Chapter 6: Vehicles

WinFrog allows you to define up to 25 vehicles for real-time navigation, tracking, and data collection purposes. A vehicle may be a vessel, an ROV, a towed body, a sea plow or any other object associated with navigational data.

WinFrog provides you the ability to modify various vehicle parameters, including its name, size, shape, color, tracking offsets, associated devices, fairleads, and event generation capabilities. In order to ensure consistency throughout a project, it is suggested that all configuration be complete before any real-time navigation or data collection begins.

All vehicle configuration parameters (and all other WinFrog parameters) are saved in the **WinFrogini.wfg** file. **Note:** the **WinFrogini.wfg** file is overwritten with the current configuration each time WinFrog is exited correctly. WinFrog reads this same file each time the program is started.

WinFrog's configuration can also be saved without exiting the program by creating a **System Config (.cfg)** file. A **.cfg** file can be loaded at any time, re-configuring WinFrog instantly to reflect the stored configuration parameters. The vehicle's shape can be saved in a separate **.veh** file, eliminating the need to manually enter the various dimensions each time that particular vessel is used.

This chapter discusses WinFrog vehicles and is divided into three main sections: **Adding a Vehicle**, **Configuring a Vehicle**, and **Deleting a Vehicle**.
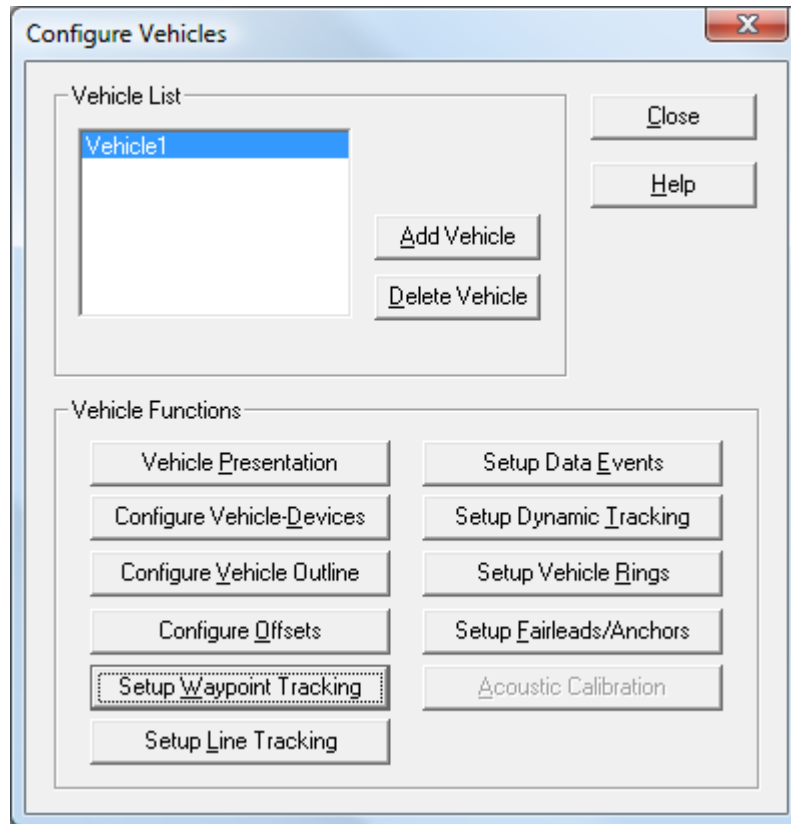
Adding a Vehicle

By default, WinFrog is configured with a single vehicle named **Vehicle1**. However, various types of projects, such as ROV, towed body, or anchor handling operations, require the configuration of multiple vehicles. Each vehicle that is created within WinFrog must be modified to suit its individual configuration.

To Add a Vehicle to WinFrog

1 From the **Configure** menu, choose **Vehicles**.

WinFrog opens the **Configure Vehicles** dialog box, as seen below.

2   Click the **Add Vehicle** button.

The vehicle added is given the name **VehicleX,** where **X** is the next sequential number available.

Configuring a Vehicle

The configuration of a vehicle is an essential step in any work using WinFrog. For example, whenever a new vehicle is created you must configure the vehicle to inform WinFrog which devices will be used to provide navigation information for the vehicle. You may also want to detail the ship's shape more accurately to assist in real-time interpretation of WinFrog's **Graphics** displays. These changes must be initiated at the start of the project to ensure that all real-time navigation and subsequent data collection operations are accurate.

The **Configure Vehicles** dialog box has the following eleven configuration buttons:

- Vehicle Presentation
- Configure Vehicle - Devices
- Configure Vehicle Outline
- Configure Offsets
- Setup Waypoint Tracking
- Setup Line Tracking
- Setup Data Events (Disabled if the vehicle is not set as the Primary Event vehicle.)
- Setup Dynamic Tracking

- Setup Vehicle Rings
- Set up Fairleads/Anchors
- Acoustic Calibration (Disabled if no acoustic device is associated with the vehicle.)

The eleven options are listed above in the order that you would approach them in a typical WinFrog operation. These eleven buttons open dialog boxes that control the configuration of the many vehicle parameters available in WinFrog. For example, to access the configuration parameters associated with a vehicle's position calculations, you would highlight the desired vehicle using the mouse, and then click the **Configure Vehicle-Devices** button. In this example, WinFrog would open the **Configure Vehicle-Devices** dialog box. You would then make the desired modifications to the position calculations parameters and click the **OK** button. When all configuration changes have been made, clicking the **Close** button in the **Configure Vehicle-Devices** dialog box would return you to WinFrog's main menu. Each of these buttons (and their associated configuration options) are discussed in the following sections.
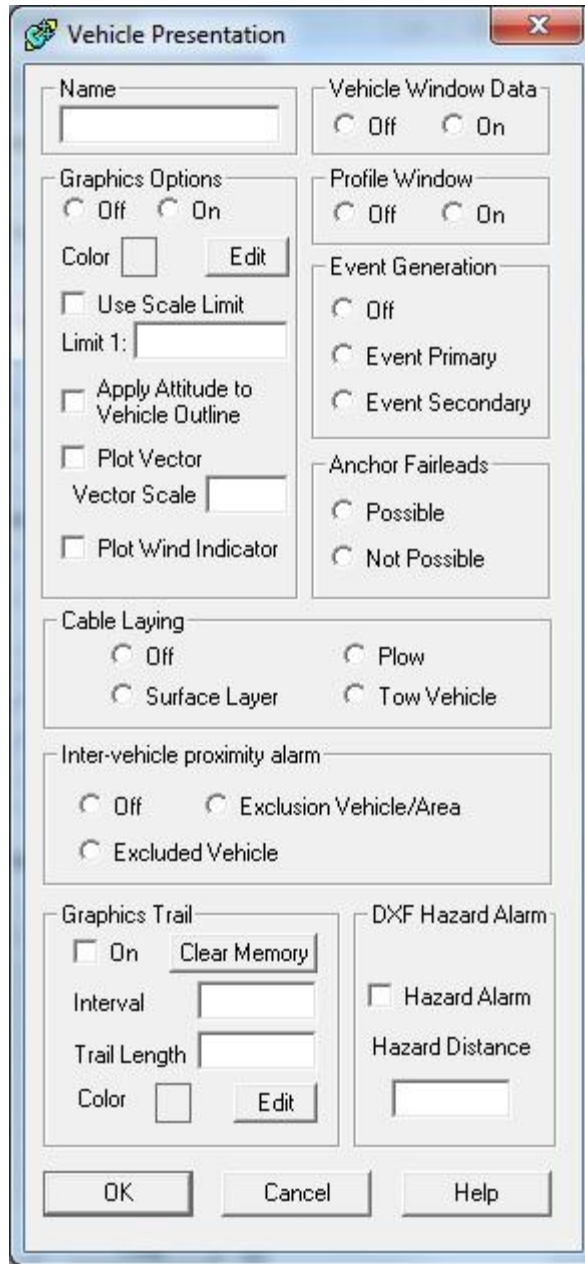
Vehicle Presentation

Select the **Vehicle Presentation** button to open the **Vehicle Presentation** window. This window allows for definition of the vehicle's name as well as the configuration of several other very significant options.

To Display the Vehicle Presentation Window

1   From the main menu items select **Configure >Vehicles.**

The **Configure Vehicles** window displays

2   Click the **Vehicle Presentation** button to open the **Vehicle Presentation** window, as shown below.

The following parameters are configurable using the **Vehicle Presentation** dialog box:

Name

Name field	The name of the vehicle is shown here. Each vehicle in WinFrog must have a unique name so that it can be identified quickly during real-time operations, as well as to remove any confusion during data processing. The vehicle name must be limited to 18 characters, which can include spaces, but cannot include semi colons, quotation marks, or forward or back "slashes." **Note:** If configuring a **Smart Remote** system,

the vehicle name must be identical in the WinFrog software on both the "master" WinFrog system and the smart remote system.

Note: If the name of a vehicle that is currently selected as the icon for a waypoint is changed, the graphical display of the respective waypoint will default to a square until reconfigured to select the new vehicle name.

Vehicle Window Data

Vehicle Window Data
radio buttons
These control whether the current vehicle appears in the **Vehicle Text** window. If the **Off** radio button is selected, the information for this vehicle is not displayed in the **Vehicle Text** window. If the **On** radio button is selected, the vehicle's data are shown.

Graphics Options

Graphics Options
radio buttons
These control the presentation of the vehicle in the **Graphics** and **Bird's Eye** windows. If the **On** radio button is selected, the vehicle's outline is drawn on the displays. If the **Off** radio button is selected, the vehicle's outline does not appear.

Color box
Displays the current color selection for the vehicle. Click the **Edit** button, choose a new color, and click **OK** to change the color of the vehicle.

Use Scale Limit box
This is a control for how small the vehicle displays in the **Graphics** and **Bird's Eye** windows when the window is zoomed out. If this checkbox is selected, WinFrog will not draw the vehicle any smaller than the size (scale limit) specified in the **Limit 1:** field. This prevents the vehicle from becoming too small and difficult to see when "zooming out" in either the **Graphics** or **Bird's Eye** windows.

