

WinFrog Device Group:	ROV
Device Name/Model:	Orion
Device Manufacturer:	
Device Data String(s) Output to WinFrog:	\$POSCISIS,H:224.6,P:1.0,R:1.0,D:-0.6,*04
WinFrog Data String(s) Output to Device:	NONE
WinFrog Data Item(s) and their RAW record:	ROVDATA 496 ATTITUDE 413 HEADING 409 ELEVATION 372

DEVICE DESCRIPTION:

This is a driver designed to read ROV type data from the Orion ROV.

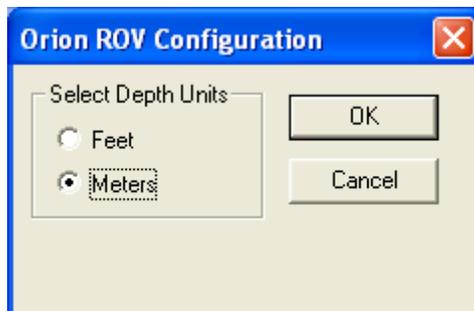
DEVICE CONFIGURATION INSTRUCTIONS

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 Orion ROV configuration dialog box appears, as seen below.



Select the units that the ROV depth is being output in.

WINFROG I/O DEVICES > DEVICE DECODE AND DISPLAY:

All decoded data is displayed in the I/O Device window with the associated status. The time of data receipt is always displayed if an ASCII message terminated with a LF is received. The following details the checks applied to the incoming telegram and the associated display information.

- Correct checksum. If this fails, the Received time is displayed followed by “(Failed Checksum)”.
- Correct header (\$POSCISIS). If this fails, the Received time is displayed followed by “(Wrong Message)”.
- Invalid characters. If this fails, the Received time is displayed followed by “(Invalid Chars)”. Note that this case is unlikely to occur because invalid characters would most likely be due to corrupt data, which would be detected by the test of the checksum.
- Heading is $\geq 0^\circ$ and $< 360^\circ$. If heading is OK, the value is displayed followed by “OK”, if it is not, the value is followed by “Bad”.
- Pitch¹ is between 90° and -90° . If pitch is OK, the value is displayed followed by “OK”, if it is not, the value is followed by “Bad”.
- Roll¹ is between 90° and -90° . If roll is OK, the value is displayed followed by “OK”, if it is not, the value is followed by “Bad”.
- Depth is $\geq -10\text{m}$ and $\leq 10000\text{m}$. If depth is OK, the value is displayed followed by “OK”, if it is not, the value is followed by “Bad”. Note that the minimum depth being negative allows for a depth while ROV is on deck.

¹ Large pitch and roll values are allowed to allow for instances when the ROV may not be in an upright orientation as a result of problems.

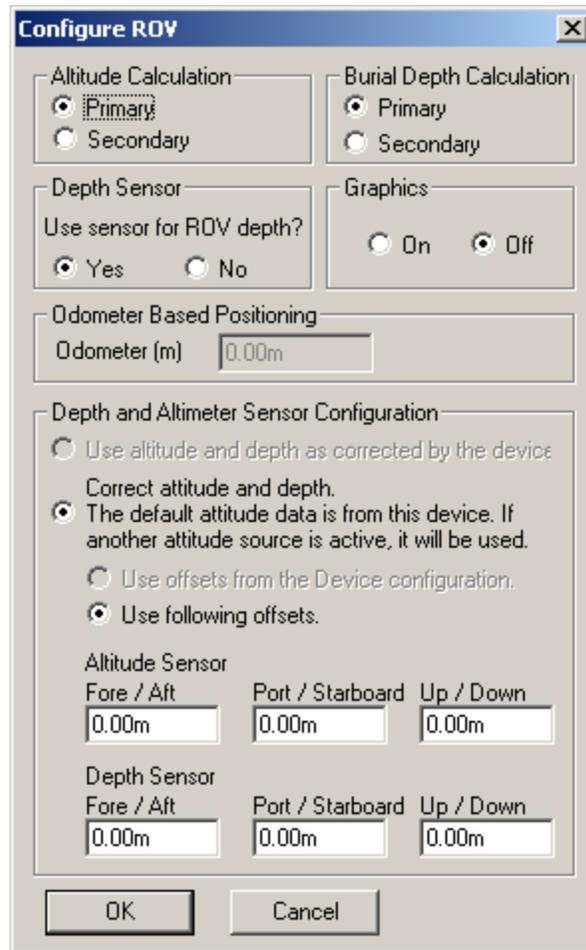
If a value is flagged as bad, it is not passed to the respective vehicle via the associated data item. In the case of the ATTITUDE data item, both the pitch and roll must be OK in order to be passed to the vehicle. In the case of ROVDATA, all components must be OK.

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

Adding the Orion device creates four data items: ROVDATA, ATTITUDE, HEADING, and ELEVATION. Once the data items have been added to the vehicle, they must be edited to suit the application.

Data item: ROV, ORION ROV, ROVDATA

This data item is designed to read specific ROV type data from this device. Highlight this data item in the vehicle’s device list and click the Edit button to open the Configure ROV dialog box as seen below. Note that not all configuration options are applicable.



