WinFrog Device Group:	**ROV**
Device Name/Model:	**Olympian T2 ROV**
Device Manufacturer:	Perry Slingsby Systems Ltd. Tel +44 (0) 1751 434224 Mob +44 (0) 7774 632114 Fax +44 (0) 1751 431388 http://www.perryslingsbysystems.com
Device Data String(s) Output to WinFrog:	See Telegram Specification section below.
WinFrog Data String(s) Output to Device:	See Telegram Specification section below.
WinFrog Data Item(s) and their RAW record:	ROVDATA 496 HEADING 409 ATTITUDE 413 BOTTOMDEPTH 411 ELEVATION 372 ROV REF VEH NONE

DEVICE DESCRIPTION:

This driver is designed to read data from the Olympian T2 ROV. This ROV doesn't include cable burial depth in its telegram. However, the ROV carries a TSS 340 or TSS 350 pipe tracker, both of which will output burial depth. WinFrog has a driver for both of these instruments from which to obtain the burial depth. This driver can also substitute the burial depth with the tool depth.

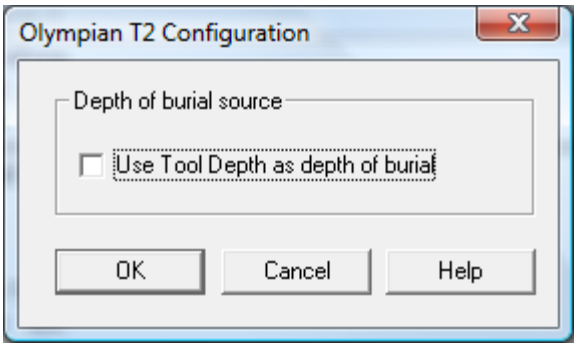
DEVICE CONFIGURATION INSTRUCTIONS

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 Olympian T2 Configuration dialog box appears, as seen below.



This device does not provide the depth of burial of the cable. However, you may substitute the Tool Depth for the depth of burial by first checking the box in this dialog. This action itself does not change this device's Data Item setting (ROVDATA) for Primary Data Source for Burial Depth. See below.

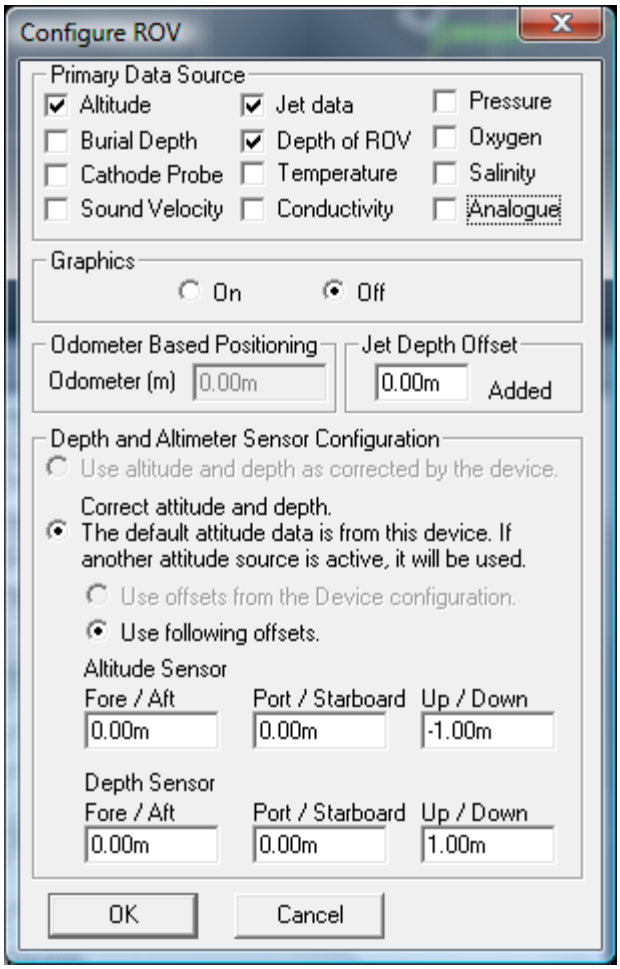
WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:

Adding the Olympian T2 ROV device creates six data items: ROVDATA, HEADING, ATTITUDE, BOTTOMDEPTH, ELEVATION, and ROV REF VEH. Once the data items have been added to the appropriate vehicle, they must be edited to suit the application.