Limit 1: field
The value entered here controls the scale of the vehicle on the **Graphics** window when the **Use Scale Limit** checkbox is selected. The scale can be set from 1:1000 to 1:10000.

Apply Attitude to Vehicle Outline box
If this checkbox is selected, WinFrog applies attitude data (if available) in the calculation of the outline points for display in the **Graphics** and **Bird's Eye** windows. Note that if the vehicle has been defined as having a vertical component, i.e. the **z top** and **z bottom** values

		have been used, only the outline of the *top* is drawn.
Plot Vector box		If this checkbox is selected, WinFrog displays a vector in the **Graphics** and **Bird's Eye** windows.
		This vector represents the vehicle's current speed and course made good. An arrow is drawn from the vehicle's origin, pointing in the direction of the vehicle's course made good. The length of the arrow is proportional to the vehicle's speed.
Vector Scale field		The value entered here controls the scale of the vector on the **Graphics** window. For example, entering a "2" will double the vector's size to represent the same velocity.
Plot Wind Indicator box		This setting controls whether a wind vector will appear in the **Graphics** window. This option requires that a wind measuring device is interfaced to WinFrog and added to a vehicle's position device list.

Profile Window

Profile Window
radio buttons — These control whether the current vehicle appears in the **Profile** window. If the **Off** radio button is selected, this vehicle is not displayed in the **Profile** window. If the **On** radio button is selected, the vehicle is displayed.

Event Generation

Event Generation
radio buttons — These buttons are used to control the event generation status of the vehicle. The generation of events can be controlled by only one vehicle at a time. This vehicle is designated as the **Event Primary** vehicle. This means that it is used to trigger all time and distance events. In the case of external events, an external hardware trigger is used.

If event-based data logging for other vehicles is also required, those vehicles must have the **Event Secondary** radio button selected in the **Vehicle Presentation** dialog box. If no event recording is required, select the **Off** radio button.

When right-clicking on the Vehicle Text window the Setup Events menu item will only appear if the primary event vehicle is selected in the window.

Note: WinFrog will not allow you to delete the **Event Primary** vehicle.

Anchor Fairleads

Anchor Fairleads
radio button

this button defines the anchor-handling capabilities of the vehicle. Select the **Possible** button if the vehicle has anchors to be deployed. This vehicle is then added to the list of barges in the **Anchor Handling** dialog box.

If the vehicle does not have anchors to be tracked or displayed by WinFrog, select the **Not Possible** radio button. In this case, the vehicle is then added to the list of vehicles capable of dropping and picking up anchors in the **Anchor Handling** dialog box.

Cable Laying

Cable Laying
radio buttons

The selection here defines how this vehicle will be utilized in real-time cable modeling calculations.

Inter-vehicle proximity alarm (Dynamic Vehicle Alarm)

These controls enable/disable the vehicle settings for the Dynamic Vehicle Alarm that is

turned on and off with the Dyn button on the toolbar. This feature causes an audible alarm to sound (and the vehicle outline changes from solid to dashed) if a vehicle enabled as an Excluded Vehicle enters a zone (vehicle) enabled as an Exclusion Vehicle/Area. The zone must be implemented as a vehicle whose entire shape forms the zone. The zone is filled with a cross-hatch pattern of the specified vehicle color. If desired to be a moving zone, the zone (vehicle) must have a position and heading data item to position it in real-time, therefore, this zone (vehicle) must be associated with another vehicle, given the appropriate offset, and will use that other vehicle's position and heading data items.

Note: The shape of the exclusion zone vehicle must be a closed simple polygon that is always concaved inwards. The interior angle at each node must be less than 180 degrees.

Note: If WinFrog is restarted, the Dyn button will need to be clicked again to restart the alarm-enabled mode.

Off	If this radio button is selected (the default), the vehicle is not enabled as either an Exclusion Vehicle/Area or as an Excluded Vehicle.
Exclusion Vehicle/Area	Select this radio button to enable a vehicle to be an exclusion zone.
Excluded Vehicle	Select this radio button to enable a vehicle to be an excluded vehicle. An excluded vehicle will trigger the alarm if it enters the exclusion zone.

Graphics Trail

On checkbox

If this box is checked, WinFrog displays a graphics trail in the **Graphics** and **Bird's-Eye** views. The trail is drawn based upon the number of points entered in the **Trail Length** field (50 is

|	
	the default)and shows the past locations of the vehicle.
	The density of the points displayed is defined by the time interval entered in the **Interval** field. For example, the default setting of 50 means that 50 points are drawn, with the oldest point being removed as a new point is added.
Color box	Click the **Edit** button, select a new color, and choose **OK** to change the color of the trail.
Clear Memory button	Allows you to clear the memory of the **Graphics Trail** points displayed in the **Graphics** and **Bird's-Eye** views.
Hazard Alarm checkbox	If this box is checked, it sets the hazard alarm to alert you that the vehicle is within 100 meters of a designated **Map** object.
	Note 1: The hazard alarm will work with BML and BMM files added as a background layer in the Graphics window. See **Chapter 8 – Operator Display Windows** for a description of how to use and create these BMM and BML files. The hazard alarm will work with BMM files that have one layer of type SHP or DWG or DXF. The hazard alarm will also work with BML files that have the following user drawn widgets: arc, circle, text, point, polyarc and polyline. A polygon and DGN map layer cannot be selected as a hazard.
	Note 2: In order to designate an item in a BMM or BML file as a hazard, select the 'arrow' icon in the 'drawing tools' toolbar and click within 5 meters of this item in the Graphics window while the Hazard Alarm button in the 'options' toolbar is selected.
	Note 3: The distance to the alarm feature is calculated from the vessel CRP rather than the closest point on the vessel shape.

Configure Vehicle Outline

WinFrog allows you to configure how vehicles are displayed in the **Graphics, Bird's Eye,** and **Profile** windows. Vehicle size measurements are made from a single reference position on the vehicle. This coordinate origin is referred to as the **C**ommon **R**eference **P**oint (**CRP**). The CRP can be at any point on the boat i.e., the GPS antenna, the vessel's center of gravity, the main mast, etc. Once the location of the CRP has been established, all measurements entered in WinFrog must be made from that location.

Note: If the shape of a vehicle that is currently selected as the icon for a waypoint is changed, the change is reflected immediately in the graphical display of the respective waypoint.
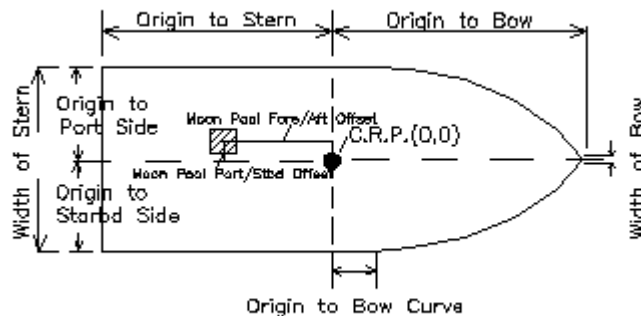
To Configure a Vehicle's Outline

1   Click the **Configure Vehicle Outline** button in the **Configure Vehicle** dialog box.
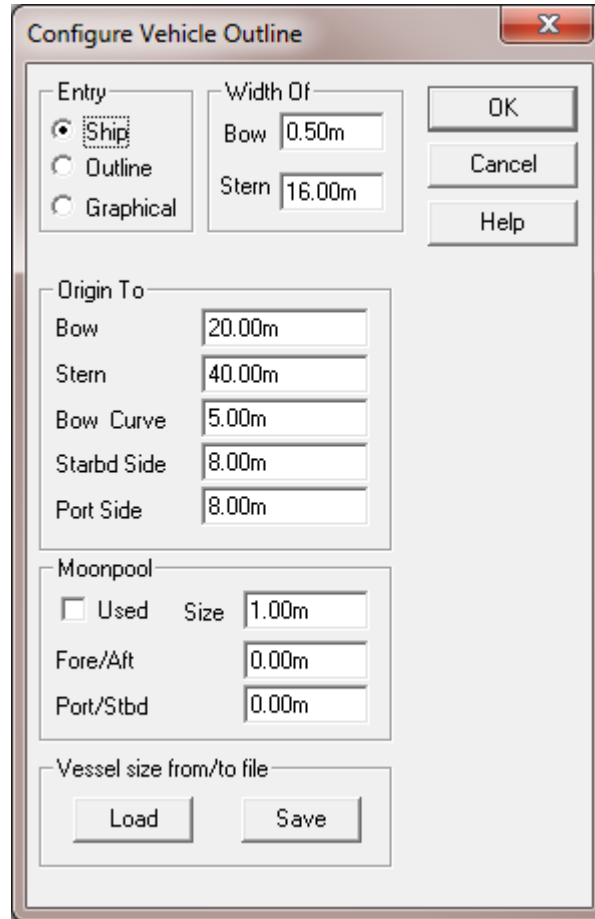
The **Vehicle Outline** dialog box allows you to define a generic ship shape by entering various vessel dimensions. You can also define a custom vehicle shape by entering "coordinates" relative to the vessel's CRP using the Outline or Graphical entry methods.

Ship Dimensions

A generic ship shape is created by defining the parameters seen in the diagram below:

To Define a Vehicle's Dimensions

1 With the **Configure Vehicle Outline** dialog box still open, select the **Ship** radio button in the **Entry** area.

2 Change the values in the **Width Of** and **Origin To** fields to match the measurements for your vehicle.

Note: the word *origin* in **Origin To** refers to the vehicle's **Common Reference Point**.

3 If the vehicle contains a **Moonpool** (an opening in the vessel to allow access to the water), you must define its size and location. The single value required for the **Moonpool's** size refers to the fact that the **Moonpool** will be drawn as a square. For the **Moonpool** location, **Forward** and **Starboard** offsets are positive values, while **Aft** and **Port** offsets are negative values.

To Define a Moonpool

1 Check the **Used** box in the **Moonpool** area of the **Vehicle Outline** dialog box.

2 Enter the size of the moonpool in the **Size** field.

WinFrog creates a square with sides of length equal to this value.

