WinFrog Device Group:	**INS**
Device Name/Model:	**Seatex MRU 4 & 6**
Device Manufacturer:	**NAVIA Maritime AS, Seatex Division** Pirsenteret, N-7462, Trondheim, Norway Tel: +47 73 54 55 00, Fax: +47 73 51 50 20 http://www.seatex.no **Seatex Inc.** 911 Western Avenue, Suite 302, Seattle, WA 98104-1031, USA Tel: +1 206 903 8393; Fax: +1 206 903 8394 **Seatex Ltd.** Suite 1, Old Skene Road Westhill, Aberdeen AB32 6RL Tel: ++44 1224 744625; Fax: ++44 1224 744626 Duty phone: +44 (0) 831 349277 e-mail: sales@seatex.demon.co.uk
Device Data String(s) Output to WinFrog:	Variable but begins with $PSXN
WinFrog Data String(s) Output to Device:	Nil
Data Types	ATTITUDE, HEADING, HEAVE
WinFrog .raw Data Record Type(s):	Type 413 (Attitude): Time, Pitch, Roll, Status Type 888 (Heave): time, heave, roll, pitch, yaw, heave velocity, heave acceleration Type 410 (Heading): Time, heading, status, delta time, … repeat last four items 14 times. Type 910 (Heading for events): Time heading status

DEVICE DESCRIPTION:

The MRU 4 or 6 is one of seven different models of MRU's (Motion Reference Units) produced by Seatex Inc. The models include the MRU-1 through MRU-6 and the MRU-H. These units vary in capability (the higher the model number the more capable) and depending on model, can provide some or all of the following data:

- Pitch (radians)
- Roll (radians)
- Yaw (radians)
- Heave (M)
- Heave velocity (m/s)
- Heave Acceleration (m/s/s)
- Heading (Magnetic from Fluxgate Compass) (radians)

The MRU 4 or 6 can be used for motion compensation in swathe bathymetric echo sounders, DP systems, ROVs, high-speed (high dynamics) vessel motion damping systems and tow-fish systems.

Although the MRU 4 or 6 offers many data output variables, the WinFrog driver only decodes pitch, roll, yaw, heading, heave, heave velocity and heave acceleration. WinFrog allows for any order of input. WinFrog only decodes the ASCII $PSXN NMEA style format and the data must be in the floating point format.

WinFrog can be configured to apply the attitude data to remove device and tracking offsets caused by the vehicle's pitching and rolling motion. These calculations include reducing the GPS antenna position to the Z datum zero reference, removing apparent vehicle wandering due to the vehicle's pitch and roll.

DEVICE CONFIGURATION INSTRUCTIONS:

Baud Rate: Software configurable between 1200 and 56000 baud
Data Bits: 8
Stop Bits: 1
Parity : None
Handshake: None

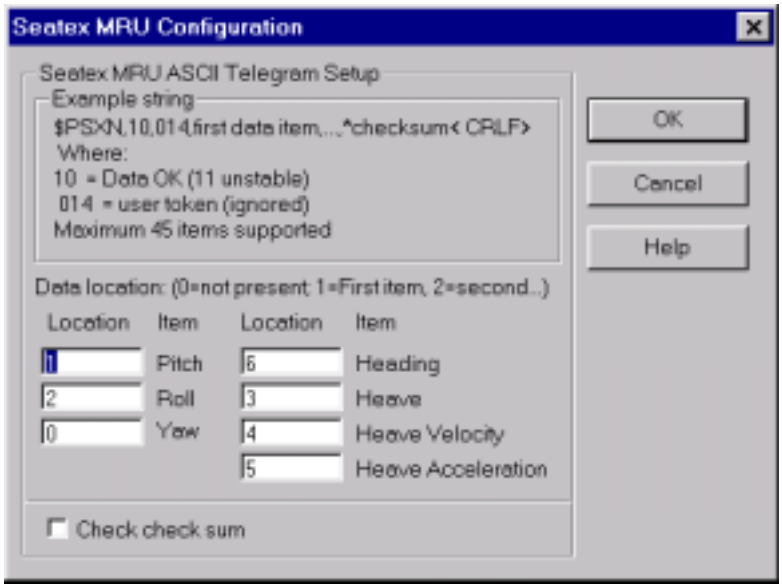
WINFROG I/O DEVICES > CONFIG OPTIONS:

The Seatex MRU 4 & 6 is added to WinFrog from the INS device category. Adding an MRU 4 & 6 creates the ATTITUDE, HEADING and HEAVE data items.

In the Decoded Data display, you can view the raw data from the unit. The time difference between readings is also displayed.

Note: In WinFrog, as in the MRU 4 or 6, the Pitch angle is positive for Bow up. The Roll angle is positive for Starboard Down.