Data item: ROV, OlympianT2 ROV, ROVDATA

This data item is attached to the ROV vehicle in WinFrog.

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



Primary Data Source:
For each of these items that are checked the value for it, as obtained from this device, will be passed to the vehicle. If this device does not supply the particular value, 0 will be assigned to the vehicle for that item potentially overwriting the correct value obtained from another device. Thus uncheck all those values not available from this device. The Jet Data value is the Tool Depth as described in the format.

Burial Depth:
As mentioned above, the burial depth is not available from this device. However, you may use the uncorrected tool depth as an estimate of burial depth, in which case check the Burial Depth box here and check the Use Tool Depth as Burial Depth box in the device configuration dialog described in the previous section. If there are any other ROVDATA items (or any other data items that supply burial depth) uncheck their equivalent Burial Depth box.

Jet Data:
This is the Tool Depth. Check it to pass the data to the vehicle.

Depth of ROV:
Check it to pass the depth to the vehicle. You may also use the ELEVATION data item to pass the depth to the vehicle (see below). Only one (either here or on the ELEVATION configuration dialog) should be check as the primary data source.

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

Odometer Based Positioning:
Not applicable to this device.

Jet Depth Offset:
This value will be added to the Jet Depth (Tool Depth).

Depth and Altimeter Sensor Configuration:
For most devices, including this one, the radio button settings cannot be changed.

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.

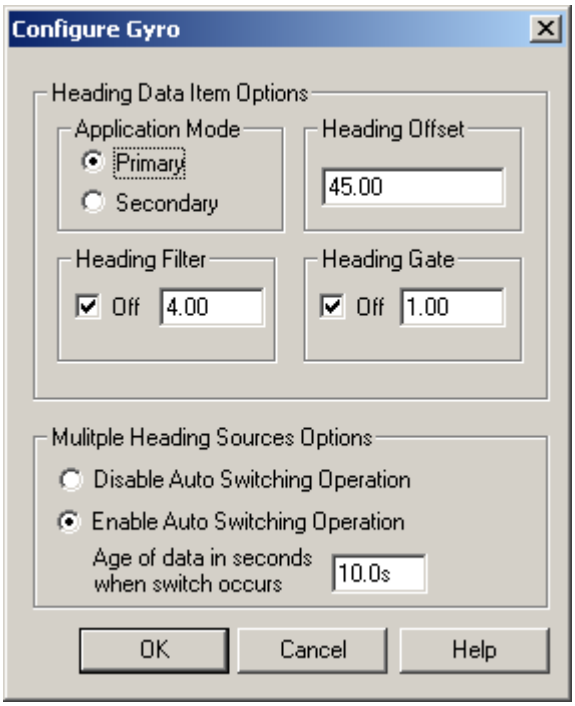
The offset position will be corrected for pitch and roll then the vertical offsets will be applied to determine the depth of the ROV and height of the ROV above the bottom.

The burial depth data can be 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 the **Data Item Text** and **Time Series** options and turn the data item **ROV, OlympianT2 ROV, ROVDATA** on by highlighting it and clicking the **ON** button.

Data item: ROV, OlympianT2 ROV, HEADING

This data item is attached to the ROV vehicle in WinFrog.

If the bottom depth data from this device is deemed accurate, then this data item can be used to orient the vehicle. Highlight this data item in the vehicle's device list and click the Edit button to open the Configure Gyro dialog box 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 device 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.