3 Enter the values in the **Fore/Aft** field and the **Port/Stbd** field to locate the center of the moonpool with respect to the origin (common reference point).

Custom Outline

WinFrog also allows you to define a vehicle's shape using relative X, Y, and Z coordinates. To display the vehicle, WinFrog joins the coordinates in the order that they are entered. The outline can begin at any point of the vehicle, but must be continuous in direction, returning to the first point entered.

The origin of this relative coordinate system is the origin of the vehicle (the common X, Y, Z reference point); the y-axis is parallel to the vehicle's heading (positive forward); the x-axis is perpendicular to the Y axis (positive starboard).

There are three methods for defining a vehicle's outline, the Outline entry method, importing an outline from a DXF file and the Graphical entry method. The Outline entry method provides a basic interface to enter the vehicle's shape. The Graphical entry method provides advanced vehicle shape entry features along with a visual representation of the vehicle as it is being defined.

To Define a Vehicle's Outline using the Outline Entry Method

1 Select the **Outline** radio button in the **Entry** area of the **Vehicle Outline** dialog box.
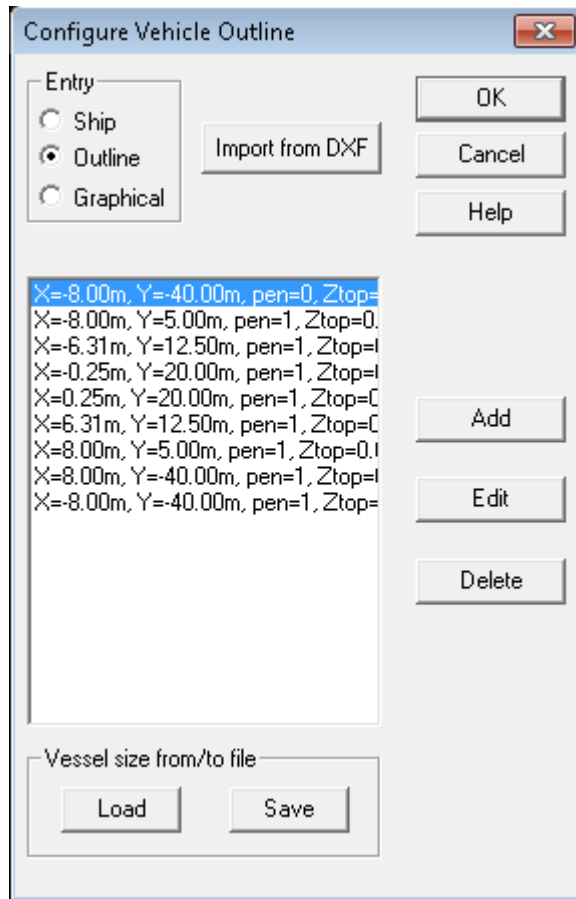
WinFrog displays the default "generic" ship shape converted to the relative coordinate data format.

The point coordinates are shown in the form **X = #.###**, **Y = #.###**, **pen = #**, **Z Top = #.##, Z Bottom = #.###**.

The **X, Y and Z** entries are distances from the **CRP** in the user-defined measurement units. (To change units, close this window then select the main menu item **Configure > Units >Distances**).

Note: for **Z** values you must enter a negative sign for points below the Z reference datum.

Pen number is either **0** or **1** where:

pen=0   the previous segment is configured "pen up."
**pen=1**   the previous segment is configured "pen down."

If the segment is configured "pen down," WinFrog draws the line. If the segment is configured "pen up," WinFrog does not display the line, allowing you to move from one coordinate to another without drawing a line segment.

Note: you must configure the first entry made in this window as **pen up**.

2   Click the **Add**, **Edit**, or **Delete** button to enter the coordinates required to properly depict the vehicle's shape. When defining a new vehicle shape, first **delete** all of the default entries and then **add** new points.

Add	Select this button to add a new point to the list. WinFrog inserts the new point immediately after the currently highlighted point. Use this if you forgot to add a point in the original entry of coordinates. When you click the **Add** button the **Outline Point** dialog box opens, as seen below.
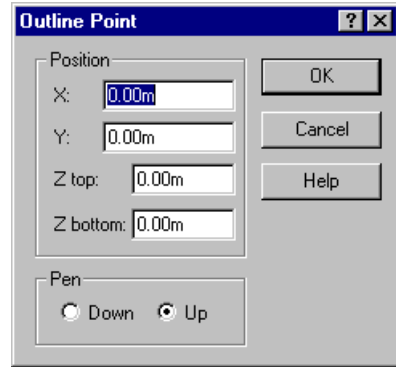
	Highlight the appropriate field and enter the value. Use the keyboard's "Tab" and "arrow" keys to move between entry options. Select **OK** to confirm the entries and return to the previous window.
Edit	allows you to change the parameters of a selected point. Clicking the **Edit** button opens the same **Outline Point** dialog box (seen above). Highlight the desired entry and change the values as required.
Delete	removes the highlighted point.

3 To save or recall a defined shape, click the **Save** or **Load** buttons.

Save	saves the entered coordinates to a **.veh** file.
Load	opens the **Select File** dialog box to allow you to find and open a previously created **.veh** file.

WinFrog also can read a vehicle outline from a DXF file.

To Import a Vehicle's Outline from a DXF File

1 With the **Outline** radio button selected in the **Entry** area of the **Vehicle Outline** dialog box, click the **Import from DXF** button.

The following are rules for importing a DXF file to be used as a vehicle outline:

- The DXF file must be version 12 or higher.

- A maximum of 800 points can be used to describe the vehicle shape.

- The vehicle shape stored in the DXF file can be in the form of drawing entities or drawing blocks. WinFrog first scans the DXF file for any block and if it finds any, the

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DXF Vehicle Outline dialog pops up. Here you can choose a block to be used for the vehicle outline or the drawing entities.

- Only a number of elements are accepted in either drawing entities or drawing blocks. Elements that can define a vehicle outline are LINE, ARC, CIRCLE, POLYLINE, and LWPOLYLINE. Arc and Spline as part of a POLYLINE are not accepted.

- The unit of measurements is read from the DXF file.

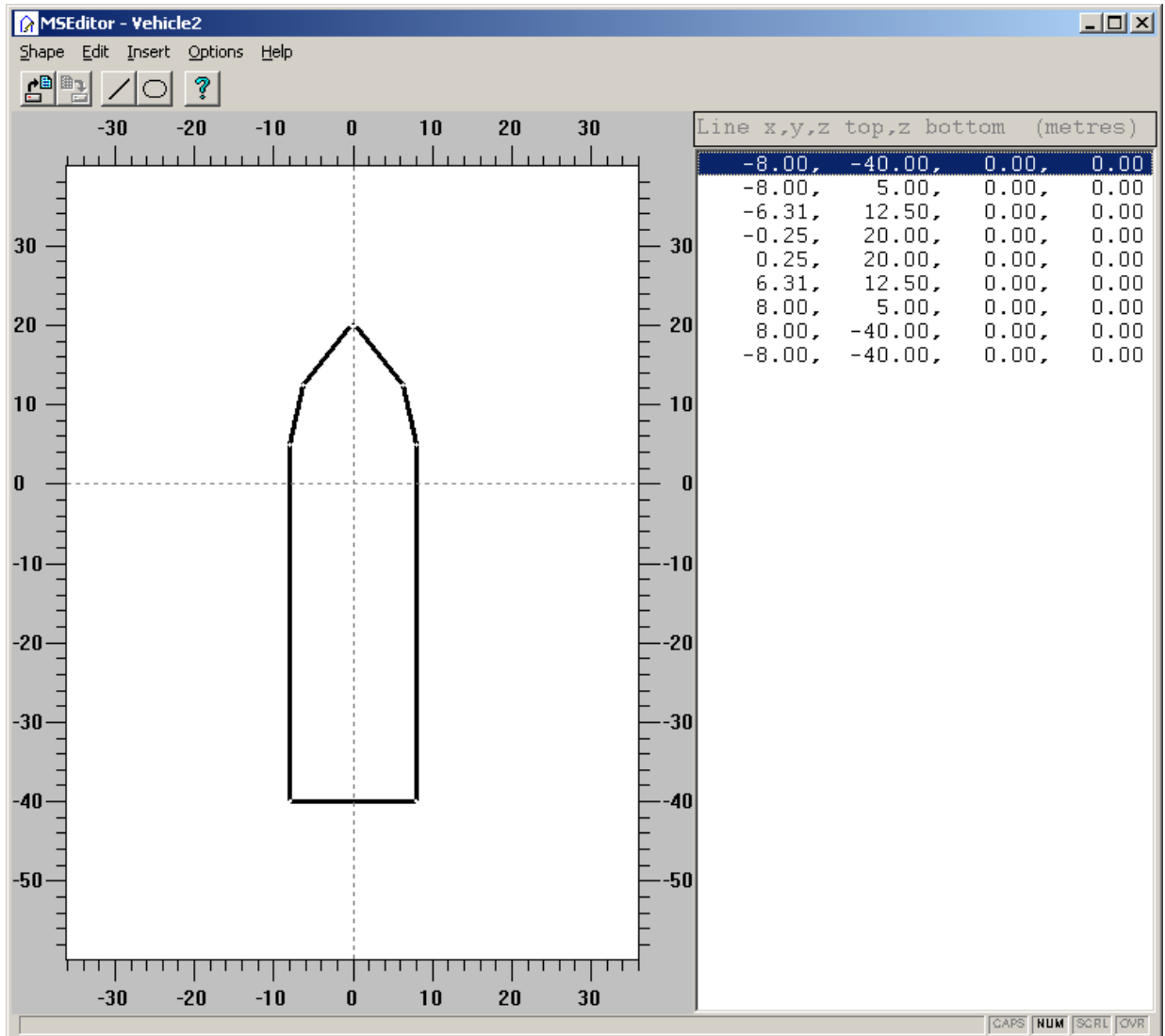- Block names starting with '*' or '_' are skipped.
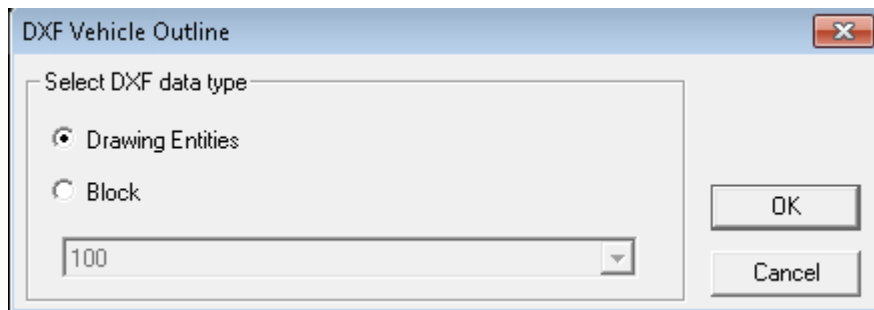
To Define a Vehicle's Outline using the Graphical Entry Method

