WinFrog Device Group:	**ROV**
Device Name/Model:	**Thales ROV**
Device Manufacturer:	
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:	HEADING 409 ATTITUDE 413 BOTTOMDEPTH 911 DATA OUTPUT 450 ROVDATA 496

DEVICE DESCRIPTION:

This is a driver designed to read ROV type data from either the Thales ROV, the Thales BV ROV or the Multibeam systems. It can also provide a configurable output of positions for both the ROV and ship. See the DATA OUTPUT data item description below for more details on configuring this output.

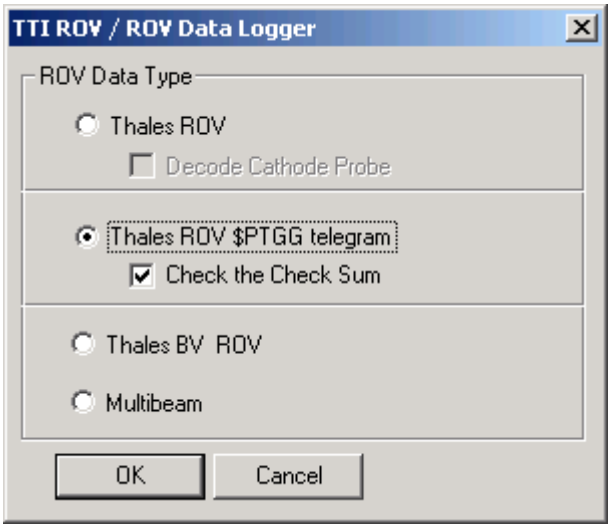
DEVICE CONFIGURATION INSTRUCTIONS

WINFROG I/O DEVICES > EDIT I/O:

Serial
Configurable Parameters
This device initiates a 2-way communication on the same serial port. The ROV data string is input into WinFrog from the ROV system and the calculated positions are output from WinFrog to the ROV system.

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 TTI ROV / ROV Data Logger dialog box appears, as seen below.



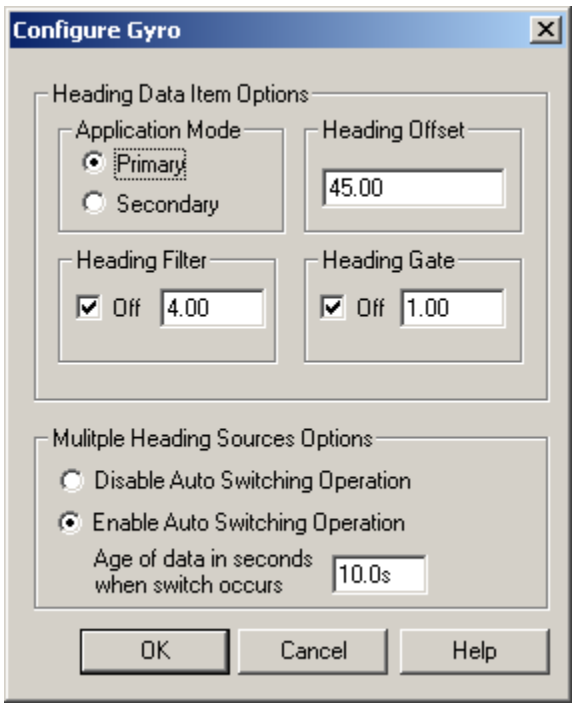
From this dialog box select the appropriate ROV Data Type. There are two formats for the Thales ROV the second is newer and follows the NMEA standard. If the first Thales ROV is selected, an option to decode cathode probe values is available. The second allows the choice of verfying the check sum or not. See the string specifications below. This option is not available for Thales BV or Multibeam selections.

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

Adding the Thales ROV device creates five data items: HEADING, ATTITUDE, BOTTOMDEPTH, DATA OUTPUT and ROVDATA. Once the data items have been added to the vehicle, they must be edited to suit the application.

Data item: ROV, Thales ROV, HEADING

If the heading data contained in the data string from the ROV is to be used to orient the ROV vehicle, this data item is added to the ROV vehicle's device list. 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.