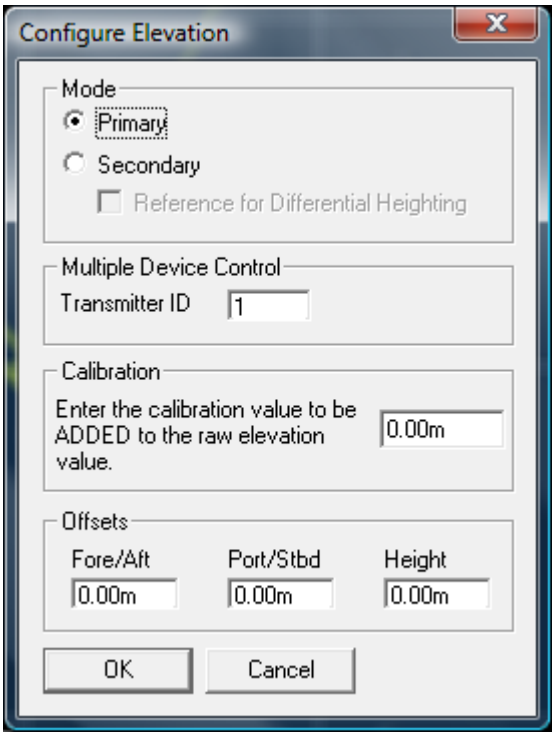
Age of data in seconds when switch occurs:
Enter the age of data that is permitted before the source is considered to have failed.

Data item: ROV, OlympianT2 ROV, ELEVATION

This data item is attached to the ROV vehicle in WinFrog.

Add the ELEVATION data item to a vehicle to record and/or assign the vehicle's height or depth.

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



Mode
Set the mode to primary if this device is to determine the vehicle's depth. The default is secondary. Other devices (see ROVDATA) that can also determine depth need to be set to primary or secondary depending upon which you want to use to determine the depth. You should only set one to primary.

Reference for Differential Heighting
Leave this unchecked as it applies to long baseline (LBL) acoustics only.

Multiple Device Control
Leave Transmitter ID set to 1. This device only supports the output of one depth.

Calibration
Enter a calibration value if one is available. This can be used to account for atmospheric pressure or other instrument errors if it is not zeroed out of the device. See the device manual for information to zero out the sensor. This value is added to

the observed value. Note: elevation is used as the terminology and as a result, if the point is below sea level the elevation is negative. Depth is considered positive below sea level and this device is measuring depth. An elevation calibration value will be combined to an observed depth as described below:

Elevation = -(observed depth value) + calibration value
And
Vehicle depth = -elevation
Both these values can be displayed in the Vehicle Text window.

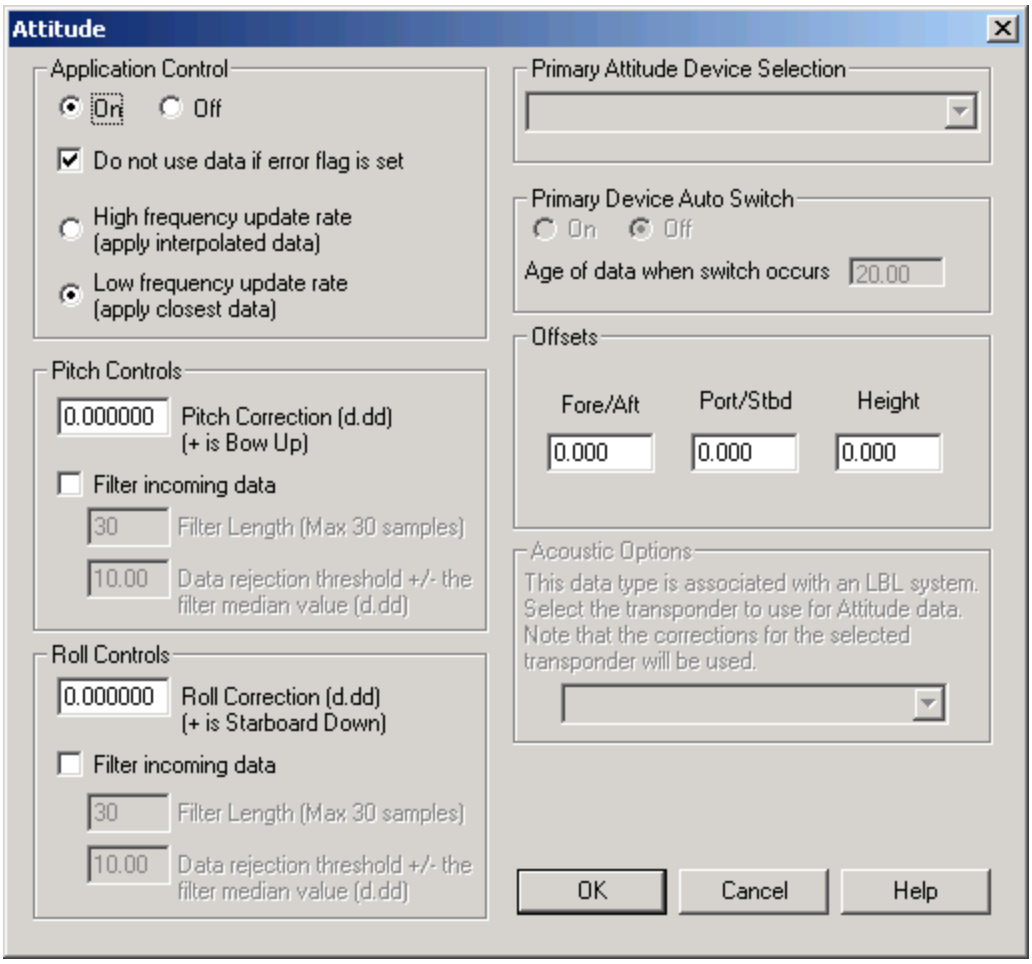
To zero out atmospheric pressure you would enter it as a positive number. For example, say at sea level the sensor read a depth of 10 metres. Enter 10m in the dialog then if the sensor was at depth of 1 metre it would read 11 and the result would be:
Elevation = -(11) + 10 = -1
Vehicle depth = -elevation = 1

