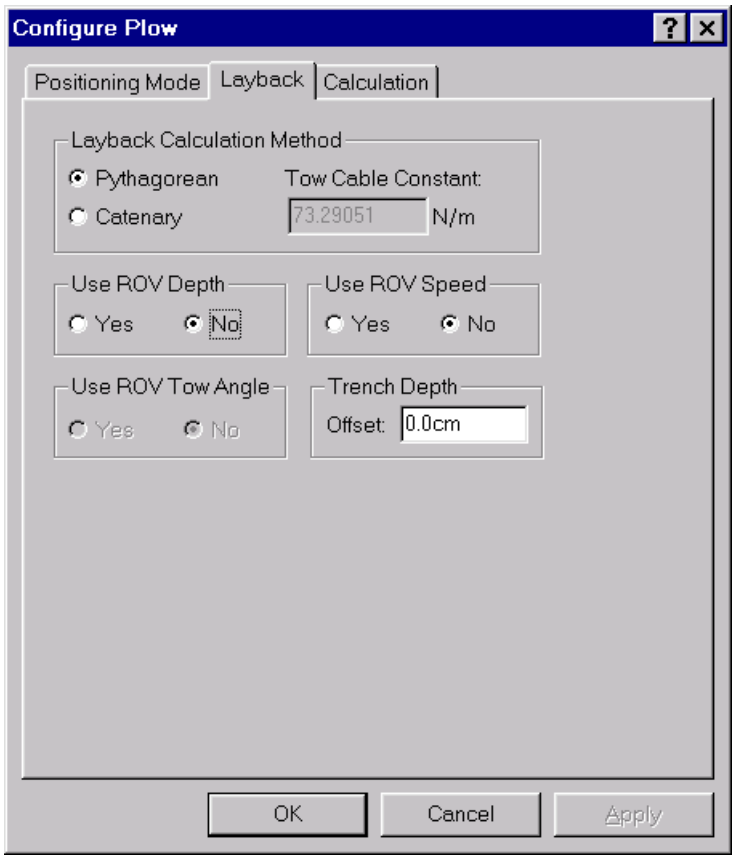
This checkbox determines whether WinFrog automatically determines the towed vehicle location and mode or whether the operator determines it.

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

Layback Tab
Clicking on the Layback tab produces the following dialog:



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 below.

Catenary requires the weight of the cable in newtons/metre, (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.

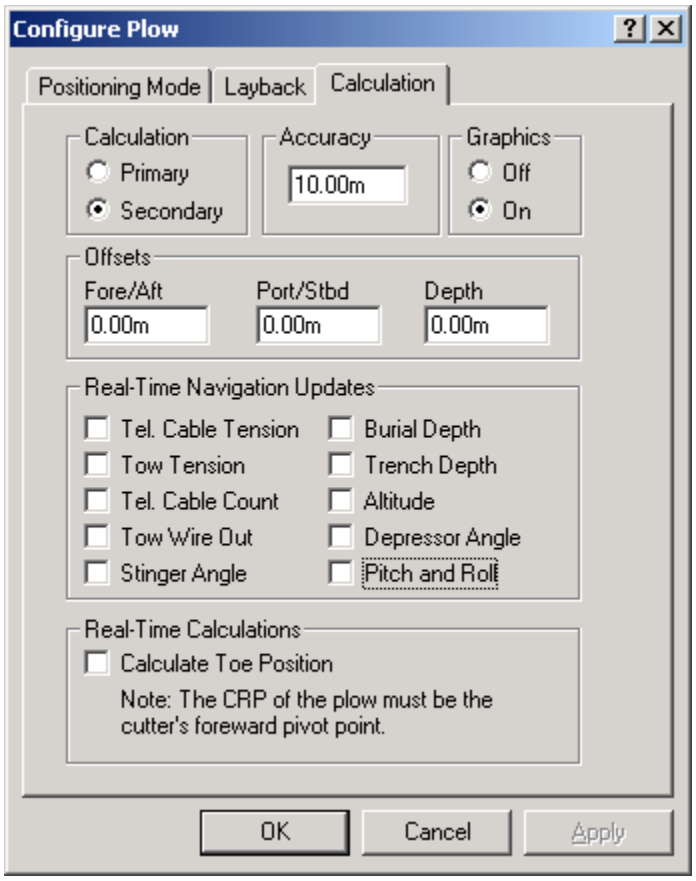
No causes the depth for the layback calculation to be obtained from the vehicle. Essentially this means the depth must be assigned by another device. This essentially overrides the selection of a device or manual entry of depth.

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 checked on the Calculation tab (below) then this value, 0.0 or otherwise, will be assigned as this vehicle's trench depth.

Calculation Tab
Clicking on the Calculation tab produces the following dialog:



Calculation:
Primary – when selected, the layback described above will be used to calculate this vehicle's position that 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. The default value of 0.10 is adequate for most applications.