Altitude Calculation: N/A

Burial Depth Calculation: N/A

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.

Use sensor for ROV depth

Selecting the Yes radio button will cause the depth of this vehicle’s CRP to be determined from the observed depth value found in the string from this device corrected for the depth offsets.

Selecting the No radio button will result in 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).

Odometer Based Positioning: N/A

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 device documentation for information on setting these radio buttons.

Altitude Sensor: N/A

Depth Sensor

Offsets of the respective depth sensor, relative to the CRP, are entered here. The offset position will be corrected for pitch and roll then the vertical offsets will be applied to determine the depth of the ROV.

Data item: ROV, ORION ROV, ATTITUDE

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

The screenshot shows the 'Attitude' dialog box with the following sections and controls:

- Application Control:**
 - On Off
 - Do not use data if error flag is set
 - High frequency update rate (apply interpolated data)
 - Low frequency update rate (apply closest data)
- Pitch Controls:**
 - 0.000000 Pitch Correction (d.dd) (+ is Bow Up)
 - Filter incoming data
 - 30 Filter Length (Max 30 samples)
 - 10.00 Data rejection threshold +/- the filter median value (d.dd)
- Roll Controls:**
 - 0.000000 Roll Correction (d.dd) (+ is Starboard Down)
 - Filter incoming data
 - 30 Filter Length (Max 30 samples)
 - 10.00 Data rejection threshold +/- the filter median value (d.dd)
- Primary Attitude Device Selection:**
 - Dropdown menu
- Primary Device Auto Switch:**
 - On Off
 - Age of data when switch occurs: 20.00
- Offsets:**

Fore/Aft	Port/Stbd	Height
0.000	0.000	0.000
- Acoustic Options:**
 - This data type is associated with an LBL system. Select the transponder to use for Attitude data. Note that the corrections for the selected transponder will be used.
 - Dropdown menu

Buttons: OK, Cancel, Help

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: N/A

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

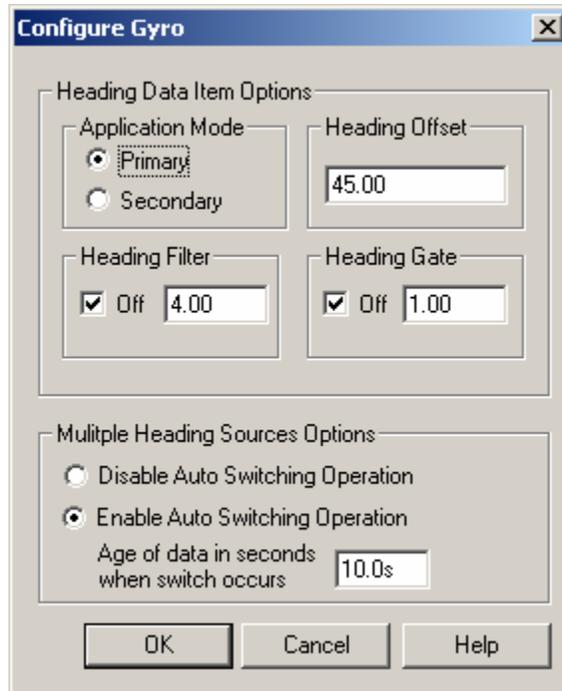
To use this feature first turn the sensor on as described in the Attitude section above. Next, select the attitude device that you wish to be primary from the drop down list box. Then turn the primary device auto switch on and enter the time out time. Then edit all the other attitude data items and enable 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: N/A

Acoustic Options: N/A

Data item: ROV, ORION ROV, HEADING

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.

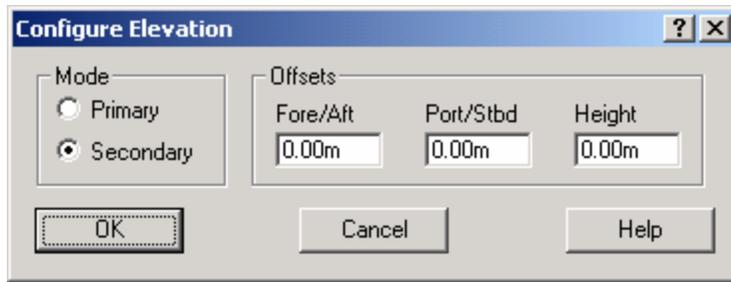
Age of data in seconds when switch occurs

Enter the age of data that is permitted before the source is considered to have failed.

Data item: ROV, ORION ROV, ELEVATION

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.



Assign the vehicle's height or depth by selecting the Primary or Secondary radio button on the dialog. In the Vehicle Text window, a vehicle's elevation (ELEV) will have the opposite sign of its depth (ROV D). The Height offset will be subtracted from the observed value. All the offsets are used for pitch and roll corrections.

TELGRAM SPECIFICATION:

The following is a sample of the comma delimited data telegram with checksum.

\$POSCISIS,H:224.6,P:1.0,R:1.0,D:-0.6,*04

where:

\$POSCISIS	header
H:224.6	heading
P:1.0	pitch (bow up is positive)
R:1.0	roll (starboard down is positive)
D:-0.6	depth (down is positive)