1 Select the **Graphical** radio button in the **Entry** area of the **Vehicle Outline** dialog box.

WinFrog displays the default "generic" ship shape in the shape display.
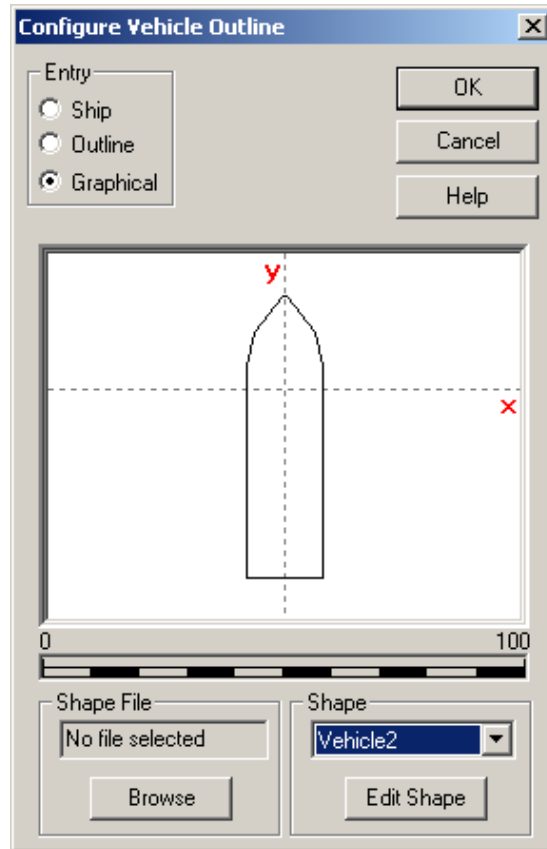
2 Click the **Edit Shape** button to modify the vehicle's shape. This will launch the MSEditor program.

Modify the vehicle's shape using the MSEditor program; refer to the following MSEditor section for help on using the MSEditor program. When the modifications are completed save the vehicle's shape and exit the MSEditor program. The modified shape will be displayed in the WinFrog Configure Vehicle Outline dialog. Click OK to set the vehicle's shape to the new shape.

3 To recall a defined shape, select the vehicle definition file by clicking the Browse button. When a vehicle definition file is selected, the shapes are loaded from the file and added to the shape dropdown list box. Select the desired shape from the shape list box. The shape can then be edited and implemented as described in step 2.

MSEditor

The following parameters are configurable from the **MS Editor** program:

Shape Menu

New Shape	Opens a new, untitled shape page. The application prompts you to name untitled shapes when they are closed.
Load Shape	Displays the **Shape Load** dialog box so you can select a shape to load into a new shape window.
Store Shape	Saves the shape in the active window to disk. If the shape is unnamed, the **Store Shape As** dialog box is displayed so you can name the shape.
Store Shape As	Allows you to save a shape under an new name. The command displays the **Store Shape As** dialog box. You can enter the new shape name. If you choose an existing shape name, you are asked if you want to overwrite the existing shape.
Delete Shape	Allows you to delete a shape from the shape file. The command displays the **Delete Shape** dialog box.
Import LBR File	Allows an existing shape from an LBR file to be imported. The command prompts you to select the LBR file to import the shape from. The **Shape Load** dialog box is then displayed so you can select the shape to import.
Exit	Exits MSEditor. If you've modified any shapes and not saved the changes, you'll be prompted to save before exiting.

Edit Menu

Move Shape Origin	Allows the origin to be shifted relative to the shape. This command displays the **Move Origin** dialog box.
	Warning: ensure that any other offsets already defined with respect to the origin are not compromised. When selected as a shape for a mobile in the main application the origin point will become the Datum Point.
Horizontal, Vertical	Displacement of the origin in the current Units.
Resize Shape	Allows the shape to be scaled by a percentage. This command displays the **Resize Shape** dialog box.
Horizontal	Enter percentage value to modify horizontal X values.

	Vertical	Enter percentage value to modify vertical Y values.
Previous Component		Selects the previous item (line or ellipse) in the shape and highlights it on the drawing area.
Next Component		Selects the next item (line or ellipse) in the shape and highlights it on the drawing area.
Move Component		Allows the selected item to be moved relative to the origin. This command displays the **Move** dialog box.
	Horizontal, Vertical	Displacement of the point in the current Units.
Delete Component		Allows the selected line or ellipse to be deleted in its entirety.
Ins Pt		Allows a point to be inserted at the highlight cursor for the currently selected line. The command displays the **Edit a Point** dialog box.
	X, Y	Co-ordinates of the point entered in the current Units.
Edit		Allows the point at the highlight cursor to be edited for the currently selected line or ellipse. The command displays the **Edit a Point** or **Edit an Ellipse** dialog box. This can also be achieved by double-clicking the point to be edited in the co-ordinates window.
	Edit a Point	
	X, Y	Co-ordinates of the point entered in the current Units.
	Edit an Ellipse	
	Centre X, Y	Co-ordinates of the centre point of the ellipse entered in the current Units.
	Horiz, Vert Radius	Horizontal and vertical radii for the ellipse entered in the current Units.
Del Pt		Deletes the point indicated by the highlight cursor.

Insert Menu

Line	Allows a new line within the shape to be defined. The command displays the **Edit a Point** dialog box. (Described above under the Edit menu, Edit command.)
Ellipse	Allows a new ellipse within the shape to be defined. The command displays the **Edit an Ellipse** dialog box. (Described above under the Edit menu, Edit command.)

Options Menu

Drawing Area	Defines the minimum and maximum X,Y values for the display area. This command displays the **Drawing Area** dialog box.

Left, Right,	
Bottom, Top	The area is scaled isotropically - the two axes will be scaled identically. The scale chosen by the application will accommodate the largest minimum to maximum separation.
	As shape lines and ellipses are added then the application checks whether or not it falls within the drawing area. If not the user is warned.
Units	Specifies the measurement units to be used for the co-ordinate entry. This command displays the **Units** dialog box.
	The application will always store the values entered in meters irrespective of how they are viewed.
	If the units are changed when a shape is currently being edited then the application prompts to know whether the existing measurements need to be converted. If the answer is yes then any entered values will be modified to the new units.
Meters	Co-ordinates to be entered in meters.
Feet	Co-ordinates to be entered in feet. All entered values will be multiplied by 0.3048 prior to storage.
Other	Co-ordinates to be entered in a user defined system, the Conversion to Meters value being used to multiply the entered values prior to storage.
Conversion to Meters	When Other is used as the units then the entered values are multiplied by this conversion prior to storage.

Help Menu

Contents, Keyboard	Displays on line Help for MSEditor including instructions on using the Windows keyboard function keys.

The Toolbar

The Toolbar is a row of buttons at the top of the main window that represent application commands. Clicking one of the buttons is a quick alternative to choosing a command from the menu. Buttons on the toolbar activate and deactivate according to the state of the application.

Button	Action
	Load Shape
	Store Shape
	Insert Line
	Insert Ellipse
	Help Contents

Note: When operating WinFrog in a Controller/Controlled Remote application, caution should be exercised if an ellipse is defined as part of a vessel, as it is saved as a list of points. When transferring complex vessel shapes via telemetry, significant bandwidth is required and can impact the overall performance of the telemetry link.

Configure Vehicle-Devices

One of the most important steps in configuring a vehicle in WinFrog is to correctly configure the vehicle's devices. This **Configure Vehicles-Devices** option defines which data sources are used to provide the vehicle's information (position, heading, depth, etc.). Typically, only real-time data sources are used for primary navigation purposes, whereas smart remote systems utilize a network data source.

WinFrog is capable of having more than one vehicle configured. Thus, you must define which devices are added to which vehicle. Once added to a vehicle, each device must be edited to suit that particular installation.

The **Configure Vehicles-Devices** window is also used to control the amount of filtering that can be applied to the raw data being used to calculate the vessel's position, speed, and course made good.

Note: WinFrog determines vehicle speed relative to the Working Map Projection and uses this speed for display and output. In most cases any variance between this and true geographic speed is so small as to be negligible. However, when using the Mercator map projection and operating a great distance from the **Latitude of True Scale**, the variance between Map Projection speed and true geographic speed can be of the magnitude of 20%. This must be considered when selecting and configuring the Working Map Projection for operations that are dependent on vehicle speed, such as cable lay operations.