Offsets
Offsets can also be entered to relate the depth (pressure) sensor of the sensor to the CRP of the vehicle. If an attitude sensor is available, the data from it will be used to correct the offsets.

Data item: ROV, OlympianT2 ROV, ATTITUDE

This data item is attached to the ROV vehicle in WinFrog.

If the pitch and roll data is to be used, then this data item can be added to the ROV's device list. Highlight the ATTITUDE data item and click the Edit button to open the Attitude dialog box 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.

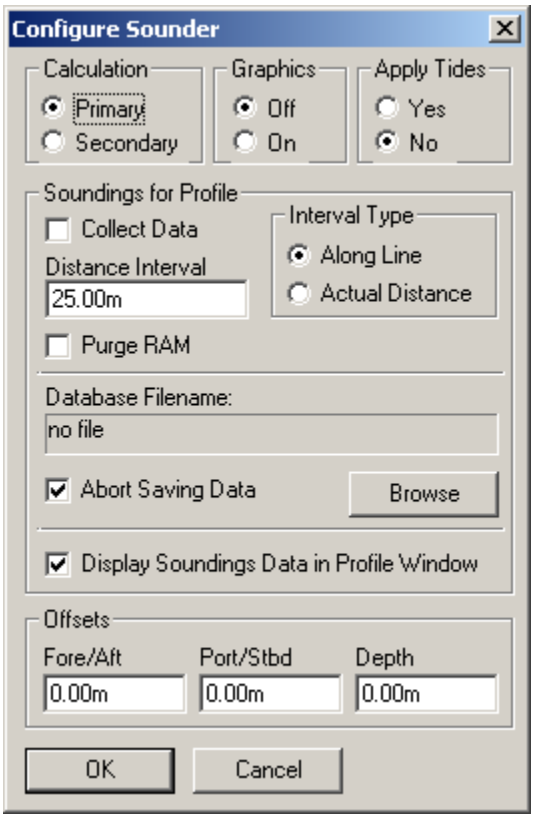
Offsets
These are not applicable in this case.

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

Data item: ROV, OlympianT2 ROV, BOTTOMDEPTH

This data item is attached to the ROV vehicle in WinFrog.

If the bottom depth data from this device is deemed accurate, then this data item can be added to the ROV's device list. Highlight the BOTTOMDEPTH data item in the vehicle's device list and click the Edit button to open the Configure Sounder dialog box 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 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 are displayed here.

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.

