Chapter 12: Simulator

WinFrog includes the capability to simulate input device data. The simulated devices are designed to mimic real devices as closely as possible. By adding simulated devices, a new (or experienced) user can experiment with WinFrog to learn about the software's capabilities and options without risking downtime on important projects.

Currently, WinFrog supports the following **Simulated Devices**:

- GPS (position only - no pseudorange simulation)
- Echosounder
- Gyrocompass
- USBL
- LBL Acoustic
- Speed Log
- Profiler (found in the ROV Device Category)
- SeaPlow (found in the ROV Device Category)
- Counter
- INS
- Range/Range

You can configure **Simulated Vehicle Operations** in two different ways:

1 Set the **Vehicle's Data Source** to **Simulated**.

Note: this option is not recommended as you are unable to control which devices are made available. Only basic navigation and survey abilities such as positioning, heading, and depth are available.

2 However, if you set the **Vehicle's Data Source** to **Real-Time** and add **Simulated Devices** from the list above you can configure each device. Each simulated real-time device has a configuration dialog box to define various operational parameters for that device type. Overall, this choice provides both more device choices and a more realistic simulation.

The following sections detail both methods.

Simulated Devices

To Set the Vehicle Data Source to Simulated

1 Open the **Configure Vehicles** dialog box by **1a or 1b**.

1a In the **Vehicle Text** window (**View > Vehicle Text**), right click then select the **Configure Vehicle Devices** button.

1b In the **Configure Vehicles** dialog box (**Configure > Vehicles**), click the **Configure Vehicle Devices** button.

2 In the **Data Source** area of the **Configure Vehicles Devices** dialog box, click the **Simulated** radio button.

To Add a Simulated Real-Time Device

1 From the **View** menu, select **I/O Devices**.

2 With the mouse pointer in the left (white) portion of the **I/O Device** window, click the right mouse button and select **Add Device**.

A list of all of the different **Device Categories** available is displayed.

3 Click on the "+" beside the **Category** of the **Simulated Device** to be added (as per the list above). A list of the different supported models of that **Device Category** will now appear.

4 Click **OK**.

5 Select the desired **Simulated Device**.

6 Click **OK**.

The chosen **Simulated Device** is now added to WinFrog.

This device must still be "generically" configured, added to the appropriate vehicle, and configured specifically for that vehicle. Finally, the **Simulator Tools** must be enabled and configured to control the **Simulated Device** in real-time.

The following sections detail these steps in the order mentioned above.

To "Generically" Configure a Simulated Device

1 Highlight the appropriate **Simulated Device** in the **I/O Devices** window.

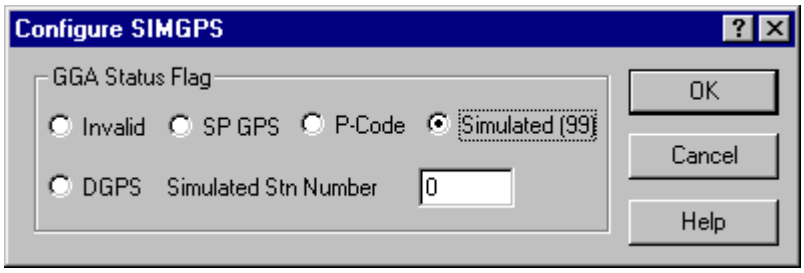
2 Click the right mouse button and select **Configure Device**.

Depending on the type of **Simulated Device** that you have selected, a **Configuration** dialog box may or may not appear, as per the following list;

- GPS - Configure SIMGPS
- Echo Sounder - No
- Gyrocompass - No
- USBL - Configure Sim USBL
- LBL Acoustic - No
- Speed Log - No
- Profiler - No
- SeaPlow - Plow Simulator
- Counter - Simulation Counter Configuration
- INS - Configure Simulated Attitude Sensor
- Range/Range - No

The following sections detail each of these **Configuration** dialog boxes in the order listed above.

To Configure the Simulated GPS Device



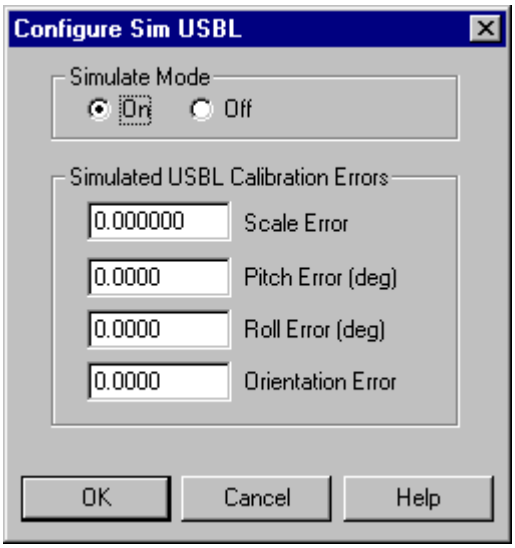
The **Configure SIMGPS** dialog box, as seen above, offers the following options.