To Configure a Vehicle's Devices

1   Click the **Configure Vehicles-Devices** button in the **Configure Vehicles** dialog box.
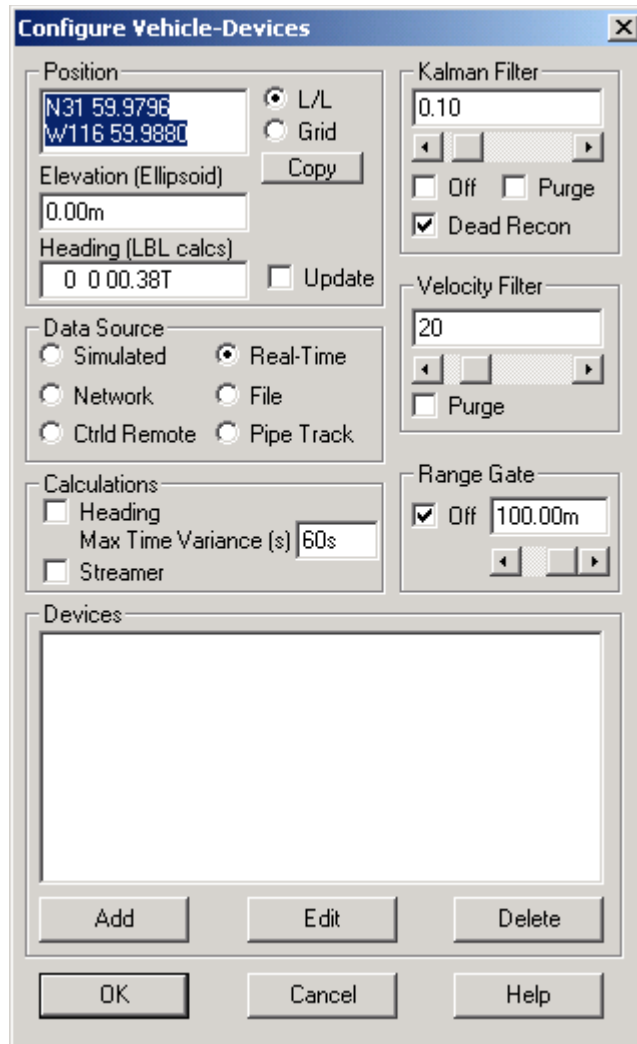
The following parameters can be configured from the **Configure Vehicle-Devices** dialog box:

Position

Entry field	This window is used primarily with a simulated positioning device and to initialize MultiRef and LBL calculations. To enter a new initial position for the vehicle, select the appropriate radio button and enter the respective coordinate – geographic (lat/lon) or grid (Northing/Easting). The vehicle will move to the position entered in the **Position** input field only if the **Update** box is checked.
Copy button	Copies the position of the cursor in the active **Graphics** or **Bird's Eye** window (via the clipboard memory) into the **Position** entry field.
Update box	If this is checked, when **OK** is selected to close the **Configure Vehicle-Devices** window, the

	vehicle position will move to the coordinates entered in the **Position** input field; if this box is not checked, the newly entered position is ignored.
Elev field	The elevation of the vehicle's origin above the current spheroid can be entered into the **Elev** input field. The elevation entered here will only be used if the **Update** box is checked.
Heading (LBL Calcs) field	Used for entry of initial heading for LBL inverted Transceiver Xponder vehicle calculations.

Kalman Filter

WinFrog applies "Kalman filtering" to help smooth raw data received from positioning devices. This includes the input of position data and LBL range data. The **Kalman Filter** analyzes a series of observations and calculates (predicts) the acceleration (in both latitude and longitude) for the next program update. If the next raw position observed by WinFrog causes a jump in position that exceeds the limit of acceleration allowed in the **Kalman Filter**, then the observation is not used. Instead, the maximum acceleration value entered in the **Kalman Filter** (in meters/second^2) is used to calculate the next position.

This predicted position is then used for waypoint and line tracking, as well as for speed and course made good calculations. This predicted position is also displayed in the **Vehicle Text** window and recorded in events generated by manual fixes or by automatic eventing.

You can change the amount of filtering that is applied by changing the settings found in the **Configure Vehicle-Devices** window. The following sections detail the different options found in this window.

Entry field	This box allows you to change the **Kalman Filter** setting for the vehicle. Highlight and overwrite the value shown in this window, to a maximum value of 1.00 m/s^2. You can also use the scroll bar to change the setting.
Scroll bar	The scroll bar controls the maximum allowable acceleration parameter (m/s^2) in the **Kalman Filtering** routines. This can range from 0.01 to 1.0 m/s^2. The larger the number, the more acceleration, or "noise", that is permitted to pass through the filter. Therefore, the larger the number, the more freedom allowed and the less filtering applied to the vehicle's positioning.
Off box	If this box is checked, the **Kalman Filter** is not used and the **Velocity Filter**, (a median filter), is used instead. (Information describing the use of the **Velocity Filter** is described below).
Purge box	If this box is checked, the **Kalman Filter** is reset when **OK** is selected. This may be necessary if a series of bad observations is received by WinFrog causing the filter calculations to be skewed incorrectly.

Dead Recon box	If this box is checked, the vehicle's position will continue to update (based on the last observed speed and course made good) even when no position information is being received. After 15 seconds of "dead reckoning", an asterisk is displayed next to the latitude, longitude, Northing, and Easting in the **Vehicle Text** window. These items will also change to yellow to represent the dead reckoning status.
	Additionally, if a **Calculations** window is open and configured to display the vehicle's **position** information, an alarm will sound after 30 seconds of no new positional data being received. This alarm is silenced by clicking the **ACK** button in the **Calculations** window. (**View > Calculations**)

Note: Rho/Theta and **layback** positional information is not **Kalman Filtered**. Instead it is passed through a median filter (see **Velocity Filter** immediately below for more information).

Velocity Filter

Entry field	In addition to the **Kalman Filter**, WinFrog also has the capability to pass positional velocity information through a median filter. This median filter, called the **Velocity Filter**, is used for **Rho/Theta** and **layback** navigation data. It is also used for all navigation data if the **Kalman Filter** is switched **Off**.

The following controls are used to configure the velocity filter:

Scroll bar	You define the "length" of the filter with the scroll bar. This "length" is the number of epochs of data to be used in the median filter. The larger the value, the more stable the predictions will be and, hence, the more filtering that is applied to the velocity.
Purge box	If this box is checked, the median filter resets when you click **OK**.

Range Gate

Off box	When this box is unchecked (not turned off), WinFrog will test new position and range data against the current position. If the new position or range differs from the current value by more than the value entered here, WinFrog will not use the new data. (See the **Range/Range Devices** chapter for more information.)

Scroll box	This is used to set a range gate value from 5 to 100 meters. If range and position data do not pass this test they are excluded from the calculations process.

Data Source

radio buttons	These are used to select the source of position information. For more information on the various data sources, see the **Vehicle Data Source** chapter.

Calculations

Heading checkbox	Selecting the **Heading** checkbox instructs WinFrog to use the results of positioning data types associated with the vehicle to calculate a True heading for the vehicle. This is supported by USBL, LBL, POSITION and PSEUDORANGE data types. The calculated heading is then used as the primary heading source for this vehicle. It can be compared to other heading sources in the Calculation window.
Max Time Variance (s)	This control is enabled when the Heading option is activated. This is the maximum age, in seconds, of data that WinFrog will use to calculate a heading based on data type position information.
Streamer box	Reserved for future development. Leave this option "unselected."

Devices

Window list	This lists all devices that are associated with this vehicle.

The following buttons are associated with the **Devices** input box:

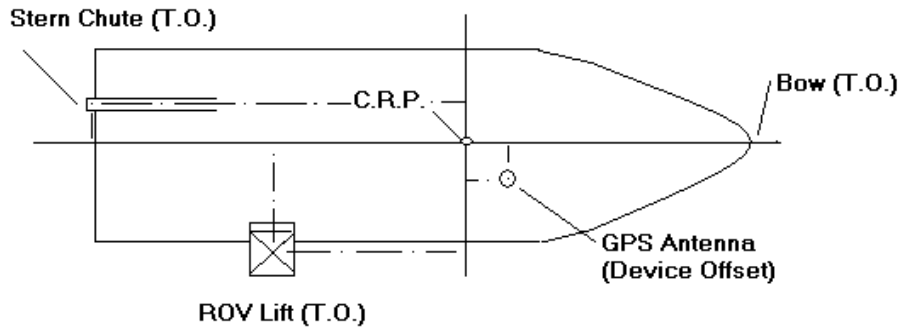| **Add**	allows you to add peripheral devices to the vehicle's calculations. When **Add** is selected, the **Select Data Items** window appears listing all devices that have been added to WinFrog. Highlight the devices that you wish to associate with this vehicle, then select **OK**.
Edit	allows you to set the configuration parameters specific to a device highlighted in the **Devices** box. It is critical that every device that is added to a vehicle is properly configured for that vehicle. (For more information on configuration parameters for a specific device, refer to **Appendix C: I/O Devices**.)
Delete	removes the selected device from a vehicle's calculations.

Note: for more information on configuring a vehicle's devices, refer to the section describing real-time navigation in the **Vehicle Data Source** chapter.

Configure Tracking Offsets

WinFrog allows you to define and store up to fifteen **Tracking Offset** points per vehicle. With this information pre-configured and readily available, you can quickly change the point on the vessel to which WinFrog refers for its position display as well as its survey line and waypoint tracking calculations. Only one point on the vehicle can be selected for these calculations at any time.

The **Tracking Offset** points are defined by name and are entered as coordinates relative to the vessel's origin. You can configure WinFrog to display the **Tracking Offset** names in the **Graphics** and **Vehicle Text** window. In addition, you can view the real-time coordinates of all **Tracking Offset**s, as well as a trail from all **Tracking Offset** points.

Note: these **Tracking Offsets** are used to define the position of a specific point on the vehicle relative to the vehicle origin. These should not be confused with antenna offsets that are used to offset the position obtained at the navigation sensor to the vehicle origin. The drawing below shows the difference between a **Tracking Offset (T.O.)** and a **Device Offset**.

To Configure Tracking Offsets

1   With the **Configure Vehicles** dialog box still open, click the **Configure Offsets** button.

2   Enter a descriptive name for the **Offset** in the **Name** field.

3   If you wish to see the **Offset** name in the **Graphics** window, check the **Plot** box next to the offset being defined. (This also enables the display of this tracking offset in the **Offse**t display window).

4   Use the **Fore/Aft**, **Port/Stbd,** and **Elev** fields to describe the position of the **Offset** in relation to the vehicle's origin (distance from the **CRP**).

5   If you wish to see a series of dots follow the **Offset** point on the **Graphics** screen, check the **Trail** radio button top the right of the specific item.

6   To enable a **Tracking Offset**, select the **On** radio button beside the desired name. Ensure that the **Use Heading** or **Use CMG** (**Course Made Good**) radio button at the bottom of the screen is selected as desired. Typically, **Offset** points that refer to a physical location on the vessel must use the **Use Heading** option. If you wish to track the **CRP**, select the **Off** button at the bottom of the window.