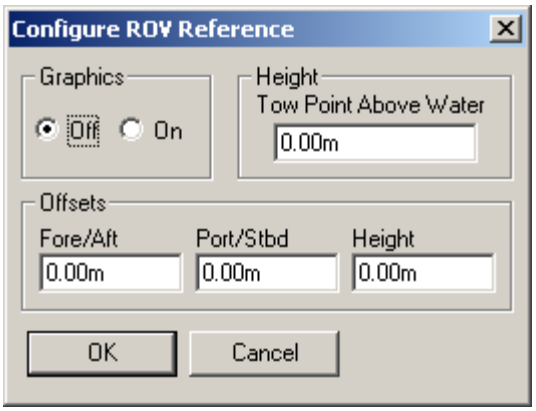
The Depth Offset is applied; the entered value will be added to the received sounder data.

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: ROV, OlympianT2 ROV, ROV REF VEH

This data item is attached to the ship vehicle in WinFrog.

This data item is added to the ship's device list to allow the ship's position to be transmitted to the ROV control system. As such, this data item is attached to the ship in WinFrog. Highlight the ROV REF VEH data item in the ship's device list and click the Edit button to open the Configure ROV Reference dialog box as 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:
This option is not used by this device.

Offsets:
The X,Y,Z Offsets are applied from CRP to the offset position the operator desires to transmit to the ROV control system. These values are set similar to values that would be applied to any device offset within WinFrog.

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

TELGRAM SPECIFICATIONS:

STRING RECEIVED FROM SURVEY COMPUTER

Each transmission consists of a header, followed by any number of readings separated using comma characters, followed by a carriage return (ASCII code 13 decimal) and a linefeed (ASCII code 10 decimal).
The header consists of the single character '#'. This is the character with ASCII code 35 decimal. This must be sent at the start of every transmission.

Each reading consists of:
1. A variable number of uppercase ID characters which indicate the meaning of the reading.
2. A minus sign ('-' ASCII code 45 decimal) is required if the reading that follows is negative. A plus sign ('+' ASCII code 43 decimal) may be used to indicate a positive reading, but is not required.
3. At least 1 decimal digit, but not more than 20 decimal digits. A decimal digit is any character between '0' and '9', with ASCII code between 48 and 57 decimal inclusive.
4. A decimal point ('.' ASCII code 46 decimal).
5. Between 0 and 20 decimal digits. If no digits are sent after the point then the decimal point character must be omitted.
If a particular reading is not known then the ID characters should be sent, immediately followed by a single question mark character ('?' ASCII code 63 decimal).
The ID characters which are recognized are :

1. HR – This precedes the hours (24 hour clock) of the current time. Must be a whole number between 0 and 23. Must be sent on every transmission.

2. MIN – This precedes the minutes (0 to 59) of the current time. Must be a whole number. Must be sent on every transmission.

3. SEC – This precedes the seconds (0 to 59) of the current time. Fractions of a second may be included after the decimal point, but are not required. Must be sent on every transmission.

4. DAY – This precedes the day of the month. Must be a whole number between 1 and 31 and must be valid for the current month and year. For example, 31 is invalid if the month is February. Must be sent on every transmission.

5. MON – This precedes the month. This must be a whole number between 1 (indicates January) and 12 (indicates December). Must be sent on every transmission.

6. YR – This precedes the year. This must be a positive whole number representing the year. All four digits should be sent. For example the year 2000 should be sent as YR2000, and not as YR00. Must be sent on every transmission.

7. KP – These characters precede a KP (kilometre point) reading. The reading should be specified in kilometres. It should be a positive number.

8. N – This character indicates a northing should follow. It should be specified in kilometres. A positive number indicates a ship's position to the north of the reference point, a negative number indicates a position to the south.

9. E – This character indicates an easting should follow. It should be specified in kilometres. A positive number indicates a ship's position to the east of the reference point, a negative number indicates a position
to the west.

10. SH – These characters indicate the ship's heading should follow. It should be specified in degrees clockwise from north and must be greater than or equal to zero and strictly less than 360.

11. DCC – These characters indicate the DCC reading (direct cross course) should follow. It should be specified in metres and may be positive or negative.
Note that the time and date must be sent on every transmission.
In the following examples the '↲' character is used to represent the carriage return character (ASCII code 13 decimal), and the '↓' character is used to represent the linefeed character (ASCII code 10 decimal).