Invalid	Simulates an invalid NMEA GGA GPS position. Status = 0.
SP GPS	Simulates a single point Non-Differential NMEA GGA GPS position. Status = 1.
P-Code	Simulates a P-code military precise GPS position or RTK position. Status = 3.
Simulated (99)	Simulates a Fugro proprietary status. Status = 99.
DGPS	Simulates a differentially corrected NMEA GGA GPS position. Status = 2.
Simulated Stn Number	Identifies the station number of the source of the DGPS corrections (for use with DGPS option above).

1 Select the radio button beside the desired choice.

2 Select **OK** to close the window and enact the changes.

To Configure the Simulated USBL Device



The **Configure SIMUSBL** dialog box, as seen above, offers the following options.

Simulate Mode	Use these to enable the USBL simulator.

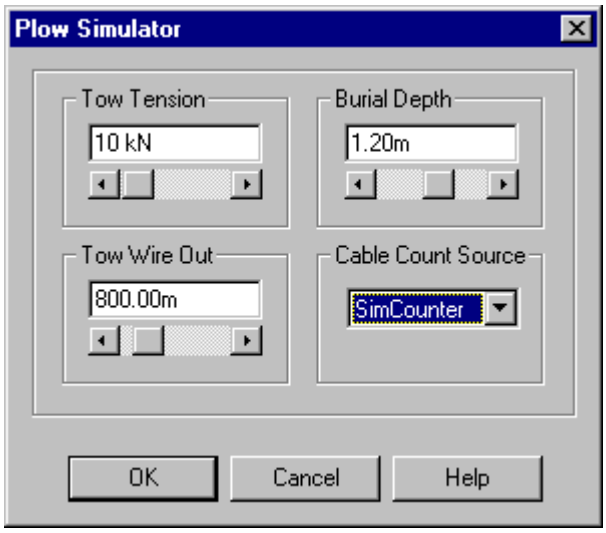
Simulated USBL Calibration Errors	The four entry windows allow you to include various errors in the simulated **USBL** data string.

1 Select the **On** radio button to enable the USBL simulator.

2 Highlight the appropriate window and enter values as desired.

3 Select **OK** to close this window and enact the changes.

To Configure the Plow Simulator



The **Plow Simulator** dialog box offers the following options.

Tow Tension	Entry window and slide bar allow you to change the **Tow Tension** value.
Burial Depth	Entry window and slide bar allow you to change the **Burial Depth** value.
Tow Wire Out	Entry window and slide bar allow you to change the **Tow Wire Out** value.
Cable Count Source	Lists the available options.

1 Either highlight the entry window and enter the required value or move the sliding bar (found below the entry window) to change the **Tow Tension** value.

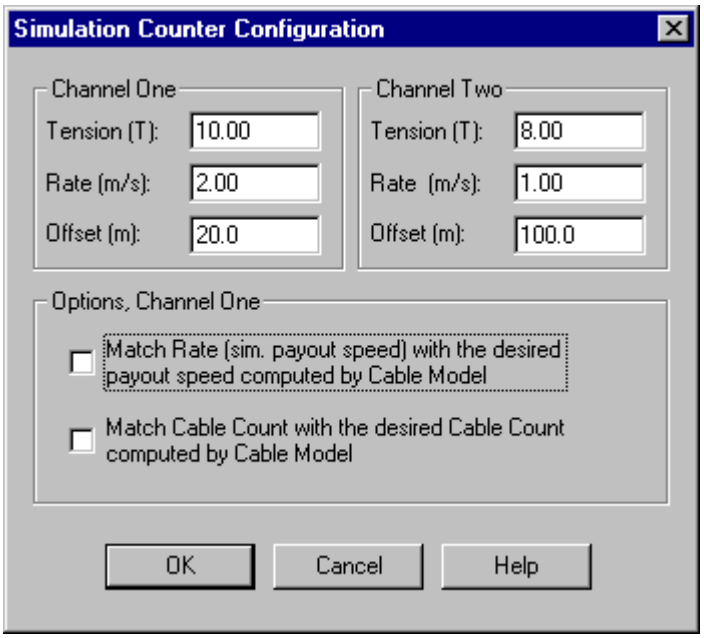
2 Either highlight the entry window and type in the required value or move the sliding bar (found below the entry window) to change the **Burial Depth** value.

3 Either highlight the entry window and type in the required value or move the sliding bar (found below the entry window) to change the **Tow Wire Out** value.