Configure Fairleads/Anchors

WinFrog can calculate and display **Anchor** and **Fairlead** information in real-time. **Fairleads** refer to the location of anchors when they are onboard the "barge" vehicle. (In WinFrog, any vehicle that is configured as **Fairlead Possible** is referred to as a **Barge** in the **Anchor Handling** window).

Each vehicle can have different fairleads defined up to a limit of 16. Each fairlead have up to three **midbuoys** defined. **Midbuoys** are defined by the distance from their related anchor when the anchor is not on the barge.

Fairlead/anchor information can be displayed both numerically and graphically. The real-time display of numeric anchor handling data (including anchor placement target information) is found in the **Anchor Handling** display. The **anchors**, **fairleads**, and **targets** can also be seen in the **Graphics** display. (See the section on **WinFrog Displays** for more information.)

Note: the vehicle must be configured as **Fairlead Possible** before anchor handling operations are possible. This option is found under the **Configure > Vehicles > Vehicle Presentation** dialog window.

To Configure Fairleads and Anchors

1 Click the **Setup Fairleads/Anchors** button in the **Configure Vehicles** dialog box.

The following parameters are configurable from the **Fairleads** dialog box:

On checkbox	used to turn the display of a fairlead on and off
Name field	the name of the fairlead
Fore/Aft field	forward or aft offset of the fairlead's onboard position with respect to the vehicle's origin (CRP)
	Remember: forward values are positive and aft values are negative.
Port/Starboard field	the port or starboard offset value of the fairlead's onboard position with respect to the vehicle's CRP
	Remember: starboard values are positive and port values are negative.
Northing field	grid Northing of the anchor - if the anchor is on the bottom

Easting field	grid Easting of the anchor - if the anchor is on the bottom
Status field	indicates whether the anchor is currently **On Board** a vessel or **On** (the) **Bottom**.
Static Color field	the color of the anchor in the **Graphics** window when it is **not** being handled
Active Color field	the color of the anchor in the **Graphics** window when it is being handled.

Setup Vehicle Rings

You can configure WinFrog to display a series of circles (1, 3, 5 or 10 rings) centered on the point on the vehicle that is currently being tracked. These circles are used to give you a better sense of the scale of the **Graphics** display**,** or can be used as a moving guide when you wish to keep the vehicle a certain distance away from a point or line. These circles are called **Rings** in WinFrog.

To Setup Vehicle Rings

1   Click the **Setup Vehicle Rings** button in the **Configure Vehicles** dialog box.

The following parameters are configurable using the **Setup Vehicle Rings** dialog box:

Separation

Separation field	defines the radius of the smallest circle - This is also the distance between successive circles.

Plot

Plot Rings checkbox	Check this option to have WinFrog display the rings in the **Graphics** and **Bird's Eye** windows.
Plot Labels checkbox	Check this option to have WinFrog display the numeric value of the radius of each circle in the **Graphics** and **Bird's Eye** windows.

Note: the **Plot Rings** checkbox must also be checked in order for labels to be displayed.

Number of Rings

radio buttons	WinFrog can be configured to display 1, 3, 5, or 10 rings around the vehicle.

Color

Color radio buttons	Select the color of the circles and labels to be red, green, blue, or gray.

Setup Waypoint Tracking

WinFrog can be configured to display the "**range**" and "**bearing**" from a vehicle to a **waypoint** in the vehicle text window. For every cycle of WinFrog, the range and bearing from the vehicle's **Tracking Point** (i.e. any enabled **Tracking Offset**) to the waypoint is automatically re-calculated and available for display in the **Vehicle Text** window. In addition, if the selected waypoint is configured to use a vehicle's shape as its icon, the heading rotation (-180° to +180°) required to align the tracking vehicle with the orientation specified for the vehicle shape icon is also updated and available for display in the **Vehicle Text** window.

You can choose to track any entry in the **Working Waypoints** file, **Working Logs** file, a temporary (unstored) point, or a point related to a certain distance downline and offtrack from a tracked **Survey Line**. (For details on creating **waypoints** in WinFrog, see the waypoints section of the **Working Files** chapter.)

The selected point is drawn in Graphics windows in the color of the tracking vehicle. The exception is a waypoint configured to use a vehicle's shape as the icon. In this case, to prevent confusion the waypoint is drawn using the color selected for that waypoint and not that of the tracking vehicle.

Note: If the waypoint selected for tracking is configured to use a vehicle shape as the icon and that vehicle cannot be found in the current WinFrog vehicles, e.g. it has been deleted or renamed, when the Graphics windows refresh the icon for this waypoint defaults to a square.

See the Controlled Remote Tug Telemetry chapter for details regarding the use of a vehicle shape as a waypoint icon for controlled remote operations.

In addition, WinFrog can be configured to trigger an audible alarm if the vehicle either enters or leaves a user-defined circle centered on the current waypoint. Up to two circles can be defined and may be drawn in the graphics window if desired. The tone generated is operator-selectable for each circle. A sound card is required if system tones or WAV files are to be played.

To Setup Waypoint Tracking

1 Click the **Setup Waypoint Tracking** button in the **Configure Vehicles** dialog box.
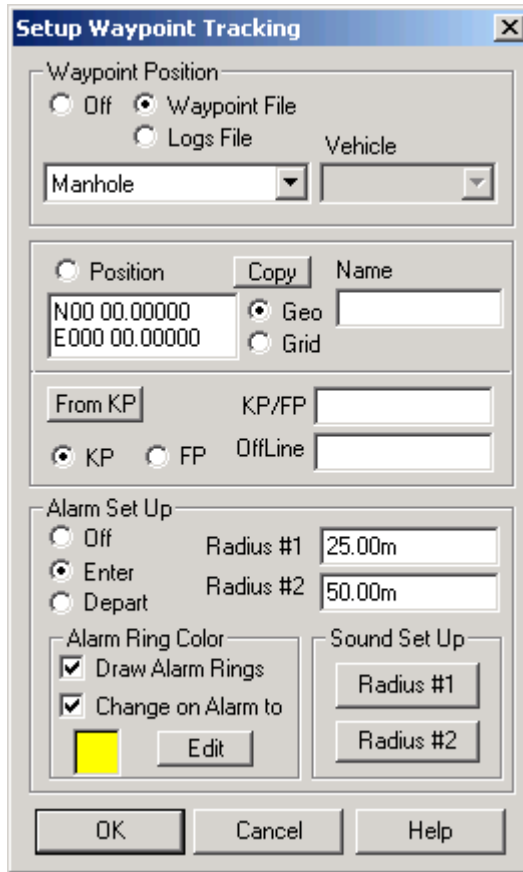
The **Setup Waypoint Tracking** dialog box allows you to select a fixed point for the vehicle to track.

2 Select one of the following types of points to track using the appropriate radio button:

Waypoint Position

Waypoint File	If this radio button is selected, the left dropdown menu is used to select a specific waypoint for tracking from the Working Waypoints file.
Logs File	If this radio button is selected, the left dropdown menu is used to select a specific manual event (.log) to be tracked from the current **Working Logs** file. The right dropdown menu is used to select which specific vehicle's position (as recorded in the .**Log** event) to use.
Vehicle	See Logs File above.

Position

Position	If the **Position** radio button is selected, the waypoint that WinFrog tracks will be from one of three different positions:

               • The entered **coordinates**

               • A **KP/Offline** position

	• A **FP/Offline** position
	Note: these coordinates are "temporary" and will not be stored in a WinFrog file.
Copy	If you click this, the coordinates of the cursor from the active **Graphics** window (via the clipboard memory) are inserted into the **Position** field.
Name	Name for the temporary waypoint.
KP radio button	Also known as **Kilometer Post** - Enter the **down line distance in kilometres into KP/FP** field. Enter the offline distance into the **Offline** field. By clicking the **From KP** button, WinFrog will convert the distance and offset into map or geographic coordinates and place them into the Position input edit box.
	Note: You must have already assigned a line to track to this vehicle.
FP radio button	Also known as **Foot Post** - Enter the **down line distance** as chainage (e.g. 32+45.56) into the **KP/FP** field. Enter the offline distance into the **Offline** field. By clicking the **From KP** button, WinFrog will convert the distance and offset into map or geographic coordinates and place them into the Position input edit box.
	Note: You must have already assigned a line to track to this vehicle.

Alarm Set Up

| **Off/Enter/Depart** | To enable an alarm, select the **Enter** or **Depart** radio button; to disable select off. The alarm is triggered when the reference point crosses the circle. |
| **Radius #1 and #2** | You may setup alarms to occur at two different radii from the waypoint. If only one is required, enter 0 for the other. |

Alarm Ring Color

| **Draw Alarm Rings** | Check this box if you want the alarm rings, whose radii were entered in the edit boxes Radius #1 and/or Radius #2, drawn in the graphics window. |
| **Change on Alarm to** | Check this box if you want the alarm rings drawn in a different color when an alarm occurs. |

Sound Set Up

| **Radius #1/#2** | Click these buttons to open the **Waypoint Alarm Sound Configuration** dialog where you can select the tone generated when each alarm occurs for the specified radius. |
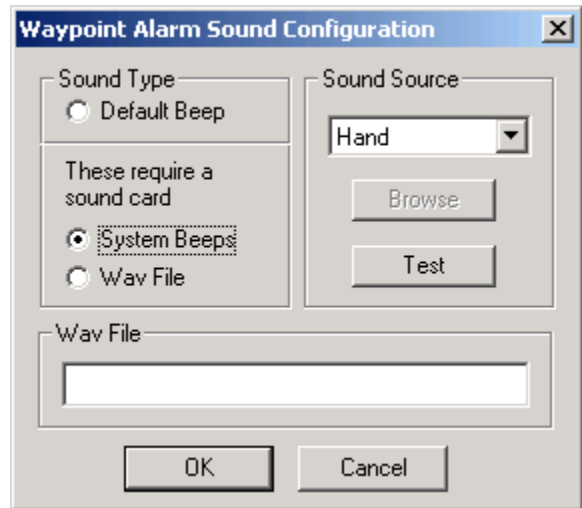
Sound Type

Default Beep   This selection causes the computer's speaker to be used to generate the tone. If a sound card is not available this may be the only option.