Graphics:
Select the **On** radio button to display a box 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, Device, 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.

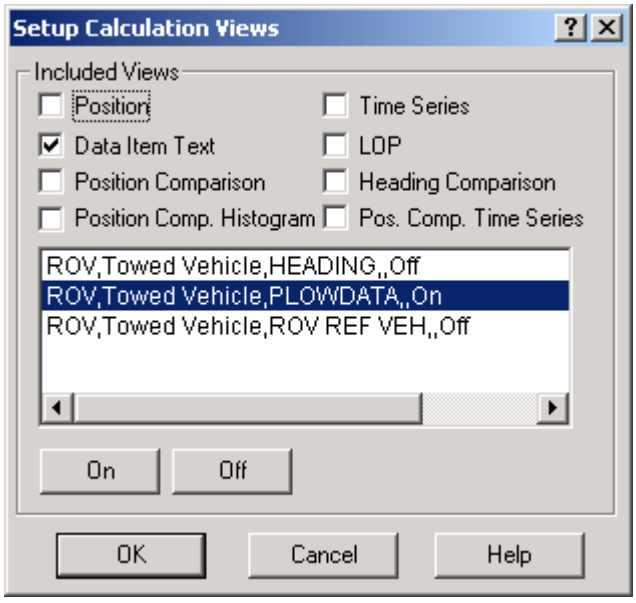
Real-Time Navigation Updates

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 checked and this may cause values from other devices to be overwritten.

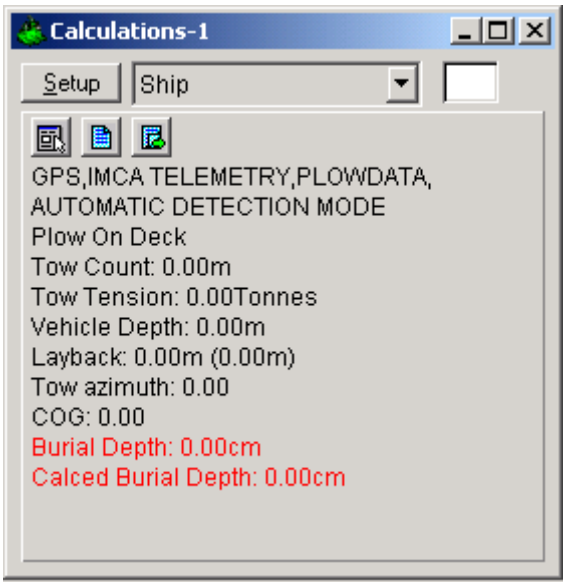
Real-Time Calculations

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. Then click the Setup button, select **Data Item Text** and turn the data item **ROV, Device, PLOWDATA** on by highlighting it and clicking the **ON** button as seen below.



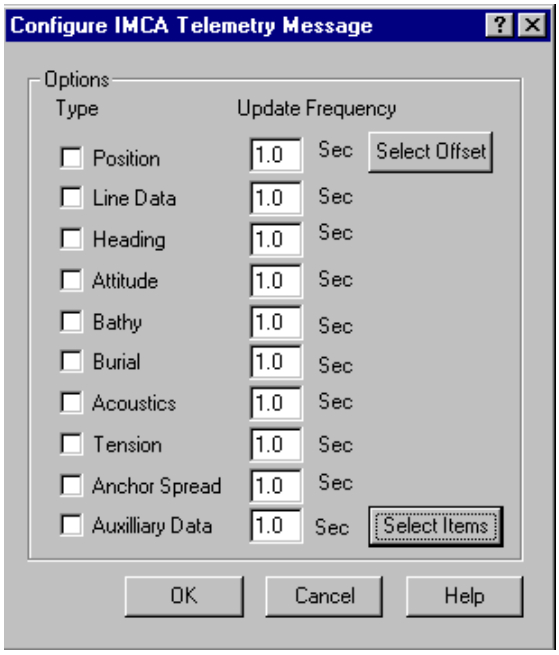
Exiting with OK will display the Calculations window as seen below.



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.

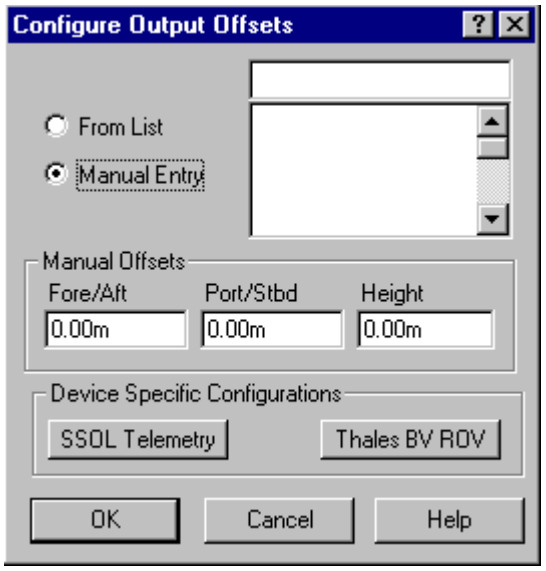
Data item: GPS, IMCA TELEMETRY, IMCA TELEMETRY

The IMCA TELEMTRY data item must also be configured once it is added to a vehicle's device list. Once attached, the Configure IMCA Telemetry Message dialog box appears as seen below.