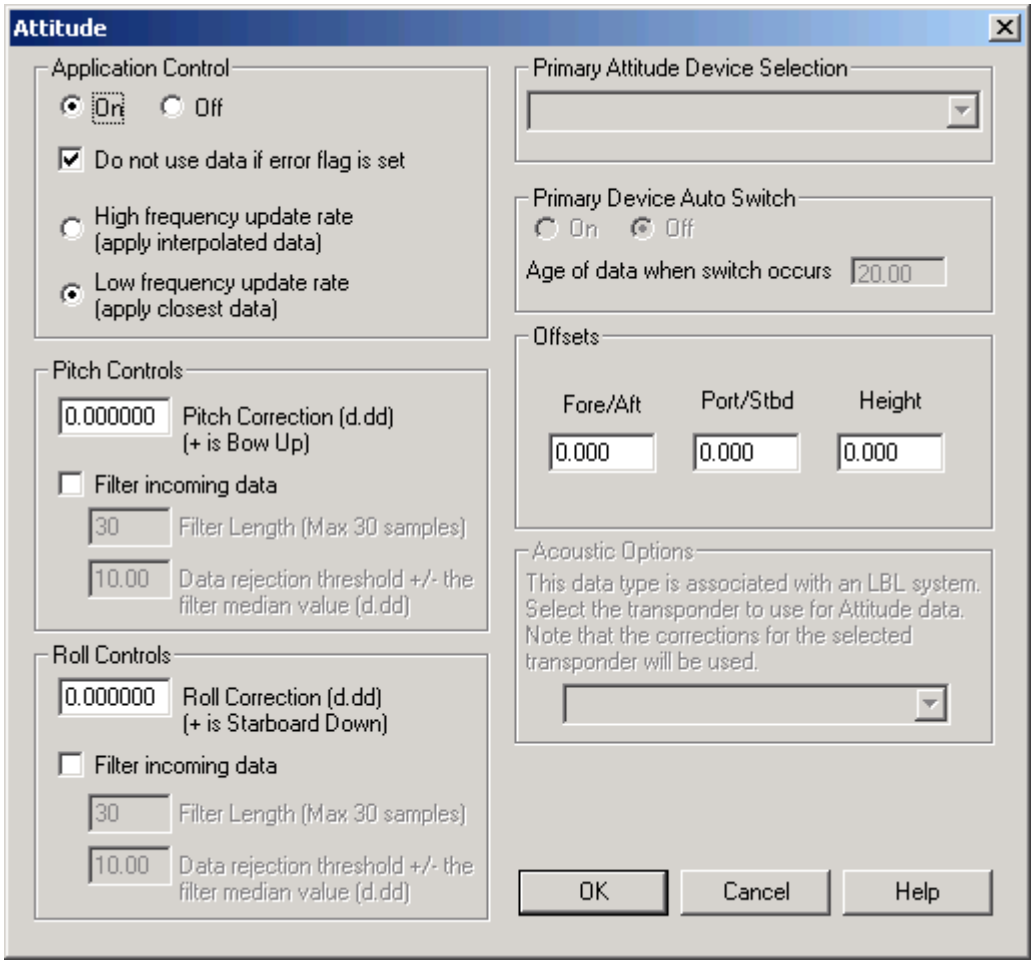
This option is not available in the WinFrog Remote package.

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, Thales ROV, ATTITUDE

If the attitude data contained in the data string from the ROV is to be applied to the ROV vehicle, this data item is added to the ROV vehicle's device list. Highlight this data item in the vehicle's device list 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.

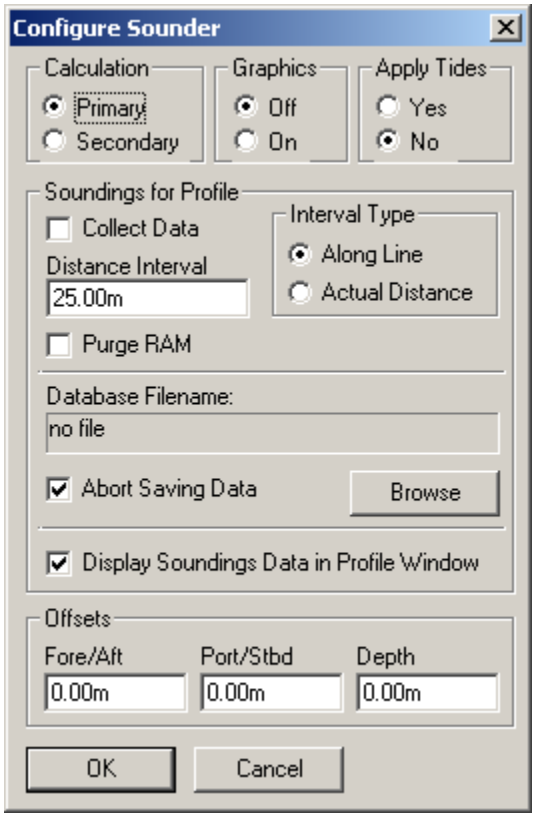
Auto Switch Feature Usage
To use this feature first turn the sensor on as described in the Attitude section above. Next, select the attitude device that you wish to be primary from the drop down list box. Then turn the primary device auto switch on and enter the time out time. Then edit all the other 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 chapter 17 for more information.

Data item: ROV, Thales ROV, BOTTOMDEPTH

Highlight this 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 depth sensor device. If there is more than one Primary depth sensor 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 depth sensor will simply be monitored.