System Beeps   Select this option to use the system assigned sounds. When this option is selected a list of these sounds will be available in the Sound Source dropdown list box. This option requires a sound card.

Wav File   Select this option to select your own WAV file. When selected, the Browse button becomes enabled allowing you to select the WAV file. This option requires a sound card.

Test   Once your sound has been selected, click this button to test your choice. Should it fail to make a sound, check the following:

- If using the Default Beep ensure the speaker is connected. Test independently.
- If using System Beeps or WAV file ensure a sound card is available. Test independently.
- If using the System Beeps ensure a sound (WAV file) is assigned to the selected sound source. See Windows <control panel><Sounds and Multimedia><Sound Events>.

Note on smart remotes and controlled remotes

The waypoint alarm information is transmitted to smart remotes and controlled remotes. However, neither the WAV file itself nor the path to the WAV file is transmitted. Thus if the WAV file option is selected at the master, only the option will be assigned, not the file.

In order for a particular WAV file to be played at a remote, it must be selected at the remote. (The file and path is retained even if the sound type, e.g. Default Beep, is changed locally or remotely.)

Setup Line Tracking

WinFrog allows you to configure a vehicle to track a **Survey Line** from the **Working Survey Line** file. When a vehicle is tracking a **Survey Line**, WinFrog calculates how far the vehicle is perpendicularly **off-line**, how far **downline** the vehicle is from the **Start of Line**, and how far the vehicle has to go to the **End of Line**. This information can be displayed in the **Vehicle Text, Helmsman**, and **Attitude** display windows.

Information on Line Tracking Calculation Options can be found in the Units (Calculations Tab) section in Chapter 3, Configuring Geodetics and Units.

To Configure a Vehicle to Track a Survey Line

1   Click the **Setup Line Tracking** button in the **Configure Vehicles** dialog box.
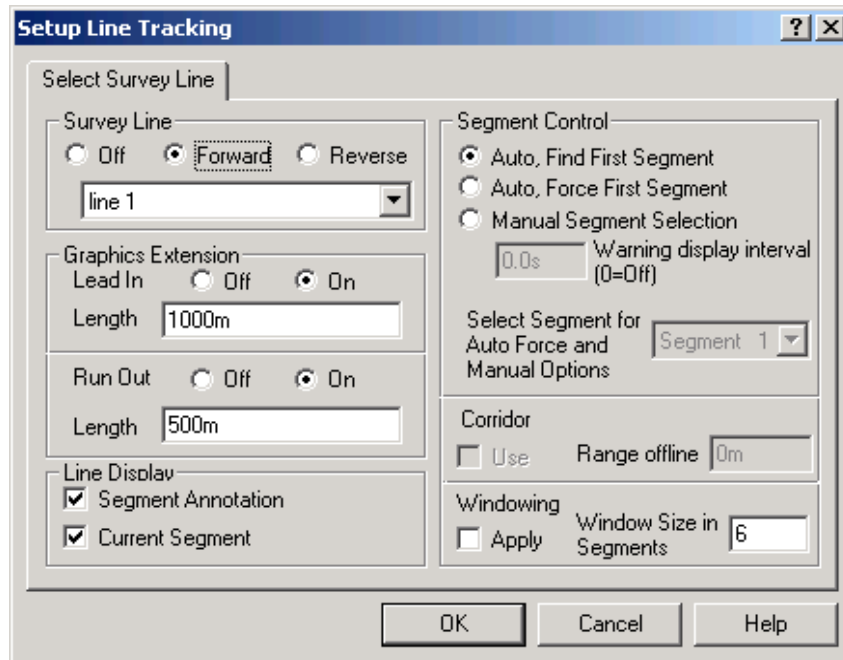
2   Using the dropdown menu, select the desired **Survey Line** from the **Working Survey Line File**.

(For details concerning adding **Survey Lines** to the **Working Survey Line** file, see the **Working Files** chapter.

3   Under the **Survey Line** area, select the radio button describing the direction of the survey line to be tracked.

In **Forward** mode, the **Start of Line** is the first coordinate entered when the survey line was created. In **Reverse** mode, the **Start of Line** is the last coordinate entered when the survey line was created.

4 Graphics extensions may be added to either end of the selected survey line. To enable, select either or both "On" radio buttons and enter the desired length in the edit box. The graphics extension appears as a dashed line in the color of the vehicle.

Segment Control

Note: only the operator has access to the relevant options depending upon the selections made directly from within the **Setup Line Tracking** dialog and the configuration of the line selected, as setup directly in the **Survey Line** dialog.

Auto, Find First Segment	When this mode is selected, WinFrog automatically determines which line segment is closest to the tracking vehicle and sets this as the current segment to track. The validity of the current tracked segment is constantly, automatically checked and updated appropriately as the vehicle moves with respect to the line.
Auto, Force First Segment	In this mode, the operator can force WinFrog to go to a specific line segment to start the line tracking. After selecting this mode, the operator must select the desired segment from the dropdown list included within this panel.
Manual Segment Selection	Selecting this mode puts WinFrog into a **Manual Line Tracking** mode. If the interval is set to 0 (off), WinFrog will track only the selected segment regardless of where the vehicle is in relation to the line.
	When manual segment control has been enabled and the warning display interval has been set to other than 0 (cannot be less than 15 seconds), WinFrog will determine when the segment should be changed and the Segment Selection dialog will open, allowing you to change the segment. If you do not select the correct segment, the dialog will reappear at the specified interval until you do or until you change the mode. Changing the mode can only be done from the Setup Line Tracking dialog and only if you are not eventing. When you first select a line for tracking and the segment selected is not the best one, the Segment Selection dialog will open.

5 If you wish to track a certain line segment, choose **Manual Segment Selection** and select the appropriate **Line Segment** from the dropdown window. Otherwise, select the **Auto Find First Segment** radio button in the **Segment Control** area.

6 The **Corridor** field is used to help WinFrog define which segment of a survey line to track. Check **Use** to enable this option, then enter a value for the **Range Offline.** This value instructs WinFrog to use only the line segment that falls within the specific offset distance

from the vehicle. This is useful if you are tracking a survey line that doubles back on itself. When this function is enabled WinFrog displays the corridor in the **Graphics** display.

7   The **Windowing** feature is used to define the number of line segments that WinFrog will use to generate KP values. Check the **Apply** checkbox and enter a value in the **Window Size in Segments** field. This feature was developed to handle large survey lines with numerous segments. This option is typically left unselected.

8   The **Line Display** options affect the way that the tracked **Survey Line** displays in the **Graphics** window. Select **Segment Annotation** to enable the display of the all line segment numbers at the start of the appropriate segment. Select **Current Segment** to have WinFrog highlight (thicken) the particular segment of the line that is currently being tracked.

9   Click **OK** to close the **Survey Line** dialog box and have the vehicle begin tracking the selected **Survey Line**.

See the **Operator Display Windows** chapter for more information on configuring and viewing the **Vehicle Text, Attitude,** and **Helmsman** displays.

Setup Dynamic Tracking

WinFrog can calculate and display tracking information from any point on one vehicle to any point on another vehicle. You must first define the **"Tracked Pairs"**, the points to be referenced on both vehicles . These points may be contained in the vehicle's **Offset** file or may just be temporary points. A maximum of 5 **Tracked Pairs** can be set up for each "From" vehicle. Repeat the setup for each vehicle from which you wish to display tracking calculations.

To Setup Dynamic Tracking Vehicles and Tracking Points

1   Open the **Configure Vehicles** dialog box (**Configure > Vehicles**). Highlight the desired vehicle **from** which tracking calculation will be made.

2   Click the **Setup Dynamic Tracking** button.
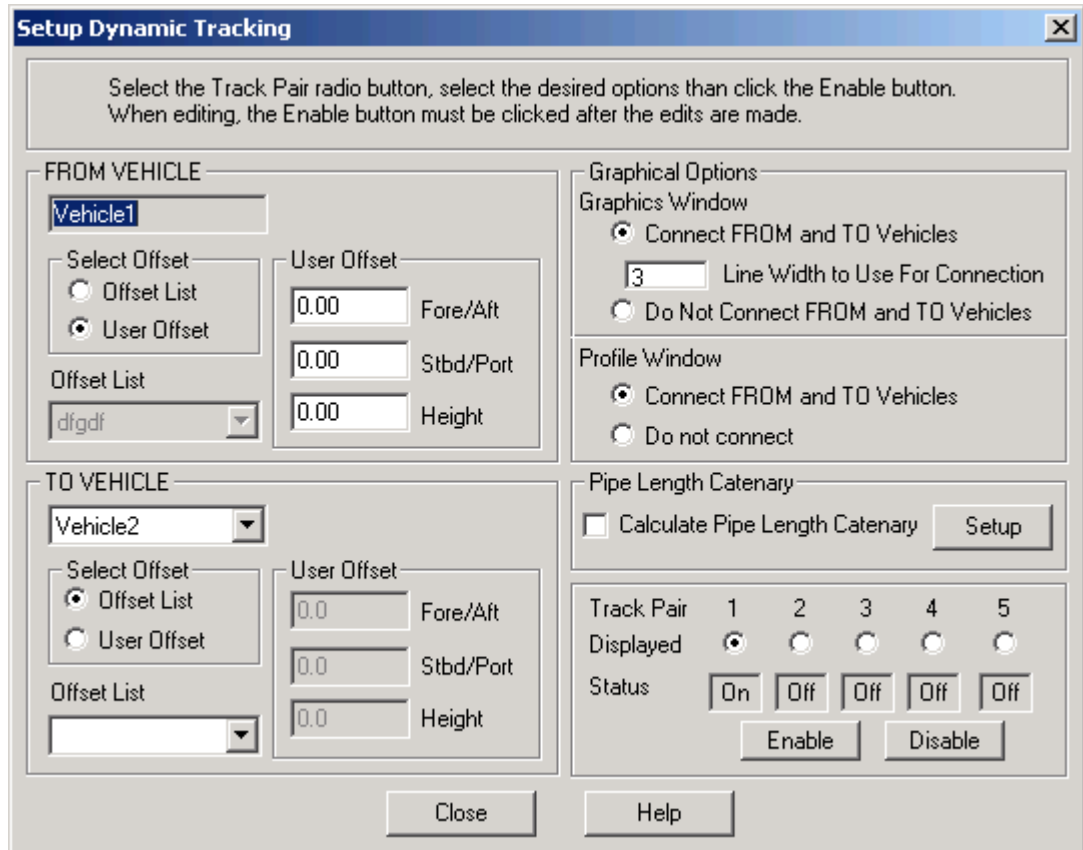
The **Dynamic Target Tracking Setup** dialog box is divided into five areas:

From Vehicle

The top area of the dialog box pertains to the vehicle **from** which the range and bearing are measured.