Examples of valid transmissions :
1.
#HR11,MIN29,SEC45,DAY16,MON2,YR2000,KP12.34,N1.23,E3.45,SH90.1234,DCC5
4321↲↓
Note that a comma separates each reading, but no comma comes after the last reading. Instead a carriage return and linefeed are used.

2.
#HR11,MIN29,SEC45,DAY16,MON2,YR2000↲↓
This is the bare minimum that can be sent, but contains no useful information. The date and time information may be sent in any order.
3.
#HR11,MIN29,SEC45,DAY16, MON2,YR2000,N?,E?,KP?,DCC?,SH?↲↓
This demonstrates how to indicate that no valid reading is available, and also shows that the order in which readings are sent does not matter.

STRING TRANSMITTED TO SURVEY COMPUTER

Sent at 9600 baud, 8 bits, no parity, 1 stop bit.
Transmissions sent at a rate between once a second and once every 10 seconds.

The format is similar to the strings received from the survey computer.
Each transmission consists of a header, followed by any number of readings separated using comma characters, followed by a carriage return (ASCII code 13 decimal) and a linefeed (ASCII code 10 decimal).
The header consists of the single character '#'. This is the character with ASCII code 35 decimal. This must be sent at the start of every transmission.
Each reading consists of :

1. A variable number of uppercase ID characters which indicate the meaning of the reading.

2. A plus sign ('+' ASCII code 43 decimal) or a minus sign ('-' ASCII code 45 decimal) to indicate the sign of the reading. If the reading is positive the plus sign may be omitted.

3. At least 1 decimal digit, but not more than 20 decimal digits. A decimal digit is any character between '0' and '9', with ASCII code between 48 and 57 decimal inclusive.

4. A decimal point ('.' ASCII code 46 decimal).

5. Between 0 and 20 decimal digits. If no digits are sent after the point then the decimal point character must be omitted.
If a particular reading is not known then the ID characters should be sent, immediately followed by a single question mark character ('?' ASCII code 63 decimal).

The ID characters which must be recognized are:
1. PIT – This precedes a vehicle pitch reading which is specified in degrees. A negative number indicates that the vehicle is pitching nose down, a positive number indicates the vehicle is pitching nose up.

2. ROL - This precedes a vehicle roll reading which is specified in degrees. A negative number indicates that the vehicle is rolling to port, a positive number indicates the vehicle is rolling to starboard.

3. VH – This precedes a vehicle heading reading which is specified in degrees from north. It is greater than or equal to 0 and strictly less than 360. It may be obtained either from the gyrocompass or from the fluxgate compass and includes any offsets to compensate for gyro slew or local adjustments for magnetic north (fluxgate offset). In short, the reading is identical to the reading displayed on the compass display of the Olympian T system at the moment the transmission is sent.

4. ALT – This precedes a vehicle altitude reading specified in metres. Positive numbers indicate a height above the seabed. Negative numbers indicate the vehicle is below the seabed which in theory should never happen, but in practice may happen if the offset between the echo sounder and the bottom of the vehicle is configured incorrectly.

5. DEP – This precedes a vehicle depth reading specified in metres. Theoretically always positive, and increases as the vehicle goes deeper. In practice a negative reading may be sent.

6. TDEP – This precedes a tool depth reading specified in metres. A positive reading indicates the tip of the tool is beneath the seabed, a negative reading indicates the tip is above the seabed.

7. DDEP - This precedes a depressor depth reading specified in metres. A positive reading indicates the depressor sword is beneath the seabed, a negative reading indicates the sword is above the seabed. In the following examples the '↵' character is used to represent the carriage return character (ASCII code13 decimal), and the '↓' character is used to represent the linefeed character (ASCII code 10 decimal).

Examples of valid transmissions:

1.
#VH123.5,PIT-10.3,ROL+3.0,DEP123.6,ALT4.7↵↓
Note that a comma separates each reading, but no comma comes after the last reading. Instead a carriage return and linefeed are used.
2. #↵↓
This is the bare minimum that can be sent, but contains no useful information.
3.
#VH?,PIT?,ALT4.7,ROL?,DEP123.6,↵↓
This demonstrates how to indicate that no valid reading is available, and also shows that the order in which readings are sent does not matter.