Graphics:
Select the On radio button to display a labeled square representing the location of the depth sensor 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 is 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 window 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: A depth sensor is not a positioning device, and hence its horizontal offsets have no application. If the depth sensor'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 depth sensor data.

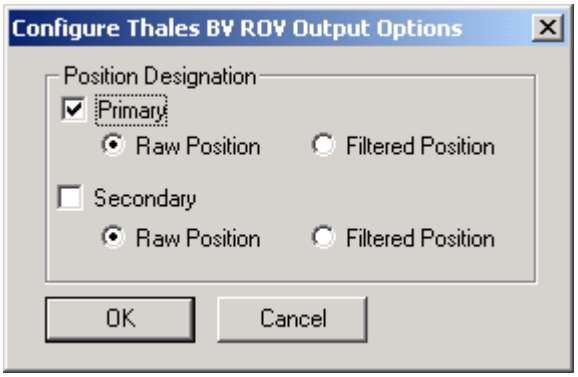
Depths displayed in the Vehicle Text window and recorded in automatic event (i.e. .DAT, .SRC, and .RCV) and type 351 raw files will refer to the corrected depths. Note that type 411 raw data records will remain truly raw and will not reflect the depth offset correction.

Data item: ROV, Thales ROV, DATA OUTPUT

This configuration is designed to output the Thales BV ROV position to the ROV Data Logging software/system NeSA ROV. This option is only used if the Thales BV ROV option is selected from the TTI ROV / ROV Data Logger dialog discussed in the WINFROG I/O DEVICES > CONFIGURE DEVICE section above. This item is rarely used now that Multi ROV is the standard for Thales ROV operations.

The items to choose from in the configuration dialog shown below are for the most part self-explanatory. The Position Designation can be chosen as Primary or Secondary, and the output data can be either the Raw Position or the Filtered Position as chosen in the Configure Vehicle-Devices dialog.

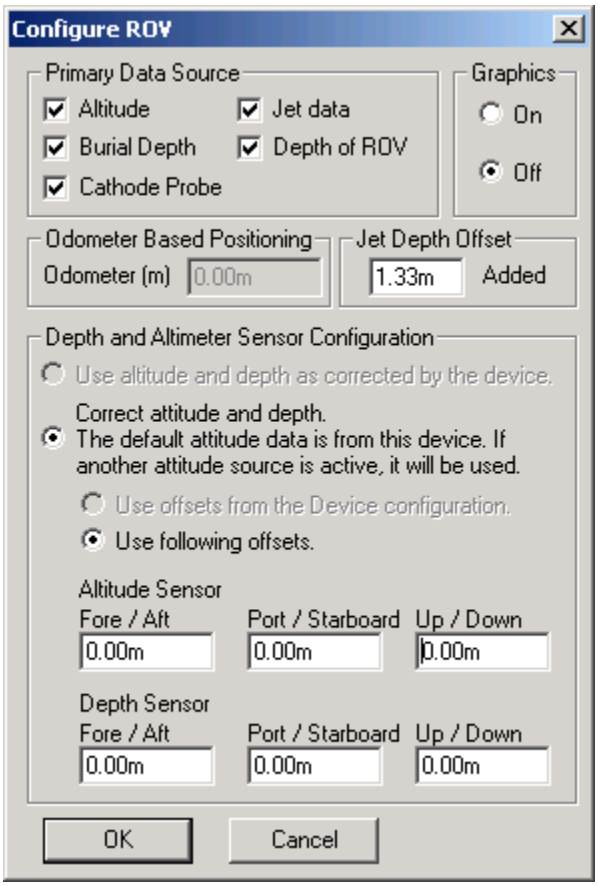
This item should not be modified unless the operator is fully aware of the results.



This option can enable a configuration such as Filtered USBL, from an ROV as Primary; and, Filtered GPS from a ship as Secondary. Another option supported is the Filtered USBL for an ROV as Primary, and the Raw USBL for the same as Secondary. For the latter configuration, it is important that the DATA OUTPUT device be added to only one vehicle, or that neither the Primary nor Secondary is selected on any vehicle other than the ROV.

Data item: ROV, Thales 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.



Primary Data Source Group Box
Checking any of the check boxes in this group causes the particular data to be assigned to the vehicle. If it is not checked it will still be stored in the raw record.

Altitude:
Checking this will result in this vehicle's altitude being determined from the observed altitude value found in the 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.

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

Burial Depth:
Only the Thales ROV using the $PTGG telegram contains a burial depth. And the value is only meaningful if the jetting sled is present. The value in the telegram

assigned to the burial depth is the depressor depth. If the jetting spread is not present then this and the jet data check box must be unchecked.

Cathode Probe:
Only the Thales ROV (old) telegram can contain the cathode probe data. If the probe is not present then this should be left unchecked.