To Vehicle

The middle area of the dialog box pertains to the vehicle **to** which the range and bearing are measured.

Graphical Options

This area allows you to select whether or not to have WinFrog draw a line in the Graphics and/or Profile windows connecting each Track Pair that has been enabled and displayed. The line width in the Graphics window can be specified.

Track Pairs

The bottom area allows you to enable or disable up to five possible target pairs, **Track Pairs**, from a specified point on the vehicle indicated in the **FROM VEHICLE** field to a specified point on the vehicle indicated in the **TO VEHICLE** field.

Pipe Length Catenary

Enables the calculation of a pipe catenary using the distance between the selected points on the selected vehicles and the depth. The setup button allows you some options on depth determination.

The catenary length and angle are calculated using the equations below:

$$L = \frac{C * Sinh^{-1}(Tan(\alpha))}{Tan(\alpha)}$$

$$C = \frac{W * Tan(\alpha)}{Cosh(Sinh^{-1}(Tan(\alpha))) - 1}$$

Where:

L = Layback; Horizontal distance between the ship offset point and ROV offset point

C = catenary length; Length of pipe from the ship offset point to the touch down point.

W = Water depth

$\alpha = 90 - \theta$; θ (theta) is the angle between the vertical (down) and the tangent to the pipe at the departure point from the ship

3 Select one of the five **Track Pair Displayed** radio buttons. (To setup a new pair ensure that the status for this **Track Pair** is currently set to **Off**).

4 In the **FROM VEHICLE** group box select the point on the "From Vehicle" to measure from.

You can select a point on the **From** vehicle from the existing list of vehicle offset points (previously configured in the **Offsets** dialog box) by using the dropdown **Offset Vehicle List** (making sure the **Offset List** radio button is selected in the **Select Offset** area) or enter some other offset values in the three **User Offsets** fields (making sure the **User Offsets** radio button is selected in the **Select Offset** area). To select the vessel's common reference point (**0,0 or CRP**), select the **User Offsets** radio button and enter zeros in the three **User Offsets** fields.

5 In the **TO VEHICLE** area in the lower left of the **Setup Dynamic Tracking** dialog box, select the vehicle to measure to. Then select a point on this vehicle to measure to, similarly to above.

6 If it is desired to draw a line on the Graphics window between the two vehicles' reference points, click the **Connect FROM and TO Vehicles** radio button in the Graphic Options group box. You may also vary the line width.

7 To calculate the pipe angle and pipe catenary length for display in the Dynamic Tracking window, click the checkbox in the Pipe Length Catenary group box. (See above for details.) The setup button opens the following dialog:
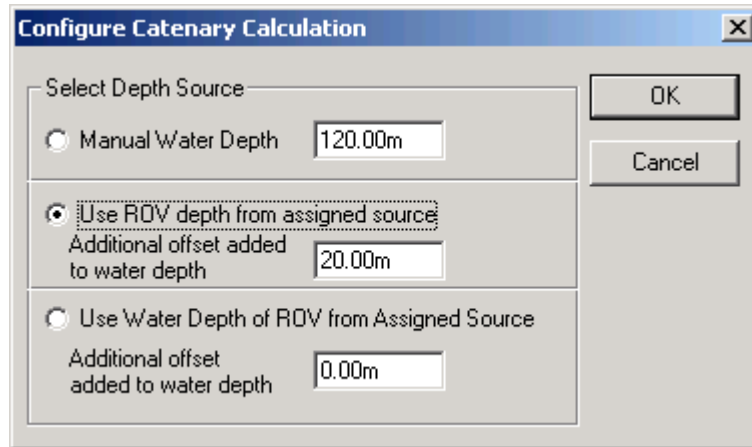
The touch down depth is required to make the catenary calculation. The first choice uses a manually entered value. The second choice uses the ROV's depth as the touch down depth for the catenary calculation. The edit box allows for an offset, such as altitude, to be applied to the ROV's depth for use as the touch down depth. The ROV's depth can be from any source such as a USBL depth or pressure sensor on the ROV; whatever is the current prime source of depth for the ROV will be used if this option is selected. For the third choice there must be a BOTTOMDEPTH data assigned to the vehicle. This data item determines water depth and for an ROV is most likely from an ROV device that provides ROV depth and altitude which, when combined with their offsets, will produce water depth. However, this water depth does not account for any offset between the water level and the departure point on the ship, thus an additional offset may be entered. This additional offset is added to the water depth.

8   Click the **Enable** button. Ensure that the **Status** changes to **On**. If any parameters are subsequently changed, you must click the Enable button before they take effect.

Enable turns on the display of the data in the **Dynamic Tracking** window. The target is only enabled or disabled by clicking the **Enable** or **Disable** button with the desired **Track Pair** selected.

9   To configure more **Track Pairs**, repeat steps **3** through **8**.

10   When finished configuring **Track Pairs**, click **Close**.

Note: When smart remotes are in use, each smart remote must be updated from the Smart Remote control window whenever these parameters are changed.

Display of Dynamic Tracking Information

Dynamic tracking information is displayed in its own window.

To View the Dynamic Tracking Information

1   Click the **Close** button in the **Configure Vehicles** dialog box.

2   Choose **View > Dynamic Tracking**.
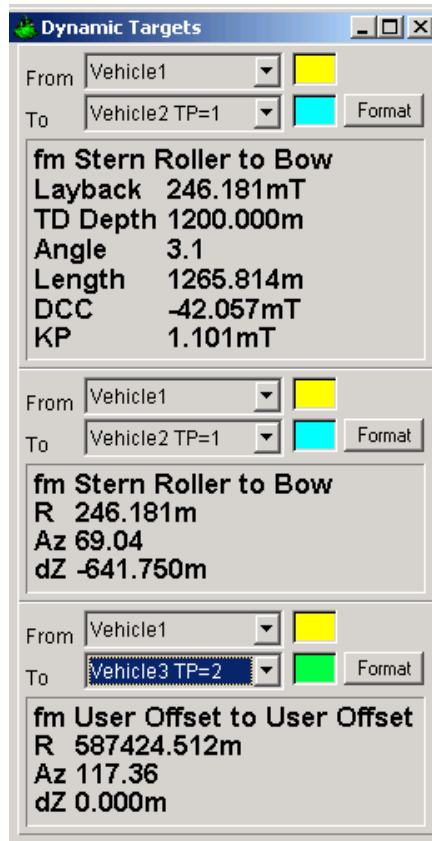
The **Dynamic Tracking** window is divided into three identical areas, each allowing for the display of one **Track Pair**.

From dropdown	displays the list of vehicles configured with tracking pairs from which the range and bearing are measured
To dropdown	displays the list of tracking pairs configured with the vehicle selected in the From dropdown menu as the source from which the range and bearing are measured
Data area	displays the target data being tracked between the two points.
Format button	changes the type of target data displayed to one of five choices:

- Range, Azimuth and delta Z
- Delta X, delta Y, and delta Z
- Delta north, delta east and delta Z
- Range, relative azimuth and delta Z
- Pipe catenary data

Note: Delta X and delta Y are relative to the vehicle from which the data are calculated based on the heading of the vehicle.

Note: The relative azimuth is calculated relative to the heading of the 'From' vehicle (i.e. heading of 'From' vehicle is a relative azimuth of zero, counting up clockwise).

Note: Pipe Catenary Data. The layback is equal to the range above, the TD Depth is the touch down depth, which may be either the water depth, ROV depth or manually entered value. The calculated angle is measured from the vertical (down) to the pipe. Length is the calculated length of pipe between the reference points of both vehicles. The DCC is the amount the "To vehicle" is off line (+ right). The KP is the distance down line. If the distance is grid there will be a G after it, otherwise there will be a T. Both the TD Depth and catenary length are always true distances. If the water depth from the ROV is used for the catenary calculations and the ROV altitude is 0 from the device, the TD Depth line will turn red with the added text ALT=0.

3   Select the vehicle, in the **From** drop down, from which the range and bearing are to be measured.

This action fills the **To** drop down menu with the track pairs enabled for this particular vehicle. Each track pair is numbered.

4   Select the track pair to be displayed from the **To** list.

5   Click the **Format** button until the desired type of data is displayed.

Acoustic Calibration

This option provides you the ability to calibrate both LBL and USBL acoustic positioning systems. (See the **LBL Acoustics**, **USBL Acoustics**, and **USBL&LBL Calibration** chapters for more information describing the calibration of LBL or USBL devices.)

Setup Data Events

This option allows you to enable automatic event generation and data recording based on user-defined time or distance intervals, as well as the collection of raw device data. (See the **Eventing** chapter for information about configuring **Data Events**.)

Deleting a Vehicle

Unless a vehicle has been designated as the **Primary Eventing** vehicle, you can delete it from WinFrog at any time. (See the **Vehicle Presentation** section (above) for details about designating a vehicle as a **Primary** or **Secondary Eventing** vehicle.)

To Delete a Vehicle

1   Choose **Configure > Vehicles**.

2   Highlight the vehicle you wish to delete from the **Vehicle List**.

3   Click the **Delete Vehicle** button.

4   Confirm that you want to delete this vehicle.

Note: If a vehicle that is currently selected as the icon for a waypoint is deleted, the graphical display of the respective waypoint will default to a square until reconfigured.