4 Select a **Cable Counter** device from the options presented in the **Cable Count Source** dropdown box.

5 Select **OK** to close this window and enact the changes.

To Configure the Simulated Counter



The **Simulation Counter Configuration** dialog box, as seen above, offers the ability to configure 2 separate channels for the same (single) device. As well, additional options are presented for configuring Channel 1 to be controlled by the real-time cable model calculations.

Channel 1 and Channel 2

Tension	Entry window allows you to set the desired tension. units = tons
Rate	Entry window allows you to set the cable payout speed. units = meters/second
Offset	Entry window allows you set the offset value. unit = meters

Options, Channel 1

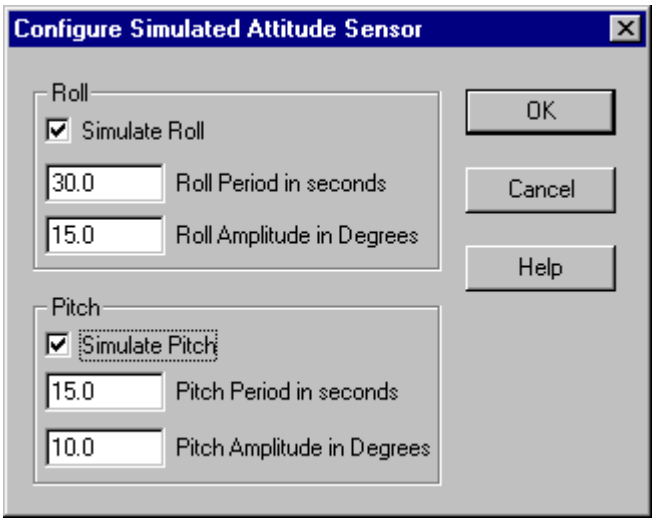
These options will supercede those values entered above.

Match Rate	This checkbox enables WinFrog's Cable Model to control the simulated rate of cable payout.
Match Cable Count	This checkbox enables WinFrog's Cable Model to control the simulated cable count.

1. Enter the desired tension (in tons) in the **Tension** entry window.
2. Enter the desired rate (in meters/second) in the **Rate** entry window to set the cable payout rate.
3. Enter the desired counter **Offset** value (in meters).
4. Check the **Match Rate** option to have WinFrog's Cable Model control the simulated rate of cable payout.

5 Check the **Match Cable Count** box if you want to have WinFrog's Cable Model control the simulated cable count.

To Configure the Simulated Attitude Sensor



The **Configure Simulated Attitude Sensor** dialog box, as seen above, allows you to configure the **Period** and **Amplitude** for **Simulated Pitch** and **Roll** data.

Roll

Simulate Roll	Enables the simulated **roll** data.
Roll Period in seconds	Entry window allows you to set the **Roll Period**.
Roll Amplitude in Degrees	Entry window allows you to set the **Roll Amplitude**.

Pitch

Pitch Period in seconds	Entry window allows you to set the **Pitch Period**.
Pitch Amplitude in Degrees	Entry window allows you to set the **Pitch Amplitude**.

1 Check this **Simulate Roll** checkbox to enable the **Simulated Roll** data.

2 Enter the desired value in seconds in the **Roll Period** entry window.

3 Enter the desired value in degrees in the **Roll Amplitude** entry window.

4 Click in this window and type in the desired value.

5 Click in this window and type in the desired value.

6 Select **OK** to close this window and enact the changes.

To Add a Simulated Real-time Device to a Vehicle

1 Open the **Configure Vehicle Devices** dialog box by using method **1a or 1b**.

1a In the **Vehicle Text** window (**View > Vehicle Text**), click the **Configure Vehicle-Devices** button.

1b In the **Configure Vehicles** dialog box (**Configure > Vehicles**), click the **Configure Vehicle-Devices** button.

2 Make sure the **Real-Time** radio button is selected in the **Data Source** area.

3 Click the **Add** button.

4 Select the desired **Simulated Real-time Device** in the **Select Data Items** dialog box.

5 Click **OK**. The **Simulated Real-time Device** is listed in the vehicle's **Devices** list of the **Configure Vehicle Devices** dialog box.

6 To add more **Simulated Real-time Devices**, repeat steps **2** through **5**.

To Configure a Simulated Real-time Device for a Specific Vehicle

Once any device (real-time or otherwise) has been added to a WinFrog vehicle (as described immediately above), it must be correctly configured for that specific installation. The following section details how to access the configuration options for any device that has been added to a vehicle.

1 Open the **Configure Vehicle-Devices** dialog box by using method **1a or 1b**.

1a In the **Vehicle Text** window (**View > Vehicle Text**), click the **Configure Vehicle-Devices** button.

1b In the **Configure Vehicles** dialog box (**Configure > Vehicles**), click the **Configure Vehicle-Devices** button.