From this dialog window you can select;
the type of data to be sent and at what interval,
the offsets to be applied to the position data and
the selection of the auxilliary items to transmit.

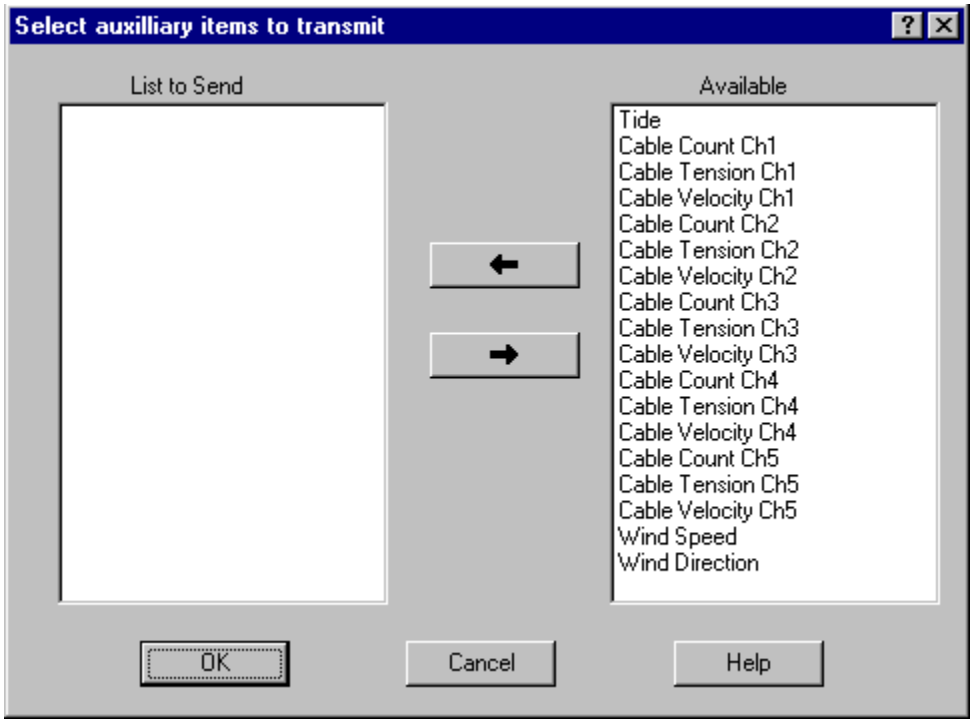
Select Offset:
The 'Select Offset' button opens a 'Configure Output Offsets' dialog box for offset selection as seen below.



Configure Output Offsets:
Normally the position that is to be output will be the position of the CRP of vehicle. However if another position is required, the offset to be applied to the output position can either be taken from the list of vessel offsets or a manual offset entry can be input. Select the appropriate radio button (From List or Manual Entry). The offset can now be highlighted from the list, or if Manual Entry is chosen, the offset values can be input. The position data output will now be referenced to the offset location chosen.

Device Specific Configurations:
Under the Device Specific Configurations section, there are two buttons that access dialog boxes, SSOL Telemetry and Thales BV ROV. These dialog boxes are only to be modified for specific applications. You should not modify these items unless you are completely familiar with the outcome. Refer to documentation elsewhere in this manual for information specific to the configuration of SSOL Telemetry and Thales BV ROV units.

Select Items:
The **Select Items** button will open a dialog box in which you can select the auxiliary items to send as seen below.



Move the items to transmit from the 'Available' list to the 'List to Send' list by highlighting the appropriate items and using the left/right arrow buttons.

A. For the configuration of the correct Water Depth to be calculated in WinFrog and displayed in the vehicle text window, attach the BOTTOMDEPTH for only sounder data being transmitted OR attach the BOTTOMDEPTH and ROVDATA or PLOWDATA for an ROV or PLOW providing the water depth data. Select the 'Use ROV Depth' option to correctly calculate the water depth.
B. For the automatic selection of line tracked data in WinFrog, attach the LINETRACK data item to the vehicle. When new line information is transmitted in the telemetry string, WinFrog will automatically update the line being tracked.
C. To add the Tension data to the vehicle attach the COUNT data item to the vehicle.

For the driver to transmit any type of data, the IMCA TELEMETRY data item must be attached. This data item controls the transmission of ANCHOR SPREAD, the TELEMETRY STRING and MESSAGING.