The MRU 4 & 6 must be configured at the "generic" I/O Devices level. Highlight the MRU 4 & 6 in the I/O Devices window and then right-click and select Configure Device. The Seatex MRU 4 & 6 INS Configuration dialog box appears as seen below.



Enter the location of each data item in the telegram numbered from the first data item. Thus the first data item is actually the forth element in the telegram. If the data item is not present enter 0. A maximum of 45 data items are allowed in the telegram of which WinFrog only supports 7.

Check check sum:
If the MRU has been configured (via Seatex's MRC software) to include a check sum in its output data string, this box may be checked. If the telegram does not include the check sum and this box is checked no data will be decoded.

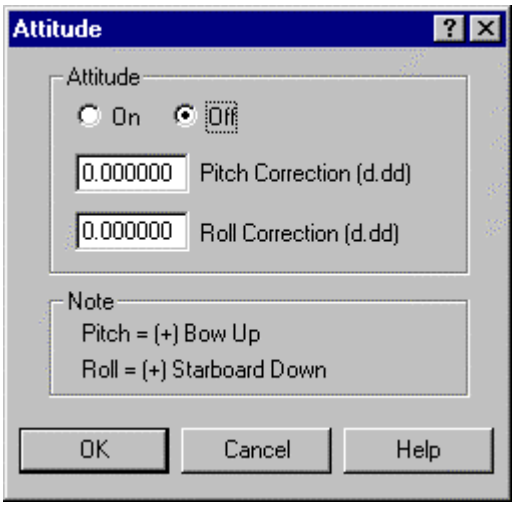
WINFROG VEHICLE TEXT WINDOW > CONFIGURE VEHICLE DEVICES > DEVICES > EDIT OPTIONS:

ATTITUDE

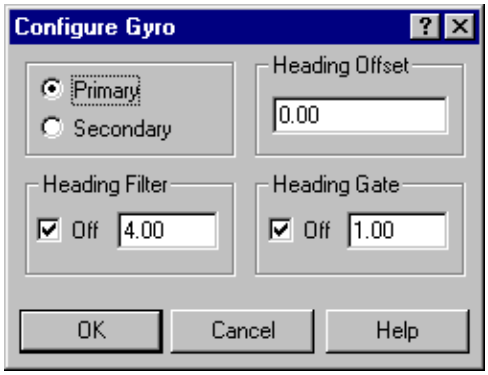
When the MRU 4 & 6's Attitude data item is added to a vehicle's device list, it must be edited to suit the application. To edit the device, in the vehicle's devices list highlight the INU,Seatex MRU 4 & 6, Attitude data item and click the Edit button.
The Attitude dialog box appears as seen below.

By default, the sensor is OFF. In order for WinFrog to apply the attitude information in the position calculations, you must click the "On" radio button.

Pitch and Roll Correction values can also be entered in this window. The correction values are in degrees-decimal degrees. These values are added to the raw pitch and roll data received from the MRU 4 & 6. Note the sign conventions used by WinFrog in referring to pitch and roll.



HEADING
Once the heading data item has been added to the vehicle's device list, it must be edited to suit the application. In the appropriate vehicle's device list, highlight the heading data item and click the Edit button. The standard Configure Gyro dialog box appears as seen below.



Calculation (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.

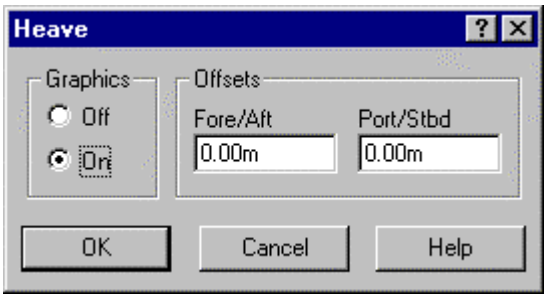
In the case of Primary device failure, WinFrog will not automatically use the Secondary device(s). You must manually change a Secondary device to Primary status in order for it to be used in the vehicle's calculations.

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 MRU 4 or 6 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 compass readings. If the next observed value falls outside the specified range of predicted values (i.e. plus or minus the entered value), the value will not be used.

HEAVE
When the Heave data item is edited, the Heave dialog box appears as seen below.



Graphics:
The Graphics Off/On radio buttons have no application at this time. This is to say that when the graphics is turned on, no display of the unit’s position will appear.

Offsets:
The Fore/Aft and Port/Stbd entry boxes allow you to enter Offsets of the MRU sensor from the vessel’s Common Reference Point (CRP).

The heave data is only recorded for use in post processing, i.e. if an echo sounder is added to WinFrog, recorded depths are not corrected for heave. If real time heave corrected depth data is required, you must use an echo sounder that is capable of interfacing to the MRU and applying the heave data internally. WinFrog does not make the correction as the time delays can cause erroneous results.