2 Make sure the **Real-Time** radio button is selected in the **Data Source** area.

3 Highlight the appropriate device in the **Devices** list.

4 Click the **Edit** button.

5 A **Configuration** dialog box will appear for that particular device. See the **Peripheral (I/O) Devices** chapter for more information on **Device Configuration**.

6 Configure the device as required and then click on the **OK** button to return to the **Configure Vehicle-Devices** dialog box.

7 Repeat steps **3 - 6** for each device listed in the vehicle's **Devices** list.

8 Click **OK** to close the **Configure Vehicle-Devices** window and enact the changes.

Controlling Simulated Devices

Once a **Simulated Device** has been added to a vehicle's **Device List**, WinFrog treats it just like any other device. Those devices designated as **Primary** will control or affect the vehicle just like a "real" device.

WinFrog allows you to control the behavior of several **Simulated Devices** through the use of **Toolbar** or **I/O Device Window Configuration** options.

The following section details those simulator tools found in WinFrog's toolbar; **Speed, Heading,** and **ROV Depth**.

See the section above named **To Generically Configure a Simulated Device** for details on controlling a device through the **I/O Device Window Configuration** options.

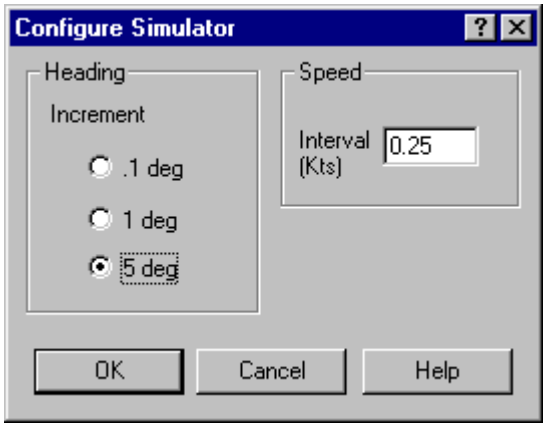
Controlling the Simulated Devices Via The Toolbar Buttons

You can control the **Position, Speed, Heading**, and **Depth** of a vehicle that has been configured with **Simulated** devices. This is accomplished through the toolbar buttons located below the WinFrog menu bar.

This section details the configuration and use of the **Simulator** buttons in the toolbar. For more information about the toolbar, see the **Toolbar** section of the **Introduction** chapter.

To Configure the Toolbar Button Controls

1 From the main menu item **Configure**, select **Simulator** to open the **Configure Simulator** dialog box.



The following parameters are configured using the **Configure Simulator** dialog box.

Heading - Increment

.1 deg radio button — Sets the simulated heading to change by one tenth (0.1) of a degree each time the toolbar's **Turn Left** button or **Turn Right** button is clicked.

1 deg radio button	Sets the simulated heading to change by one (1.0) degree each time the toolbar's **Turn Left** button or **Turn Right** button is clicked.
5 deg radio button	Sets the simulated heading to change by five (5.0) degrees each time the toolbar's **Turn Left** button or **Turn Right** button is clicked.

Speed

Interval (knts)	Enter a value that defines the amount that the vessel's Speed will change each time the toolbar's **Increase Speed** or **Decrease Speed** button is clicked.

Toolbar Simulator Controls

WinFrog's default configuration enables 6 simulator controls in the main toolbar. These buttons are shown in their default locations (**27**-**32**) below. All of the buttons in the toolbar are "dockable", so the location of your **Simulator Controls** may differ.

To Use the Toolbar Simulator Control Buttons

This section details each of the **Simulator Control** buttons, in the order that they are found in the toolbar.

Note: The toolbar buttons act on the vehicle that was last selected in any Vehicle Text window for display. At launch, in order to start using the simulator toolbar buttons, a vehicle must be selected for display in a Vehicle Text window to initiate this association.

Turn Left (**27**)	The vehicle's **Simulated Heading** will turn to **left** (port) by the specified amount each time this button is clicked.
Turn Right (**28**)	The vehicle's **Simulated Heading** will turn to the **right** (starboard) by the specified amount each time this button is clicked.
Decrease Speed (**29**)	The vehicle's **Simulated Speed** will **decrease** by the specified amount each time this button is clicked. **Note:** If you click this button too many times, the vehicle will start moving backwards.
Increase Speed (**30**)	The vehicle's **Simulated Speed** will **increase** by the specified amount each time this button is clicked.
Increase ROV Depth (**31**)	The vehicle's **Simulated Depth** will **increase** by 10 meters each time this button is clicked. Do not confuse this **Depth** of the **Vehicle** value as water depth.

Decrease ROV Depth (**32**) The vehicle's **Simulated Depth** will **decrease** by 10 meters each time this button is clicked.