Cathode Probe:
Only the Thales ROV using the $PTGG telegram contains jet sword or knife depth. And the value is only meaningful if the jetting sled is present. If the jetting spread is not present then this and the burial depth check box must be unchecked.

Depth of ROV:
Checking this will cause the depth of this vehicle's CRP to be determined from the observed depth value found in the telegram from this device plus the depth offset below. This vehicle's elevation will be the negative of this value. 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.

Leaving this unchecked 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).

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

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

Jet Depth Offset:
If the jetting spread is present an offset can be applied to the observed knife depth. The 496 raw record contains this value and the observed jet knife depth.

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.

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.

TELGRAM SPECIFICATIONS:

The input Telegrams from the various ROV systems to WinFrog are delimited strings that contain the following data;

Thales ROV

Field Data

1 heading

2 ??
3 depth
4 gyroError
5 pitch
6 roll
7 offsetDepth
8 time

Alternatively, if the string contains a cathode probe value, the format is:

Field Data

1 heading

2 ??
3 depth
4 gyroError
5 pitch
6 roll
7 offsetDepth

8 cathode probe voltage
9 time

Thales ROV $PTGG telegram

The telegram format is defined as followed:
$PTGG,ROV,Time,Heading,Altitude,Raw_Depth,Gyro_Error,Pitch,Roll,Offset_Depth,B_DepthD,DepressorD,Dis,Arm1_Dist,Arm2_Dist,Arm_Depth,Dps_Depth,*hh***CRLF**

Field	Description
$PTGG,ROV	This is the NMEA style header, Proprietary message, Thales Geosolutions Group, ROV Message.
Time	The time for which the data in the telegram is relative in the Format HH:MM:SS.
Heading	The current heading of the vehicle.
Altitude	The current altitude of the vehicle.
Raw Depth	The current depth of the vehicle.
Gyro Error	The difference between the two onboard gyros.

Pitch	The current pitch of the vehicle in the Thales convention. (Bow Up positive.)
Roll	The current roll of the vehicle in Thales convention. (Port down Negative.)
Offset_Depth	**Unused, but kept for backward compatibility.**
B_DepthD	**Unused, but kept for backward compatibility.**
DepressOrD	**Unused, but kept for backward compatibility.**
DIS	**Unused, but kept for backward compatibility..**
Arm1_Dist	Distance of Jetting Arm 1 from center of ROV(Top view). (mm)
Arm2_Dist	Distance of Jetting Arm 2 from center of ROV(Top view). (mm)
Arm_Depth	Arm depth from the bottom of ROV. (mm)
Dps_Depth	Depressor depth from the bottom of ROV. (mm)
*hh	A standard NMEA checksum, XOR of all characters between, but not including, the '$', '*', and CRLF.
CRLF	Carriage return and line feed.

Thales BV ROV

Field	Data
1	heading
2	pitch
3	roll
4	depth
5	altitude

Multibeam

Field	Data
1	??
2	??
3	heading
4	??
5	pitch
6	roll
7	depth
8	altitude

The output Telegrams from WinFrog to the various ROV systems are delimited strings that contain the following data;

If the ROV type is Thales BV ROV and the Position Designation Primary is checked (in the Configure Thales BV ROV Output Options dialog accessed through the Thales BV ROV button in the Configure Output Offsets dialog) then the output Telegram contains the following comma delimited data;

Field	Data
1	time (seconds)
2	currentEventNumber
3	pos_time (sec)
4	ROV Easting, // Primary E
5	ROV Northing, // Primary N
6	shipEast, // Secondary E
7	shipNorth, // Secondary N
8	ROV Dop, // Primary pdop
9	shipPdop, // Secondary pdop
10	kp, // kp in m
11	xt, // dist offtrack
12	shipHeading, // nav gyro
13	shipSdrDepth, // nav depth
14	FixLogStatus, // fixing 1, logging 2, logging and fixing 3
15	conv, // convergence
16	0.0, // PL_hdg
17	0.0, // doppler y
18	0.0, // doppler m
19	0.0, // doppler b
20	ROV Lat, // Primary Lat for FOG gyro
21	ROV Lon, // Primary Lon for FOG gyro
22	spd, // Primary speed for FOG gyro
23	adv // Primary CMG for FOG gyro

If the ROV type is Multibeam and the Position designation primary is checked (in the Configure Thales BV ROV Output Options dialog accessed through the Thales BV ROV button in the Configure Output Offsets dialog) then the output Telegram contains the following comma delimited data;

Field	Data
1	$PRPC
2	POS

3 ROV1,

4 DATUM

5 yymmdd

6 hhmmss

7 lat N

8 lon W

9 prDop

10 Easting

11 Northing

12 0.00

13 kp

14 xt // cross track

15 log_status

16 fileNameInOutStr

17 direction*hh\x0D\x0A